BEFORE THE NATIONAL GREEN TRIBUNAL SITTING AT PUNE

MEMORANDUM OF APPLICATION

(Under Section 18(*1*) read with Sections 14 and 20 of the National Green Tribunal Act, 2010)

Application No. _____ of 2023

BETWEEN :

Federation of Rainbow Warriors and Anr) ...Applicants

Versus

Union of India and Ors) ...Respondent

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Enrolment No.
MAH/2973/2017

NOTARY SUBHASH KRISHNA KANEKAR SALCETE TALUKA MARGAO-GOA Regd. No 344/14 Exp. Dt: 28/02/2024 GOVT. OF GOA (INDIA)

BEFORE THE NATIONAL GREEN TRIBUNAL SITTING AT PUNE

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(Under Section 18(*1*) read with Sections 14 and 20 of the National Green Tribunal Act, 2010)

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BETWEEN :

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SYNOPSIS

SR NO	PARTICULARS	EXHIBIT
1	The CRZ Notification of 2019 was published on 18.01.2019 and dilutes the protections guaranteed to eco-sensitive coastal stretches as well as coastal communities under the preceding CRZ Notification of 2011 in a manner that is inconsistent with the Environmental Protection Act as well as the principles of non-regression.	A-3

2	The Applicants herein first approached the Hon'ble High Court Bombay at Goa on 07.03.2019 by filing PIL WP No. 19/2019 to challenge the said impugned CRZ Notification of 2019	
3	The Hon'ble Bombay High Court directed the Applicants herein by order dated 03.01.2023 to file the present Application before this Hon'ble Tribunal within 4 weeks of the date of the order. Hence this Application	A-1

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LIST OF DATES

DATE	PARTICULAR
1991	The CRZ notification of 1991 was promulgated to protect vulnerable Coastal Stretches of India
1996	Coastal Zone Management Plans ("CZMP") under the 1991 Notification were approved
2011	CRZ Notification of 2011 was promulgated
18.04.2018	The Ministry of Environment, Forest and Climate Change issued a Draft CRZ Notification, 2018 seeking comments from the public. The Draft Notification watered down the CRZ Notification, 2011. The Draft Notification was widely criticized by the public. The Applicants also submitted their objections to the draft notification.
18.01.2019	The impugned CRZ Notification of 2019 was published, with more egregious dilutions of environmental protections that what was included in the draft notification

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07.03.2019	The Applicants herein moved the Hon'ble Bombay High Court at Goa by filing PIL No. 19/2019 to challenge the said impugned CRZ Notification of 2019
	Draft CZMP maps for Goa under CRZ Notification of 2011 were published for public objections
06.09.2022	CZMP Plans under the 2011 CRZ Notification for Goa were approved
03.01.2023	The Hon'ble Bombay High Court directed the Applicants herein to file the present Application before this Hon'ble Tribunal within 4 weeks of the date of the order. Hence this Application

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PUNE

MEMORANDUM OF APPLICATION

(Under Section 18(*1*) read with Sections 14 and 20 of the National Green Tribunal Act, 2010)

Application No. _____ of 2023

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1. **FEDERATION OF RAINBOW WARRIORS,**)

A society Registered under the Societies Registration Act, 1860,)

under Registration No. 190/Goa/2014,)

With its address at CSH-1, Block C-2,)

Leandra Heritage, Madel, Margao, Goa - 403601)

Through its Secretary, Mr. David Rodrigues)

Phone No.: 9527477367)

Email: rainbowwarriors2014@gmail.com)

2. OUR RIVER OUR RIGHTS)

With its address at Baboy Commerce Center,)

SO22 B Building, Behind Big G Mall,)

Pajifond, Margao, Goa - 403601)

Through its Convenor, Mr. Ohm Stanley Rodrigues)

Phone No.: 96457651796)

Email: ohmstanley@gmail.com)..

Applicants

VERSUS

1.UNION OF INDIA,)

Through the Joint Secretary,)

Ministry of Environment, Forests and Climate Change,)

2nd Floor, Agni Block, Indira Paryavaran Bhawan,)

Jorbagh Road, New Delhi – 110 003)

Contact Number: 91-11-20819220)

Email address: secy-moef@nic.in)

2. GOA COASTAL ZONE MANAGEMENT AUTHORITY)

Through its Member Secretary,)

Department of Science, Technology,)

and Environment, Opp. Saligao Seminary,)

Saligao, Bardez, Goa - 403511)

Ph: 0832-2407189)

Email: dir-ste.goa@nic.in)

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3. STATE OF GOA)

Through the Director)

The Department of Environment and Climate Change)

4th Floor, Dempo Towers, Panaji Goa 403 001.)

Ph: 0832-2407189)

Email address: dir-env.goa@nic.in)...**RESPONDENTS**



MEMORANDUM OF APPLICATION UNDER SECTION 14 READ WITH SECTION 18(1) AND 20 OF THE NATIONAL GREEN TRIBUNAL ACT, 2010

MOST RESPECTFULLY SHEWETH:

1. The addresses of the Applicants are given above for the service of notices of this application.

2. The address of the Respondents are as given above for service of notices of the application.

3. The Applicants above named begs to present the Memorandum of Application on the grounds set out hereunder:

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FACTS

4. Vide the present Application, the Applicants seek to challenge the impugned Notification dated 18.01.2019 issued by the Ministry of Environment, Forest and Climate Change, the Respondent herein, which introduced the Coastal Regulation Zone (hereinafter referred to as **"CRZ"**) Notification, 2019. The impugned Notification has been issued to supersede the CRZ Notification, 2011, and under the garb of conserving and protecting the coastal environment and marine areas, the impugned Notification has considerably diluted the CRZ Notification, 2011, to facilitate tourism and commercial activities in highly ecologically sensitive CRZ areas, and activities that were previously prohibited under the CRZ Notification, 2011. The impugned notification is therefore contrary to the principle of non-regression, which is a well-settled fiat within environmental jurisprudence across the world.

5. At the outset, the Applicants wish to bring on record the fact that this Application had originally been filed as Public Interest Litigation Petition 19/2019 before this Hon'ble Bombay High Court as Goa. Vide its order dated 03.01.2023 in the said Public Interest Litigation Petition as well as other connected Petitions, the Hon'ble Bombay High Court was pleased to

grant liberty to the Applicants to file the present Application in the National Green Tribunal, as this Hon'ble Tribunal would be the correct forum to hear the matter. In the said order dated 03.01.2023, the Hon'ble High Court was pleased to direct at paragraph 8 that *"we also observe that in case the Applicants approach the Hon'ble NGT within 4 weeks from today, the proceedings they institute will be considered, in accordance with law and on their own merits without raising the issue with respect to limitation."*. The Hon'ble High Court also recorded the statement of the standing counsel for the Central Government that the Central Government would not raise any issue on limitation before the Hon'ble NGT. A copy of the order of the Hon'ble Bombay High Court at Goa in PIL 19/2019 dated 03.01.2023 has been annexed hereto and marked as **Annexure A-1.**

6. The impugned Notification has been issued under Sections 3(1) and 3(2) of the EP Act, 1986. Section 3 of the EP Act, 1986 provides power to the Central Government to take measures to "protect and improve the environment". However, the impugned Notification contradicts the very objective of Section 3 of the EP Act, 1986 by diluting the CRZ Notification, 2011, instead of further protecting or improving it. The impugned Notification has therefore been issued in violation of the Principle of Non-regression. It is submitted that in the Goa State Action Plan on Climate Change for the Period between 2020-2030, has even noted the risks of

Climate Change and flood which the State of Goa is likely to face in the immediate future, and has cautioned against permissive development in CRZ Areas. It is further submitted that the Performance Audit Report on Conservation of Coastal Ecosystems, prepared by the Comptroller and Auditor General of India, for the period between 2015-2020, was a scathing review of the manner in which the CRZ Notification of 2011 was poorly implemented throughout the country, including within the state of Goa. It is submitted that even as the tangible consequences of the climate crisis is increasing each day, the Respondents have sought to introduce the impugned CRZ Notification of 2019, which does away with many of the protections of eco-sensitive coastal areas that have been in place for the past several decades.

7. That further, the impugned Notification is substantially different from the Draft Notification, which was put in public domain for inviting public comments, as mandated under Rule 5 sub-Rule 3 of the EP Rules, 1986. By doing so, the Respondent MoEFCC has vitiated the objective of issuing public notice, since the objections were raised to the issues in the Draft CRZ Notification, and not to the additions made in the impugned Notification.

8. **The Applicant No. 1 society** is a society registered under the Societies Registration Act, 1860 under Registration No. 190/Goa/2014 and

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is dedicated to the protection of the environment, sustainable economies and local communities of the State of Goa. Applicant No 1 has been carrying out awareness and empowerment programmes in villages regarding environment, law and land use. Applicant No 1 is involved in forest identification, protection of CRZ areas, and stopping of illegal activities, among other environmental issues. Applicant No 1 has filed petitions in Courts and Tribunals regarding illegal tree felling, Regional Plan of Goa, TCP amendments, Consents to Operate Coal handling and transportation, sand mining, grant of Environmental Clearance to a Greenfield Airport at Mopa and other issues. A copy of the Registration Certificate of the Applicant Society No 1 is annexed herewith as **Annexure A -2 (Colly)**

9. **The Applicant No. 2 society** is dedicated to the protection of the rivers of Goa and the villages situated along the banks of the rivers. Applicant No. 2 society was formed by the residents of such villages who were concerned with the environment and the economies that sustain the local communities, who got together in the face of displacement and destruction due to industrial, construction and infrastructure projects proposed for profits of corporations. Applicant No 2 has been carrying out awareness and empowerment programmes in villages regarding issues related to rivers, CRZ and environment. Applicant No 2 has campaigned

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widely for legislation and implementation for the improvement of riverine environment, including for sustainable CRZ laws.

10. The Respondent No. 1 is the Ministry of Environment, Forests and Climate Change and is the authority responsible for the protection and preservation of the environment and prevention and abatement of environmental degradation in the country. In the present case, the Respondent is the authority responsible for issuing and notifying the impugned Notification. The Respondent No. 2 is the Goa Coastal Zone Management Authority which is the authority constituted under the CRZ Notification 2011 and is vested with the task of enforcing and implementing the CRZ Notification. The Respondent No. 3 is the Environment Forest and Climate Change Department of the Government of Goa.

FACTS IN BRIEF, CONSTITUTING THE CAUSE:

11. In June 1972, India participated and ratified the Stockholm Convention where it was decided to take appropriate steps towards protection and improvement of the environment, in furtherance of which the Respondent notified the Environment (Protection) (**"EP"**) Act, 1986 on 23.05.1986. Section 3 of the EP Act, 1986 gives the Central Government power to take measures to "protect and improve the environment". Section 3(2)(v) specifically deals with *restriction of areas where industries or*

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operations shall not be carried out or shall be carried out subject to safeguards. Subsequently, vide Notification dated 19.11.1986, the Respondent issued the Environment (Protection) (**"EP"**) Rules, 1986. Rule 5 of the EP Rules, 1986 gives the Central Government power to "restrict or prohibit location of industries, processes and operations" in different areas. Clause (a) of sub-rule (3) of Rule 5 of the said Rules states that, "*Whenever it appears to the Central Government that it is expedient to impose prohibition or restrictions on the location of an industry or the carrying on of processes and operations in an area, it may, by notification in the Official Gazette and in such other manner as the Central Government may deem necessary from time to time, give notice of its intention to do so.*"

12. That it is submitted that the impugned Notification, G.S.R 37(E) dated 18.01.2019, has been issued under sub-section (1) and clause (v) sub-section (2) of Section 3 of the EP Act, 1986. It is further submitted that the impugned Notification has been issued pursuant to publishing a Draft CRZ Notification, 2018, which was published on 18.04.2018 and was kept open for public consultation for a period of sixty days. A copy of the impugned CRZ Notification, 2019 is annexed herewith as **Annexure A-3**

PREPARATION OF CRZ NOTIFICATIONS OF 1991, 2011 AND 2019

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13. The first time coastal stretches were recognized as areas that needed statutory protection was in 1991 through the CRZ Notification, 1991. The CRZ Notification, 1991 was notified by the Respondent herein on 19.02.1991. This was done with the objective of (a) recognizing the Coastal Regulation Zones and (b) restricting the setting up and expansion of industries and operations in these areas. Subsequently in 2004, the Respondent set up an Expert Committee to be headed by Prof. M.S. Swaminathan. The mandate of the Committee was to research and review the CRZ Notification, its implementation, its shortcomings, and mitigation mechanisms. The major recommendations of the Committee was that the boundaries should be based on coastal vulnerability instead of zones, the coastal management authority structure should be 3 tiered with the National Institute for Sustainable Coastal Zone Management and instead of coastal regulation zones (CRZ I-IV), there should be coastal management zones (CMZ I-IV). A copy of the Swaminathan Committee Report has been annexed hereto and marked as **Annexure A-4**. Based on the recommendations of the Committee, on 01.05.2008, the Respondent issued a draft Coastal Management Zone Notification, 2008, which was open for public comments. However, due to severe criticism from the public, the Draft Coastal Management Zone Notification was never notified, and steps were taken towards strengthening the Coastal Regulation Zones. Holding meetings with the locals and fisherfolk in all the states and union territories,

the Respondent issued the Draft Island Protection Zone Notification, and Draft CRZ Notification under the EP Act, in 2010 and on 06.01.2011, the Respondent issued CRZ Notification, 2011. A copy of the CRZ Notification, 2011 is annexed herewith as **Annexure A-5** .

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14. It is further submitted that the Swaminathan Committee Report made various recommendations while assessing the CRZ Notification of 1991 as well as the reports of 7 special committees also constituted for the purpose of reviewing the CRZ regime as it existed at the time. Apart from the Swaminathan Committee's biggest recommendation for the Coastal Management Zones to replace CRZ areas, there were other various recommendations made in the Committee Report with a view to preserve and conserve the marine environment and ecologically sensitive coastal areas. However, the impugned notification blatantly contradicts various aspects of the said Committee report, and appears to have been prepared with a specific and intentional view not to effectuate the safeguards to the marine/coastal environment identified by the Swaminathan Committee. Across the present Application, such contradictions between the Swaminathan Committee report and the provisions of the impugned notification of 2019 have been highlighted. In Particular, the Swaminathan Committee Report recommended that real economic value/costs should be assigned with the help of the Respondent No. 1 to the principle of intergenerational equity such

that natural resources would be preserved for future generations and a *"purely economic rationale to pursue many 'development'policies or projects must cease to exist."* Further, the Swaminathan Committee also recommended that the burden of proof should be on the developers (including government agencies) to show that their activities will not cause harm to the coastal environment or the coastal communities. The impugned CRZ Notification of 2019 however appears to have been prepared with a sole view to further commercial gain and economic growth without any regard for the preservation of natural resources or traditional coastal communities and has enabled the Respondent No. 1 to introduce various provisions that seek to undo the restrictions to harmful development under the CRZ Notification of 2011, without any explanation or justification for the same.

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15. Pursuant to issuing the CRZ Notification, 2011, the Respondent herein has diluted it multiple times, in violation of the powers granted to it under Section 3 of the EP Act, 1986. Between the years 2014-2018, 6 amendments were issued to the CRZ Notification, 2011 to relax the restrictions provided under it. Three out of the six amendments were issued under Rule 5(4) of the EP Rules, without any notice to the public of its intention to do so. The Respondent issued S.O. 4162 (E) on 23.12.2016 under Rule 5(4) of the EP Rules, 1986 whereby restriction on construction within the CRZ-II areas was relaxed and construction of a memorial was permitted. Subsequently, vide

Notification S.O 1002 (E) dated 06.03.2018 issued under Rule 5(4) of the EP Rules, 1986, the Respondent increased the validity of CRZ Clearances from 5 years to 7 years. Further, the Respondent also allowed regularization of activities which had commenced construction without obtaining prior Clearance as required under this Notification, thus regularising 'ex-post facto' clearances.

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16. On 18.04.2018, the Respondent issued the Draft CRZ Notification, inviting public participation, to replace the CRZ. On account of the many new provisions introduced through the draft notification that evidently reduced the protection of CRZ areas in comparison to the 2011 draft, the Draft CRZ Notification was strongly opposed by the public and faced severe criticism. An article titled "CRZ Notification published despite 68% objections from public" published in Hindustan Times on 29.01.2019 shows that of 1,965 responses received by the Respondent to the Draft CRZ Notification, 1,388 were objections and only 470 were in favour. A copy of the Draft CRZ Notification, 2018 dated 18.04.2018 is marked and annexed herewith as **Annexure A-6**. A copy of the Article titled "CRZ Notification published despite 68% objections from public" dated 29.01.2019 published in Hindustan Times is marked and annexed herewith as **Annexure A-7**. The Applicants had also submitted their objections to the draft notification, which have been referred to and annexed below in the present Application.

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17. That subsequently on 18.01.2019, the Respondent notified the impugned Notification, GSR 37(E), which included all the dilutions that were in the Draft CRZ Notification and further egregiously diluted the CRZ Notification, 2011, with provisions which were not included in the Draft CRZ Notification that was published for public consultations.

DEFICIENCIES IN THE IMPUGNED CRZ NOTIFICATION OF 2019:

18. The Applicants submit that issues raised in the present Application with regards to the deficiencies of the CRZ Notification of 2019 are as follows:

A. Severe dilution of the CRZ Notification, 2011;

B. The impugned Notification has been issued in violation of the EP Act, 1986, which is the parent act and is, therefore, bad in law;

C. The impugned Notification vitiates the purpose of the mandate of issuing notice under Rule 5(3)(a) because it is substantially different from the Draft Notification put out for public comments and objections;

D. The impugned Notification violates the Biological Diversity Act, 2002;

E. The impugned Notification requires updating the CZMPs thereby, making it a tool to regularise activities that were otherwise illegal under the CRZ Notification, 2011;

F. The report of Dr. Shailesh Nayak Committee, on the basis of which the impugned Notification has been issued, is highly inadequate and does not discuss the real concerns faced by the coastal communities and coastal ecology;

G. The impugned Notification violates the principle of Non-Regression;

A. SEVERE DILUTION OF THE CRZ NOTIFICATION, 2011:

19. India signed the United Nations Framework Convention on Climate Change (**"UNFCC"**) on 10.06.1992 and ratified it in 1993. In its submission to the UNFCC titled, "India's Intended Nationally Determined Contribution: Working towards Climate Justice", the Central Government has admitted to being one of the countries most vulnerable to the impact of accelerated sea level rise due to global warming and has stated that the Indian islands are highly susceptible to frequent and intense tropical cyclones, storm surge, tsunami, droughts and volcanoes. In order to effectively tackle the same, India claims to have demarcated the vulnerable coastal areas declaring them as CRZ and imposing restrictions on setting up and expansion of industries,

implementing programmes for coastal management through ecological management, protection of critical habitats, mapping of hazard lines for emergency response, protection of mangroves through the 'Mangroves for the Future' initiative, ensuring livelihood security to local communities, conserving and protecting coastal stretches, and promoting development in a sustainable manner by notifying the Island Protection Zone in 2011.A copy of "India's Intended Nationally Determined Contribution: Working towards Climate Justice" submitted the UNFCCC is marked and annexed herewith as **Annexure A-8**

20. However, in complete and utter disregard to the threat the coastal states and its inhabitants will be in with its implementation, the Respondent MoEFCC notified the impugned Notification. It is submitted that although the impugned notification was issued under the garb of conservation and protection of the unique environment of coastal stretches, providing livelihood to the coastal communities and fisher communities, and sustainable development, the impugned Notification has only diluted the provisions to allow industries, tourism and commercial activities within the ecologically and socio-economically sensitive CRZ areas, without looking into the livelihood security of the fisherfolk and local communities and the measures that would be required to protect the coastal ecology. It is submitted that the full extent of alterations in the CRZ Notification of 2011

vide the impugned CRZ Notification of 2019 can best be appreciated if compared in a tabular form. The Applicants have therefore summarised the averments below in a tabular form as well for the sake of comprehensiveness. The said table has been annexed hereto and marked as **Annexure A- 9**. The dilutions made by way of the impugned Notification are also explained herein below as follows:

a. **WEAKENS ROLE OF THE HAZARD LINE** –As per the CRZ Notification, 2011, "CRZ areas" extended from the High Tide Line ("HTL") up to the Hazard Line. However, as per the impugned Notification, the CRZ areas extend from the HTL up to 500 metres on the landward side along the seafront, thereby removing the areas within the Hazard line a tool for demarcating the boundary of a CRZ area. It is submitted that effectively, any protection granted to areas between 500 metres from the HTL to the Hazard Line as originally provided under the CRZ Notification, 2011 has been done away with. It is submitted that the CRZ Notification of 2011 initially mandated using the Hazard Line while setting out the Land Use Plan of CRZ areas, thereby aiming to anticipate and prepare for the dangers of climate change and sea level rise. Land use planning is the process of ordering and regulating the utilization of land that promotes the efficient and ethical use of land; meaning that, it is mandatory that the Hazard Line be used by the authorities while planning how the land is utilized in the coastal areas. Relying on the hazard line for land use planning considers the possibility of

a disaster occurring in the area and determines the activities that would be permissible within those areas and the most efficient way to utilize the area. A Hazard line is defined in Annexure IV of the Impugned notification as follows

"A 'Hazard line' has been demarcated by the Survey of India (SOI) taking into account the extent of the flooding on the land area due to water level fluctuations, sea level rise and shoreline changes(erosion or accretion) occurring over a period of time."

b. However, vide an amendment dated 02.07.2018, less than 6 months prior to the publication of the impugned CRZ Notification of 2019, the original provision of the CRZ Notification of 2011 using a Hazard line to demarcate a CRZ area boundary was done away with, and under the amendment, Hazard Lines were to be utilised only for the purpose of planning and preparation for disaster management and not demarcating CRZ areas. It is submitted that the impugned Notification of 2019 has adopted the same provision in relation to Hazard lines as the amendment of 02.07.2018 of the CRZ Notification of 2011. As a result, the environmentally fragile, flood-prone hazardous areas between the High Tide Line and Hazard Line is now open to indiscriminate construction. As per the impugned Notification, the Hazard Line should only be used as a tool for Disaster Management Planning. Disaster management means a process of planning and

implementing measures which are necessary or expedient, primarily, for prevention of danger or threat of any disaster and mitigation or reduction of risk of any disaster or its severity or consequences; this implies that the Hazard Line will be a tool to form a plan to mitigate the effect in the event of a disaster only, and will not have any purpose in the demarcation of CRZ areas. A copy of the amendment to the CRZ Notification of 2011 dated 02.07.2018 has been annexed hereto and marked as **Annexure A-10**. In removing the protection offered by the Hazard Line, the Government has failed to take into consideration the properties, critical infrastructure and population that stands to be affected by effects of climate change and sea level rise, thus, being perverse to the principle of Sustainable Development. It is submitted that the amendment to the CRZ Notification of 2011 dated 02.07.2018 has essentially been adopted in and carried forward in the provisions of the Impugned Notification, and the Applicants have challenged the relevant provisions of the Impugned notification that pertain to the use of hazard lines, since the CRZ Notification of 2019 is intended to supersede the CRZ Notification of 2011. It is noteworthy that in the matter of ***Ratheesh KR v. State of Kerala*** **2013 SccOnLine Ker 14359,** the Hon'ble Kerala High Court was pleased to issue orders for the demolitions of hotels and other constructions in islands and areas falling beyond the High Tide Line on the landward side in Kerala. The Hon'ble Kerala High Court further noted, while discussing the blatant violation of the CRZ Notification of 2011,

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"The cases which we are disposing of by this Judgment characterise the total indifference and non-application of mind by the authorities and particularly the local bodies. The Notifications issued are intended to protect the coasts, the environment in general and to achieve the sustainable development, particularly of the fisher folk and other local population. The Notifications are meant to be enforced with full vigour. Circulars have been issued to the local bodies. We notice, however, that only lip service is being paid if at all to the terms of the Notifications. By such callous indifference and consequent blatant violation of the Notifications, a law which is meant to address serious environmental issues which adversely affect the present and future generations, is being completely undermined. If only the local body was vigilant and had conformed to the law, the matters would not have come to the sorry state of affairs the parties find themselves in....We would hope that all the authorities including the Governments, both Central and State, will put their heads together and bring about not only dissemination of clear information regarding the Notification, but also implement its terms in an effective manner."

The aforesaid judgment of the Hon'ble Kerala High Court was upheld by the Hon'ble Supreme Court of India in the matter of *Kapico Kerala Resorts (P) Ltd. v. State of Kerala, (2020) 3 SCC 18.*

c. **REDUCES CRZ AREA FOR TIDAL INFLUENCED BODIES:**

The boundary/limit of the protected areas classified as CRZ areas adjacent to tidally influenced water bodies have been reduced to 50m from the 100m that the CRZ Notification, 2011 prescribed. The CRZ Notification 1991 that preceded the CRZ Notification, 2011 mandated a 500m buffer. The reduction

of CRZ shall cause severe environmental degradation and impact the stability of the shoreline.

d. **REDUCES CRZ AREA FOR ISLANDS**: CRZ Notification 2011 provides for CRZ up to 500 metres from the HTL for offshore islands on landward side of the sea and up to 50 metres for islands in backwaters of Kerala. However, the impugned Notification reduces the CRZ to 20 m from HTL for islands in coastal backwaters, as well as on landward side of islands along the mainland coast. Opening up these areas for development will have a direct and irreversible impact on the fragile ecology of these regions which are already at threat from rising sea levels. It is submitted that the coast of Goa is also peppered with many such islands, which are mainly utilised by locals for the purpose of fishing and cultivation.

e. **CHANGES DEFINITION OF CRZ ZONES –**

i. **CRZ I AREAS** - The impugned Notification brings in changes in the language used to define CRZ zones. Under the CRZ Notification, 2011, CRZ-I area has been identified as the "Ecologically Sensitive Areas" having the *geo-morphological features which play a vital role in maintaining the functions of the coast*. The conservation, protection and management of the same has also been discussed in Annexure-I to the CRZ Notification, 2011. However, as per the impugned Notification, mangroves, beaches, corals,

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nesting areas and other eco-sensitive areas shall be Ecologically Sensitive Areas only if they have been identified by the National Centre for Sustainable Coastal Management (**"NCSCM"**) of the Respondent MoEFCC. The rights of local communities will also be considered only if identified by NCSCM. This reduces the scope of actual conservation and protection measures that can be taken under the CRZ Regulation Regime, since many of these ecologically and socio-economically sensitive areas lay outside the areas hitherto identified by NSCSM. It is submitted that the said fact can be witnessed by a perusal of the CZMP 2011 maps of Goa under the CRZ Notification of 2011 that have recently been finalised and approved in September 2022. The said maps, although prepared under the robust CRZ Notification of 2011, are at 1:25.000 scale, without any cadastal or survey demarcations and without demarcation of many of the essential features. Despite the difficulty in reading these maps, it is evident that portions of ecologically and socio-economically sensitive areas have been omitted, due to the negligence of the NSCSM and the Respondent Authorities involved in the preparation of the maps. It is therefore essential that all the beaches, mangroves, fish breeding areas, corals, nesting areas, mudflats, wetlands, sand dunes, low-lying areas, etc within the CRZ are designated as CRZ-I without any exceptions. The non-inclusion of such ecologically and socio-economically sensitive areas in CZMP 2011 maps prepared for Goa thus far can be seen from a few of the examples listed in the table and demonstrated

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by images and documents collectively annexed hereto and marked as **Annexure A- 11**.

ii. **CRZ II -** The impugned Notification effectively makes all coastal stretches within cities, towns, municipalities and other legally designated urban areas as **CRZ II,** by removing the clause present in the CRZ 2011 that declares areas with low built up area within municipal limits as CRZ III. Definition of CRZ to has also been expanded to define "Substantially Built up Areas" as areas where the ratio between built up plots to number of plots being more than 50%. This calculation and/or definition does not explain what is meant by the term "Plots". It is submitted that Coastal areas have witnessed a boom in illegal "Plots" being sold as real estate. With no definition given to the term 'plots' and without an estimate of total number of legal, regularized plots, defining CRZ-II and CRZ-III areas, vis-à-vis the built up plot ratio, becomes all the more ambiguous. With ever expanding cities and municipal limits, the changes in the CRZ Notification of 2019 is just a way to promote coastal real estate schemes; this has been done without the understanding that any properties that are constructed in these areas will be harmed by natural disasters.

iii. **CRZ-III -** Further, CRZ III areas, which are land areas that are relatively undisturbed (viz. rural areas, etc.) and do not fall under CRZ-II, shall be further classified into following categories:CRZ–IIIA, and CRZ-IIIB under

the impugned Notification based on population density (2161/sq.m). It is submitted that no rational basis has been provided for adopting this criteria of population density as being the quantitative test to distinguish between CRZ IIIA and CRZ IIIB areas. The methodology to be used for deriving coastal population density from overall density as enumerated in the 2011 census has also not been revealed, raising suspicions about the scientific validity of such provisions and the very real risk of mischief by subjective interpretation of such terms.

iv. **No-Development Zones in tidal influenced areas** - NDZs in impugned Notification reduces the extent of the No-Development Zone (**"NDZ"**) from 200m to a mere 50 mts for the landward side along tidal influenced water bodies in CRZ-III A areas on the basis of CZMP approval; this also has no logical outline, except to defeat the purpose of the Notification and permit construction in the regions that were hitherto classified as NDZ and displacing local sustainable economies and communities. It is noteworthy that the Hon'ble Supreme Court has, vide judgment in *Indian Council For Enviro-Legal Action v. Union of India, (1996) 5 SCC 281* quashed a notification seeking to dilute the very first CRZ Notification, which was the CRZ Notification of 1991 by reducing the set back lines and the span of the NDZ from 100 metres to 50 metres, because it would give the Central Government too much arbitrary power which could result in serious

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environmental degradation. The Hon'ble Supreme Court of India held as follows:

37. In the written submissions filed by the Union of India in this Court on 29-9-1995, this amendment has been sought to be justified and explained by it in the following words:

> *"As regards the developmental activities up to the High Tide Line, the Central Government may for reasons recorded in writing permit construction in any particular case taking into account the geographical features and other relevant aspects.*
> *This is necessary as providing of 200 metres of no-development zone all along was not possible in the coastal line in a uniform way on account of wide variations in geographical features, existing human settlements and developmental activities requiring foreshore facilities etc."*
> *The relaxation with regard to NDZ was sought by the Hotel and Tourism Industry and they desired concession only with regard to 20-30 kms of coastline. By the amended notification, power had been given to the Central Government to make such relaxation with regard to any part of the 6000 kms long coastline of India. The Central Government has, thus, retained the absolute power of relaxation of the entire 6000 kms long coastline and this, in effect, may lead to the causing of serious ecological damage as the said provision gives unbridled power and does not contain any guidelines as to how or when the power is to be exercised. The said provision is capable of abuse. The Central Government also did not confine the relaxation to the extent as specified by the Vohra Committee. No satisfactory reason has been given by the Union of India as to why it departed from the opinion of the Expert Committee and that too in such a manner that the concession which has now been given is far in excess of what was demanded by the Hotel and Tourism Industry.*

38. We, accordingly, hold that the newly added proviso in Annexure II in paragraph 7 in sub-paragraph (1) (Item i) which gives the Central Government arbitrary, uncanalized and unguided power, the exercise of which may result in serious ecological degradation and may make the NDZ ineffective is ultra vires and is hereby quashed. No suitable reason has been given which can persuade us to hold that the enactment of such a proviso was necessary, in the larger public interest, and the exercise of power under the said proviso will not result in large-scale ecological degradation and violation of Article 21 of the citizens living in those areas.

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v. **CRZ-IV** - The impugned Notification has also attempted to include the sea bed area in definition of "CRZ IV" areas. If the sea bed is also opened up for all kinds of activities, development, construction and projects that have been permitted in the CRZ-IV area, then the impact on the ecosystem and the entire marine fauna will be disastrous, as fish-breeding, tidal patterns, water level increases, and the integrity of the entire sea-bed will be compromised.

f. **PERMITS ACTIVITIES IN CRZ AREAS WHICH ARE PROHIBITED AT PRESENT:** The CRZ Notification, 2011 was originally envisaged to protect the coastal ecology and the unique features of the coast, protect coastal livelihoods and to prohibit detrimental activities to the same. However, the impugned Notification brings in a number of changes which dilute or entirely remove the prohibitions/protections provided under the CRZ 2011, such as:

i. The CRZ Notification, 2011 prohibits the *"Reclamation for commercial activities such as shopping and housing complexes, hotels and entertainment activities"*. This provision has been deleted in the impugned Notification, making reclamation of CRZ areas for commercial activities a permissible activity.

ii. CRZ Notification, 2011 prohibits the "*Dressing or altering sand dunes, hills and other natural features including landscape changes for beautification and recreational purposes*" .This has been changed in the impugned Notification to only include "Active" sand dunes. However, no definition has been provided for what are considered "Active" Sand dunes. Further, this change also means that the protection offered to hills and other natural features of the coast have now been removed, giving legality to constructions on these ecologically fragile areas. Considering that the entire stretches of the western coastline are not sandy, but hilly, the removal of protection indicates an intent to open up these areas for real estate and other constructions. Further, even sand dunes can be destroyed now by classifying them as not being active. It is noted that the Swaminathan Committee Report recommended that all *"natural barriers such as coral reefs, mangroves and sand dunes must be protected at all costs. No activities that affect these natural assets should be permitted"*

iii. The CRZ Notification, 2011 also laid a mandate on local authorities to prepare a phased out plan for discharge of untreated effluents and disposal of city wastes in CRZ Areas. However, until today untreated effluents and disposal of city wastes continue to pollute CRZ Areas. The impugned Notification does away with the responsibility of officers within the Government to prepare this plan and stop such discharges/disposals in a timely manner.

iv. The CRZ Notification, 2011's provisions regarding "Setting up and expansion of units or mechanisms for disposal of wastes and effluents" has been deleted, making it a permissible activity under the new impugned Notification. The CRZ Notification, 2011 only permitted the discharge of treated effluents, storm water and facilities for discharge of such effluents. It permitted treatment facilities for wastewater arising from facilities within the CRZ only. The impugned Notification does away with this clause, permitting even facilities not within the CRZ areas to have treatment facilities for waste and effluents within the CRZ.

v. Restrictions on withdrawal of groundwater within 200-500 m from HTL have also been relaxed in the impugned Notification, making it a permissible activity through manual wells for agriculture, horticulture, fisheries, drinking purposes, etc. However, no definition of any of these words has been given. Further, no restriction on the quantity of groundwater that can be drawn is put in place. Drawl of groundwater will lead to salinity ingress and destruction of the coastal freshwater aquifers.

g. **THE IMPUGNED NOTIFICATION GIVES CARTE BLANCHE FOR DESTRUCTION IN THE NAME OF STRATEGY, DEFENCE, SECURITY, PUBLIC UTILITY:** The impugned Notification provides a wide scope for permitting projects that fall within the "Defence" "Strategic", "Security" and "Public Utilities" categories. However, no

definition for any of these words have been provided. This ambiguity will allow a range of exceptions and loopholes for projects detrimental to the coastal environment and communities under the guise of "Defence", "Strategic", "Security" and "Public Utilities". Even worse, Strategic, Defence-related, Security and Atomic Energy projects have been made permissible within the ecologically and socio-economically sensitive CRZ-I Areas. These exceptions could also be used as a loophole and any project can be termed strategic or of public-utility in order to avail of exemption from the restrictions of the Notification, defeating the spirit and purpose of the CRZ notification.It is submitted that similar provisions were also introduced in the CRZ Notification of 2011 vide the above mentioned amendment dated 02.07.2018, which has been annexed as Annexure A-10 and the Applicants have challenged the relevant provisions of the Impugned notification that permit development for Defence" "Strategic", "Security" and "Public Utilities" purposes, since the CRZ Notification of 2019 is intended to supersede the CRZ Notification of 2011.

It is noteworthy that the Swaminathan Committee report had advised against "defence" projects being blindly permitted in CRZ areas and recommended that any such defence project in CRZ area should also be subject to a "*well-defined process of identifying impacts so that efforts can be made in mitigating them*"

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h. **THE IMPUGNED NOTIFICATION FAVOURS TOURISM OVER SUSTAINABLE LIVELIHOODS:**

The impugned Notification plays into the coastal tourism agenda of the State Governments by permitting the development of year-round tourism facilities in all coastal states. The intent of the Government to shift coastal areas from being livelihood spaces of the fishers and safety buffers for the inland to being recreational space for those who have high stakes in tourism activities in these areas is evident and ill-advised.

i. With Government of India promoting its "Swadesh Dharshan" scheme through the Ministry of Tourism, it seems to be the real intention behind revamping the CRZ Notification, 2011 from being a plan to protect the coastal areas to a plan allowing all sorts of tourism.

ii. CRZ-I areas like mangroves have been opened up for tourism as the impugned Notification permits the setting up for eco-tourism trails like mangrove walks, tree walks etc. within mangroves identified in the CZMP.Mangrove areas are considered important bird habitats and flood buffer, allowing tourism and increasing human presence can drastically change the nesting and resting patterns of migratory birds. Mangroves are also important fish breeding areas, increase in built up space, and garbage and footfalls will hamper fish breeding, leading to a decline in overall fish resource.

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iii. In CRZ II areas, provisions for developing tourism facilities on "Vacant" land has been permitted given the guidelines in Annexure III of the impugned Notification. "Vacant" coastal areas are almost always areas being traditionally used by small-scale fishing communities for traditional livelihood uses. Instead of recognizing these uses and securing these areas for the fishing community, the impugned Notification has opened these areas up for development and commercial use.

iv. In CRZ III Areas, the impugned Notification allows for the construction of temporary tourism facilities on the seaward side - i.e. the "No Development Zone" of the CRZ Area – if a state or national highway passes through the area. The spirit of creating NDZs was to preserve the environmental integrity of the coastal areas. Allowing tourism activities, albeit temporary, will increase garbage & sewage in the area. The impugned Notification does not call for any management plan for garbage in these areas. Commercial establishments and tourism facilities change the nature of land use in these areas. Fisher land use and livelihood uses will be destroyed by these provisions.

v. The guidelines in Annexure III do not lay out any consultative process with fishing communities before allowing any tourism facilities. In urban areas, where the fishers are already reeling under the pressures of a seaward moving city and a landward moving sea, the pressures that arise from tourism will cause them to lose all their livelihood.

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i. **THE IMPUGNED NOTIFICATION FAVOURS INDUSTRIAL ACTIVITIES AT THE COST OF COASTAL ECOLOGY AND BIODIVERSITY:** The impugned Notification relaxes a number of restrictions on the setting up of coastal industries such as Thermal Power Plants, Desalination Plants, Waste Treatment Plants, Non-Conventional Energy Generation etc, that were rightly regulated by the CRZ notification 2011. Some examples are:

i. The impugned Notification opens up for construction and non-traditional activities the ecologically sensitive "Intertidal Areas" i.e - the area between the low tide line and high tide line in the case of the sea/ocean and the areas that tidal influenced water bodies expand and contract according to the season. The CRZ Notification, 2011 gave the highest level of protection to intertidal areas like Salt Pans, Mudflats etc.

ii. Pipelines, conveyance facilities and transmissions lines to and from these industries are permitted through CRZ I-A Areas (like mangroves, salt marshes, sand dunes, mudflats, coral reefs etc.) in the impugned Notification.

iii. Ancillary facilities for industries like storage terminals for oil and other substances, power generation through non-conventional sources, manual mining of atomic minerals etc. have been permitted in Intertidal areas.

iv. Port projects, especially those falling within the "strategic" definition are being set up through the impugned Notification. Pipelines, conveyor systems like belts, pipelines, roads, breakwaters, storage terminals, and facilities for

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thermal power plants have all been marked as permissible activities. As CRZ I-B includes Salt Pans the Notification effectively permits the conversion of intertidal saltpans into real estate for industries.

v. Construction of roads and roads on stilts have been permitted by way of reclamation of CRZ I areas (like mangroves, sand dunes, turtle nesting sites, salt marshes, coral reefs etc.). Such activities will severely affect endemic flora and fauna of such ecologically and socio-economically sensitive areas going against the spirit of the CRZ Notification, 2011. Increasing built up spaces so close to the sea will also greatly harm the nesting patterns of sea turtles that are dependent on isolated beach stretches for laying eggs.

vi. Land reclamation and bunding for the construction for Defence, Strategic and Security project facilities in intertidal areas i.e - the area between the low tide line and high tide line in the case of the sea/ocean and the areas that tidal influenced water bodies expand and contract according to the season.

vii. Mega flagship projects like "Sagarmala" and "Smart Cities" have been touted to be multi-million dollar strategic projects of the Government of India. Allowing facilities of such projects to come up unregulated in CRZ Areas is hazardous and is bound to degrade the marine ecology, coastal environment and the aesthetic uses of the sea coast.

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j. **THE IMPUGNED NOTIFICATION PROMOTES UNSUSTAINABLE CONSTRUCTIONS & LAND USE CHANGES BY DESTROYING SUSTAINABLE FISHERIES:** The water and sea bed area and tidal influenced water bodies and coastal commons serve as the primary livelihood and food security for over 14 million people in India, as enumerated by the National Livestock Census, 2003. The impugned Notification is an attempt to promote coastal industries, coastal tourism and coastal real estate and turns a blind eye to the fate of millions of fisher workers dependent on the sea and the coast for their life and livelihoods. The impugned Notification proposes to allow unsustainable building constructions and land use changes which will destroy the fisheries as follows

i. The impugned Notification allows for reclamation of water and bed areas in CRZ IV for construction of industries, ports, memorials, monuments etc. The protection measures that were mandated by the CRZ Notification, 2011 including restrictions on constructions and non-traditional activities, and mapping of livelihood spaces, fishing grounds, land use and community infrastructure etc have been done away with.

ii. The environmental impact of the impugned Notification will be significantly negative, especially since the draft permits encroachment of water areas and intertidal areas along the sea and in estuaries and creek without any understanding of its overall impact on coastal surface water or groundwater

hydrologies, biodiversity, fishery habitats and resources or the fisheries economy. Reclamation of coastal wetlands for "strategic" projects will catalyse the collapse of the small scale fisheries economy, leading to widespread social disharmony.

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k. **NOT NCSCM, BUT UNBIASED, SCIENTIFIC INSTITUTES SHOULD DEMARCATE TIDE LINES IN CONSULTATION WITH LOCAL COMMUNITIES:** The CRZ Notification 2011 authorises seven agencies to carry out tidal demarcation that is used as a reference line to demarcate the area under the jurisdiction of CRZ. However, the impugned Notification authorises only the National Centre for Sustainable Coastal Management (NCSCM) to carry out tidal demarcation for the Indian coastline. Firstly, this implies that only NCSCM and no other agency can carry out tidal demarcation that is used as a reference line to demarcate the area under the jurisdiction of CRZ. The dilution from a healthy choice of seven agencies, the process is now made a monopoly, making the entire process vulnerable to bias and corruption. Further, the local communities must be consulted and involved in this important process to ensure transparency and justice.

l. **DECENTRALIZATION OF CLEARANCE PROCEDURES:** The impugned Notification has overturned the entire clearance procedure by

granting powers to the state CZMAs and other local authorities, which were till now only a clearance appraising authority at the district and state levels to grant CRZ Clearances. As per the CRZ Notification, 2011, the authorities responsible for granting CRZ Clearance was the Respondent herein, in case of Category A projects and projects not listed in the Environment Impact Assessment Notification, 2006, and the SEIAA, for Category B projects.

The impugned Notification further states that only activities that attract clearance under CRZ I or CRZ IV (with or without CRZ II and III in the project) will attract clearance from the Respondent herein. All other projects falling squarely within CRZ III or II can be accorded clearance by the CZMAs, which were only recommending bodies under the CRZ Notification, 2011.

The impugned Notification also grants local authorities like Tahsilars, Municipalities and Local Corporation to accord clearance for CRZ projects without the appraisal of even the state CZMA if the total project site is less than 300 Sq. Mts. Revenue Authorities are not equipped to perform the function of environmental protection.

This responsibility of being a clearance granting Authority is given to local bodies/agencies who have not, till date taken any steps in the implementation of the CRZ Notification, 2011. It is submitted that in Goa, a vast majority of projects requiring CRZ Clearance have started operation after obtaining a No-objection Certificate from the Goa SCZMA, without obtaining a CRZ

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Clearance from either the Respondent herein or the SEIAA, which is a blatant violation of the CRZ Notification, 2011. It is submitted that the impugned Notification is also a means to regularize these activities that have proceeded without a valid prior CRZ Clearance. Decentralizing the entire clearance procedures will only lead to a complete collapse in the administration and implementation of the CRZ Notification.

m. **THE IMPUGNED NOTIFICATION REMOVES SPECIAL CONSIDERATIONS:** The CRZ Notification, 2011 provided special considerations to the CRZ Areas like Goa and Kerala, including provisions that restricted setting up structures on the beach; the coastal areas of Kerala and Goa have been opened up for construction and non-traditional activities. The khazan lands of Goa were also protected by CRZ Notification 2011, a much needed provision for the survival of Goa's coastal ecology and environment. These considerations were put in place keeping in mind the unique coastal ecosystems specific to such areas. By removing these special considerations, the responsibility of the Government to prepare special protection plans has been lifted. The special considerations given to khazan lands of Goa need to be strengthened by any new law/ Notification in view of the severe pressures and accelerated destruction of these ecologically and socio-economically sensitive areas. It is submitted that the removal of special protections under the CRZ Notification of Goa is an egregious instance of

dilution of environmental protection. perversity and malafides on the part of the Respondent No.1, as special protections for eco-senstive low-lying khazan lands, which prevent and control flooding will be done away with, after being introduced in the 2011 Notification.

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n. **THE IMPUGNED NOTIFICATION FAILS TO CONSIDER DEMANDS TO DEMARCATE LIVELIHOOD SPACES:** Public hearings announced by the Government for the CZMP under CRZ Notification, 2011 was opposed vehemently on the basis of non-demarcation of livelihood spaces. In Goa, there has been years of agitation against poorly prepared draft CZMP maps, which resulted in local villagers personally inspecting their lands, using technical assistance from the students and faculties of Goan Universities and preparing maps to show the various mistakes, purposeful exclusions and inaccuracies in Draft CZMP maps prepared by the Respondent GCZMA. It is submitted that much of the work undertaken by local Goans to demonstrate the woefully incomplete and inaccurate draft CZMP maps of the Respondent GCZMA was undertaken in the throes of the Covid-19 Pandemic. The submissions of the people to the Respondents persuaded Respondent No 1 to amend CRZ Notification 2011 on 01.05.2020 to recognize the ancient river bunds and sluice gates of the khazans for demarcation of HTL. The elaborate, painstaking efforts of the citizens of Goa also resulted in the Respondent GCZMA having to prepare

its draft CZMP maps under the CRZ Notification of 2011 once again. However, neither were the people or Panchayats consulted, nor were the elaborate plans prepared by the people referred, resulting in persistence of most of the gross errors and deficiencies. The second draft of CZMP maps prepared by the Respondent GCZMA under the 2011 Notification was finalised by the Respondent MoEFCC in September 2023.

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o. **THE IMPUGNED NOTIFICATION FAILS TO RESPOND TO ENVIRONMENTAL CRISIS:** It is submitted that the Respondents are deliberately attempting to relax the CRZ Notification, 2011 to benefit builders and industrialists, despite the fact that the environmental crisis facing our planet and our country is increasing. With climate change and sea level rise, it is evident that the problems facing the eco-sensitive and fragile coastal areas will increase even further. It is therefore in the National interest that the CRZ regime be strengthened further rather than it be diluted to benefit private interests at public cost.

Considering the fact that all scientific data available seems to indicate that the rate of increase in sea levels has been underestimated, and it is evident that both the frequency and intensity of extreme climatic events has been increasing, there is a need to ensure that our coastal areas are given increased protection rather than further diluting the protection that existed as on 19th February 1991.

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It is submitted that in the Goa State Action Plan on Climate Change for the Period between 2020-2030, commissioned by the Goa State Biodiversity Board and prepared through NABARD Consultancy Services, the flood vulnerability analysis from the state reveals that 14.73% of the land in Goa is under 15 meter elevation, much of it in the coastal zones, and are severely vulnerable to flooding both from extreme rainfall events and sea-level rise. The said Action Plan further states that Though Goa is situated in high precipitation zones, it has one of the lowest per capita freshwater availability and therefore recommends that natural water resources be maintained to avoid flooding and to keep related infrastructure functional during peak events and disasters. The Action Plan further recommends that Environmental Clearance for large tourism projects/hotels in Goa could include climate mitigation and adaptation plan and climate disaster preparedness plan and further recommends that projects reflected in the coastal development plan or zone for new construction based on the climate predictions on sea-level rise, flooding, and erosion be *reconsidered.* A copy of the Goa State Action Plan on Climate Change for the Period between 2020-2030,commissioned by the Goa State Biodiversity Board prepared through NABARD Consultancy Services has been annexed hereto and marked as **Annexure A-12.** The Applicants therefore state that its seems that the Respondent GCZMA is at cross purposes with the position of other agencies of the Goa Government, including the Goa State Biodiversity

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Board, which recommends that new projects proposed in the coastal development plan or zone must be reconsidered entirely, as the environmental consequences of such constructions in flood prone and coastal areas are too severe and must be avoided.

It is further submitted that the Performance Audit Report on Conservation of Coastal Ecosystems, prepared by the Comptroller and Auditor General of India, for the period between 2015-2020, was a scathing review of the manner in which the CRZ Notification of 2011 was implemented through out the country. In relation to Goa, it was observed that the State of Goa has still not demarcated khazan lands nor has it prepared management plans for the same as required under the CRZ Notification, 2011. The said Performance Audit Report further reveals that this non-demarcation of khazan lands, which are identified as ecologically-sensitive areas has led to the State of Goa granting permissions for prohibited activities such as land filling and construction on khazan lands. It is further stated in the said Report that State Coastal Zone Management authorities did not take proactive action against CRZ violations as required under the CRZ Notification, 2011 and even in instances where action was taken against CRZ violations, the follow up action was ineffective. The Comptroller and Auditor General further recorded that despite the existence of CRZ notifications, coastal areas continue to be impacted and degraded by anthropological activity. A copy of the said Report is annexed hereto and marked as **Annexure A - 13**.

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p. **THE IMPUGNED NOTIFICATION PERMITS EXPANSION OF FISH PROCESSING UNITS IN CRZ I:** While CRZ Notification, 2011 prohibits expansion of fish processing units in the CRZ I areas, the draft Notification proposes to allow 25% expansion of plinth area for existing fish processing units in CRZ IB. Expansion of fish processing units will mean less open inter-tidal spaces and therefore less protection against natural hazards. It is also to be noted that fish processing units are not those that are used by small-scale fisher folk, and this amendment facilitates construction of industrial units in ecologically sensitive CRZ IB areas.

q. **WASTE TREATMENT PLANTS:** CRZ Notification, 2011 prohibits waste and effluent treatment plants in CRZ I, but the impugned Notification proposes to allow treatment of waste and effluents and transportation of the treated effluents in CRZ I-B. These dilutions are completely against the need of the hour, and it is necessary that the new law prohibits all waste treatment plants in the entire CRZ which may be located inland, far away from the water bodies and the sea.

r. **THE IMPUGNED NOTIFICATION ALLOWS COMMERCIAL SALT PRODUCTION IN LIEU OF TRADITIONAL SALT PRODUCTION:** CRZ Notification, 2011 allowed salt production in CRZ I

only by solar evaporation, while the impugned Notification deletes the restriction, thus opening up the salt pans to commercial giants for private profit, and displacing the local traditional salt farmers.

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s. **THE IMPUGNED NOTIFICATION LIBERALISES CONSTRUCTION NORMS FOR CRZ II**: CRZ Notification 2011 restricted the Town & Country Planning norms for CRZ II and the Floor Space Index and Floor Area Ratio to be frozen as per 1991 norms. However, the impugned Notification allows Floor Space Index and Floor Area Ratio according to the Town and Country Planning norms as changed from time to time as on the date of the notification of the new law. This will allow more built up areas and more constructions in the CRZ, thus devastating the coastline further. It is noteworthy that the limit placed on FSI being frozen at levels applicable in 1991 was challenged in two occasions before the Hon'ble Bombay High Court. In the matter of *Overseas Chinese Cuisine (India) Pvt. Ltd. v. Municipal Corporation of Greater Bombay*, 1999 SCC OnLine Bom 473, the Hon'ble Bombay High Court, while discussing the provision of the CRZ Notification of 1991 that limited the FSI for development in Coastal Areas to remain as per 1991 norms indefinitely, the Hon'ble Bombay High Court held as follows,

74. *There appears to be great merit in the contentions of the respondents based on the C.R.Z. Notifications. We too are inclined to think that the*

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purpose of imposing severe restrictions as done in the C.R.Z. Notification would be rendered nugatory if these restrictions are capable of being abrogated or watered down by subsequent amendments made by the local authorities or local town planning laws. We cannot lose sight of the fact that this is a salutary piece of Central legislation intended for the benefit of the entire country. That it might cause hardship to someone in some corner of the country, can hardly be a ground for tilting against it. True, that by the time the Central Government sat up and took notice and Parliament enacted this piece of legislation, considerable amount of development activity had already taken place all along the coasted areas, which are now technically defined as the Coastal Regulation Zones. It would have been eminently unjust to undo all that had already been done. Parliament, therefore, adopted what we may call as the "Doctrine of Toleration" that development activity already carried out and in existence in accordance with laws and norms then existed, had to be tolerated. Simultaneously, the legislative policy is also reflected in what we may style as the "doctrine of containment", which means that even though what existed on the date of the Notification is to be tolerated, it should not be permitted to grow beyond the dimensions upto which it was tolerated. When looked at from this point of view, particularly keeping in mind the responsibilities of the country towards the world community as a whole and to its future generations, it appears to us that the construction sought to be put on the C.R.Z. Notification by the

respondents is perfectly justified and would have to be upheld irrespective of the clarification given by the letter dated 8th September 1998 by the Ministry of Environment and Forests.

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77. The petitioners rejoin that if we adopt such a rigid construction of the Notification it may lead to absurdity. If the local Town and Country Planning Regulation bring about a reduction in the F.S.I. norms in future, a plot of land falling within the C.R.Z.-II area may become entitled to F.S.I. higher than the ones in existence than on the date the application for development permission is made. In our view, this is not such an alarming or astounding situation as to found an argument of Reductio ad Absurdum. The situation contemplated is perfectly feasible and compatible with the legislative intent as we see it. After all, what the Notification intends is that the F.S.I. norms be pegged at the level at which they existed in February 1991. This was the extent to which the coastal area had already been built upon. If, therefore, even in future, notwithstanding reduction of the F.S.I. norms elsewhere, the C.R.Z.-II zone is given this benefit, we see nothing wrong or objectionable therein, nor any reason against such construction being adopted. At the highest, this may be a factor to be reckoned with in the future legislation. We decline to consider the construction of the C.R.Z. Notification done by the petitioners as arbitrary, absurd or irrational.

It is submitted that this order of the Hon'ble High Court was upheld again by a coordinate bench of the Hon'ble Bombay High Court in Writ Petition No.1019 of 1999 dated 8.12.1999, and accordingly, the restrictions on FSI in CRZ areas placed by the 1991 CRZ Notification had remained unchanged till the impugned notification.

t. **THE IMPUGNED NOTIFICATION DRASTICALLY INCREASES THE VALIDITY OF CRZ CLEARANCES:** The CRZ Notification 2011 allowed only 5 years validity for CRZ Clearances, while the impugned Notification increases it to 7 years. This dilution is also without any reasoning or logic, since the coastal environment is fast deteriorating today and the destruction could be so rapid that the project permitted earlier may not be feasible after 5 years. It is submitted that the extension of the validity of a CRZ clearance was increased from 5 years to 7 years vide an amendment to the CRZ Notification of 2011 dated 06.03.2018. Therefore it is evident that the amendment introduced in the 2011 Notification has been carried forward in the impugned Notification with a view to continue the malafide and perverse enhancement of the duration of a CRZ clearance.



B. THE IMPUGNED NOTIFICATION HAS BEEN ISSUED IN VIOLATION OF THE EP ACT, 1986, WHICH IS THE PARENT ACT AND IS, HEREFORE, BAD IN LAW:

1. The impugned Notification has been issued under sub section (i) and sub-section (ii) (v) Section 3 of the EP Act, 1986. It is submitted that the power granted under section 3(1) and 3(2) (v) of the Environment (Protection) Act, 1986 is for protection and improvement of the quality of the environment. The said provision is as follows:

"3. Power of Central Government to take measures to protect and improve environment.

(1) *Subject to the provisions of this Act, the Central Government shall have the power to take all such measures as it deems necessary or expedient for the purpose of protecting and improving the quality of the environment and preventing, controlling and abating environmental pollution.*

(2) *In particular, and without prejudice to the generality of the provisions of sub-section (1) such measures may include measures with respect to all or any of the following matters, namely:-*

...

(v) Restriction of areas in which any industries, operations or processes or class of industries, operations or processes shall not be carried out or shall be carried out subject to certain safeguards".

A plain reading of Section 3 of the EP Act, 1986 makes it clear that anything issued under this Section must satisfy the requirement of protecting and improving the quality of the environment and anything issued under Section 3(2)(v) must satisfy the further requirement of restriction of areas where activities can or cannot be carried out.

2. Further, the preamble of the impugned Notification states that it has been issued under Section 3(1) and Section 3(2)(v) of the EP Act, 1986. It is submitted that the EP Act must be read along with the EP

Rules, 1986. Rule 5 of the EP Rules provides the procedure in accordance with which the Central Government may prohibit or restrict the location of industries and carrying on of processes and operations in different areas, i.e. the procedure to be followed while exercising its power under Section 3(2)(v) of the EP Act, 1986. Therefore, any Notification issued under Section 3(2)(v) of the EP Act, 1986 must also be notified under Rule 5 of the EP Rules, 1986. Since the impugned Notification has been issued under Section 3(2)(v) of the EP Act, and not under Rule 5 of the EP Rules, the impugned Notification is not bad in law.

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3. The Ld. National Green Tribunal in *Society for Protection of Environment & Biodiversity v. Union of India (O.A NO. 677 of 2016)* and*Pushp Jain v. Union of India (OA 01/2017)* and*Ajay Kumar Singh v. MoEF&CC&Ors. (OA 7/2017)* and *Mahendra Pandey v. Union of India &Ors. (OA 55/2017)* and *R. Sreedhar v. Union of India (OA 67/2017)*while explaining the legislative intent in Section 3 of EP Act and Rule 5 of the EP Rules held:

"25. Besides noticing the above mentioned deficiencies in and dilutions of the existing laws by the impugned Notification, we must also notice a very strong legal infirmity in it. Admittedly, the notification has been issued by the MoEF& CC in exercise of its powers under sub-section (1) read with clause (V) of subsection (2) of Section (3) of the Act of 1986 and clause (d) of sub-rule (3) of Rule (5) of the Environment (Protection) Rules, 1986. By the impugned Notification, paragraph 14 is sought to be inserted after paragraph 13 of the existing Notification/Regulations of 2006. The powers

under these provisions can be exercised under Section 3(2)(5) of the Act of 1986 which empowers the Central Government to take measures to protect and improvement of the quality of environment in regard to restrictions of areas in which any industry/operations or process or class of industries operations or processes shall not be carried out or shall be carried out subject to certain safeguards. In terms of section 3 (1)of the Act, this power of taking measures is to be exercised by the Central Government when it deems necessary and expedient for the purpose of protecting and improving the quality of environment and preventing, controlling and abating environmental pollution (emphasis supplied). Rule 5 deals with the prohibition and restriction on the locations of industries and the carrying on process and operations in different areas. It gives power to the Central Government to take into consideration the factors while prohibiting or restricting the locations of industries and carrying on of process/operations in different areas. Sub-rule 3 of this Rule contemplates the procedure to be followed by the Central Government while issuing the notification for imposing prohibition or restriction as stated in Sub-rule (1) of Rule 5.Thus, both the sections and the rule gives power for issuing of any notification and placing prohibition / restriction in their terms, subject to the conditions, i.e., while issuing notification the procedure under Rule 5 (3) should be followed and more importantly it should be exercised only for the purpose of protecting and improving the quality of the environment and preventing pollution. Once any of these essential statutory features are missing the notification issued would be liable to be interfered with. The major part of the Notification does not satisfy these ingredients."

4. It is submitted that the impugned Notification does not satisfy this requirement under Section 3 of the EP Act, 1986; in fact, by relaxing the standards that existed under the CRZ Notification, 2011 and allowing industries to come up in areas where they were restricted under the CRZ Notification, 2011, the impugned Notification violates the very objective of Section 3, which is strengthening environmental protections. It is further submitted that the EP Act has no provision that allows weakening or dilution of the existing environmental norms. The impugned Notification therefore, has been issued in violation of the parent act, the EP Act, 1986.

5. It is a well-settled position that delegated legislation must be exercised within the four corners of the delegation. The Hon'ble Supreme Court discussed the vires of delegated legislation in *Cellular Operators Assn. of India v. TRAI, ((2016) 7 SCC 703 : 2016 SCC OnLine SC 486)*:

Parameters of judicial review of subordinate legislation:
34. In State of T.N. v. P. Krishnamurthy [State of T.N. v. P. Krishnamurthy, (2006) 4 SCC 517] , this Court after adverting to the relevant case law on the subject, laid down the parameters of judicial review of subordinate legislation generally thus: (SCC pp. 528-29, paras 15-16)
"15. There is a presumption in favour of constitutionality or validity of a subordinate legislation and the burden is upon him who attacks it to show that it is invalid. It is also well recognised that a subordinate legislation can be challenged under any of the following grounds:
(a) Lack of legislative competence to make the subordinate legislation.
(b) Violation of fundamental rights guaranteed under the Constitution of India.
(c) Violation of any provision of the Constitution of India.
(d) ***Failure to conform to the statute under which it is made or exceeding the limits of authority conferred by the enabling Act.***
(e) Repugnancy to the laws of the land, that is, any enactment.
(f) Manifest arbitrariness/unreasonableness (to an extent where the court might well say that the legislature never intended to give authority to make such rules).
16. ***The court considering the validity of a subordinate legislation, will have to consider the nature, object and scheme of the enabling Act, and also the area over which power has been delegated under the Act and then decide whether the subordinate legislation conforms to the parent statute. Where a rule is directly inconsistent with a mandatory provision of the statute, then, of course, the task of the court is simple and easy.*** *But where the contention is that the inconsistency or non-conformity of the rule is not with reference to any specific provision of the enabling Act, but with the object and scheme of the parent Act, the court should proceed with caution before declaring invalidity."* (Emphasis Supplied)

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The Respondent has clearly acted in utter violation of the parent Act under which this power has been delegated to it, and for the same reason, is subject to judicial review.

6. It is submitted that the Respondent herein has overreached the powers granted to it under the EP Act, 1986. The Hon'ble Supreme Court in *Smt. Shalini Soni etc. v. Union of India and Ors [1981 AIR 431]* held that administrative decision making is subjective to statutory functionary, and there is an implicit obligation to apply ones mind in the pertinent matters;in *State Of U.P. and Ors vs. Renusagar Power Co. And Others [1988 AIR 1737]*, the Hon'ble Supreme Court has adjudicated on the issue of administrative power being used arbitrarily, or has being exercised without application of mind, and held that such decisions are patently erroneous and such exercise of power will be set aside.

7. That the impugned Notification should be set aside on account of being ultra vires the provisions of the parent Act, i.e. Environment (Protection) Act, 1986. It is submitted that the power provided by the 1986 Act as well as the Rules made thereunder is to enact stringent measures for the purpose of protection and improvement of the environment. Nowhere do they grant the power of diluting or relaxing existing restrictions and prohibitions which were put in place in order to improve the environment. The impugned Notification intends to dilute or relax the Environmental norms compared to the current environmental approval regime and the

monitoring & compliance of the Environmental conditions by an incompetent local body amounting to further relaxation or dilution. Thus, the Respondent herein had no substantive power under the Environment (Protection) Act, 1986 to issue the impugned notification under the provisions of the Environment (Protection) Act, 1986. It was held in the case of *Assam Company v State of Assam and Ors.* [(2001) 4 SCC 202] as follows:

"A delegate cannot override the Act either by exceeding the authority or by making provision which is inconsistent with the Act. Any Rule made in exercise of such delegated power has to be in consonance with the provisions of the Act, and if the Rule goes beyond what the Act contemplates, the Rule becomes in excess of the power delegated under the Act, and if it does any of the above, the Rule becomes ultra vires of the Act."

C. THE IMPUGNED NOTIFICATION VITIATES THE PURPOSE OF THE MANDATE OF ISSUING NOTICE UNDER RULE 5(3)(A) BECAUSE IT IS SUBSTANTIALLY DIFFERENT FROM THE DRAFT NOTIFICATION PUT OUT FOR PUBLIC COMMENTS AND OBJECTIONS:

1. That the Draft CRZ Notification was issued under sub-section (1) and Clause (v) of sub-section (2) of Section 3 of the Environment (Protection) Act, 1986. It is submitted that on a para-wise comparison of the Draft CRZ Notification as well as the impugned Notification, it is clear that the two Notifications are completely different in its import and effect.

2. That the main additions which were not part of the Draft CRZ Notification but have found place in the impugned Notification and thereby have

substantially altered the whole purpose of the Draft CRZ Notification are as follows: -

a. That in addition to 'Land reclamation, bunding or distributing the natural course of seawater' the final notification under paragraph 4: "Prohibited activities within CRZ", Point No. (iv) has added the words 'except for the activities permissible under this Notification and executed with prior permission from the competent authority'. These words were not a part of the Draft CRZ Notification issued earlier.

b. That the impugned Notification has added 'hover ports for coast guard' in addition to the list of facilities like ports, harbours, jetties, wharves, quays, slipway, bridges and sea link etc. permitted for land reclamation, bunding, etc. mentioned in the Draft CRZ Notification.

c. That the impugned Notification has added 'hover ports for coast guard' to maintenance and clearing activities permitted for land reclamation, bunding, etc. in CRZ-IB as well as in CRZ-IV areas that were not present in the Draft CRZ Notification.

d. That the activities related to 'Indian coast guard stations' have been added to regulated or permissible activities in CRZ-IB Inter tidal areas. This activity was not mentioned in the Draft CRZ Notification;

e. That the Draft CRZ Notification permitted construction of various buildings only on landward side of the existing road subject to local town and country planning regulations for Floor Space Index (FSI) or Floor Area

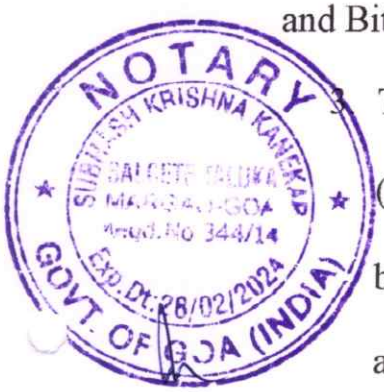
Ratio (FAR) and ensuring that Solid Wastes are handled as per rules. The impugned Notification has an added provision that in the event that there is a need for amendment of the FSI, the Local Body/State Government/Union Territory shall approach MoEFCC through the concerned SCZMA or Union Territory CZMA, and the concerned SCZMA or Union Territory CZMA shall forward the proposal to the National CZMA with its views on the matter, thereby diluting the norms for construction of buildings.

f. In the procedure for CRZ Clearance of permissible and regulated activities, the Draft CRZ Notification required submission of *inter alia* (i) Comprehensive EIA with cumulative studies for projects; (ii) Risk Assessment Report and Disaster Management Plan. The impugned Notification of 18.01.2019 dilutes it by creating an exemption for building construction projects or housing schemes with built-up area less than the threshold limit stipulated in the EIA Notification, 2006 dated 14.09.2006;

g. The Draft CRZ Notification mandated submission of 'Consent to Establish' or a No- Objection Certificate (NOC) from concerned SPCB or Union Territory Pollution Control Committee (UTPCC) for projects involving discharge of industrial effluents. The impugned Notification provides an alternative to project proponents to obtain such consent from respective SPCB or UTPCC following the CRZ Clearance under this Notification but before the start of any construction activity, thereby diluting the clearance procedure;

h. As per the Draft CRZ Notification, projects/activities not covered in the EIA Notification, 2006 but attracting CRZ Notification and located in CRZ-I or CRZ-IV areas, the concerned CZMA was to examine the documents and make recommendations to SEIAA. This set of projects/activities are to now be considered by the concerned SCZMA only for clearance as per the impugned Notification;

i. As per Annexure-II of the Draft CRZ Notification, there were seventeen (17) petroleum and chemical products permitted for storage in CRZ (except CRZ-IA). By the impugned Notification, this list has been extended to include a total of 23 (Twenty-Three) products now, with inclusion of products like Paraxylene, Ethane, Butadine, Methanol, Caustic and Bitumen;



3. That it is pertinent to note that as per Rule 5 (3) of the Environment (Protection) Rules, 1986, (under which the impugned Notification has been issued) the Central Government must give 60 days' time to the any person for filing any objection to any Notification which has been issued under the provision. Even though, the Draft CRZ Notification was issued in April 2018 for public scrutiny, it submitted that if the final Notification has been substantially altered from what was put in public domain for comments and objections, then the whole object of prior consultation is vitiated. This act of the Respondent is therefore,

in complete violation of the provisions of the Environment (Protection) Rules, 1986 as well as the principles of prior consultation.

4. The requirement of public participation in Administrative Law has been discussed in great detail and the Hon'ble Supreme Court has highlighted the importance of public participation to maintain transparency in the functioning of the public authorities. The Hon'ble Supreme Court has time and again stressed and underscored the importance of public consultation in the field of Administrative Law, so that it is inclusive and fair, and concluded after taking into consideration all stakeholders. That in *Cellular Operators Association of India v. Telecom Regulatory Authority of India ((2016) 7 SCC 7033)*, the Hon'ble Supreme Court relied on Section 13 of the Airports Economics Regulatory Authority of India Act, 2008 as a good working test of transparency, by:



a. Holding due consultation with all stakeholders

b. Allowing all stakeholders to make their submissions

c. Making all decisions of the authority fully documented and explained.

The Hon'ble Court further held that where a statute provides Natural Justice to be followed, it must be followed. Relying on *Chief Information Commissioner v. State of Manipur [(2011) 15 SCC 1]*, the Bench observed that openness in governance is a legislatively well-established fact, and went on to hold that for a healthy functioning of democracy, all subordinate

legislation needs to be transparent, after due consideration of stakeholders submissions, together with an explanatory memorandum which broadly takes into account what they have said and reasons for agreeing and disagreeing with them.

The Ld. National Green Tribunal in its judgment dated 08.12.2017 in *Society for Protection of Environment & Biodiversity v. Union of India (O.A NO. 677 of 2016),Pushp Jain v. Union of India &Anr. (O.A. 1 of 2017)* and *Ajay Kumar Singh v. MoEF&CC&Ors. (OA 7/2017)* has placed reliance on the holding of the High Court of Bombay in the case of *Dr.AvinashRamkrishnaKashiwar vs. the State of Maharashtra(2015)5 Mh.L.J.*:

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17."It could thus be seen that it appears to be settled position of law that the requirement of previous publication inviting objections and suggestions is not an empty formality. It is with an intention to enable persons likely to be affected, to be informed, so that they may take steps as may be open to them and the objections/suggestions made would be required to be taken into consideration by the authorities before issuing a final notification".

26. "In the result, we hold that the impugned notification dated 26.07.2013 is not sustainable in law and, therefore, quashed and set aside. Rule is, therefore, made absolute in the aforesaid terms with no orders as to costs.""

Further, the High Court of Delhi in *Shiva Alloys (Pvt.) Ltd. and Anr. v. Union of India &Ors.*(Citation) observed that the notice issued for public comments as per the procedure prescribed under the Act did not include the ban/ prohibition which was included in the final Notification and held that part which was not included to be illegal:

"4. ...The Applicants have been prejudiced thereby. In respect of these furnaces, no notice was issued as per the procedure under Section 10 of the Act and thus, insofar as inclusion of the Applicants in the ban/ prohibition is concerned, there is a clear violation of mandatory procedure which is to be followed in terms of Section 10 of the Act.

5. It is trite law when the mandatory procedure is not followed, the action of the authorities is null and void. Those who build the procedural sword normally get perished by the same. That is what happened in the instant case. The clause in the Master Plan which bans the induction furnaces of the capacity of less than 3 tons is therefore, illegal and has to be struck down. We order accordingly."

D. **THE IMPUGNED NOTIFICATION VIOLATES THE BIOLOGICAL DIVERSITY ACT, 2002:**

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1. Section 36 of the Biological Diversity Act, 2002 places certain duties and responsibilities on the Central and State Government for conservation, promotion and sustainable use of natural resources. Section 36(4) states that the Central Government shall undertake measures:-

(i) *Wherever necessary, for assessment of environmental impact of the project which is likely to have adverse affect on biological activity, with a view to avoid or minimize such effects and where appropriate provide for public participation in such assessment;...*

It is submitted that given the nature of the legislation and the impact on biological diversity, it was required by the Central Government to have undertaken an environmental impact assessment to assess the effects that the impugned Notification would have on the coastal areas. In failing to do so,

it is submitted that the Central Government has acted in violation of the Biological Diversity Act, 2010.

It is noteworthy that the Swaminathan Committee Report also recommended that the burden of proving minimal or no environmental impact of any project to be undertaken in a CRZ area be placed on the development agency/government body.

E. THE IMPUGNED NOTIFICATION REQUIRES UPDATING THE CZMPS THEREBY, MAKING IT A TOOL TO REGULARISE ACTIVITIES THAT WERE OTHERWISE ILLEGAL UNDER THE CRZ NOTIFICATION, 2011;

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1. The CRZ Notification, 2011 mandated the SCZMAs to formulate the Coastal Zone Management Plans on the basis of which the SCZMA's would make recommendations to the MoEF&CC and SEIAA's for projects that required CRZ Clearance. It is submitted that 11 years after the CRZ Notification, 2011 has been notified, CZMP maps were finalised for the State of Goa in September 2022.

2. It is submitted that revising the CZMPs on the basis of the impugned Notification is just another way to regularize the structures and activities that existed illegally in CRZ areas under the CRZ Notification, 2011. It is

noteworthy that as per Clause 5 of the CRZ Notification of 2011, the CZMPs should have been prepared within two years of the CRZ Notification of 2011 coming into effect. However, the CZMPs under the 2011 notification were finalised for the State of Goa only in September 2022, 11 years after the 2011 CRZ notification came into effect. It is submitted that the said 2011 CZMP maps are also incomplete and inconsistent with various provisions of the 2011 CRZ Notification, which has reaffirmed the view of the Applicants that the CZMP maps under the 2019 Notification will continue to perpetuate the various inaccuracies and mistakes in the CZMP maps that will be prepared under the impugned notification. The examples annexed as Annexure A-11 also indicate the manner in which destruction of CRZ areas and violation of the CRZ Notification of 2011 will take place if the impugned Notification is allowed to come into force.

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3. Clause 6.1 of the impugned notification now requires the CZMP maps for coastal areas across the country to be revised as per the provisions of the 2019 Notification. It is humbly submitted that since the CZMPs under the 2011 Notification form the foundation of future CZMP maps under the impugned notification, and will also regulate the extend of development projects/construction permissible in CRZ areas, any attempt to make a new law without preparing accurate CZMPs under CRZ Notification, 2011 only

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indicates the intention to prevent the beneficial provisions of CRZ Notification, 2011 from being implemented.

4. It is noteworthy that this Hon'ble Tribunal has recognised the importance of properly prepared CZMP maps, and has time and again directed the SCZMAs to prepare the CZMPs under the 2011 Notification, failing which the Ld. National Green Tribunal, vide Order dated 22.11.2017 in *M/s. Mehdad v. MoEF&CC&Ors. (Original Application 424 of 2016)*, directed the MoEF&CC not to grant any Environmental Clearance for developmental activity falling within the regulating area, as it would defeat the entire purpose of preparing the CZMP. It is submitted that a similar direction to Maharashtra CZMA was previously issued by this Hon'ble Tribunal, Western Zone Bench, in *Vanashakti v. Union of India &Ors. (Original Application 117/2014 (WZ))* vide order dated 10.02.2016.

A copy of the Order of the Ld. National Green Tribunal, Principal Bench dated 22.11.2017 in *M/s. Mehdad v. MoEF&CC&Ors. (OA 424/2016)* is marked and annexed herewith as **AnnexureA-14**

A copy of the Order of the Ld. National Green Tribunal, Western Zone Bench dated 10.02.2016 in *Vanashakti v. Union of India&Ors. (OA 117/2014)* is marked and annexed herewith as **Annexure A - 15**

F. **THE REPORT OF DR. SHAILESH NAYAK COMMITTEE, ON THE BASIS OF WHICH THE IMPUGNED NOTIFICATION HAS**

BEEN ISSUED, IS HIGHLY INADEQUATE AND DOES NOT DISCUSS THE REAL CONCERNS FACED BY THE COASTAL COMMUNITIES AND COASTAL ECOLOGY:

1.That on 17.06.2014, the Respondent constituted a six-member Committee under the chairmanship of Dr. Shailesh Nayak to "examine the issues of coastal States and Union Territories with respect to the CRZ Notification, 2011 and to examine the errors or inconsistencies and procedural simplification in the said Notification". The Committee submitted its report in January 2015, after holding discussions and meeting with the Governments of coastal States and Union Territory. It is submitted, however, that the report of the Committee was highly inadequate and unequipped to handle the rise in coastal degradation, for reasons substantiated below:

a. Inadequacy of Terms of Reference: The Terms of Reference (hereinafter referred to as **"TOR"**) on the basis of which the Committee formed its report was highly inadequate to deal with the issues of the coastal areas. The TOR, which forms the scope of the report, is limited to examining the issues raised by the State Governments of Maharashtra, Kerala and Karnataka, to examine the errors and inconsistencies in the CRZ Notification, 2011; the TOR is completely silent on the other coastal States and Union Territories. Further, the TOR has no mention of the Committee being set up to look into the implementation of the CRZ Notification, 2011

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or to carry out a study for a law to replace the CRZ Notification, 2011. With the limited scope of the TOR and with a report only to simplify the procedures of the CRZ Notification, 2011, the impugned Notification was implemented. Further, since the Committee Report formed the basis of the impugned Notification, the TOR given ought to have considered the performance and implementation of the CRZ Notification, 2011, an actual study into the issues faced by the local community and fisherfolk who are most affected by changes in the coastal areas, a study into the illegal constructions existing in CRZ areas and the loss of livelihood of the local communities owing to the same, a study into the sea level rise, salt water ingress, frequency and intensity of natural hazards due to climate change. The TOR however, only limits the scope of the study to discussions with State and Union Territory Governments and to study the errors in the CRZ Notification, 2011 and to simplify the procedures under the CRZ Notification, 2011. It is most strange that the report does not have a single annexure or reference which records the contents of documents relied upon by the Committee.

b. No consultation with the people who would be most affected by the new law: It is submitted that the Committee report was prepared solely on the basis of the presentation of and discussions with the State Government, who have an interest in making CRZ areas a commercial and tourist facility. As stated earlier, 68% of the public comments received for the Draft CRZ

Notification, 2018 when it was in public domain were objections. The State being a custodian of all the natural resources ought to have considered the fact that they would be acting against the needs of the public by issuing the impugned Notification. In contrast, the Swaminathan Committee Report strongly recommended the involvement of local coastal communities in the process of identifying ecologically sensitive areas and the implementation of the CRZ protections.

c. Objective of the report is a complete contradiction from the recommendations: While the Report quotes the objectives of the Notification to conserve the coastal ecosystems and communities, its recommendations are for the dilution of the existing provisions, in direct contradiction to the objectives of the Notification, using the guise of responding to the requests of the States, which are mainly for enabling constructions in the CRZ. Due to the failure to refer to any factual data, reliance has been placed only on superficial surmises and conjectures and the scope being limited to the wish list of the States for increasing human activities in the CRZ, the report ends up recommending the dilution of the provisions protecting the CRZ rather than increasing the protection, which is essential in view of the facts regarding increasing degradation in the past and future threats due to sea level rise, increased frequency and strength of storms and cyclones, ecological collapse and displacement of local communities. The Report states that 40% coast is eroding as compared to 22% in 2004 and 30% in

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2010, yet the Report attempts to increase human activities in this fragile region.

d. The recommendation of the Committee seem to do away with all the restrictions of the CRZ Notification, 2011 and to replace it with provisions under the Town and County Planning Regulations: The section in the report regarding the Terms of Reference 1(d) - "to examine errors/inconsistencies in CRZ Notification 2011 and procedural simplification" starts by stating, "*The Committee has examined the various issues raised by the coastal State Government and UTs vis-a-vis CRZ Notification, 2011. The Committee has also examined some of the relevant Court Orders in the matter. After taking into account the hardship faced by the people in the coastal areas especially due to the restrictions imposed on housing, road development and tourism development, the Committee is of the opinion that the present CRZ Notification, 2011 should be recast and a fresh notification shall be considered by the Government, which will supersede the CRZ Notification, 2011. This decision of the Committee is mainly founded on the premises that each of the coastal State/UT has well-laid Town and Country Planning Regulations including other developmental regulations which address most of the issues in the CRZ Notification, 2011. The imposition of the Notification by the Central Government on the State and UT Governments has restricted the housing development of the coastal communities. Although there is a*

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need to protect the coastal environment, the housing need of the communities is equally important."

Paragraph 2.5.17 on page 63 states, "*... The provisions in CRZ Notification are often overriding the Town and Country Planning Regulation of the State/UT Governments and could be considered as not appropriate from the legal point of view.*" Next para 2.5.18 states, "*Hence, it was felt that the provisions of Town and Country Planning Regulations should be adhered to the coastal areas, subject to ...*"

Para 3.3 on page 72 states, "*Since the setting up of fish-processing units fall under the purview of the State/UT Governments, issues relating to modernization may also be dealt by the respective coastal State/UT Governments.*" The report states on page 73, *Tourism projects in the CRZ-II areas may be taken up as per the local Town and Country Planning Regulations.*

The report states on page 78 regarding mangroves, *"3.11.1 The Committee after examination of the provisions of the CRZ Notification, 2011 it is observed that there is no adequate provision for management of ESAs which are categorized as CRZ-1 including the geomorphological and archaeological features. It was brought to the notice of the Committee that the mangroves are present in the Government as well as in the private lands. While the protection is provided in the Government land by the concerned State Government agencies, the owners of private land, who have planted*

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the mangroves and face difficulties as the mangrove land is declared as 'no development area. This provision of imposing no development on a private mangrove land is a disincentive to such land owners. While the Committee appreciates the efforts and initiatives taken by the private owners in developing mangroves, it is found that there are no incentives to such initiatives. Further, the Committee feels that the private land owners should also be enabled to undertake development as per the local Town and Country Planning Regulations. 3.11.2 1t was mentioned that the mangroves in case of more than 1000 m2 are required to provide 50 m buffer. However, unfortunately, the buffer zone of 50 m has led to encroachment, illegal dumping, construction activity and slum redevelopment Hence, to prevent such unauthorized and illegal activities which are harmful to mangroves, a walkway on stilts along the boundary may be permitted." Instead of incentivizing the protection of mangroves on private lands, the Committee finds it proper to allow destruction of them.

It is submitted that the CRZ regulations have been imposed, separately from the Town and County Planning Regulations, because of the ecological and socio-economic sensitivity of CRZ areas. The Committee has also recognized the ecological and socio-economic sensitivity of CRZ areas. However, by doing away with the protections granted under the CRZ Notification, 2011 and replacing it with the Town and County Planning Regulations, it is effectively nullifying the ecological and socio-economic

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sensitivity and considering it similar to the non-CRZ areas. The Report of the Western Ghats Ecology Expert Panel also notes that the Town and Country Planning administration does not have any implications in terms of environmental regulation.

It is submitted that the Town & Country Planning Department of the State of Goa has prepared and notified Regional Plan 2021 that shows large plots which lie in No Development Zones and other CRZ areas as settlement zones in blatant disregard to the ecology, environment and local communities, only to satisfy the requests of real estate companies, mass tourism and private interests. It is therefore necessary that the CRZ laws must be relied upon and remain in force, irrespective of the Town & Country Planning regulations, which are ineffective and inadequate. In fact the admitted position of the Government of Goa that it has erroneously and wrongfully demarcated land as "settlement zone" or "developable land" in the Regional Plan made under the Town and Country Planning Act, 1964 which are "low-lying paddy field, water body, khazan land, flood prone area, land having slopes more than 25%, forest land including private forest land, land falling under the buffer zone of Wild Life Sanctuaries (without the prior permission of Forest Department) and No Development Zone as per CRZ Notification .This is evident from the order dated 28.03.2018 wherein the Town and Country Planning Department of the Government of Goa brought into effect the Regional Plan of 2021. A copy of the order dated 28.03.2018 has been

annexed hereto and marked as **Annexure A-16.** Vide an order dated 26.02.2019 in PIL WP No. 45/2018, the Hon'ble High Court of Goa recorded the commitment of the Town and Country Planning Department to ensure the provisions of the order dated 28.03.2018 and such erroneously demarcated eco-sensitive lands would not be developed upon without the prior approval of the GCZMA be complied with. A copy of the order dated 26.02.2019 of the Hon'ble High Court has been annexed hereto and marked as **Annexure A-17**

e. The problems recognized by the Committee report will only increase, if recommendations of the Committee are to be followed: The report recognizes that some of the key issues faced along the coast include destruction of coast for economic use, vulnerability to natural disasters, pollution by industries and threatened food security. It is beyond any understanding that after recognizing these are the issues, the report has then gone ahead to make recommendations that will only amplify all of the above issues.

f. Non-application of mind by the Committee: The Committee states on page 64, "*... The present regulations of NDZ of 200 m have been highly restrictive in the densely populated parts of the country, which has hindered the housing development of the local communities. The Committee is of the opinion that the housing issues of local communities must be addressed immediately.*"

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Further the report states under para 3.2.3. "*The Committee after detailed discussion on the issue is of the opinion that the dwelling units of the coastal communities in CRZ-111 areas which have been constructed in violation of the CRZ Notification shall be regularized by the concerned States/UTs Government following the local town and country construction norms. If any of these violations are pending before the Court, the State Government may take up the matter, and with the approval of the Court such violations could be regularized.*"

Further the report refers to SICOM being created to implement World Bank sponsored Island Coastal Zone Management in the country with objectives such as, "*(e) To explore various possibilities of exchange programme in terms of visits, information exchange etc., with other countries especially in South East Asia, where similar environmental and demographic pressures exist*" and "*(h) To prepare a comprehensive capacity development plan for all the stakeholders like Ministry of Shipping, Tourism, Petroleum, Agriculture, Fisheries etc., and execute them*". It is necessary that SICOM and NCSCM, who are appointed for shipping, tourism and petroleum interests are excluded from the preparation and implementation of the CRZ laws, because the coast is at the biggest threat from these very interests. Instead, the Government scientific institutes which are independent of the economic interests, such as NIO, must be given the tasks in consultation with the local communities.

g. The attitude of the Committee vis-à-vis the impact of its recommendation has been very casual: The Committee met only on six occasions as stated on page 12 of the report, out of which one day each were for examining issues related to the three States that had made the initial representations, one to meet all the other coastal States/ UTs and two to prepare the report. It is clear that only casual talks were held and that the detailed and rigorous scientific analysis necessary for this complex subject having huge socio-economic impact could not have been made in such introductory meetings.

2. It is submitted that the Committee Report is just a means to promote tourism and development of hotels in CRZ areas. The Committee Report opens up CRZ-I and CRZ-III areas to eco-tourism facilities and homestays, under the facade of providing alternative livelihood to the local communities, which shows the malafide intent of the Respondent herein.

A copy of the Dr. Shailesh Nayak Committee Report is marked and annexed herewith as **Annexure A- 18**

G. THE IMPUGNED NOTIFICATION VIOLATES THE PRINCIPLE OF NON-REGRESSION:

1. The doctrine of Non-Regression is a well-established norm in International law, traditionally recognized in the area of human rights; it is

founded on the principle that law should not be modified to the detriment of recognized human rights. This principle is increasingly being interpreted and applied in international environmental law.India has ratified the Stockholm Convention (on human environment), 1972 with the objective of preserving and enhancing the human environment. The Hon'ble Supreme Court, recognizing the depletion of marine resources, emphasized the need and the legal obligation to maintain our international commitments in order to protect the coastal environment in its judgment in *S. Jagannath v. Union of India (1997) 2 SCC 87*:

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"With noticeable increase in marine pollution and the consequential decline in marine resources, serious concern was expressed in the United Nations' Conference on Human Environments in Stockholm (1972) attracting global attention towards the urgent need of identifying the critically polluted areas of the marine environments, specially in coastal waters, for urgent remedial actions. The Conference unanimously resolved that the littoral States should take early action at their National level for assessment and control of marine pollution from all sources and carry out systematic monitoring to ascertain the efficacy of the pollution regulatory actions taken by them. In the background of the Stockholm Conference and in view of 1982 Convention on the "Law of the Sea" defining jurisdiction of territorial waters, a model comprehensive Action Plan has been evolved under the United Nations' Environment Programme (UNEP). Keeping with the international commitments and in greater National interest, the Government of India and the Governments of the coastal States are under a legal obligation to control marine pollution and protect the coastal-environments."

2. The principle of Non-Regression was reiterated by this Hon'ble Tribunal in its judgment dated 08.12.2017 in *Society for Protection of Environment & Biodiversity v. Union of India (O.A NO. 677 of 2016), Pushp Jain v. Union of India (OA 01/2017), Ajay Kumar Singh v. MoEF&CC&Ors. (OA 7/2017), Mahendra Pandey v. Union of India &Ors. (OA 55/2017)* and *R. Sreedhar*

v. Union of India (OA 67/2017), where the Hon'ble Tribunal quashed a Notification issued in 2016 which sought to dilute the environmental legislation and held:

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"Under the International law, the doctrine of Non-regression is an accepted norm. It is founded on the idea that environmental law should not be modified to the detriment of environmental protection. This principle needs to be brought into play because today environmental law is facing a number of threats such as deregulation, a movement to simplify and at the same time diminish, environmental legislation perceived as too complex and an economic climate which favours development at the expense of protection of environment. The draft amendment of the existing environmental laws should be done with least impact on environment protection that was available under the existing law or regime. The present amendment in the Notification particularly few clauses that we will refer hereinafter can lead to severe environmental impacts....

32... Thus, some other provisions of the same Notification ex-facie suffer from legal infirmities and are incapable of being implemented in accordance with the scheme of federal structure under the Constitution of India. Out of them, some provisions are directly opposed to the Principle of Non-regression as they considerably dilute the existing environmental laws and standards to the prejudice of the environment..."

The Draft CRZ Notification 2018 is full of deregulations and diminutions of environmental legislation, without any regard to the Principle of Non-Regression. In view of the total failure to adhere to this basic Principle, the Draft CRZ Notification, 2018 has been prepared with changes that are exactly opposite to what is necessary, which is to increase and improve the environmental protection.

3. The impugned Notification also seeks to dilute an existing environment legislation, violating the doctrine of non-regression. Further Section 3 of the EP Act, 1986 limits the power given to the Central Government only to

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strengthen environmental norms and limit the areas accessible to industries. Yet, it is a general tendency of the Respondent to issue notifications diluting the existing environmental norms. With the increase in development in the coastal areas, the marine resources are under tremendous pressure and Goa has already seen a considerable drop in the fish catch over the past few years, due to which the fisherfolk are losing their means of livelihood. The Respondent being the apex Ministry in enforcement of environmental laws in the country is required to be more mindful about the environment while issuing notifications; however, it seems to be acting in the exact opposite manner.

4. It is noteworthy that the Swaminathan Committee noted, in relation to the amendments made to reduce the efficacy of the CRZ Notification of 1991 that,

" The several amendments brought into the original notification have to some extent distracted from the original objectives and the spirit of the Coastal Regulation Zone Notification, 1991.

"The range of amendments presents a trend that has allowed commercial and industrial expansion in coastal areas. Many of these activities have proved to be extremely harmful to the ecological and livelihood security of the coastal areas. The Committee is of the view that CRZ notification needs to be strengthened and made more scientific in its overall approach, keeping in

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mind both the needs of the coastal communities (including fishing, agricultural) and the conservation of the coast. "

That inspite of the warning against the reduction of protections under the CRZ regime and even judgments of the Hon'ble Supreme Court of India disallowing the rolling back of protections under the CRZ Notification,1991, the impugned notification glaringly reduces the impact of the provisions of the CRZ Notification of 2011.

5. The Applicants submit that the impugned Notification dated 18.01.2019 will have a catastrophic effect on the coastal States in the country and will destroy the livelihoods of millions who are supported by the coastal ecology. It will make the coastal states more vulnerable to natural hazards and disasters, which will lead to widespread inundation, loss of ecosystems, coastal habitats, infrastructure, property and life. The impugned Notification would also amount to a violation of the right to life, livelihood and clean environment under Article 21.

6. The Applicants herein have made representation to the Respondent Authority when the Draft CRZ Notification, 2018 was published in public domain, which is annexed hereto and marked as **Annexure A- 19**

7. Being aggrieved by the acts of omissions and commissions on the part of the Respondents, the Applicants wish to approach this Hon'ble Tribunal on the following amongst other grounds which are without prejudice to one another:

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H. **Grounds**:

A. That the coastal zone being a transition between marine and territorial areas, including the shore, wetland, mangrove, mudflat, sea grass, salt marsh and seaweed ecosystem, it provides livelihood to numerous people living along the coast line of the country and needs to be protected;

B. Because in 'India's Intended Nationally Determined Contribution: Working towards Climate Change' to United Nations Framework Convention on Climate Change , India has recognized the vulnerability of coasts to cyclones, tsunamis, droughts, storm surge and volcanic eruptions and has adopted strategies including ecological management, conservation and protection of critical habitats, ensuring livelihood security for local communities, conserving and protecting the coastal stretches, imposing restrictions on setting up and expansion of industries in CRZ areas;

C. That the impugned Notification, with a view to "conserve and protect the unique environment of coastal stretches and marine areas" has significantly diluted the CRZ Notification, 2011, leaving the ecologically sensitive coastal areas bereft of most of the protections granted to it under the CRZ Notification, 2011;

D. That the impugned Notification diluting the CRZ Notification, 2011 has been issued in ultra vires the EP Act, 1986 and EP Rules, 1986 because it was issued under Section 3(2)(v) of the EP Act, 1986; the legislative intent expressed through Section 3 of the EP Act, 1986 grants power to the Central Government only for strengthening the Environmental laws by restricting the areas where industries or operations shall not be carried out (Section 3(2)(v));

E. That the impugned Notification has been issued only under Section 3(2)(v) of the EP Act, 1986 and not under Rule 5 of the EP Rules, 1986, which lays down the procedure to be followed by the Central Government while exercising its power under Section 3(2)(v);

F. That the provisions of the impugned Notification do not seek to protect or improve the environment and have only been issued to dilute the CRZ Notification, 2011;

G. That the Ld. National Green Tribunal, in its judgment dated 18.12.2017 in *Society for Protection of Environment & Biodiversity v. Union of India (O.A NO. 677 of 2016)* and*Pushp Jain v. Union of India (OA 01/2017)* and*Ajay Kumar Singh v. MoEF&CC&Ors. (OA 7/2017)* and *Mahendra Pandey v. Union of India &Ors. (OA 55/2017)* and *R. Sreedhar v. Union of India (OA 67/2017)*,explained the legislative intent in Section 3 of EP Act:

"25. Besides noticing the above mentioned deficiencies in and dilutions of the existing laws by the impugned Notification, we must also notice a very strong legal infirmity in it. Admittedly, the notification has been issued by the MoEF& CC in exercise of its powers under sub-section (1) read with clause (V) of subsection (2) of Section (3) of the Act of 1986 and clause (d) of sub-rule (3) of Rule (5) of the Environment (Protection) Rules, 1986. By the impugned Notification, paragraph 14 is sought to be inserted after paragraph 13 of the existing Notification/Regulations of 2006. The powers under these provisions can be exercised under Section 3(2)(5) of the Act of 1986 which empowers the Central Government to take measures to protect and improvement of the quality of environment in regard to restrictions of areas in which any industry/operations or process or class of industries operations or processes shall not be carried out or shall be carried out subject to certain safeguards. In terms of section 3 (1)of the Act, this power of taking measures is to be exercised by the Central Government when it deems necessary and expedient for the purpose of protecting and improving the quality of environment and preventing, controlling and abating environmental pollution (emphasis supplied). Rule 5 deals with the prohibition and restriction on the locations of industries and the carrying on process and operations in different areas. It gives power to the Central Government to take into consideration the factors while prohibiting or restricting the locations of industries and carrying on of process/operations in different areas. Sub-rule 3 of this Rule contemplates the procedure to be followed by the Central Government while issuing the notification for imposing prohibition or restriction as stated in Sub-rule (1) of Rule 5.Thus, both the sections and the rule gives power for issuing of any notification and placing prohibition / restriction in their terms, subject to the conditions, i.e., while issuing notification the procedure under Rule 5 (3) should be followed

and more importantly it should be exercised only for the purpose of protecting and improving the quality of the environment and preventing pollution. Once any of these essential statutory features are missing the notification issued would be liable to be interfered with. The major part of the Notification does not satisfy these ingredients.";

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H. That the Hon'ble Supreme Court has, vide judgment in *Indian Council For Enviro-Legal Action v. Union of India, (1996) 5 SCC 281* quashed an earlier notification seeking to dilute the CRZ Notification, 1991 because it gave the Central Government too much arbitrary power which could result in serious environmental degradation:

37. In the written submissions filed by the Union of India in this Court on 29-9-1995, this amendment has been sought to be justified and explained by it in the following words:
"As regards the developmental activities up to the High Tide Line, the Central Government may for reasons recorded in writing permit construction in any particular case taking into account the geographical features and other relevant aspects.
This is necessary as providing of 200 metres of no-development zone all along was not possible in the coastal line in a uniform way on account of wide variations in geographical features, existing human settlements and developmental activities requiring foreshore facilities etc."
The relaxation with regard to NDZ was sought by the Hotel and Tourism Industry and they desired concession only with regard to 20-30 kms of coastline. By the amended notification, power had been given to the Central Government to make such relaxation with regard to any part of the 6000 kms long coastline of India. The Central Government has, thus, retained the absolute power of relaxation of the entire 6000 kms long coastline and this, in effect, may lead to the causing of serious ecological damage as the said provision gives unbridled power and does not contain any guidelines as to how or when the power is to be exercised. The said provision is capable of abuse. The Central Government also did not confine the relaxation to the extent as specified by the Vohra Committee. No satisfactory reason has been given by the Union of India as to why it departed from the opinion of the Expert Committee and that too in such a manner that the concession which has now been given is far in excess of what was demanded by the Hotel and Tourism Industry.

38. We, accordingly, hold that the newly added proviso in Annexure II in paragraph 7 in sub-paragraph (1) (Item i) which gives the Central Government arbitrary, uncanalized and unguided power, the exercise of which may result in serious ecological degradation and may make the NDZ ineffective is ultra vires and is hereby quashed. No suitable reason has been given which can persuade us to hold that the enactment of such a proviso was necessary, in the larger public interest, and the exercise of power under the said proviso will not result in large-scale ecological degradation and violation of Article 21 of the citizens living in those areas.

I. Thatwith regard to the overriding powers of the Environment (Protection) Act, 1986 and the EIA Notification, 2006, the Ld. National Green Tribunal, in *S P Muthuraman v Union of India [O.A. No 37 of 2015 (Principal Bench)]* held as follows:

"The provisions of the Act of 1986, Rules of 1986 and the Notification of 2006 are statutory documents having the force of law. Providing a mechanism in exercise of administrative or executive power in complete deviation or disregard to the law in force, would be contrary to the basic rule of law. Besides it being in derogation to the environmental jurisprudence, it would also have adverse impacts upon environment and ecology of the area. There is greater need for compliance to the statutory provisions. Such compliance would be essential in the interest of the environment...."

J. That while adjudicating whether the freeze on FSI norms as per 1991 in CRZ areas was reasonable and justified, the Hon'ble Bombay High Court held, in the matter of *Overseas Chinese Cuisine (India) Pvt. Ltd. v. Municipal Corporation of Greater Bombay, 1999 SCC OnLine Bom 473,*

" It serves an important purpose, namely, to highlight that irrespective of what Local Town and Country Planning Regulations may provide for in future in any nook on comer of the country, and irrespective of how the norms of Floor Space Index/Floor Space Ratio might be revised at some

future point of time, the building activity permitted under the Notification in C.R.Z.-II shall be frozen to the laws and norms existing on the date of the Notification. This interpretation, in our view, in perfectly is consonance with the legislative intention behind the Environment (Protection) Act, 1986."

K. That the delegated legislation has been issued in contravention to the parent Act and in this regard, the Hon'ble Supreme Court in *Cellular Operators Assn. of India v. TRAI, ((2016) 7 SCC 703 : 2016 SCC OnLine SC 486*) held:

Parameters of judicial review of subordinate legislation:
34. In State of T.N. v. P. Krishnamurthy [State of T.N. v. P. Krishnamurthy, (2006) 4 SCC 517] , this Court after adverting to the relevant case law on the subject, laid down the parameters of judicial review of subordinate legislation generally thus: (SCC pp. 528-29, paras 15-16)
"15. There is a presumption in favour of constitutionality or validity of a subordinate legislation and the burden is upon him who attacks it to show that it is invalid. It is also well recognised that a subordinate legislation can be challenged under any of the following grounds:
(a) Lack of legislative competence to make the subordinate legislation.
(b) Violation of fundamental rights guaranteed under the Constitution of India.
(c) Violation of any provision of the Constitution of India.
(d) ***Failure to conform to the statute under which it is made or exceeding the limits of authority conferred by the enabling Act.***
(e) Repugnancy to the laws of the land, that is, any enactment.
(f) Manifest arbitrariness/unreasonableness (to an extent where the court might well say that the legislature never intended to give authority to make such rules).
16. ***The court considering the validity of a subordinate legislation, will have to consider the nature, object and scheme of the enabling Act, and also the area over which power has been delegated under the Act and then decide whether the subordinate legislation conforms to the parent statute. Where a rule is directly inconsistent with a mandatory provision of the statute, then, of course, the task of the court is simple and easy.*** *But where the contention is that the inconsistency or non-conformity of the rule is not with reference to any specific provision of the enabling Act, but with the*

object and scheme of the parent Act, the court should proceed with caution before declaring invalidity." (Emphasis Supplied)

L. In the matter of *Secretary, Ministry of Chemicals & Fertilisers v. Cipla Ltd.* (2003) 7 SCC 1, the Hon'ble Supreme Court has held as follows:-

"...Broadly, the subordinate law making authority is guided by the policy and objectives of the primary legislation disclosed by the preamble and other provisions.

...

Though exactitude and meticulous conformance is not what is required, it is not open to the Government to go hay-wire and flout or debilitate the set norms either by giving distorted meaning to them or by disregarding the very facts and factors which it professed to take into account in the interest of transparency and objectivity."

Further, in the matter of *J.K. Industries Ltd. v. Union of India [(2007) 13 SCC 673]* it was held as follows:

"68. It is well settled that, what is permitted by the concept of delegation is delegation of ancillary or subordinate legislative functions or what is fictionally called as power to fill up the details. The judgments of this Court have laid down that the Legislature may, after laying down the legislative policy, confer discretion on administrative or executive agency like Central Government to work out details within the framework of the legislative policy laid down in the plenary enactment. Therefore, power to supplement the existing law is not abdication of essential legislative function. Therefore, power to make subordinate legislation is derived from the enabling Act and it is fundamental principle of law which is self-evident that the delegate on whom such power is conferred has to act within the limitations of the authority conferred by the Act. It is equally well settled that, Rules made on matters permitted by the Act in order to supplement the Act and not to supplant the Act, cannot be held to be in violation of the Act. A delegate cannot override the Act either by exceeding the authority or by making provisions inconsistent with the Act."

M. Because since the CRZ Notification, 1991 first came into force, the Respondent herein has been modified and diluted 34 times and reiterated

twice already, being the most amended law in the country; all these dilutions have been carried out under Section 3 of the EP Act, 1986, even though the EP Act does not permit dilution of environmental norms;

N. That the Central Government did not carry out an Environmental Impact Assessment, to understand the effect of the impugned Notification, as required by them under Section 36(4)(i) of the Biological Diversity Act, 2002;

O. Because by issuing the impugned Notification which was significantly and materially different from the Draft CRZ Notification that was in public domain for comments from the public, the Respondent herein has rendered the entire process of publication for public participation a mere formality;

P. That the Division Bench of the Hon'ble High Court of Rajasthan, in *Maula Bux and Orsv. The Appellate Tribunal of State Transport Authority, Jaipur and Ors*, AIR 1962 Raj 19, held:

"It is incumbent on the rule making authority to publish a draft of the rule under Section 23 of the General Clauses Act and to invite objections from all concerned. The authority has further to consider the objections, if any, and to make a rule in exercise of its rule making power. The powers of rule making under Sec. 68 of the Motor Vehicles Act are subject to the condition of previous publication only and after a draft of the amendment of rules is published as required by Section 23, it is open to the authority to make rules

with or without changes in the previously published draft, subject however to the condition that the rule so made is not absolutely foreign to the draft."

Q. That the Hon'ble High Court of Bombay has reiterated the need for public participation, and set aside a Notification that was issued without notice and had held that the process inviting suggestions and objections cannot be an empty formality in *Dr.Avinash Ramkrishna Kashiwar vs. the State of Maharashtra(2015)5 Mh.L.J.*:

"17."It could thus be seen that it appears to be settled position of law that the requirement of previous publication inviting objections and suggestions is not an empty formality. It is with an intention to enable persons likely to be affected, to be informed, so that they may take steps as may be open to them and the objections/suggestions made would be required to be taken into consideration by the authorities before issuing a final notification".

26. "In the result, we hold that the impugned notification dated 26.07.2013 is not sustainable in law and, therefore, quashed and set aside. Rule is, therefore, made absolute in the aforesaid terms with no orders as to costs."

R. That the High Court of Delhi in *Shiva Alloys (Pvt.) Ltd. and Anr. v. Union of India & Ors.*(Citation) observed that the notice issued for public comments as per the procedure prescribed under the Act did not include the ban/ prohibition which was included in the final Notification, and held that part which was not included to be illegal:

"4. ...The Applicants have been prejudiced thereby. In respect of these furnaces, no notice was issued as per the procedure under Section 10 of the Act and thus, insofar as inclusion of the Applicants in the ban/ prohibition is concerned, there is a clear violation of mandatory procedure which is to be followed in terms of Section 10 of the Act.
5. It is trite law when the mandatory procedure is not followed, the action of the authorities is null and void. Those who build the procedural sword normally get perished by the same. That is what happened in the instant case.

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The clause in the Master Plan which bans the induction furnaces of the capacity of less than 3 tons is therefore, illegal and has to be struck down. We order accordingly."

S. That the Hon'ble Supreme Court of India held at para 9 of its judgment in the matter of *State of Punjab v. Tehal Singh*, (2002) 2 SCC 7 that where the legislature has provided for giving an opportunity of hearing before effectuating a substantial change in subordinate legislation, an opportunity of hearing is sine qua non and failure to give such an opportunity of hearing to the residents would render the declaration or change invalid;

T. That the coastal State Governments, including the Government of Goa have taken an inordinate number of years to complete the preparation of the CZMPs under the 2011 Notification, despite being directed time and again by this Hon'ble Tribunal to do so, and the CZMPs prepared for the State of Goa under the 2011 CRZ Notification are flawed, inadequate and incomplete, and have omitted the demarcation of various ecologically and socio-economically sensitive areas.

U. That the Shailesh Nayak Committee report, on the basis of whose recommendation the impugned Notification has been issued, had the limited scope of addressing the grievances with respect to the CRZ Notification, 2011 raised by Maharashtra, Karnataka and Kerala, and simplifying procedures;

V. That the Shailesh Nayak Committee report could not have encompassed the need for a new law or the issues faced for implementation of the CRZ Notification, 2011 because the TORs granted to it, on the basis of which the Committee carried out its study, was only to correct any irregularities in the CRZ Notification, 2011 and simplifying the procedures under the CRZ Notification, 2011; the scope of the study did not include the needs of the coastal areas, the implementation of the CRZ Notification, 2011, or the risk of natural disasters faced by the coasts, without understanding of which, any new law will be disastrous to the local communities, and to any activity carried out in these areas;

W. That the Shailesh Nayak Committee report is based solely on meetings with the State Governments and has failed to consider the needs of the fisherfolk and local communities, who will be most affected by the impugned Notification, entirely;

X. That the Shailesh Nayak Committee recommends application of Town and Country Planning regulations to be applicable to CRZ areas, instead of specific CRZ Regulations, showing its complete failure to understand the needs of coastal areas and the sensitive ecology supported by it;

NOTARY SUBHASH KRISHNA KANEKAR SALCETE TALUKA MARGAO-GOA Regd. No 344/13 Exp. Dt: 28/02/2024 GOVT. OF GOA (INDIA)

Y. That the Shailesh Nayak Committee report has given all its recommendations without the final CZMPs, without any scientific studies and without understanding the needs of the coastal communities;

Z. That the impugned Notification violates the doctrine of non-regression, a well-recognized principle in international human rights law, being adopted in environmental law, which was also adopted by the Hon'ble National Green Tribunal in its judgement dated 08.12.2017 in *Society for Protection of Environment & Biodiversity v. Union of India (O.A NO. 677 of 2016)* and *Pushp Jain v. Union of India &Anr. (OA 01/2017)* and *Ajay Kumar Singh v. MoEF&CC&Ors. (OA 7/2017)*, where the Hon'ble National Green Tribunal quashed a Notification issued in 2016 which sought to dilute the environmental legislation and held:

"Under the International law, the doctrine of Non-regression is an accepted norm. It is founded on the idea that environmental law should not be modified to the detriment of environmental protection. This principle needs to be brought into play because today environmental law is facing a number of threats such as deregulation, a movement to simplify and at the same time diminish, environmental legislation perceived as too complex and an economic climate which favours development at the expense of protection of environment. The draft amendment of the existing environmental laws should be done with least impact on environment protection that was available under the existing law or regime. The present amendment in the Notification particularly few clauses that we will refer hereinafter can lead to severe environmental impacts....

32... Thus, some other provisions of the same Notification ex-facie suffer from legal infirmities and are incapable of being implemented in accordance with the scheme of federal structure under the Constitution of India. Out of them, some provisions are directly opposed to the Principle of Non-

regression as they considerably dilute the existing environmental laws and standards to the prejudice of the environment. Thus, in the facts and circumstances of the present case, the Tribunal can safely take recourse to the doctrine of severability to declare some of the provisions of the Notification as ultra-vires or ineffective while holding the other part of the Notification as legally sound and sustainable."

NOTARY SUBHASH KRISHNA KANEKAR SALCETE TALUKA MARGAO-GOA Regd. No 344/14 Exp. Dt: 28/02/2024 GOVT. OF GOA (INDIA)

AA. That the Respondent has not applied its mind while exercising the powers granted to it and the Hon'ble Supreme Court held that in such cases, the judiciary can exercise its power of judicial review:

"By now, the parameters of the Court's power of judicial review of administrative or executive action or decision and the grounds on which the Court can interfere with the same are well settled and it would be redundant to recapitulate the whole catena of decisions of this Court commencing from Barium Chemicals Ltd. v. Company Law Board case on the point. Indisputably, it is a settled position that if the action or decision is perverse or is such that no reasonable body of persons, properly informed, could come to or has been arrived at by the authority misdirecting itself by adopting a wrong approach or has been influenced by irrelevant or extraneous matters the Court would be justified in interfering with the same."

BB. Because in the matter of *M.C. Mehta vs. Union of India (Writ Petition 4677 of 1985)*, the Hon'ble Supreme Court held that when faced with a situation where if an activity is allowed to go ahead, there may be irreparable damage to the environment and if it is stopped, there may be irreparable damage to economic interest, protection of the environment would have precedence over the economic interest. The Precautionary Principle requires anticipatory action to be taken to prevent harm. The harm can be prevented even on a reasonable suspicion. It is not always necessary that there should be direct evidence of harm to the environment.

CC. That the Respondent followed bad practice in policy making by failing to consult the Ministry of Law and Justice before finalizing the impugned Notification;

DD. That the Respondent has issued the impugned Notification, despite the fact that 68% of the comments received by the Draft CRZ Notification were objections. This is gross violation of the public trust doctrine;

EE. Because India has witnessed 8 violent cyclones since 2000, including Tauktae, Amphaan, Asani, Yaas, Fani, Sitarang, Nisaraga, Jawad, Ochki and Phailin, and any new law that comes in place to supersede the CRZ Notification, 2011 ought to consider the growing number of natural disasters, the impact of global warming, and rise in sea level, in order to assess the protections needed for the coasts and the activities which can permissible within CRZ areas;

NOTARY SUBHASH KRISHNA KAMAT SALCETE GOA MARGAO Regd. No 344/14 EXP. DT: 28/02/2024 GOVT. OF GOA (INDIA)

I. LIMITATION :-

The Applicants submit that there has been no delay in filing this Application, as the Applicants herein had initially challenged the CRZ Notification of 2019 vide a Public Interest Litigation Petition No. 19/2019. Vide its order dated 03.01.2023 in the said Public Interest Litigation Petition as well as

other connected Petitions, the Hon'ble Bombay High Court was pleased to grant liberty to the Applicants to file the present Application in the National Green Tribunal, as this Hon'ble Tribunal would be the correct forum to hear the matter. In the said order dated 03.01.2023, the Hon'ble High Court was pleased to direct at paragraph 8 that *"we also observe that in case the Applicants approach the Hon'ble NGT within 4 weeks from today, the proceedings they institute will be considered, in accordance with law and on their own merits without raising the issue with respect to limitation."*. The Hon'ble High Court also recorded the statement of the standing counsel for the Central Government that the Central Government would not raise any issue on limitation before the Hon'ble NGT.

NOTARY SUBHASH KRISHNA KANEKAR MARGAO GOA Reg. No 344/14 Exp. Dt: 28/02/2024 GOVT. OF GOA (INDIA)

J. **Reliefs prayed for:-**

The Applicants therefore humbly pray that this Hon'ble Tribunal be pleased to :-

a. Quash and set aside the impugned CRZ Notification, 2019 dated 18.01.2019.

b. Direct the Respondent authorities herein to revoke all development permissions granted as per the impugned Notification dated 18.01.2019;

c. Restrain the Respondent Authorities from issuing any further development permissions as per the impugned Notification dated 18.01.2019;

d. Direct the Respondents to continue implementing the CRZ Notification of 2011 till the finalisation of a fresh CRZ Notification within the State of Goa;

e. That pending hearing and final disposal of this Application, this Hon'ble Tribunal be pleased to stay the operation of the impugned CRZ Notification, 2019 dated 18.01.2019;

f. That pending hearing and final disposal of this Petition, this Hon'ble Tribunal be pleased to direct the Respondent authorities to revoke all development permissions granted as per the impugned Notification dated 18.01.2019;

g. That pending hearing and final disposal of this Petition, this Hon'ble Tribunal be pleased to direct the Respondent herein not to issue any further development permissions as per the impugned Notification dated 18.01.2019

h. That pending hearing and final disposal of this Petition, this Hon'ble Tribunal be pleased to direct the Respondents to continue implementing the CRZ Notification of 2011 till the finalisation of a fresh CRZ Notification within the State of Goa;

NOTARY
SUBHASH KRISHNA KANEKAR
SALCETE TALUKA
MARGAO-GOA
REGD. NO 344/14
EXP. DT: 28/02/2024
GOVT. OF GOA (INDIA)

VERIFICATION

I, David Rodrigues, the Applicant No. 1 above named, age 56 years, r/o House No 1053/B/4, Ulandi, Gandhi Road, Bacbhat, Raia, Salcete, Goa, 403720 do hereby state and solemnly declare that what is stated in Paras Nos. 1 to 45 is true to my own knowledge and what is stated in the remaining Paras. Nos. A to EE and Para No 46 is stated on information and belief and I believe the same to be true.

Solemnly declared at Margao, Goa

On this 30th day of January 2023

Applicant No. 1

(Mr. David Rodrigues)

(Secretary, Federation of RainbowWarriors)

NOTARY
SUBHASH KRISHNA KANEKAR
SALCETE TALUKA
MARGAO-GOA
Regd. NO 344/14
EXP.ON:28/02/2024
GOVT OF GOA (INDIA)

Applicant No 2

(Adv. Ohm Stanley Rodrigues)

(Convenor, Our River Our Rights)

BEFORE ME

30/01/2023

SUBHASH KRISHNA KANEKAR
NOTARY
SALCETE TALUKA
STATE OF GOA (INDIA)
Reg. No. 162/2023
Date: 30/01/2023

NOTARY SUBHASH KRISHNA KANEKAR SALCETE TALUKA MARGAO-GOA Regd.No 344/14 Exp.Dt:28/02/2024 GOVT. OF GOA

BEFORE THE NATIONAL GREEN TRIBUNAL SITTING AT

PUNE

MEMORANDUM OF APPLICATION

(Under Section 18 (1) read with Sections 14 and 20 of the National Green Tribunal Act, 2010)

APPLICATION NO. _____ OF 2023

BETWEEN :

Federation of Rainbow Warriors and Anr)...Applicants

Versus

Union of India and Ors) ...Respondent

AFFIDAVIT IN SUPPORT OF THE APPLICATION

We, David Rodrigues, the Applicant No. 1 above named, age 56 years, r/o House No 1053/B/4, Ulandi, Gandhi Road, Bacbhat, Raia, Salcete, Goa, and Mr. Ohm Stanley Rodrigues, Convenor of the Applicant No.2, having its office at Baboy Commerce Center, SO22 B Building, Behind Big G Mall,Pajifond, Margao, Goa - 403601, do hereby state on solemn affirmation:

1. We say that we have read the contents of the Application and have understood its contents and are therefore

competent to file an affidavit in support of the said Application.

2. We state that the documents annexed herein are true copies and have been collected by us through RTI applications and on the websites of the Respondent Authorities.

3. We further state that do hereby state what is stated in the Application is true to our knowledge or on information and belief which we believe the same to be true.

Solemnly affirmed at Margao, Goa)
Dated this 30th day of January 2023)

(DEPONENT)
Applicant No. 1
(Mr. David Rodrigues, Secretary, Federation of RainbowWarriors)

Applicant No 2
(Adv. Ohm Stanley Rodrigues, Convenor, Our River Our Rights)

Identified by me

RONITA BHATTACHARYA

Advocate for the Applicant

BEFORE ME

pp

99(a)



Solemnly affiremed before me by
Shri/~~Smt~~. David Rodrigues
Who is identified to me by Self
Shri/Smt. Epic No. TVK0311993
Who is personally known to me
this 30th day of Jan. 2023
Reg. No. 162/2023

30/01/2023

SUBHASH KRISHNA KANEKAR
NOTARY
SALCETE TALUKA
STATE OF GOA (INDIA)

BEFORE THE NATIONAL GREEN TRIBUNAL SITTING AT PUNE

MEMORANDUM OF APPLICATION

(Under Section 18(*1*) read with Sections 14 and 20 of the National Green Tribunal Act, 2010)

Application No. _____ of 2023

BETWEEN :

Federation of Rainbow Warriors and Anr) ...Applicants

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NOTARY SUBHASH KRISHNA KANEKAR GOVT. OF GOA INDIA

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Filed By

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NOTARY SUBHASH KRISHNA KANEKAR SALCETE TALUKA MARGAO-GOA Regd. No 344/14 EXP. DT: 28/02/2024 GOVT OF GOA (INDIA)

ANNEXURE A-1

2109

Maria S.

IN THE HIGH COURT OF BOMBAY AT GOA

PUBLIC INTEREST LITIGATION WRIT PETITION NO.21 OF 2018

WITH

PUBLIC INTEREST LITIGATION WRIT PETITION NO.18 OF 2019

WITH

PUBLIC INTEREST LITIGATION WRIT PETITION NO.19 OF 2019

WITH

STAMP NUMBER (MAIN) NO.2322 OF 2019(FILING)

WITH

PUBLIC INTEREST LITIGATION WRIT PETITION NO.21 OF 2019

WITH

PUBLIC INTEREST LITIGATION WRIT PETITION NO.22 OF 2018

PUBLIC INTEREST LITIGATION WRIT PETITION NO.21 OF 2018

Kashinath Jairam Shetye And 8 Ors. ...Petitioners

Versus

Union of India, thr. Jt. Secretary, Ritesh Kumar Singh And Anr. ... Respondents

Petitioner in person.

Mr Raviraj Chodankar, Standing Counsel *for Respondent No.1.*

Mr Devidas J. Pangam, Advocate General *with* **Ms Maria S. J. Correia, Additional Government Advocate** *for Respondent State.*

NOTARY SUBHASH KRISHNA KANEKAR SALCETE TALUKA MARGAO GOA Exp. On: 29/02/2024 GOVT. OF GOA (INDIA)

WITH

PUBLIC INTEREST LITIGATION WRIT PETITION NO.18 OF 2019

Kashinath Jairam Shetye And 7 Ors. ...Petitioners

Versus

Union of India, thr. Director MOEF, New Delhi And 2 ors. ... Respondents

Petitioner in person.

Mr Raviraj Chodankar, Standing Counsel *for Respondent No.1.*

Mr Devidas J. Pangam, Advocate General *with* **Ms Maria S. J. Correia, Additional Government Advocate** *for Respondent State.*

WITH

PUBLIC INTEREST LITIGATION WRIT PETITION NO.19 OF 2019

Federation of Rainbow Warriors, thr. Its Secretary, David Rodrigues And 2 Ors. ...Petitioners

Versus

Union of India, thr. The Secretary, Ministry of Environment, New Delhi And Anr. ... Respondents

Ms Maria Caroline Collasso, Advocate *for the Petitioner No.1.*

Mr Raviraj Chodankar, Standing Counsel *for Respondent No.1.*

Mr. Devidas J. Pangam, Advocate General *with* **Mr Suhas Parab, Additional Government Advocate** *for Respondent State.*

NOTARY SUBHASH KRUSHNA KANEKAR SALCETE TALUKA MARGAO-GOA EXP. 01/29/02/2024 GOVT OF GOA (INDIA)

WITH

STAMP NUMBER (MAIN) NO.2322 OF 2019 (FILING)

Old Cross Fishing Canoe Owners Co-op. Society Ltd., thr. Its President, Custodio D'Souza And 3 Ors. ... Petitioners

Versus

Ministry of Environment, Forests And Climate Change, thr. its Secretary, New Delhi And Anr. ... Respondents

Mr Raviraj Chodankar, Standing Counsel *for Respondent No.1.*

Mr. Devidas J. Pangam, Advocate General *with* **Ms Sulekha Kamat, Additional Government Advocate** *for Respondent State.*

WITH

PUBLIC INTEREST LITIGATION WRIT PETITION NO.21 OF 2019

The Goa Foundation, thr. Its Secretary Dr. Claude Alvares And Anr. ... Petitioners

Versus

Ministry of Environment, Forests And Climate Change, thr. its Secretary And Anr. ... Respondents

Ms Norma Alvares *and* **Mr Om D'Costa, Advocates** *for the Petitioner.*

Mr Raviraj Chodankar, Standing Counsel *for Respondent No.1.*

Mr. Devidas J. Pangam, Advocate General *with* **Mr Geetesh Shetye, Additional Government Advocate** *for Respondent State.*

WITH
PUBLIC INTEREST LITIGATION WRIT PETITION NO.22 OF 2018

Kashinath Jairam Shetye And 8 Ors. ... Petitioners

Versus

Union of India, thr. Jt. Secretary, Ritesh Kumar Singh And Anr. ... Respondents

Petitioner in person.

Mr Raviraj Chodankar, Standing Counsel *for Respondent No.1.*

Mr Devidas J. Pangam, Advocate General *with* **Mr Shubham Priolkar, Additional Government Advocate** *for Respondent State.*

CORAM: **M. S. SONAK &**
BHARAT P. DESHPANDE,JJ.

DATED : **3rd January, 2023**

ORAL ORDER:

Heard learned counsel for the parties, learned Advocate General for the State and Mr Chodankar, learned Standing Counsel for the Central Government.

2. In all these petitions, the challenge is to certain provisions of the CRZ Notification, 2019. In the petitions instituted by Mr Kashinath Shetye, he has challenged further notifications issued under the Environment Protection Act, 1986.

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SATISH KRISHNA KANEKAR
SALCETE TALUKA
GOA
Exp Dt:28/02/2024
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3. A coordinate Bench of this Court in the case of ***Vanashakti & Anr. v/s. Union of India & Ors.***[1] has held that such petitions need not be entertained by the High Court because the petitioners have an alternate and efficacious remedy before the National Green Tribunal.

4. The decision in **Vanashakti** (supra) was challenged before the Hon'ble Supreme Court by instituting the petition for Special Leave to Appeal (C) No.20495 of 2021. On 03.08.2022, we had made it clear that we would await the decision of the Hon'ble Supreme Court in the said SLP and only after that, decide whether these petitions should be entertained or whether the petitioners should be relegated to avail of the alternate remedy before the National Green Tribunal.

5. The Hon'ble Supreme Court disposed of the above SLP on 30.09.2022 by making the following Order:

> *'In the facts and circumstances of the case, the High Court has rightly relegated the petitioners to approach the National Green Tribunal (NGT) as number of technical issues arise which can very well be dealt with by the NGT are involved. Therefore, it is appropriate that the petitioners approach the NGT,*

[1] 2021 0 Supreme (Bom) 368

NOTARY SH. KRISHNA KANEKAR MAPUSA-GOA Regd.No 344/14 Exp On 28/02/2024 GOVT. OF GOA (INDIA)

as observed by the High Court. The Special Leave Petition stands dismissed.

However, it is observed that if the petitioners approach the NGT within a period of four weeks from today, the proceedings be considering in accordance with law and on its own merits without raising the issue with respect to limitation.

All the contentions and defences which may be available to the respective parties are kept open to be considered by the NGT in accordance with law and on its own merits.

Pending application(s), if any, stand disposed of.'

6. Therefore, consistent with the above order, we dispose of these petitions by relegating the petitioners to avail of the alternate remedy before the National Green Tribunal.

7. Some of the petitioners, including, in particular, Mr Kashinath Shetye, expressed apprehension on the issue of limitation. Mr Chodankar, learned Standing Counsel for the Central Government made it clear that if the petitioners indeed approach the NGT within 4 weeks from today, the issue of limitation will not be raised. This statement is entirely consistent with the directions of the Hon'ble Supreme Court in its order dated 30.09.2022 disposing of the above SLP.

NOTARY SUBHASH KRISHNA KAMEKAR SALCETE 'ALUA' MARGAO-GOA Regd. No 344/14 Exp. Dt: 28/02/2024 GOVT. OF GOA (INDIA)

8. Even otherwise, all these petitioners, were bonafidely pursuing their petitions before this Court. The issue of alternate remedy was also pending before the Hon'ble Supreme Court in the challenge against the decision in **Vanashakti** (supra). Therefore, consistent with the order made by the Hon'ble Supreme Court, we also observe that in case the petitioners approach the NGT within 4 weeks from today, the proceedings they institute will be considered in accordance with law and on their own merits without raising the issue with respect to limitation. Further, all contentions of all parties are expressly left open because we have not examined the merits and these petitions are being disposed of only by relegating the petitioners to avail of the alternate remedy available before the NGT.

9. All these petitions are, therefore, disposed of by granting the petitioners liberty to approach the NGT. If the petitioners indeed approach the NGT within 4 weeks from today, the proceedings they institute be considered in accordance with law and on their own merits without raising the issue with respect to limitation. The statement of Mr Chodankar, learned Standing Counsel for Central Government in this regard is also noted and accepted.

NOTARY
SHRI KRISHNA KANEKAR
SALCETE TALUKA
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10. The petitions are disposed of in the above terms without any order for costs.

BHARAT P. DESHPANDE, J. **M. S. SONAK, J.**

NOTARY
GOVT OF GOA (INDIA)

ANNEXURE A-2

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GOVERNMENT OF GOA

CERTIFICATE OF REGISTRATION

(See Rule 5)

(The Societies Registration Act, 1860)

(Central Act 21 of 1860)

Registration No. 190/Goa/2014.

It is certified that the Society **"FEDERATION OF RAINBOW WARRIORS, MARGAO"** has this day been duly registered under the Societies Registration Act, 1860 (Central Act 21 of 1860).

Given under my hand this day of 8th December, 2014.

NOTARY

(R. D. REDKAR)
Inspector General of Societies
District Registrar (South Goa)

रजिस्ट्री सं० डी० एल०-33004/99 REGD. NO. D. L.-33004/99



भारत का राजपत्र
The Gazette of India

असाधारण
EXTRAORDINARY
भाग II—खण्ड 3—उप-खण्ड (i)
PART II—Section 3—Sub-section (i)
प्राधिकार से प्रकाशित
PUBLISHED BY AUTHORITY

सं. 36] नई दिल्ली, शुक्रवार, जनवरी 18, 2019/पौष 28, 1940
No. 36] NEW DELHI, FRIDAY, JANUARY 18, 2019/PAUSHA 28, 1940

पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय

अधिसूचना

नई दिल्ली, 18 जनवरी, 2019

सा.का.नि. 37(अ).—केन्द्रीय सरकार ने भारत सरकार के तत्कालीन पर्यावरण और वन मंत्रालय, की अधिसूचना संख्या का.आ. 19 (अ) तारीख 6 जनवरी, 2011 (जिसे इसमें इसके पश्चात तटीय विनियमन जोन अधिसूचना, 2011 कहा गया है) द्वारा तटीय क्षेत्रों को पर्यावरण (संरक्षण) अधिनियम, 1986 की धारा 3 के अधीन कतिपय तटीय विनियमन क्षेत्र (जिसे इसमें इसके पश्चात सीआरजेड कहा गया है) के रूप में घोषित किया था;

और पर्यावरण वन और जलवायु परिवर्तन मंत्रालय को समुद्री तथा तटीय पारितंत्रों के प्रबंधन और संरक्षण, तटीय क्षेत्रों में विकास, पारि-पर्यटन, तटीय क्षेत्रों में रहने वाले समुदायों की जीविका के विकल्पों तथा वहनीय विकास आदि के संबंध में तटीय विनियमन जोन अधिसूचना, 2011 में कतिपय उपबंधों के बारे में अन्य पणधारियों के अतिरिक्त, विभिन्न तटीय राज्यों और संघ राज्य क्षेत्रों से अभ्यावेदन प्राप्त हुए हैं;

और विभिन्न राज्य सरकारों/संघ राज्य क्षेत्रों और पणधारियों ने पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय से तटीय विनियमन जोन अधिसूचना, 2011 के संदर्भ में तटीय पर्यावरण और वहनीय विकास से संबंधित चिंताओं का निराकरण करने का अनुरोध किया है;

और पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय ने तटीय विनियमन जोन अधिसूचना, 2011 के संबंध में विभिन्न मुद्दों तथा तटीय राज्यों और संघ राज्य क्षेत्रों और पणधारियों की चिंताओं की जांच करने और उक्त अधिसूचना में समुचित परिवर्तन किए जाने की सिफारिश करने के लिए डॉ. शैलेश नायक की अध्यक्षता में एक समिति का गठन किया था;

और मंत्रालय में डॉ. शैलेश नायक द्वारा प्रस्तुत की गई रिपोर्ट की जांच की गई है और इस संबंध में विभिन्न पणधारियों के साथ परामर्श किए गए हैं;

और सभी संबंधितों से टिप्पणियों और सुझावों की ईप्सा से प्रारूप तटीय विनियमन जोन अधिसूचना, 2018 [illegible] की गई थी और उसे तारीख 18 अप्रैल, 2018 को पर्यावरण, वन और जलवायु परिवर्तन की वेबसाईट पर [illegible] गया थी;

और केन्द्रीय सरकार द्वारा उपर्युक्त उल्लिखित प्रारूप तटीय विनियमन जोन अधिसूचना, 2018 की प्रतिक्रिया में प्राप्त आक्षेपों और सुझावों पर सम्यक रूप से विचार कर लिया गया है;

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MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

NOTIFICATION

New Delhi, the 18th January, 2019

G.S.R. 37(E).—Whereas by notification of the Government of India in the erstwhile Ministry of Environment and Forests number S.O.19 (E), dated the 6th January, 2011 (hereinafter referred to as the Coastal Regulation Zone Notification, 2011), the Central Government declared certain coastal stretches as Coastal Regulation Zone (hereinafter referred to as the CRZ) under section 3 of Environment (Protection) Act, 1986 (29 0f 1986);

And Whereas, the Ministry of Environment, Forest and Climate Change has received representations from various coastal States and Union territories, besides other stakeholders, regarding certain provisions in the Coastal Regulation Zone Notification, 2011 related to management and conservation of marine and coastal ecosystems, development in coastal areas, eco-tourism, livelihood options and sustainable development of coastal communities etc.;

And Whereas, various State Governments and Union territory administrations and stakeholders have requested the Ministry of Environment, Forest and Climate Change to address the concerns related to coastal environment and sustainable development with respect to the Coastal Regulation Zone Notification, 2011;

And Whereas, the Ministry of Environment, Forest and Climate Change had constituted a Committee under the Chairmanship of Dr. Shailesh Nayak to examine various issues and concerns of coastal States and Union territories and various stakeholders, relating to the Coastal Regulation Zone Notification 2011 and to recommend appropriate changes in the said Notification;

And Whereas, the report submitted by Dr. Shailesh Nayak Committee has been examined in the Ministry and consultations have been held with various stakeholders in this regard;

And Whereas, a draft Coastal Regulation Zone Notification, 2018 was issued and hosted in the website of the Ministry of Environment, Forest and Climate Change on the 18th April, 2018 seeking comments and suggestions from all concerned;

And Whereas, objections and suggestions received in response to the above mentioned draft Coastal Regulation Zone Notification, 2018 have been duly considered by the Central Government;

Now, therefore in exercise of the powers conferred by sub-section (1) and clause (v) of sub-section (2) of section 3 of the Environment (Protection) Act, 1986 (29 of 1986) and in supersession of the Coastal Regulation Zone Notification 2011, number S.O. 19(E), dated the 6th January, 2011, except as respects things done or omitted to be done before such supersession, the Central Government, with a view to conserve and protect the unique environment of coastal stretches and marine areas, besides livelihood security to the fisher communities and other local communities in the coastal areas and to promote sustainable development based on scientific principles taking into account the dangers of natural hazards, sea level rise due to global warming, do hereby, declares the coastal stretches of the country and the water area up to its territorial water limit, excluding the islands of Andaman and Nicobar and Lakshadweep and the marine areas surrounding these islands, as Coastal Regulation Zone as under:-

(i) The land area from High Tide Line (hereinafter referred to as the HTL) to 500 meters on the landward side along the sea front.

Explanation. - For the purposes of this notification, the HTL means the line on the land upto which the highest water line reaches during the spring tide, as demarcated by the National Centre for Sustainable Coastal Management (NCSCM) in accordance with the laid down procedures and made available to various coastal States and Union territories.

(ii) CRZ shall apply to the land area between HTL to 50 meters or width of the creek, whichever is less on the landward side along the tidal influenced water bodies that are connected to the sea and the distance upto which development along such tidal influenced water bodies is to be regulated shall be governed by the distance upto which the tidal effects are experienced which shall be determined based on salinity concentration of five parts per thousand (ppt)

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measured during the driest period of the year and distance up to which tidal effects are experienced shall be clearly identified and demarcated accordingly in the Coastal Zone Management Plan (hereinafter referred to as the CZMP):

Provided that the CRZ limit of 50 meters or width of the creek whichever is less, shall be subject to revision and final approval of the respective CZMPs as per this notification, framed with due consultative process, public hearing etc. and environmental safeguards enlisted therein, and till such time the CZMP to this notification is approved, the limit of 100 meters or width of the creek whichever is less, shall continue to apply.

Explanation.- For the purposes of this sub-paragraph the expression "tidal influenced water bodies" means the water bodies influenced by tidal effects from sea in the bays, estuaries, rivers, creeks, backwaters, lagoons, ponds that are connected to the sea.

(iii) The "intertidal zone" means land area between the HTL and the Low Tide Line (hereinafter referred to as the LTL).

(iv) The water and the bed area between the LTL to the territorial water limit (12 Nm) in case of sea and the water and the bed area between LTL at the bank to the LTL on the opposite side of the bank, of tidal influenced water bodies.

2.0 Classification of CRZ. – For the purpose of conserving and protecting the coastal areas and marine waters, the CRZ area shall be classified as follows, namely: -

2.1 **CRZ-I** areas are environmentally most critical and are further classified as under:

2.1.1 CRZ-I A:

(a) CRZ-I A shall constitute the following ecologically sensitive areas (ESAs) and the geo-morphological features which play a role in maintaining the integrity of the coast viz.:

(i) Mangroves (in case mangrove area is more than 1000 square meters, a buffer of 50 meters along the mangroves shall be provided and such area shall also constitute CRZ–I A);

(ii) Corals and coral reefs;

(iii) Sand dunes;

(iv) Biologically active mudflats;

(v) National parks, marine parks, sanctuaries, reserve forests, wildlife habitats and other protected areas under the provisions of Wild Life (Protection) Act, 1972 (53 of 1972), Forest (Conservation) Act, 1980 (69 of 1980) or Environment (Protection) Act, 1986 (29 of 1986), including Biosphere Reserves;

(vi) Salt marshes;

(vii) Turtle nesting grounds;

(viii) Horse shoe crabs' habitats;

(ix) Sea grass beds;

(x) Nesting grounds of birds;

(xi) Areas or structures of archaeological importance and heritage sites.

(b) A detailed environment management plan shall be formulated by the states and Union territories for such ecologically sensitive areas in respective territories, as mapped out by the National Centre for Sustainable Coastal Management (NCSCM), Chennai based on guidelines as contained in **Annexure-I** to this notification and integrated with the CZMP.

2.1.2 CRZ-I B:

The intertidal zone i.e. the area between Low Tide Line and High Tide Line shall constitute the CRZ-I B.

2.2 CRZ-II:

CRZ-II shall constitute the developed land areas up to or close to the shoreline, within the existing municipal limits or in other existing legally designated urban areas, which are substantially built-up with a ratio of built-up plots to that of total plots being more than 50 per cent and have been provided with drainage and approach roads and other infrastructural facilities, such as water supply, sewerage mains, etc.

2.3 CRZ-III:

Land areas that are relatively undisturbed (viz. rural areas, etc.) and those which do not fall under CRZ-II, shall constitute CRZ–III, and CRZ-III shall be further classified into following categories: -

2.3.1 CRZ-III A:

Such densely populated CRZ-III areas, where the population density is more than 2161 per square kilometre as per 2011 census base, shall be designated as CRZ–III A and in CRZ-III A, area up to 50 meters from the HTL on the landward side shall be earmarked as the 'No Development Zone (NDZ)', provided the CZMP as per this notification, framed with due consultative process, have been approved, failing which, a NDZ of 200 meters shall continue to apply.

2.3.2 CRZ-III B:

All other CRZ-III areas with population density of less than 2161 per square kilometre, as per 2011 census base, shall be designated as CRZ-III B and in CRZ-III B, the area up to 200 meters from the HTL on the landward side shall be earmarked as the 'No Development Zone (NDZ)'.

2.3.3:

Land area up to 50 meters from the HTL, or width of the creek whichever is less, along the tidal influenced water bodies in the CRZ III, shall also be earmarked as the NDZ in CRZ III.

Note: The NDZ shall not be applicable in the areas falling within notified Port limits.

2.4 CRZ- IV:

The CRZ- IV shall constitute the water area and shall be further classified as under:-

2.4.1 CRZ- IVA:

The water area and the sea bed area between the Low Tide Line up to twelve nautical miles on the seaward side shall constitute CRZ-IV A.

2.4.2 CRZ- IVB:

CRZ-IV B areas shall include the water area and the bed area between LTL at the bank of the tidal influenced water body to the LTL on the opposite side of the bank, extending from the mouth of the water body at the sea up to the influence of tide, i.e., salinity of five parts per thousand (ppt) during the driest season of the year.

3.0 Areas requiring special consideration in the CRZ.- Following coastal areas shall be accorded special consideration for the purpose of protecting the critical coastal environment and difficulties faced by local communities: -

3.1 Critically Vulnerable Coastal Areas (CVCA):

Sundarban region of West Bengal and other ecologically sensitive areas identified as under Environment (Protection) Act, 1986 such as Gulf of Khambat and Gulf of Kutchh in Gujarat, Malvan, Achra-Ratnagiri in Maharashtra, Karwar and Coondapur in Karnataka, Vembanad in Kerala, Gulf of Mannar in Tamil Nadu, Bhaitarkanika in Odisha, Coringa, East Godavari and Krishna in Andhra Pradesh shall be treated as Critical Vulnerable Coastal Areas (CVCA) and managed with the involvement of coastal communities including fisher folk who depend on coastal resources for their sustainable livelihood.

3.2 CRZ for inland Backwater islands and islands along the mainland coast.

3.3 CRZ falling within municipal limits of Greater Mumbai.

4. Prohibited activities within CRZ.- The following activities shall be prohibited, in general, within the entire CRZ and exceptions to these and other permissible and regulated activities in specific CRZ categories viz. CRZ-I, II, III and IV, shall be governed by the provisions of paragraph 5:-

(i) Setting up of new industries and expansion of existing industries, operations or processes.

(ii) Manufacture or handling of oil, storage or disposal of hazardous substances as specified in the notification of the Ministry of Environment, Forest and Climate Change number G.S.R.395 (E), dated the 4th April, 2016.

(iii) Setting up of new fish processing units.

(iv) Land reclamation, bunding or disturbing the natural course of seawater except for the activities permissible under this notification and executed with prior permission from the competent authority.

(v) Discharge of untreated waste and effluents from industries, cities or towns and other human settlements.

(vi) Dumping of city or town wastes including construction debris, industrial solid wastes, fly ash for the purpose of land filling.

(vii) Port and harbour projects in high eroding stretches of the coast.

(viii) Mining of sand, rocks and other sub-strata materials.

(ix) Dressing or altering of active sand dunes.

(x) In order to safeguard the aquatic system and marine life, disposal of plastic into the coastal waters shall be prohibited and adequate measures for management and disposal of plastic materials shall be undertaken in the CRZ.

(xi) Drawal of ground water.

5. Regulation of permissible activities in CRZ:

5.1 CRZ-I:

5.1.1. CRZ–IA:

These areas are ecologically most sensitive and generally no activities shall be permitted to be carried out in the CRZ-I A area, with following exceptions:-

(i) Eco-tourism activities such as mangrove walks, tree huts, nature trails, etc., in identified stretches areas subject to such eco-tourism plan featuring in the approved CZMP as per this notification, framed with due consultative process, public hearing, etc. and further subject to environmental safeguards and precautions related to the Ecologically Sensitive Areas, as enlisted in the CZMP.

(ii) In the mangrove buffer, only such activities shall be permitted like laying of pipelines, transmission lines, conveyance systems or mechanisms and construction of road on stilts, etc. that are required for public utilities.

(iii) Construction of roads and roads on stilts, by way of reclamation in CRZ-I areas, shall be permitted only in exceptional cases for defence, strategic purposes and public utilities, subject to a detailed marine or terrestrial or both environment impact assessment, to be recommended by the Coastal Zone Management Authority and approved by the Ministry of Environment, Forest and Climate Change; and in case construction of such roads passes through mangrove areas or is likely to damage the mangroves, a minimum three times the mangrove area affected or destroyed or cut during the construction process shall be taken up for compensatory plantation of mangroves.

5.1.2 CRZ-I B - The inter tidal areas:

Activities shall be regulated or permissible in the CRZ-I B areas as under:-

(i) Land reclamation, bunding, etc. shall be permitted only for activities such as

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(a) foreshore facilities like ports, harbours, Jetties, wharves, quays, slipway, bridges, hover ports for coast guard, sea links, etc;

(b) projects for defence, strategic and security purposes;

(c) road on stilts, provided that such roads shall not be authorised for permitting development on the landward side of such roads, till the existing High Tide Line:

Provided that the use of reclaimed land may be permitted only for public utilities such as mass rapid or multimodal transit system, construction and installation of all necessary associated public utilities and infrastructure to operate such transit or transport system including those for electrical or electronic signaling system, transit stopover of permitted designs; except for any industrial operation, repair or maintenance;

(d) measures for control of erosion;

(e) maintenance and clearing of waterways, channels, ports and hover ports for coast guard;

(f) measures to prevent sand bars, installation of tidal regulators, laying of storm water drains or for structure for prevention of salinity ingress and freshwater recharge.

(ii) Activities related to waterfront or directly needing foreshore facilities such as ports and harbours, jetties, quays, wharves, erosion control measures, breakwaters, pipelines, lighthouses, navigational safety facilities, coastal police stations, Indian coast guard stations and the like.

(iii) Power by non-conventional energy sources and associated facilities.

(iv) Transfer of hazardous substances from ships to Ports, terminals and refineries and vice versa.

(v) Facilities for receipt and storage of petroleum products and liquefied natural gas as specified in Annexure-II to this notification, subject to implementation of safety regulations including guidelines issued by the Oil Industry Safety Directorate in the Ministry of Petroleum and Natural Gas and guidelines issued by the Ministry of Environment, Forest and Climate Change, provided that such facilities are for receipt and storage of fertilizers and raw materials required for fertilizers, like ammonia, phosphoric acid, sulphur, sulphuric acid, nitric acid, etc.

(vi) Storage of non-hazardous cargo i.e. edible oil, fertilizers and food grains in notified Ports.

(vii) Hatchery and natural fish drying.

(viii) Existing fish processing units may utilise 25% additional plinth area for modernisation purposes (only for additional equipment and pollution control measures) subject to the following:-

(a) Floor Space Index of such reconstruction not exceeding the permissible Floor Space Index as per prevalent town and country planning regulations;

(b) additional plinth area is constructed only to the landward side.

(c) approval of the concerned State Pollution Control Board or Pollution Control Committee.

(ix) Treatment facilities for waste and effluents and conveyance of treated effluents.

(x) Storm water drains.

(xi) Projects classified as strategic, defence related projects and projects of the Department of Atomic Energy, Government of India.

(xii) Manual mining of atomic mineral(s) notified under Part-B of the First Schedule to the Mining and Minerals (Development and Regulation) Act, 1957)(67 of 1957) occurring as such or in association with one or other minerals in the intertidal zone by such agencies as authorised by the Department of Atomic Energy, Government of India as per mining plan approved by the Atomic Mineral Directorate for Exploration and Research:

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Provided that the manual mining operations shall be carried out only by deploying persons using baskets and hand spades for collection of ore or mineral within the intertidal zone and as per approved mining plan, without deploying or using drilling and blasting or Heavy Earth Moving Machinery in the intertidal zone.

(xiii) Exploration and extraction of oil and natural gas and all associated activities and facilities thereto;

(xiv) Foreshore requiring facilities for transport of raw materials, facilities for intake of cooling water, intake water for desalination plants, etc, and outfall for discharge of treated wastewater or cooling water from thermal power plants in conformity with the environmental standards notified by Ministry of Environment, Forest and Climate Change and relevant directions of Central Pollution Control Board (CPCB) or State Pollution Control Board (SPCB) or Pollution Control Committee (PCC), as the case may be.

(xv) Pipelines, conveying systems including transmission lines.

(xvi) Weather radar for monitoring of cyclones prediction, ocean observation platforms, movement and associated activities.

(xvii) Salt harvesting and associated facilities.

(xviii) Desalination plants and associated facilities.

5.2 CRZ-II:

(i) Activities as permitted in CRZ-I B, shall also be permissible in CRZ-II, in so far as applicable.

(ii) Construction of buildings for residential purposes, schools, hospitals, institutions, offices, public places, etc. shall be permitted only on the landward side of the existing road, or on the landward side of existing authorised fixed structures:

Provided that no permission for construction of buildings shall be given on landward side of any new roads which are constructed on the seaward side of an existing road.

(iii) Buildings permitted as in (ii) above, shall be subject to the local town and country planning regulations as applicable from time to time, and the norms for the Floor Space Index (FSI) or Floor Area Ratio (FAR) prevailing as on the date of this Notification, and in the event that there is a need for amendment of the FSI after the date of publication of this notification in the official Gazette, the Urban Local Body or State Government or Union territory Administration shall approach the Ministry of Environment, Forest and Climate Change through the concerned State Coastal Zone Management Authority (SCZMA) or Union Territory Coastal Zone Management Authority, as the case may be and the SCZMA shall forward the proposal to the National Coastal Zone Management Authority (NCZMA) with its views in the matter, and the NCZMA shall thereafter examine various aspects like availability of public amenities, environmental protection measures, etc., and take a suitable decision on the proposal and it shall be the responsibility of the concerned Town Planning Authority to ensure that the Solid Wastes are handled as per respective Solid Waste Management Rules and no untreated sewage is discharged on to the coast or coastal waters.

(iv) Reconstruction of authorised buildings shall be permitted, without change in present land use, subject to the local town and country planning regulations as applicable from time to time, and the norms for the Floor Space Index or Floor Area Ratio, prevailing as on the date of publication of this notification in the official Gazette and in the event that there is a need for amendment of the FSI after the said date of this notification, the Urban Local Body or State Government or Union territory Administration shall approach the Ministry of Environment, Forest and Climate Change through the concerned State Coastal Zone Management Authority (SCZMA) or Union Territory Coastal Zone Management Authority, as the case may be and the CZMA shall forward the proposal to the National Coastal Zone Management Authority (NCZMA) with its views in the matter, and the NCZMA shall thereafter examine various aspects like availability of public amenities, environmental protection measures etc,. and take a suitable decision on the proposal and it shall be the responsibility of the concerned Town Planning Authority to ensure that the Solid Wastes are

handled as per respective Solid Waste Management Rules and no untreated sewage is discharged on to the coast or coastal waters.

(v) Development of vacant plots in designated areas for construction of beach resorts or hotels or tourism development projects subject to the conditions or guidelines at **Annexure-III** to this notification.

(vi) Temporary tourism facilities shall be permissible in the beaches which shall only include shacks, toilets or washrooms, change rooms, shower panels; walk ways constructed using interlocking paver blocks, etc, drinking water facilities, seating arrangements, etc. and such facilities shall however be permitted only subject to the tourism plan featuring in the approved CZMP as per this notification, framed with due consultative process or public hearing, etc. and further subject to environmental safeguards enlisted in the CZMP, however, a minimum distance of 10 meter from HTL shall be maintained for setting up of such facilities.

5.3 CRZ-III:

(i) Activities as permitted in CRZ-I B, shall also be permissible in CRZ-III, in so far as applicable.

(ii) **Regulation of activities in NDZ:**

Following shall be permissible and regulated in the NDZ:-

(a) No construction shall be permitted within NDZ in CRZ III, except for repairs or reconstruction of existing authorised structure not exceeding existing Floor Space Index, existing plinth area and existing density and for permissible activities under this notification including facilities essential for activities and construction or reconstruction of dwelling units of traditional coastal communities including fisher folk, incorporating necessary disaster management provisions and proper sanitation arrangements.

(b) Agriculture, horticulture, gardens, pastures, parks, playfields and forestry.

(c) Construction of dispensaries, schools, public rain shelter, community toilets, bridges, roads, provision of facilities for water supply, drainage, sewerage, crematoria, cemeteries and electric sub-station which are required for the local inhabitants may be permitted on a case to case basis by Coastal Zone Management Authority (CZMA).

(d) Construction of units or auxiliary thereto for domestic sewage, treatment and disposal with the prior approval of the concerned Pollution Control Board or Committee.

(e) Facilities required for local fishing communities such as fish drying yards, auction halls, net mending yards, traditional boat building yards, ice plant, ice crushing units, fish curing facilities and the like.

(f) Wherever there is a national or State highway passing through the NDZ of CRZ-III areas, temporary tourism facilities such as toilets, change rooms, drinking water facility and temporary shacks can be taken up on the seaward side of the road.

On landward side of such roads in the NDZ, resorts or hotels and associated tourism facilities shall be permitted and such facilities shall, however, be permitted only subject to the incorporation of tourism plan in the approved CZMP as per this notification and the conditions or guidelines at Annexure-III, to this notification as applicable.

(g) Temporary tourism facilities shall be permissible in the NDZ and beaches in the CRZ-III areas and such temporary facilities shall only include shacks, toilets or washrooms, change rooms, shower panels, walk ways constructed using interlocking paver blocks, etc, drinking water facilities, seating arrangements etc., and such facilities shall, however, be permitted only subject to the tourism plan featuring in the approved CZMP as per this notification subject to maintaining a minimum distance of 10 meters from HTL for setting up of such facilities.

(h) Mining of atomic minerals notified under Part-B of the First Schedule to Mining and

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Minerals (Development and Regulation) Act, 1957 (67 of 1957) occurring as such or in association with one or other minerals by such agencies as authorised by the Department of Atomic Energy, Government of India, as per mining plan by the Atomic Mineral Directorate for Exploration and Research.

(iii) **Regulation of activities for CRZ–III areas beyond NDZ:**

(a) Development of vacant plots in designated areas for construction of beach resorts or hotels or tourism development projects subject to the conditions or guidelines at Annexure-III to this notification.

(b) Construction or reconstruction of dwelling units, so long it is within the ambit of traditional rights and customary uses such as existing fishing villages, etc. and building permission for such construction or reconstruction will be subject to local town and country planning rules, with an overall height of construction not exceeding 9 meters and with only two floors (ground + one floor).

(c) The local communities including fishermen may be permitted to facilitate tourism through 'home stay' without changing the plinth area or design or facade of the existing houses.

(d) Construction of public rain shelters, community toilets, water supply drainage, sewerage, roads, bridges, etc.

(e) Limestone mining:

Selective mining of limestone minerals may be permitted in specific identified areas under the mining plans, which are adequately above the height of HTL, based on the recommendations of reputed National Institutes in the mining field such as Council of Scientific and Industrial Research (CSIR), Central Mining Research Institute etc., provided that the extraction of minerals shall be carried out not below a height of 1 meter above the HTL and an adequate barrier shall be created so as to safeguard against saline water incursion and subject to appropriate safeguards related to pollution of coastal waters and prevention of coastal erosion.

(f) Mining of atomic minerals notified under Part-B of the First Schedule of Mining and Minerals (Development and Regulation) Act, 1957 (67 of 1957) occurring as such or in association with one or other minerals by such agencies as authorised by Department of Atomic Energy, Government of India, as per mining plan by the Atomic Mineral Directorate for Exploration and Research.

(iv) Drawing of groundwater and construction related thereto shall be prohibited within 200 meters of HTL except for the use of local communities in areas inhabited by them and in the areas between 200 to 500 meters of the HTL, groundwater withdrawal may be permitted only through manual means from ordinary wells for drinking, horticulture, agriculture and fisheries, etc. where no other source of water is available and restrictions for such drawal may be imposed by the designated Authority by State Government or Union territory Administration in the areas affected by sea water intrusion, however, for horticulture and agriculture purpose, micro irrigation promoted by Government welfare schemes shall be permitted.

(v) Development of airports in wastelands and non-arable lands in CRZ-III areas with adequate environmental safeguards.

5.4 CRZ-IV:

Activities shall be permitted and regulated in the CRZ IV areas as under:-

(i) Traditional fishing and allied activities undertaken by local communities.

(ii) Land reclamation, bunding, etc to be permitted only for activities such as,-

(a) foreshore facilities like ports, harbours, Jetties, wharves, quays, slipways, bridges, sea links and hover ports for coast guard ,etc;

(b) projects for defence, strategic and security purpose including coast guard;

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(c) measures for control of erosion;

(d) maintenance and clearing of waterways, channels and ports;

(e) measures to prevent sand bars, installation of tidal regulators, laying of storm water drains or for structure for prevention of salinity ingress and freshwater recharge.

(iii) Activities related to waterfront or directly needing foreshore facilities, such as ports and harbours, jetties, quays, wharves, erosion control measures, breakwaters, pipelines, navigational safety facilities and the like.

(iv) Power by non-conventional energy sources and associated facilities such as offshore wind, wave energy, ocean thermal energy conversion, etc.

(v) Transfer of hazardous substances from ships to Ports.

(vi) Storage of non-hazardous cargo like edible oil, fertilizers and food grains in notified Ports.

(vii) Facilities for discharging treated effluents into the water course.

(viii) Projects classified as strategic and defence related projects including coast guard coastal security network.

(ix) Projects of department of Atomic Energy.

(x) Exploration and extraction of oil and natural gas and all associated activities and facilities thereto.

(xi) Exploration and mining of atomic minerals notified under Part-B of the First Schedule of the Mining and Minerals (Development and Regulation) Act, 1957 (67 of 1957), occurring as such or in association with other mineral(s) and of such associated mineral(s).

(xii) Foreshore requiring facilities for transport of raw materials, facilities for intake of cooling water and outfall for discharge of treated wastewater or cooling water from thermal power plants, and foreshore requiring facilities for transport of raw materials, facilities for intake of cooling water and outfall for discharge of treated wastewater or cooling water from thermal power plants, in conformity with the environmental standards notified by Ministry of Environment, Forest and Climate Change and relevant directions of the Central Pollution Control Board or State Pollution Control Board or Pollution Control Committee.

(xiii) Pipelines, conveying systems including transmission lines.

(xiv) Weather radar for monitoring of cyclone prediction, ocean observation platforms, movement and associated activities.

(xv) Construction of memorials or monuments and allied facilities by the concerned State Government in CRZ-IV (A) areas, in exceptional cases, with adequate environmental safeguards, subject to the following, namely: -

(a) the concerned State Government shall submit justification for locating the project in CRZ–IVA area along with details of alternate sites considered and weightage matrix on various parameters including environmental parameters, to State Coastal Zone Management Authority who will examine the project and make recommendation to the Central Government (Ministry of Environment, Forest and Climate Change) for grant of Terms of Reference (ToRs) for preparation of an environmental impact assessment report by the State Government;

(b) On grant of ToRs by the Central Government, the concerned State Government shall submit the draft Environmental Impact Assessment report (EIA) with Environmental Management Plan (EMP), draft Risk Assessment Report with Disaster Management Plan (DMP) including on-site and off-site emergency plan and evacuation plan during emergency, to the State Pollution Control Board for conduct of public hearing for the proposed project in accordance with the procedure laid down under the Environment Impact Assessment (EIA) notification number S.O. 1533(E), dated the 14th September, 2006;

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(c) The concerned State Government shall, after addressing the relevant issues raised by the public during the public hearing referred to in sub-item (b), submit the final EIA, EMP, Risk Assessment and DMP, to the State CZMA for their examination and recommendation to MoEF&CC;

(d) The Central Government may, if it considers necessary so to do, dispense with the requirement of public hearing referred to in sub-clause (b), if it is satisfied that the project will not involve rehabilitation and resettlement of the public or the project site is located away from human habitation.

5.5 Requirement for Clearance from Department of Atomic Energy installations:

Prior to undertaking any developmental activity including construction of new structures, falling in the boundary limits specified by Atomic Energy Regulatory Board (AERB) guidelines, prior clearance shall be obtained from Department of Atomic Energy installations.

6. Coastal Zone Management Plan (CZMP)

(i) All coastal States and Union territory administrations shall revise or update their respective coastal zone management plan (CZMP) framed under CRZ Notification, 2011 number S.O. 19(E), dated 6th January, 2011, as per provisions of this notification and submit to the Ministry of Environment, Forest and Climate Change for approval at the earliest and all the project activities attracting the provisions of this notification shall be required to be appraised as per the updated CZMP under this notification and until and unless the CZMPs is so revised or updated, provisions of this notification shall not apply and the CZMP as per provisions of CRZ Notification, 2011 shall continue to be followed for appraisal and CRZ clearance to such projects.

(ii) The CZMP may be prepared or updated by the coastal State Government or Union territory by engaging reputed and experienced scientific institution(s) or the agencies including the National Centre for Sustainable Coastal Management (hereinafter referred to as the NCSCM) of Ministry of Environment, Forest and Climate Change and in consultation with the concerned stakeholders.

(iii) The coastal States and Union territories shall prepare draft CZMP in 1:25,000 scale map identifying and classifying the CRZ areas within the respective territories in accordance with the guidelines given in **Annexure-IV** to this notification, which involve public consultation.

All developmental activities listed in this notification shall be regulated by the State Government, Union territory administration, the local authority or the concerned Coastal Zone Management Authority within the framework of such approved CZMP, as the case may be, in accordance with provisions of this notification.

(iv) The draft CZMP shall be submitted by the State Government or Union territory to the concerned Coastal Zone Management Authority for appraisal, including appropriate consultations, and recommendations in accordance with the procedure(s) laid down in the Environment (Protection) Act, 1986 (29 of 1986).

(v) The Ministry of Environment, Forest and Climate Change shall thereafter consider and approve the respective CZMP of concerned State Governments or Union territory administrations.

(vi) The CZMP shall not normally be revised before a period of five years after which, the concerned State Government or the Union territory may consider undertaking a revision.

7. CRZ clearance for permissible and regulated activities- Delegation:

(i) All permitted or regulated project activities attracting the provisions of this notification shall be required to obtain CRZ clearance prior to their commencement.

(ii) All development activities or projects in CRZ-I and CRZ-IV areas, which are regulated or permissible as per this notification, shall be dealt with by Ministry of Environment, Forest and Climate Change for CRZ clearance, based on the recommendation of the concerned Coastal Zone Management Authority.

(iii) For all other permissible and regulated activities as per this notification, which fall purely in CRZ–II and CRZ-III areas, the CRZ clearance shall be considered by the concerned Coastal Zone Management Authority and such projects in CRZ –II and III, which also happen to be traversing through CRZ–I or CRZ-IV areas or both, CRZ clearance shall, however be considered only by the Ministry of Environment, Forest and Climate Change, based on recommendations of the concerned Coastal Zone Management Authority.

(iv) Projects or activities which attract the provisions of this notification as also the provisions of EIA notification, 2006 number S.O. 1533(E), dated the 14th September, 2006, shall be dealt with for a composite Environmental and CRZ clearance under EIA Notification, 2006 by the concerned approving Authority, based on recommendations of the concerned Coastal Zone Management Authority, as per delegations i.e., State Environmental Impact Assessment Authority (hereinafter referred to as the SEIAA) or the Ministry of Environment, Forest and Climate Change for category 'B' and category 'A' projects respectively.

(v) In case of building or construction projects with built-up area less than the threshold limit stipulated for attracting the provisions of the EIA Notification, 2006 these shall be approved by the concerned local State or Union territory Planning Authorities in accordance with this notification, after obtaining recommendations of the concerned Coastal Zone Management Authority.

(vi) Only for self-dwelling units up to a total built up area of 300 square meters, approval shall be accorded by the concerned local Authority, without the requirement of recommendations of concerned Coastal Zone Management Authority and such authorities shall, however, examine the proposal from the perspective of the Coastal Regulation Zone notification before according approval.

8. Procedure for CRZ clearance for permissible and regulated activities:

(i) The project proponents shall apply with the following documents to the concerned State or the Union territory Coastal Zone Management Authority for seeking prior clearance under this notification:-

(a) Project summary details as per Annexure-V to this notification.

(b) Rapid Environment Impact Assessment (EIA) Report including marine and terrestrial component, as applicable, except for building construction projects or housing schemes.

(c) Comprehensive EIA with cumulative studies for projects, (except for building construction projects or housing schemes with built-up area less than the threshold limit stipulated for attracting the provisions of the EIA Notification, 2006 number S.O 1533(E), dated 14th September, 2006) if located in low and medium eroding stretches, as per the CZMP to this notification.

(d) Risk Assessment Report and Disaster Management Plan, except for building construction projects or housing schemes with built-up area less than the threshold limit stipulated for attracting the provisions of the EIA Notification, 2006 number S.O 1533(E), dated 14th September, 2006).

(e) CRZ map in 1:4000 scale, drawn up by any of the agencies identified by the Ministry of Environment, Forest and Climate Change vide its Office Order number J-17011/8/92-IA-III, dated the 14th March, 2014 using the demarcation of the HTL or LTL, as carried out by NCSCM.

(f) Project layout superimposed on the CRZ map duly indicating the project boundaries and the CRZ category of the project location as per the approved Coastal Zone Management Plan under this notification.

(g) The CRZ map normally covering 7 kilometre radius around the project site also indicating the CRZ-I, II, III and IV areas including other notified ecologically sensitive areas.

(h) "Consent to establish" or No Objection Certificate from the concerned State Pollution Control Board or Union territory Pollution Control Committee for the projects involving treated discharge of industrial effluents and sewage, and in case prior consent of

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Pollution Control Board or Pollution Control Committee is not obtained, the same shall be ensured by the proponent before the start of the construction activity of the project, following the clearance under this notification.

(ii) The concerned Coastal Zone Management Authority shall examine the documents in clause (i) above, in accordance with the approved Coastal Zone Management Plan and in compliance with this notification and make recommendations within a period of sixty days from date of receipt of complete application as under: -

(a) For the projects or activities also attracting the EIA Notification, 2006 number S.O. 1533(E), dated 14th September, 2006, the Coastal Zone Management Authority shall forward its recommendations to Ministry of Environment, Forest and Climate Change or SEIAA for category 'A' and category 'B' projects respectively, to enable a composite clearance under the EIA Notification, 2006 number S.O. 1533(E), dated 14th September, 2006, however, even for such Category 'B' projects located in CRZ-I or CRZ-IV areas, final recommendation for CRZ clearance shall be made only by the Ministry of Environment, Forest and Climate Change to the concerned SEIAA to enable it to accord a composite Environmental Clearance and CRZ clearance to the proposal.

(b) Coastal Zone Management Authority shall forward its recommendations to the Ministry of Environment, Forest and Climate Change for the projects or activities not covered in the EIA notification, 2006, but attracting this notification and located in CRZ-I or CRZ-IV areas.

(c) Projects or activities not covered in the aforesaid EIA Notification, 2006, but attracting this notification and located in CRZ-II or CRZ-III areas shall be considered for clearance by the concerned Coastal Zone Management Authority within sixty days of the receipt of the complete proposal from the proponent.

(d) In case of construction projects attracting this notification but with built-up area less than the threshold limit stipulated for attracting the provisions of the aforesaid EIA Notification 2006, Coastal Zone Management Authority shall forward their recommendations to the concerned State or Union territory planning authorities, to facilitate granting approval by such authorities.

(iii) The Ministry of Environment, Forest and Climate Change shall consider complete project proposals for clearance under this notification, based on the recommendations of the Coastal Zone Management Authority, within a period of sixty days.

(iv) In case the Coastal Zone Management Authorities are not in operation due to their reconstitution or any other reasons, then it shall be responsibility of the Department of Environment in the State Government or Union territory Administration, who are the custodian of the CZMP of respective States or Union territories, to provide comments and recommend the proposals in terms of the provisions of the said notification.

(v) The clearance accorded to the projects under this notification shall be valid for a period of seven years, provided that the construction activities are completed and the operations commence within seven years from the date of issue of such clearance.

The validity may be further extended for a maximum period of three years, provided an application is made to the concerned authority by the applicant within the validity period, along with recommendation for extension of validity of the clearance by the concerned State or Union territory Coastal Zone Management Authority.

(vi) Post clearance monitoring:

(a) It shall be mandatory for the project proponent to submit half-yearly compliance reports in respect of the stipulated terms and conditions of the environmental clearance in hard and soft copies to the regulatory authority(s) concerned, on the 1st June and 31st December of each calendar year and all such compliance reports submitted by the project proponent shall be published in public domain and its copies shall be given to any person on application to the concerned Coastal Zone Management Authority.

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(b) The compliance report shall also be displayed on the website of the concerned regulatory authority.

(vii) To maintain transparency in the working of the Coastal Zone Management Authority, it shall be the responsibility of the Coastal Zone Management Authority to create a dedicated website and post the agenda, minutes, decisions taken, clearance letters, violations, action taken on the violations and court matters including the Orders of the Hon'ble Court as also the approved CZMP of the respective State Government or Union territory.

9. Enforcement of this notification:

(i) For the purposes of implementation and enforcement of the provisions of this notification and compliance with conditions stipulated thereunder, the powers either original or delegated are available under Environment (Protection) Act, 1986 (29 of 1986) with the Ministry of Environment, Forest and Climate Change, State Government or the Union territory Administration, National Coastal Zone Management Authority and the State or Union territory Coastal Zone Management Authority;

(ii) The composition, tenure and mandate of National Coastal Zone Management Authority and State Government or the Union territory Coastal Zone Management Authority have already been notified by the Ministry of Environment, Forest and Climate Change in terms of Orders of Hon'ble Supreme Court in Writ Petition 664 of 1993;

(iii) The State Government or the Union territory Coastal Zone Management Authority shall primarily be responsible for enforcing and monitoring of this notification and to assist in this task, the State Government and the Union territory shall constitute district level Committees under the Chairmanship of the District Magistrate concerned comprising at least three representatives of local traditional coastal communities including from fishermen, and the State Government may consider the enforcement of this notification to the level of respective District Magistrates.

(iv) The dwelling units of the traditional coastal communities including fishermen, tribals as were permissible under the provisions of the Coastal Regulation Zone notification, 2011 number S.O. 19(E), dated the 6th January, 2011, but which have not obtained formal approval from concerned authorities under the said Notification shall be considered by the respective Coastal Zone Management Authority and the dwelling units shall be regularised subject to the following condition, namely: -

(a) these are not used for any commercial activity;

(b) these are not sold or transferred to non-traditional coastal community.

10. Areas requiring special consideration:

10.1 Critically Vulnerable Coastal Areas (CVCAs):

(i) For all the CVCAs mentioned in sub-paragraph 3.1, Integrated Management Plans (IMPs) shall be prepared, which shall, inter alia, keep in view the conservation and management of mangroves, needs of local communities, such as dispensaries, schools, public rain shelter, community toilets, bridges, roads, jetties, water supply, drainage, sewerage and the impact of sea level rise and other natural disasters and the IMPs will be prepared in line with the guidelines for preparation of Coastal Zone Management Plan.

(ii) Till such time the IMPs are approved and notified, construction of dispensaries, schools, public rain/cyclone shelters, community toilets, bridges, roads, jetties, water supply, drainage, sewerage which are required for traditional inhabitants shall be permitted on a case to case basis, by the Coastal Zone Management Authority with due regards to the views of coastal communities including fisher folk.

10.2 CRZ for inland backwater islands and islands along mainland coast:

(i) All the inland islands in the coastal backwaters and islands along the mainland coast shall also be covered under this notification.

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(ii) In view of the unique coastal systems of backwater islands and islands along the mainland coast, along with space limitations in such coastal stretches, CRZ of 20 meters from the HTL on the landward side shall uniformly apply to such islands and activities shall be regulated as under:-

(a) existing dwelling units of local communities may be repaired or reconstructed within 20 meters from the HTL of these islands, however, no new construction shall be permitted in this zone.

(b) foreshore facilities, such as fishing jetty, fish drying yards, net mending yard, fishing processing by traditional methods, boat building yards, ice plant, boat repairs and the like, may be taken up in CRZ limits subject to due environmental safeguards.

(iii) Integrated Island Management Plans (IIMPs), as applicable to smaller islands in Lakshadweep and Andaman & Nicobar, as per Island Protection Zone Notification, 2011 number S.O. 20(E), dated the 6th January, 2011, shall be formulated by respective States or Union territory for all such islands and submitted to Ministry of Environment, Forest and Climate Change and till the IIMPs are framed, provisions of this notification shall not apply and the CZMP as per provisions of CRZ Notification 2011 number S.O. 19(E), dated the 6th January, 2011, shall continue to apply.

10.3 CRZ areas falling within municipal limits of Greater Mumbai:

(i) In order to protect and preserve the 'green lung' of the Greater Mumbai area, all open spaces, parks, gardens, playgrounds indicated in development plans within CRZ-II shall be categorised as No Development Zone and a Floor Space Index up to 15% shall be allowed only for construction of civic amenities, stadium and gymnasium meant for recreational or sports related activities and the residential or commercial use of such open spaces shall not be permissible.

(ii) Construction of sewage treatment plants in CRZ-I area for the purpose of treating the sewage from the municipal area shall be taken only by the municipal authorities in exceptional circumstances, where no alternate site is available to set up such facilities, subject to recommendations of the Coastal Zone Management Authority and approval by the Central Government and in case the construction of such plant is inevitable in a mangrove area, a minimum three times the mangrove area affected or destroyed or cut during the construction process shall be taken up for compensatory plantation of mangroves.

[F. No. 19-112/2013-IA-III]

RITESH KUMAR SINGH, Jt. Secy.

Annexure-I

CONSERVATION, PROTECTION AND MANAGEMENT FRAMEWORK FOR ECOLOGICALLY SENSITIVE AREAS

The coastal and marine Ecologically Sensitive Areas (ESAs) and the geo-morphological features play a vital role in maintaining the functions of the coast. Mangroves, beaches, coral reefs, etc., aid in controlling coastal erosion, shoreline change, saltwater intrusion and also serve as natural defence against coastal hazards such as storm surges, cyclones and tsunamis. The ESAs maintain the biological integrity of the coast by providing direct and indirect ecosystem services to the coastal livelihood. In addition, several invaluable archaeological and heritage sites are also located along the coast. Hence conservation and protection of the above areas, features and sites become necessary.

1. General measures

(i) All ESAs shall be identified and boundary delineated by NCSCM using satellite data.

(ii) The State Governments or Union territory Administrations through the authorised agencies shall prepare CZMP as per the guidelines contained in this notification highlighting the conservation and protection of the ESAs.

(iii) Those activities permissible under this notification shall be included in the CZMP.

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Specific conditions shall be adopted for the conservation, protection and management of each of the ESAs as under: -

1.1 Mangroves:

(i) Mangroves declared as forest under the Forest (Conservation) Act, 1980 (69 of 1980).

Notwithstanding anything contained in this notification, such mangroves declared by the concerned State Governments or Union territory Administrations or Central Government as forest land under the Forest (Conservation) Act, 1980 (69 of 1980) shall attract the provisions of the said Act.

(ii) Mangroves not declared under Forest (Conservation) Act, 1980:

(a) Mangroves in Government land shall be protected based on a detailed plan to be prepared by the concerned State Governments or Union territory administrations, and in case the mangrove area is more than 1000 square meters, a buffer of 50 metre along the periphery of mangrove area shall be provided. This buffer zone of 50 metre may be utilised for public facilities for developing parks, research facilities related to mangrove biodiversity, facilities for conservation and the like.

(b) Mangroves in private land will not require a buffer zone.

1.2 Corals and coral reefs and associated biodiversity:

(i) Destruction of coral and coral reefs and the surroundings is a prohibited activity.

(ii) All coral and coral reefs shall be protected except for those small quantities required for research purposes.

(iii) Coral and coral reefs transplantation activities shall be through recognised research institutions wherever required for regeneration after obtaining necessary approvals under Wildlife (Protection) Act 1972 (53 of 1972).

(iv) The dead or destroyed or both coral areas shall be taken up for rejuvenation and rehabilitation. The conservation and protection of corals and coral reefs shall be taken up as follows:-

(a) active and live coral and coral reefs identified and delineated shall be declared and notified as ESA under Environment (Protection) Act 1986 (29 of 1986);

(b) it shall be ensured that no activities that are detrimental to the health of corals, coral reefs and its associated biodiversity, such as mining, effluent and sewage discharge, dredging, ballast water discharge, ship washings, fishing other than traditional non-destructive fisheries, construction activities and the like are taken up in and around the coral areas.

1.3 The National Parks, marine parks, Sanctuaries, reserve forests, wildlife habitats and other protected areas declared under the provisions of Wild Life (Protection) Act, 1972 (53 of 1972), the Forest (Conservation) Act 1980 (69 of 1980) or Environment (Protection) Act 1986 (29 of 1986); including Biosphere Reserves shall be conserved and protected as follows:-

(i) Conservation and protection of the above mentioned areas shall be as per the provisions of the respective Acts, notifications or guidelines as the case may be.

(ii) Efforts shall be made to increase the forest area in the coastal region in order to prevent loss of life and property from increased storms, tides and floods.

(iii) The concerned State Governments or Union territory administrations shall provide for adequate funds for such measures to undertake shelter belt plantation or bio-shields with planting material suitable to the location.

1.4. Salt marshes:

The conservation and protection of salt marshes shall be as follows:-

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(i) The salt marsh areas shall be conserved and protected and efforts shall be made to promote the endemic biodiversity in the salt marshes.

(ii) Only those activities required for overhead conveying or transmission of cables and underground laying of transmission line cables and so on, shall be permissible.

(iii) Traditional fishing shall be permissible in salt marshes.

(iv) Temporary tourism facilities around the salt marsh areas may be considered subject to adhering to norms laid down in the guidelines.

(v) Certain salt marshes which have less biodiversity, identified by NCSCM and demarcated in Coastal Zone Management Plan can be considered for salt pan activities.

1.5 Turtle nesting grounds shall be protected and conserved as follows:-

(i) Turtle nesting grounds identified by the concerned State Governments or Union territory administrations shall be protected as per Wildlife (Protection) Act of 1972.

(ii) No activities shall be permitted in and around the turtle nesting ground including those causing light and sound pollution except for those required for conservation and protection of these sites.

(iii) Strict management plans for protecting the turtle nesting grounds shall be undertaken and implemented by the concerned State or Union territory Authorities.

1.6 Horse shoe crabs habitats shall be protected and conserved as follows:-

(i) The habitat identified shall be taken up for conservation and protection.

(ii) No activities shall be taken up in and around these habitats which affect the horse shoe crab ecosystem.

1.7 Sea grass beds shall be protected and conserved as follows:-

(i) Identified sea grass beds shall be conserved and protected.

(ii) No developmental activities that have adverse effect on the sea grass bed shall be undertaken.

(iii) Efforts shall be made to propagate sea grass beds along the coastal waters where ever possible by States or Union territories as it acts as a carbon sink.

1.8 Nesting grounds of birds shall be protected and conserved as follows:-

(i) The nesting ground of birds including their local migratory route shall be protected. No developmental activities which have adverse impact on the nesting grounds and the migratory routes shall be undertaken including construction of wind mills, transmission lines and the like in the locality.

(ii) Efforts shall be made to increase the forest cover and mangrove cover including enriching the biodiversity of salt marsh and other coastal water bodies so as to provide for suitable habitat for the avifauna.

1.9 Geo-morphologically Important Zones shall be protected and managed as follows:

(i) **Sand dunes** identified shall be conserved and protected as follows:

(a) sand dunes identified shall be notified under Environment (Protection) Act 1986;

(b) no developmental activities shall be permissible except for providing eco-friendly temporary tourism facilities on stilts such as walkways, tents and the like;

(c) mining of sand from sand dunes shall be prohibited activity except for the removal of atomic minerals with proper replenishment using the tailings or other suitable sand;

(d) no activities on the sand dunes shall be taken up that would lead to erosion/destruction of sand dunes;

(e) afforestation, if any, on the sand dunes shall be done only with native flora;

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(f) the States or Union territory shall prepare management plans for the demarcated sand dunes.

(iii) **Sandy beaches:**

(a) Mining of beach sand is prohibited except for manual mining of atomic minerals with proper replenishment using the tailings or other suitable sand.

(b) When the permissible developmental activities are taken up on the beaches if loss of beach in the neighbourhood is predicted, necessary beach nourishment to compensate for the losses shall be undertaken by the project authorities and its long term maintenance shall be ensured by them.

(c) The States or Union Territory shall prepare management plans for the demarcated beaches.

(iv) **Biologically active mudflats:**

(a) Biologically active mudflats shall be identified by NCSCM in association with State Governments or Union territory administrations.

(b) The States or Union territories shall prepare management plans for such demarcated biologically active mudflats.

1.10 Areas or structures of archaeological importance and heritage value sites:

(i) State Archaeological agencies shall be responsible for conservation and protection of all archaeological structures and heritage sites identified by the Archaeological Survey of India, as per the provisions of the respective Acts, notifications or guidelines.

(ii) No activities that are detrimental to the identified areas or structures of archaeological and heritage value shall be permitted.

(iii) It shall be ensured that these structures or areas are preserved and activities undertaken without changing the façade/plinth of such structures. Such structures could be considered for use in accordance with the relevant norms after undertaking careful designing of the interiors without changing the exterior architectural design of the structure.

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Annexure-II

LIST OF PETROLEUM AND CHEMICAL PRODUCTS PERMITTED FOR STORAGE IN CRZ, EXCEPT CRZ-I A

(i) Crude oil;
(ii) Liquefied Petroleum Gas;
(iii) Motor spirit;
(iv) Kerosene;
(v) Aviation fuel;
(vi) High speed diesel;
(vii) Lubricating oil;
(viii) Butane;
(ix) Propane;
(x) Compressed Natural Gas;
(xi) Naphtha;
(xii) Furnace oil;
(xiii) Low Sulphur Heavy Stock;

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(xiv) Liquefied Natural Gas;

(xv) Fertilizers and raw materials for manufacture of fertilizers;

(xvi) Acetic acid;

(xvii) Mono ethylene glycol;

(xviii) Paraxylene;

(xix) Ethane;

(xx) Butadine;

(xxi) Methanol;

(xxii) Caustic;

(xxiii) Bitumen.

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Annexure-III

GUIDELINES FOR DEVELOPMENT OF BEACH RESORTS, HOTELS AND TOURISM DEVELOPMENT PROJECTS IN THE DESIGNATED CRZ AREAS

1. CRZ-II

Construction of beach resorts or hotels in designated areas of CRZ-II for occupation of tourist or visitors shall be subject to the following conditions, namely: -

(i) construction shall be permitted only to the landward side of an existing road or existing authorized fixed structures;

(ii) live fencing and barbed wire fencing with vegetative cover may be allowed around private properties subject to the condition that such fencing shall in no way hamper public access to the beach;

(iii) no flattening of sand dunes shall be carried out;

(iv) no permanent structures for sports facilities shall be permitted except construction of goal posts, net posts and lamp posts;

(v) construction of basement may be allowed subject to the condition that no objection certification is obtained from the State Ground Water Authority to the effect that such construction will not adversely affect fee flow of groundwater in that area;

(vi) the State Ground Water Authority shall take into consideration the guidelines issued by the Central Government before granting such no objection certificate;

(vii) the quality of treated effluents, solid wastes, emissions and noise levels and the like, from the project area must conform to the standards laid down by the competent authorities including the Central or State Pollution Control Board and under the Environment (Protection) Act, 1986 (29 of 1986);

(viii) necessary arrangements for the treatment of the effluents and solid wastes must be made and it must be ensured that the untreated effluents and solid wastes are not discharged into the water or on the beach; and no effluent or solid waste shall be discharged on the beach;

(ix) if the project involves diversion of forest land for non-forest purposes, clearance as required under the Forest (Conservation) Act, 1980 (69 of 1980) shall be obtained and the requirements of other Central and State laws as applicable to the project shall be met with and approval of the State or Union territory Tourism Department shall be obtained.

2. CRZ-III

Construction of beach resorts and hotels in designated areas of CRZ- III for occupation of tourists or visitors shall be subject to the following conditions, namely: -

(i) live fencing and barbed wire fencing with vegetative cover may be allowed around private properties subject to the condition that such fencing shall in no way hamper public access to the beach;

(ii) no flattening of sand dunes shall be carried out;

(iii) no permanent structures for sports facilities shall be permitted except construction of goal posts, net posts and lamp posts;

(iv) construction of basement may be allowed subject to the condition that no objection certification is obtained from the State Ground Water Authority to the effect that such construction will not adversely affect fee flow of groundwater in that area;

(v) the State Ground Water Authority shall take into consideration the guidelines issued by the Central Government before granting such no objection certificate;

(vi) though no construction is allowed in the no development zone for the purposes of calculation of Floor Space Index, the area of entire plot including the portion which falls within the no development zone shall be taken into account;

(vii) the total covered area on all floors shall not exceed 33 per cent of the plot size i.e., the Floor Space Index shall not exceed 0.33 and the open area shall be suitably landscaped with appropriate vegetal cover;

(viii) the construction shall be consistent with the surrounding landscape and local architectural style;

(ix) the overall height of construction up to the highest ridge of the roof, shall not exceed 9 metres and the construction shall not be more than two floors (ground floor plus one upper floor);

(x) groundwater shall not be tapped within 200 metre of the High Tide Line; and within the 200 to 500 metre zone it can be tapped only with the concurrence of the Central or State Ground Water Board;

(xi) extraction of sand, leveling or digging of sandy stretches, except for structural foundation of building or swimming pool, shall not be permitted within 500 metres of the High Tide Line;

(xii) the quality of treated effluents, solid wastes, emissions and noise levels and the like, from the project area must conform to the standards laid down by the competent authorities including the Central or State Pollution Control Board and under the Environment (Protection) Act, 1986 (29 of 1986);

(xiii) necessary arrangements for the treatment of the effluents and solid wastes must be made and it must be ensured that the untreated effluents and solid wastes are not discharged into the water or on the beach; and no effluent or solid waste shall be discharged on the beach;

(xiv) to allow public access to the beach, at least a gap of 20 metres width shall be provided between any two hotels or beach resorts; and in no case shall gaps be less than 500 metres apart; and

(xv) If the project involves diversion of forestland for non-forest purposes, clearance as required under the Forest (Conservation) Act, 1980 (69 of 1980) shall be obtained and the requirements of other Central and State laws as applicable to the project shall be met with; and approval of the State or Union territory Tourism Department shall be obtained.

Note: Construction of beach resorts or hotels shall not be permitted in Ecologically sensitive areas (such as marine parks, mangroves, coral reefs, breeding and spawning grounds of fish, wildlife habitats and such other area as may be notified by the Central Government or State Government or Union territory administrations).

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ANNEXURE -IV

GUIDELINES FOR PREPARATION OF COASTAL ZONE MANAGEMENT PLANS

1. Demarcation of High Tide Line and Low Tide Line:

Demarcation of High Tide Line (HTL) and Low Tide Line (LTL) as carried out by NCSCM for the entire coastline of the country, has been made available to the Coastal States or Union territories and only such demarcation of HTL and LTL shall be applicable for all purposes of this notification.

2. Hazard Line:

A 'Hazard line' has been demarcated by the Survey of India (SOI) taking into account the extent of the flooding on the land area due to water level fluctuations, sea level rise and shoreline changes(erosion or accretion) occurring over a period of time. The hazard line mapped by SOI has been shared with the coastal States or Union territories through NCSCM. The hazard line shall be used as a tool for disaster management plan for the coastal environment, including planning of adaptive and mitigation measures. With a view to reduce the vulnerability of the coastal communities and ensuring sustainable livelihood, while drawing the CZMP, the land use planning for the area between the Hazard line and HTL shall take into account such impacts of climate change and shoreline changes.

3. Preparation of CZM Maps:

(i) Base Maps of 1:25,000 scale shall be acquired from the Survey of India (SOI) and wherever 1: 25,000 maps are not available, 1: 50,000 maps shall be enlarged to 1: 25,000 for the purpose of base map preparation and these maps will be of the standard specification given below:-

Unit	: 7.5 minutes X 7.5minutes
Numbering	: Survey of India Sheet Numbering System
Horizontal Datum	: Everest or WGS 84
Vertical Datum	: Mean Sea Level (MSL)
Topography	: Topography in the SOI maps will be updated using latest satellite imageries or aerial photographs

(ii) Coastal Zone Management (CZM) Maps of scale 1:25,000 shall be got prepared by any of the agencies identified by the Ministry of Environment, Forest and Climate Change vide its Office Order number J-17011/8/92-IA-III dated the 14th March, 2014 using the demarcation of the High Tide Line or LTL, as carried out by NCSCM.

(iii) Various regulatory lines viz. at a distance of 20 metres, 50 metres, 200 metres and 500 metres from HTL respectively, as applicable in various CRZ categories, and the Hazard line shall be demarcated and transferred to the CZM maps.

(iv) HTL, LTL and CRZ boundaries, as applicable, shall also be demarcated in the CZM maps along the banks of tidal influenced inland water bodies.

(v) Classification of different coastal zones shall be done as per the CRZ notification and Standard national or international colour codes shall be used.

4. Local level CZM Maps:

(i) Local level CZM Maps are for the use of local bodies and other agencies to facilitate implementation of the Coastal Zone Management Plans.

(ii) Cadastral (village) maps in 1:3960 or the nearest scale, as available with revenue authorities shall be used as the base maps.

(iii) HTL, LTL, other CRZ regulatory lines and the Hazard line shall be demarcated in the cadastral maps and classifications shall be transferred into local level CZM maps.

5. **Classification of CRZ areas:**

(i) The CZM Maps shall clearly demarcate the land use plan of the area and map out the Ecologically Sensitive Areas (ESAs) or the CRZ-IA areas as per mapping made available by NCSCM to coastal State or Union territories. All such ESAs shall be appropriately demarcated with colour codes.

(ii) Buffer zone along mangrove areas of more than 1000 square metres shall be stipulated with a different colour distinguishing from the mangrove area. The buffer zone shall also be classified as CRZ-I area.

(iii) In the CRZ areas, the fishing villages, common properties of the fishermen communities, fishing jetties, ice plants, fish drying platforms or areas infrastructure facilities of fishing and local communities such as dispensaries, roads, schools, and the like, shall be indicated on the cadastral scale maps. States and Union territories shall prepare detailed plans for long term housing needs of coastal fisher communities in view of expansion and other needs, provisions of basic services including sanitation, safety, and disaster preparedness.

(iv) The water areas of CRZ-IV shall be demarcated and clearly demarcated if the water body is sea, lagoon, backwater, creek, bay, and estuary and for such classification of the water bodies the terminology used by Naval Hydrographic Office shall be relied upon.

(v) The fishing Zones in the water bodies and the fish breeding areas shall be clearly marked.

(vi) In CVCAs, the land use maps shall be superimposed on the Coastal Zone Management Plan clearly demarcating the CRZ-I, II, III, IV.

(vii) The existing authorised developments on the seaward side shall be clearly demarcated.

(viii) The features like cyclone shelters, rain shelters, helipads and other infrastructure including road network may be clearly indicated on the CZM Maps for the purpose of rescue and relief operations during cyclones, storms, tsunami and the like.

(ix) Construction of buildings or other activities shall be permitted under the CZMP provided adequate arrangements are made for proper management and disposal of solid and liquid wastes in accordance with the environmental standards, rules and statutes, and under no circumstances, untreated effluents shall be disposed off in the coastal waters.

6. **Public consultations on CZMP:**

(i) The draft CZMP prepared shall be given wide publicity and suggestions and objections received in accordance with the Environment (Protection) Act, 1986. Public hearing on the draft CZMP shall be held at district level by the concerned CZMA.

(ii) Based on the suggestions and objections received the CZMPs shall be revised and approval of Ministry of Environment, Forest and Climate Change shall be obtained.

(iii) The approved CZMP shall be put up on the website of Ministry of Environment, Forest and Climate Change, concerned website of the State or Union Territory Coastal Zone Management Authority and hard copy made available in the Panchayat Office and District Collector Office.

7. **Revision of Coastal Zone Management Plans:**

(i) Whenever there is a doubt, the concerned State or Union territory Coastal Zone Management Authority shall refer the matter to the National Centre for Sustainable Coastal Management who shall verify the CZMP based on latest satellite imagery and ground truthing.

(ii) If required, the rectified map shall be submitted to Ministry of Environment, Forest and Climate Change for consideration.

*****

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ANNEXURE-V

PROJECT INFORMATION DETAILS

1. PROJECT DETAILS

A. Project Name

B. Survey No./ Village/ Co-ordinates

C. District

D. State

E. Whether the proposal is for (Select relevant field)

(i) Fresh Clearance under CRZ

(ii) Amendment to an already issued CRZ clearance

(iii) Extension of validity of an already issued CRZ clearance

F. Name of the Applicant

G. Address of the Applicant

H. Contact details (Telephone nos. and e-mail address)

I. Cost of the project (Rs in crores)

2. BENEFITS OF THE PROJECT

A. Details of Project Benefits

B. Employment Likely to be Generated (Yes/No)

If Yes

(i) Total Manpower Requirement

(ii) Permanent Employment (Numbers)

(iii) Temporary Employment (Numbers)

(iv) Temporary Employment- During Construction (Numbers)

(v) Temporary Employment- During Operation (Numbers)

3. DESCRIPTION OF THE PROJECT UNDER CONSIDERATION (Select the Category of the project):

A. Resort / Buildings / civic amenities

(i) Total area/Built-up area (in sqm.)

(ii) Height of structure

(iii) FSI ratio

(iv) Name of concerned town planning authority/ Panchayat etc.

(v) Details of provision of car parking area

B. Coastal Roads / Roads on Stilt

(i) Area of land reclamation

(ii) Estimated quantity of muck/earth for reclamation

(iii) Traffic carrying capacity

(iv) Dimensions of road

C. Pipelines from thermal power blow down

(i) Length of pipeline

(ii) Length traversing CRZ area

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(iii) Depth of excavation
(iv) Width of excavation
(v) Length of pipeline from seashore to deep sea
(vi) Depth of outfall point from surface of sea water
(vii) Temperature of effluent above ambient at disposal point

D. Marine Disposal of Treated Effluent through pipelines

(i) Location of intake/ outfall
(ii) Depth of outfall point
(iii) Length of pipeline
(iv) Length traversing CRZ area
(v) Depth of excavation
(vi) Width of excavation
(vii) Length of pipeline from shore to deep sea/creek
(viii) Depth of outfall point from surface of water
(ix) Depth of water at disposal point
(x) BOD, COD, TSS, oil and grease, heavy metals in the effluent

E. Facility for storage of goods/chemicals

(i) Name of chemical
(ii) End use of the chemical
(iii) No. of tanks for storage
(iv) Capacity of tanks

F. Offshore structures

(i) Exploration or development
(ii) Depth of sea bed
(iii) No. of rigs
(iv) No. of platform
(v) Details of group gathering stations

G. Desalination Plant

(i) Capacity of desalination
(ii) Total brine generation
(iii) Temperature of effluent above ambient at disposal point
(iv) Ambient salinity
(v) Disposal point

H. Mining of atomic minerals

(i) Capacity of mining
(ii) Type of mineral to be extracted
(iii) End use of the mineral
(iv) Government order for mining lease/exploration and approved mining plan details
(v) Extent of mining lease area

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I. **Sewage Treatment Plants**

(i) Capacity

(ii) Total area of construction

(iii) Compliance of effluent parameters as laid down by cpcb/spcb/other authorised agency

(iv) Whether discharge is in sea water/creek?

If yes

- Distance of marine outfall point from shore/from the tidal river bank
- Depth of outfall point from sea water/river water surface
- Depth of seabed/riverbed at outfall point

J. **Lighthouse**

(i) Total ground area of foundation/platform

(ii) Height of the structure

K. **Wind Mills**

(i) Capacity (MW)

(ii) Height of the windmill

(iii) Diameter of the windmill

(iv) Length of blade

(v) Speed of rotation

(vi) Transmission lines (overhead or underground)

L. **Others**

(i) Please specify with salient features

(ii) Upload relevant Documents (upload PDF only)

4. **PROJECT LOCATION AS PER CRZ CLASSIFICATION** (If project site falls in different/multiple CRZ categories the same may also be elaborated)

5. **CLAUSE OF CRZ NOTIFICATION UNDER WHICH PROJECT IS A PERMISSIBLE /REGULATED ACTIVITY**

6. **MANDATORY FIELDS FOR PROJECT ASSESSMENT**

A. **CRZ map in 1:4000 scale indicating HTL, LTL demarcation and distance of the nearest project boundary** (in meters) **from HTL to be stated**

(i) Upload Map (kml file)

B. **Project layout superimposed on CRZ Map 1:4000 scale with classification of project location including other notified ESAs prepared**

(i) Upload Map (kml file)

C. **CRZ map 1:25000 scale covering 7 km radius around Project site**

(i) Upload Map (kml file)

7. **PROJECT LOCATED IN** (Select Type)

(i) Non eroding Coast

(ii) Low and Medium eroding coast

(iii) High eroding Coast



8. DETAILS OF FOREST/ MANGROVES LAND INVOLVED (YES/NO)

IF YES

(i) Detail of area diverted

(ii) Forest clearance to be submitted (Upload document)

(iii) No. of trees to be cut under the project

(iv) Compensatory afforestation plan to be submitted (Upload document)

9. DISTANCE OF PROPOSED PROJECT FROM ESA/MARINE PARK/ WILD LIFE SANCTUARY

(i) Within 10 kilometre radius from the project site (Yes/No)

If YES

- Permission from NBWL to be submitted (Upload document)

10. NOC OR CONSENT TO ESTABLISH FROM STATE/UT POLLUTION CONTROL BOARDS OBTAINED (YES/NO)

If YES

(i) Copy of NOC to be provided (Upload document)

(ii) Conditions imposed to be stated (Upload document)

11. Environment Impact Assessment (EIA) studies (relevant fields to be filled)

A. **Terrestrial studies:**

(i) Summary details of EIA (Terrestrial) Studies

(ii) Upload Recommendation made in EIAs (Upload document)

(iii) State period of Study

B. **Marine Studies**

(i) Summary details of EIA (Marine) Studies

(ii) Upload Recommendation made in EIAs (Upload document)

(iii) State period of Study

12. DISASTER MANAGEMENT PLAN / NATIONAL OIL SPILL DISASTER CONTINGENCY PLAN (If applicable)

13. PROJECT INVOLVING DISCHARGE OF LIQUID EFFLUENTS:

(i) Capacity of Sewage Treatment Plant

(ii) Quantity of effluent generated

(iii) Quantity of effluent treated

(iv) Method of treatment and disposal

14. PROJECT INVOLVING DISCHARGE OF SOLID WASTE:

(i) Type of solid waste

(ii) Quantity of solid waste generated

(iii) Method of disposal

(iv) Mode of transport

15. WATER REQUIREMENT in kilo litres per day (KLD)

(i) Quantity of water required

(ii) Source of water

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(iii) If Ground water (Upload a copy of approval from Central Ground Water Authority or other authorised body)

(iv) If other Source (Upload a copy of permission from competent authority)

(v) Mode of transport

(vi) Commitment of water supply (Upload document)

16. DETAILS OF WATER TREATMENT AND RECYCLING (If any) (Multiple Entries Allowed)

Type/ Source	Quantity of Waste Water Generated (Kilos Litre per Day)	Treatment Capacity (Kilos Litre per Day)	Treatment Method	Mode of Disposal	Quantity of Discharged Water (Kilos Litre per Day)	Quantity of Treatment Water used in Recycling/Reuse (Kilo Litre per Day)

17. DETAILS OF RAINWATER HARVESTING

(i) No. of Storage tanks

(ii) Total capacity of tanks

(iii) No. of Recharge Pits

(iv) Capacity of pits

18. ENERGY REQUIREMENT AND SOURCES

(i) Total Power Requirements (kwh)

(ii) Source

(iii) Upload Copy of Agreement (upload pdf only)

(iv) Stand by Arrangement (Details)

19. ENERGY EFFICIENCY/SAVING MEASURES

(i) Source/Mode

(ii) Details of savings

20. RECOMMENDATION OF STATE COASTAL ZONE MANAGEMENT AUTHORITY

(i) Upload Copy of CZMA recommendations (Upload pdf only)

(ii) Compliance status of the Conditions Imposed

21. WHETHER PROPOSAL ATTRACTS EIA NOTIFICATION, 2006. (Yes/No)

If YES,

(i) the category thereof

(ii) Status of proposal for EC (as applicable)

22. SOCIAL AND ENVIRONMENTAL ISSUES AND MITIGATIONS MEASURES SUGGESTED INCLUDING BUT NOT LIMITED TO R&R, WATER, AIR, HAZARDOUS WASTES, ECOLOGICAL ASPECTS, ETC. (Brief Details to be Provided)

23. DETAILS OF COURT CASES Whether there is any Court Cases pending against the project and/or land in which the project is proposed to be set up? **(Yes/No)**

If Yes, Pending or Disposed (Select relevant)

(i) Name of the Court (Supreme Court, High Court, National Green Tribunal)

(ii) Case No.



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(iii) Case Details

(iv) Orders/Directions of the court, if any and its relevance with the proposed project (Upload document)

24. ADDITIONAL INFORMATION, If any

UNDERTAKING: It is certified that the information given above are true to the best of my knowledge and belief and nothing contravening the provisions of CRZ Notification, 2011 has been concealed therefore.

Name and Signature of the applicant:

Date:

NOTARY
SALCETE TALUKA
GOVT. OF GOA (IND.)

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ALOK KUMAR
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ANNEXURE A-4

REPORT OF THE EXPERT COMMITTEE ON COASTAL REGULATION ZONE NOTIFICTION, 1991

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PREFACE

1. Experts on the origin of life, with the DNA molecule as the chemical substance of heredity, all accept that life began in the ocean. Oceans and coastal regions have since long attracted the awe, admiration, respect and reverence of human communities all over the world. Before the arrival of the aviation industry, oceans provided the channel of communication among different continents. Unfortunately, in the post-industrial era, oceans started becoming dumping grounds for unwanted material including toxic wastes and began losing their devotional aura. Their scenic beauty however became the bedrock of thriving tourism industries.

2. The renewable living aquatic resources of the sea represent a unique gift of nature to humankind. Coral reefs are the aquatic counterparts of tropical rainforests in terms of richness of biological diversity. Because of the multiple benefits provided by the coastal environment for human health, wealth and well-being, demographic pressures on coastal resources started increasing during the last century. Extreme cases of intensive pressure of human population on coastal ecosystems are seen in Kerala, as well as in mega-cities like Mumbai. Over 25% of India's population will live in coastal areas during this century. Many large cities and urban habitations are also near the seacoast. Therefore, an integrated and ecologically and socially sustainable coastal zone management system should be put in place jointly by government agencies and coastal communities.

3. The recent Tsunami tragedy underlines the urgent need for revisiting our disaster management and coastal infrastructure development strategies. We should establish soon a Network of Rural Knowledge Centres based on the integrated use of the internet, ham radio, cable TV, vernacular press and loud speakers. With the enhancement of our capacity for issuing early warning on impending coastal storms and tidal waves as well as our existing capacity to predict wave heights and location of fish shoals through the Indian National Coastal Information System (INCOIS), we need a mechanism to reach the un-reached with the right information at the right time. This is where our strength in Information Communication Technology (ICT) will be extremely valuable. We should develop a Digital Gateway for Sustainable Coastal Zone Management as part of our Disaster Management and coastal area conservation programmes.

4. Characteristic of her foresight and vision, the then Prime Minister of India, Smt. Indira Gandhi had proposed in 1981 that no permanent constructions should be undertaken within 500 metres of the high-tide line. This suggestion was given legal content by the Ministry of Environment and Forests through the Coastal Regulation Zone Notification dated 19th February, 1991 under the Environment (Protection) Act, 1986. Since then, numerous representations have been made for exemptions from the provisions of 1991 Notification. The Ministry of Environment and Forests therefore set up in July, 2004 a Committee to review the Coastal Regulation Zone Notification (CRZ) of 1991. This report contains the recommendations of the Committee.

5. In my view, if our recommendations are implemented sincerely and speedily, the concept of sustainable coastal management will not remain a piece of rhetoric but can become a reality. However, for achieving this goal, we must harness the power of partnership among all stakeholders. The livelihood security of the economically and socially underprivileged sections of the coastal communities and the ecological, scenic and cultural security of coastal areas should become mutually reinforcing. We have recommended the

setting up of a National Board for Sustainable Coastal Zone Management under the Chairmanship of the Union Minister for Environment and Forests with the Union Minister for Ocean Development as Co-chair, for providing a structured platform for policy oversight and for promoting symbiotic partnerships and a shared commitment to conservation among all the stakeholders. To be effective, such a National Board should be supported by a professionally-led Coastal Zone Management Authority as well as a National Institute for Sustainable Coastal Management, designed to serve as the repository of national, regional and global information and data on policy and legal affairs. To attend to the special needs of Andaman and Nicobar and Lakshadweep group of islands, it will be useful to establish a National Centre for Coastal Zone Management in island ecosystems. Since the variations in terrain, topography, climate and economic geography are so widespread along our long coastlines, these institutions should undertake specific micro-surveys to enable the listing of coastal assets in great detail. Until the micro-surveys are completed, we should strictly adhere to the current rules of CRZ notification 1991. Also, such public policy facilitation institutions should develop the capacity for fostering professional conflict resolution mechanisms. They should also develop expertise in ecological economics as applied to the coastal zone. Above all, they should spearhead an ecological literacy movement through ICT based Rural Knowledge Centres.

6. The Tsunami tragedy, to quote Prime Minister Dr. Manmohan Singh, provides an opportunity for strengthening socially and scientifically, our capacity for safeguarding human and ecological security in coastal areas. It also provides an opportunity for enhancing the economic well-being of the fisher and farm families along the shoreline through an integrated bio-shield-cum- bio-village programme.

7. It has been a privilege for me to have had the opportunity of working with dedicated and distinguished colleagues on this Committee. A wide range of government, academic, professional and civil society organizations guided us in our work. My gratitude goes to all of them. In particular, we are indebted to Hon'ble Shri A. Raja, Union Minister for Environment and Forests for his interest and to Dr. Prodipto Ghosh, Secretary, Ministry of Environment and Forests for his active participation in all our meetings. Above all, my sincere thanks go to Mr. A. Senthil Vel and Dr. E.V. Muley for their untiring efforts to enable the Committee to complete its work within the stipulated period.

Chennai
9th February, 2005

(M.S. Swaminathan)
Chairman

Introduction

Coastal environment plays a vital role in nation's economy by virtue of the resources, productive habitats and rich biodiversity. India has a coastline of about 7,500 kms of which the mainland accounts for 5,400 kms, Lakshadweep coasts extend to 132 kms and Andaman & Nicobar islands have a coastline of about 1,900 kms. Nearly 250 million people live within a distance of 50 kms from the coast. The coastal zone is also endowed with a very wide range of coastal ecosystems like mangroves, coral reefs, sea grasses, salt marshes, sand dunes, estuaries, lagoons, etc., which are characterized by distinct biotic and abiotic processes. The coastal areas are assuming greater importance in recent years, owing to increasing human population, urbanization and accelerated developmental activities. These anthropogenic activities have put tremendous pressure on the fragile coastal environment.

The coastal areas are also the place where natural disasters are also experienced. The entire East coast of India, the Gujarat coast along the West coast and the islands of Lakshadeep and Andaman and Nicobar face frequent cyclonic conditions which some times cause large scale destruction of life and property. The Super Cyclone had caused massive destruction along the coast of Orissa in 1999 and its impact was felt several kilometres inland. The tsunami, which occurred on 26th December, 2004 was one of the most serious and unexpected natural catastrophes to occur along the Indian coast. The major destruction caused by this tsunami was to the life and property located along the coast of Andaman and Nicobar, Tamil Nadu, Pondicherry and Kerala. It would take several years to restore the damages caused by this natural catastrophe. While it is agreed that no human interference is possible to control such an event but precautionary measures such as coastal area planning for locating coastal communities in safer areas, protecting and propagating the natural protecting systems such as mangroves, coral reefs, shelter belt plantations, along with installation of early warning systems, timely evacuation and relief measures can minimize loss of life and property to a large extent.

For the purpose of protecting and conserving the coastal environment the Ministry of Environment & Forests issued the Coastal Regulation Zone Notification dated 19.2.1991 under Environment (Protection) Act, 1986. This notification regulates all developmental activities in the Coastal Regulation Zone area.

The Ministry after gaining experience from implementation of the Coastal Regulation Zone Notification over a decade, suggestions received from stakeholders and NGO's and taking into the lessons learnt for the Coastal Zone Management programme of other countries, the Ministry is of the opinion that there is a need to ensure that the regulations are firmly founded on scientific principles to ensure effective protection to valuable coastal environmental resources and without unnecessarily impeading livelihood or legitimate coastal economic activity or settlements or infrastructure development. For this purpose, the Ministry is of the opinion that the CRZ Notification should be reviewed to make the approach to coastal environmental regulation more holistic and ensure protection to coastal ecological systems, coastal waters and vulnerability of some coastal areas due to potential sea level rise and other natural hazards. The Coastal Zone Management Plans (CZMPs) need to be reviewed at predetermined intervals to take into account the changes in geomorphological features that take place due to the ocean dynamics and settlement patterns. There has been significant degradation of coastal resources in recent years due to poorly planned developmental activities and overexploitation of natural resources.

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Keeping in view the above issues, the Central Government is of the view that there is a need for a comprehensive review of the CRZ Notification, 1991. This review is to be carried out in the light of the findings and recommendations of the previous Committees constituted by the Ministry to address specific issues relating to CRZ, judicial pronouncements relating to the Notification and the concerns raised by various stakeholders including NGOs.

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NOTARY

No.15(8)/2004-IA.III
Government of India
Ministry of Environment & Forests
IA-III Division

Paryavaran Bhavan,
CGO Complex, Lodi Road,
New Delhi-110 003

Dated, the 19th July, 2004

ORDER

Sub: Constitution of an Expert Committee to review and make recommendations with regard to implementation of Coastal Regulation Zone Notification, 1991 – regarding.

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The President is pleased to constitute an Expert Committee to carry out a quick but comprehensive review of the Coastal Regulation Zone Notification, 1991, in the light of findings and recommendations of all previous Committees, judicial pronouncements, representations of various stakeholders and suggest suitable amendments, if necessary, to make the regarding regulatory framework consistent with well established scientific principles of coastal zone management. The composition of the Committee will be as follows:-

1.	**Dr M.S. Swaminathan**, Chairman, MSSRF, 3rd Cross Street, Institutional Area, Taramani, Chennai - 600113, India.	**Chairman**
2.	**Prof. Bharat H. Desai**, Associate Professor, International Legal Studies Division, School of International Studies, JNU New Delhi-110 067 (Legal Expert on CRZ).	Member
3.	**Prof. S. Ramachandran**, Director Institute for Ocean Management, Koodal Building, Anna University, Chennai - 600 025 (Marine Biologist/Biodiversity Issues).	Member
4.	**Dr. M. Baba**, Centre for Earth Science Studies (CESS), Post Box No.7250, Akkulam, Thiruvananthapuram - 695 031 (Marine Geologist).	Member
5.	**Prof. U. Sankar**, Madras School of Economics, Anna University, Chennai-600 025 (Environmental Economics)	Member
6.	**Dr. Ms Janki B. Andharia**, Professor, Tata Institute of Social Sciences, Tata Institute of Social Sciences, Postbox 8313, Deonar, V.N. Purvav Marg, Sion-Trombay Road, Mumbai-400 088 (Socio-economic aspects).	Member
7.	**Dr. Shailesh B. Nayak**, Space Application Centre (SAC), Ambavadi Vistar P.O., Ahmedabad – 380 015 – Telephone: 079-6761188, 6740256, Fax: 079-6748809, 6767708 (Remote Sensing and GIS).	Member
8.	**Shri V. Sunder**, Department of Coastal Engineering, IIT, Chennai. (Shore line change).	Member
	Prof. A.K. Maitra, Ex-Director, SPA & HOD, Deptt. Of Environmental Planning, New Delhi N-3D, Saket, New Delhi-110 017	Member

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	(Mob. 9810413591) (Regional Planning).	
10.	**Dr. Mohan Joseph,** Director, Central Marine Fisheries Research Institute (CMFRI), Indian Council of Agricultural Research, Post Box No. 1603, Tatapuram PO, Ernakulam, Kochi - 682014.	Member
11.	**Secretary,** Department of Ocean Development, Block No.12, CGO Complex, New Delhi-110 003.	Special Invitee.
12.	**Secretary,** Environment & Forests, Paryavaran Bhavan, CGO Complex, New Delhi.	Special Invitee
13.	**Additional/Joint Director,** MoEF.	Member Secretary.

2. **The Terms of Reference of the Committee will be as under:-**

(a) To review the reports of various Committees appointed by the Ministry of Environment and Forests on coastal zone management, international practices and suggest the scientific principles for an integrated coastal zone management best suited for the country;

(b) To define and enlist various coastal and marine resources and recommend the methodology for their identification and the extent of safeguards required for conservation and protection;

(c) To revisit the CRZ, Notification, 1991 in the light of above and recommend necessary amendments to make the regulatory framework consistent with recommendations on (a) and (b) above and the Environment (Protection) Act, 1986;

3. The Chairman may associate any other expert in the relevant field in the deliberations of specific issues concerning coastal zone management.

4. The Committee will submit its report within two months.

5. The Committee may hold the meeting in Delhi or any other place as desired by the Chairman and also undertake site visits if required.

6. TA/DA as well as sitting fees of Non-official Members of the Committee shall be borne by the Ministry as per Rules.

Sd/-
(A. Senthil Vel)
Joint Director

The following experts were Co-opted by the Committee:

1. Dr. J.R.B Alfred, Director, Zoological Survey of India, Kolkata.
2. Dr. N. Sanjappa, Director, Botanical Survey of India, Kolkata.
3. Dr. Y.S. Yadava, Member Secretary, Aquaculture Authority, Chennai.
4. Cmdt. M.M. Sharma, Indian Coast Guards, New Delhi.
5. Shri Ronesh Ray, Heritage and Architecture, New Delhi.
6. Dr. S. Ayyappan, Director General, Fisheries, New Delhi.
7. Director, National Institute of Oceanography, Goa.

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CHAPTER 1

1.0 COASTAL ZONE MANAGEMENT – NATIONAL AND INTERNATIONAL PRACTICES

1.1 Indian Initiatives

The then Prime Minister (PM) Smt. Indira Gandhi in 1981, after taking a note of unplanned development in the coastal areas wrote letters to all the coastal States to take adequate measures for protecting the coastal environment. As the follow-up of the PM's directive, the then Department of Environment & Forests initiated preparation of a guideline for protecting the beaches of the country. These guidelines were prepared by experts and were provided to the coastal State Governments/Union Territory Administrations for implementation in 1997. However, none of the State/UT Governments took the guidelines seriously since, it had no statutory backing.

Taking into note the failure of such guidelines without statutory backing, the Ministry of Environment & Forests carried out an in-house consultation and issued a draft Coastal Regulation Zone (CRZ) Notification, 1989 under Environment (Protection) Act, 1986 inviting suggestions and objections from public. Based on the comments received from the public, the Ministry finalized the CRZ Notification on 19.2.1991. This Notification regulates all developmental activities in the CRZ area.

Marine resources management programmers were initiated as early as 1897, when the Indian Fisheries Act was passed. Several issues related to coastal management were addressed by various Ministries and Departments of State and Central Governments. However, all these management initiatives were concentrated on specific issues such as coastal erosion, coastal pollution, ports and harbours , etc. The Coastal Regulation Zone Notification issued in 1991 was the first major legislation that was aimed at regulating various coastal activities and protecting the coastal environment. Several institutions have taken up projects and pilot studies in the area of coastal zone management. Important being the Integrated Coastal and Marine Area Management (ICMAM) studies by Department of Ocean Development, Integrated Coastal Zone Management (ICZM) studies funded by Ministry of Environment & Forests and executed by agencies like Institute of Ocean Management of Anna University, Centre for Earth Science Studies, Thiruvananthapuram, Institute for Wetland Management and Ecological Designs, Kolkata, participatory management approaches and coastal system research by M.S. Swaminathan Research Foundation, Chennai, coastal mapping by Space Application Centre, Ahmedabad, Fisheries Management by Central Marine Fisheries Research Institute, Kochi and oceanography by institutes like National Institute of Oceanography, Panjim and National Institute of Ocean Technology, Chennai.

1.1.1 Indian coast

India's coastline has been undergoing physical changes throughout the geological past, although the last tectonic phase in the Indian peninsula has been one of the general emergence, the present coastal geomorphology of India has evolved largely in the background of the post-glacial transgression over the pre-existing topography of the shore,

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coast and offshore zones. The Holocene sea fluctuated in the course of the last 6,000 years and the marked regression is indicated between 3,000 to 5,000 years B.C.

There are more than 100 rivers, which bring large quantities of sediments to the coast. The mightier ones are the Ganges, Brahmaputra, Krishna, Godavari and Cauvery on the east coast and Narmada and Tapi on the north-west coast.

The continental shelf is narrow along the east coast. On the west coast, the wide shelf of about 340 kms of the north tapers to less than 60 kms in the south. With a monsoon climate, the southwesterly winds during the period from June to September bring high waves closer to the southwest coast. The east coast generally becomes active during the cyclones of the northeast monsoon period (October-November). The tidal range also varies significantly from south to north. While the southern coast, have a tidal range of less than 1 metre, the northwest peaks at 11 metres and the northeast reaches 4 metres.

Gujarat coast can be classified into five regions viz., the Rann of Kachchh, the Gulf of Kachchh, the Saurashtra Coast, the Gulf of Khambat and the South Gujarat Coast. The coastal area of Gujarat including the Rann of Kachchh is the largest in the country and covers an area of about 28,500 sq km. The Ranns of Kachchh comprise of the Great Rann and the Little Rann, which remain saline desert for the greater part of the year. The area of the lower Indus deltaic plain situated on the west of the Great Rann of Kachchh is characterised by the tidal creeks (e.g. Kori creek) and mangroves. High tidal flats with or without salt encrustations are seen. In the Gulf of Kachchh shoreline has extensive mudflats and is highly intended with a number of cliffed rocky islands. It is fringed by coral reefs at many places. Mangroves, algae, salt marsh, dunes and salt pans are common. The Saurashtra coast is less intended, but has numerous cliffs, islands, tidal flats, estuaries and embayments. Dunes (near Mahuva), sandy beaches, spits, bars, bays, marshes and estuaries predominate. Raised beaches area present around Veraval and Porbandar. The presence of 2-3 strandlines (old shorelines) for most part of the Saurashtra coast and the cliffs with undercutting reveal the dynamic nature of mudflats, dunes and sporadic beaches. The different levels of mudflats and other features are indicative of high tidal range (upto 11 m). The palcomudflats are related to the phenomenon of regression of the Flandrian sea. The south Gujarat coast is comparatively uniform and is broken by few indentations. Series of estuaries, creeks, mudflats and marsh vegetation are present. The river mouths of Purna, Ambica and Damanganga are eroding. Deposition is observed near Umargam. Similar geomorphology continues upto Mumbai in Maharashtra. This region has extensive creek systems which are flanked by mudflats, mangroves and saltpans. Numerous islands both barrier and offshore are observed. Isolated cliffs and sandy beaches are seen.

The southern Maharashtra and Goa coasts are characterized by pocket beaches flanked by raised platform, rocky cliffs and promontories (all of Deccan basalt), estuaries, bays and mangroves. Mudflats are found mainly along estuaries, bays and creeks. Ratnagiri has rich mangrove forests. Iron ore mines are located at Redi. The Marmagao bay flanked by Mandovi and Zuari estuaries is the largest estuarine system on this part of the coast. Beaches in Goa are long, linear and wide and are flanked by headlands (promontories). These beaches are extensively used for recreation.

The coastal zone of Karnataka is narrow except around estuaries. Headlands and pocket beaches characaterize the northern coast (Ankola-Karwar) and long linear beaches are seen on the southern coast. Spits, estuaries, mudflats, shallow lagoons, islands and few

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patches of mangroves are also observed. Erosion is seen near Mangalore and deposition in Kalinadi creek near Karwar. Mangalore is found to be emerging as evidenced from geological and tide records. Consequent to this, change in the course of rivers near the coast is quite common here.

On contrast to the Mangalore coast, Kerala coast is described as a sub-mergent coast. Lateritic cliffs, rocky promontories, offshore stalks, long beaches, estuaries, lagoons, spits and bars are characteristics of Kerala coast. The sand ridges, extensive lagoons and barrier islands are indicative of a dynamic coast with transgression and regression in the recent geological past. The central Kerala coast around Kochi is of recent origin. There are about 700 land-locked islands (including barrier islands) in Kerala. The mudbanks of Kerala are unique transient nearshore features appearing during monsoon. Though there are 41 rivers bringing enormous quantity of sediments, deltas are not formed due to the high energy condition of the coast. Cochin-Vembanad is one of the largest estuarine systems in the country. Ashtamudi is another major estuary in Kerala. It is estimated that 30 kms of the coast is undergoing high erosion and 21 kms is accreting. About 360 kms of the 570 kms coastline is protected by seawalls. There are rich heavy mineral deposits in Chavara. Though the Kerala coast is described as a mangrove forest in the resourced history, it is left with just 16 sq. kms of mangroves restricted mainly at Valapatanam and Puthuvaipu (Kochi).

The Tamil Nadu (including Pondicherry) coast is straight and narrow without much indentations except at Vedaranyam. Fringing and patch reefs are present near Rameswaram and Gulf of Mannar. Ichavaram, Vedaranyam and Point Calimere have well developed mangrove systems. In Tamil Nadu about 46 rivers drain into Bay of Bengal forming several estuaries adjoining coastal lagoons. The Cauvery River and its tributaries form a large delta supporting extensive agriculture. The other landforms of the Tamil Nadu coast are rock outcrops of Kanyakumari, mudflats, beaches, spits, coastal dunes and strand features. Deposition is observed at Point Calimere, Nagapattinam, South Madras, etc., while erosion is reported at Ovari Paravarnattam, Mahabalipuram and North Madras near Ennore. Rich deposits of heavy minerals are available in Muttam-Manavalakuruchi coast. The southern tip is also known for the Tera sands.

The Coastline of Andhra Pradesh is long with indentations only in the extreme south (in the saltwater lagoon of Pulicat lake) and between the Godavari and Krishna deltas (which are growing outwards). North of Godavari delta is rocky, south of Krishna delta is a sandy and in between the interdelta is vegetated with mangroves. The residual hills and ridges of the north are common here. The deltaic coast comprises of bays, creeks, extensive tidal mudflats, spits, bars, mangrove swamps, marshes, ridge and swale areas and coastal alluvial plains. The Kolleru lake is situated in the interdelta. This was formed due to the coalescence of the deltaic deposits of the rivers and later it was cut off from the sea. The Pulicat lake has extensive tidal flat and 12 km long spit, where Sriharikotta is situated. The lake is shrinking especially from the northen side. The deltaic and southern coast are rich in agriculture and aquaculture production. These coasts are frequented by cyclones.

The Orissa coast is mainly depositional in nature formed by the Mahanadi and the Brahmani-Baitarani deltas. It is exposed to severe cyclones (latest in October, 1999). The Chilka lagoon is the largest natural water body of the Indian coast. The width of the beaches of the Orissa coast vary. The Bhitarkanika and Hatmundia reserve mangroves are extensive (190 sq. km). Gopalpur is rich in heavy minerals. Mudflats, spits, bars, beach ridges, creeks,

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estuaries, lagoons, flood plains, paleomudflats, coastal dunes, salt pans and paleochannels are observed along the Orissa coast.

The West Bengal coast represents a typical deltaic strip with almost a flat terrain. The Hoogly and its distributaries form the most conspicuous drainage system and form an estuarine system. The Sundarbans with coverage of about 1,430 sq. kms, is one of the largest single block of the halophytic mangrove systems of the world. The major geomorphic features are mudflats, bars, shoals, beach ridges, estuaries, extensive network of creeks, paleomudflats, coastal dunes, large number of islands (e.g Sagar) and salt pans.

In Lakshadweep Islands, situated in the Arabian Sea, there are about 36 islands (11 inhabited), a number of sunken banks, open reefs and sand banks. These coral islands are 3-9 metres above Mean Sea Level (MSL), have an area of 32 sq. kms and all of them have well developed coral reefs. Lagoons are integral part of all Lakshadweep islands.

The Andaman and Nicobar group of islands of Bay of Bengal are about 350 in number. These islands are volcanic in origin and emerged part of a mountain chain. The coastline has coral reefs, sandy beaches, lagoons, mangroves, creeks, bays, cliffs, saline areas and forestland. The southern most island (Indira Point) is the country's southern most point, latitudinally. An active volcanic island is observed in Nicobar group of islands.

1.1.2 Indian Laws and Regulations

Apart from the Coastal Regulation Zone Notification, 1991 there are many legislations /Acts and rules related to coastal activities. The following are the important ones: Indian Fisheries Act, 1897; Indian Ports Act, 1902; Merchant Shipping Act, 1974, Wildlife (Protection) Act 1972; Water (Prevention and Control of Pollution) Act, 1974, Air (Prevention and Control of Pollution) Act, 1981; Indian Coast Guards Act, 1974; and Maritime Zones of India (Regulation of Fishing by Foreign Vessels) Act, 1981 and Environment (Protection) Act 1986; The Petroleum Act, 1934; National Environment Tribunal Act, 1995; Hazardous Wastes (Management and Handling) Rules, 1989.

In addition to this, India has signed and ratified several international conventions relating to oceans and related activities. Some of these are related to marine environment and applicable to coastal area also. The important ones are the following: MARPOL 1973/1978; London Dumping Convention, 1972; Convention on Civil Liability for Oil Pollution Damages (CLC 1969) and its Protocol, 1976; Fund, 1971 and its Protocol, 1979; CITES, Convention on Biodiversity, 1992 includes coastal bio-diversity also.

1.1.3 Institutional Infrastructure

The Ministry of Environment and Forests and the Department of Ocean Development are the two nodal Departments that deal primarily on the coastal and ocean areas. In addition to this, there are several Ministries, Departments, State Government Bodies looking after several issues relevant to coastal management in this country and are listed below:

Departments/Agencies	Responsibilities
Ministry of Agriculture	Fisheries Management, Coastal Aquaculture
Ministry of Defence (Coast Guard)	Oil Pollution, Poaching, etc

Pollution Control Board	Coastal Pollution
Ministry of Commerce	Marine Products Development, Special Economic Zones
Ministry of Surface Transport	Ports and Harbours
Ministry of Tourism	Tourism Development
Ministry of Urban Development	Town and Country Planning
Ministry of Industries	Coastal Industries
Ministry of Mines	Coastal and Offshore Mining
Ministry of Home	Disaster Management
Ministry of Petroleum and Natural Gas	Exploration and Exploitation of Oil and Natural Gas
Ministry of Chemicals and Fertilizers	Storage and Handling of Chemicals and Fertilizer in the port areas.
State/Union Territory Environment Department	Coast and Marine Management under Water Act, Air Act.

However, Coastal Regulation Zone Notification 1991 implemented by the Ministry of Environment and Forests (MoEF), is the single regulation that takes care of most of the activities in the coast.

1.2 Committees and Reports

During the last 14 years of implementation of the CRZ Notification, the MoEF has been receiving several representations/suggestions from various stakeholders including NGO's requesting MoEF to amend the notification for permitting certain activities. Taking into consideration these requests/representations, the Ministry has been constituting Committees consisting of experts to look into specific issues raised by the Central Governments, State Governments, local communities, Association and NGOs. Most of the Committees were constituted to address specific issues from time to time. The details of the Committees constituted so far, their recommendations alongwith the action taken by MoEF is briefly discussed below -

1.2.1 Shri B.B. Vohra Committee – on issues relating to tourism

Shri B.B. Vohra Committee was constituted on 1st January, 1992 mainly to examine CRZ vis-a-vis coastal tourism. The Committee submitted its report on December 31, 1992. One of the recommendations of the Committee was reduction of distance of the NDZ in selected coastal stretches for promoting tourism. The Ministry amended the CRZ Notification, 1991 on 18th August, 1994, reducing No Development Zone (NDZ) area all along the Tidal water bodies from 100 to 50 mts. The amendment also permitted construction in NDZ. This amendment was challenged in the Supreme Court of India in W.P. No.664 of 1993, and the above amendment was quashed and status quo maintained.

The B. B. Vohra Committee report also noted that the HTL demarcation was not clearly defined. Based on the recommendations, the Ministry defined the HTL and demarcation agencies in the amendment dated 8th August, 1994.

The B. B. Vohra Committee Report also recommended no drawal of Groundwater in the NDZ including CRZ area, except by manual extraction. The Report recommended

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landscaping in the NDZ by dressing of sand dunes, live fencing along the resorts and permitted playfields but not swimming pools in the NDZ.

Vide the same amendment dated 8th August, 1994, the Ministry prohibited flattening of sand dunes in the CRZ area, while maintaining status quo as in CRZ Notification with regard to height and Floor Space Index (FSI), subject to ground+one only. For the construction of basement, NOC was to be obtained from the Ground Water Board. Public access between two resorts was suggested as 6 mts by the Committee, however the Ministry maintained 20 metre distance between two resorts.

1.2.2 Prof. N. Balakrishnan Nair Committee - on issues relating to Kerala on Coastal Regulation Zone

The Balakrishnan Nair Committee which was constituted on 30th December, 1996 recommended inclusion of census towns and panchayats, which are substantially built up to be declared as urban areas (CRZ-II). The extent of CRZ area in case of inland tidal water bodies to be relaxed, to permit all ports and harbour constructions and port related industries. However, the Ministry took no action with regard to these suggestions. The report also recommended storage of petroleum products in CRZ which was considered by the Ministry and an amendment was issued on 9th July, 1997 after obtaining the views of Ministry of Petrolcum & Natural Gas. The Committee also recommended reclamation to be made permissible for the approved projects, which the Ministry did not consider. It also recommended locating non-polluting industries, relaxation for tourism potential areas and construction of fishermen houses in 200-500 mts. These recommendations were not considered by the Ministry. The Committee also recommended drawl of ground water between 0-200 metres by manual method, which was considered in the amendment dated 9th July, 1997. The report recommended setting up fish processing units. But the Ministry in its amendment dated 9th July, 1997 amended the Notification permitting modernizing of the fish processing units and setting up of effluent treatment plants for such existing plants. The report also suggested reduction of CRZ to 50 mts along tidal water bodies keeping in view the unique conditions of Kerala. However, the Ministry took no action in this regard. The amendment of 9th July, 1997 has been challenged in the High Court of Delhi since suggestions/objections from the public had been waived off while issuing the said amendment. The matter is subjudice as on today.

1.2.3 Fr. Saldanha Committee (I) - to advice on withdrawal of groundwater and extraction of sand in Andaman & Nicobar Islands

The Committee which was constituted on 5th December, 1996 and submitted its report in January, 1997. The report recommended extraction of groundwater extraction by manual method in 50-200 metres from the HTL for local communities of Andaman & Nicobar Islands.

With regard to mining of sand the Committee recommended mining of sand in the CRZ area for a short period for 1-2 years only, since the sand was of coral origin, which takes several years for formation. The rate of replenishment of this biological sand is very slow. Based on the recommendations of the Saldanha Committee, the Ministry amended the Notification by permitting mining of sand in the CRZ area, and thereafter MoEF has been periodically extending on yearly basis. The recent ICZM studies carried out by the Institute for Ocean Management, Chennai has indicated severe adverse impact due to sand mining.

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The Committee has also examined the Supreme Court's Order in one of the matters pertaining to Forest Division, wherein the Supreme Court has permitted mining of sand on a reducing balance. The Ministry has now amended the CRZ Notification, 1991 permitting mining of sand in the CRZ area for a quantity of 28,266 CBM for a period upto 31st December, 2005 with a condition that no further permission would be granted. This Committee agrees with the condition.

1.2.4 Fr. Saldanha Committee (II) - to examine specific issues relating to CRZ

The Committee was constituted on 26th June, 1997 and the report was submitted in September, 1998. The report recommended construction of dwelling units within 200 metres in CRZ-III. For permitting such dwelling units in CRZ-III the report laid down criteria which included construction of dwelling units only for bonafide traditional settlers subject to the condition that the area is adequately protected with sea-wall, the proposed construction is on the landward side of the existing buildings and the construction shall not be more than 100 sq m with 4.5 m height.

Based on the Fr. Saldanha Committee report the Ministry had issued a Draft Notification inviting suggestions and objections for amending the CRZ Notification, 1991. Based on the suggestions and objections received, the Ministry did not amend the CRZ notification.

1.2.5 Shri D.M. Sukthankar Committee (I) – to examine the issues relating to Mumbai and Navi Mumbai

This Committee was constituted on 29th May, 2000. The report recommended increase in Floor Space Index (FSI) for undertaking slum redevelopment schemes and rehabilitation of dilapidated structures. The report also recommended Transfer and Developmental Rights (TDR) in Coastal Regulation Zone area wherever the FSI has not been consumed fully. With regard to Navi Mumbai the Committee recommended to amend the notification so as to provide for expansion of mega cities in Coastal Regulation Zone areas. In case of the violations in the 161 Versova the Committee recommended development of plots which have been allotted in the inter tidal area and also construction of missing links in Coastal Regulation Zone area. The Ministry took no action on the report since the report had 3 dissent notes from its members. Further the recommendations were not in line with the CRZ notification. With regard to amendment pertaining to increase in FSI, the Ministry had to comply with the directions of High Court of Bombay in the W.P. No.1019 of 1999, which prevented increase in FSI in CRZ area.

This committee observes that the Sukthankar committee did not take into consideration the environmental issues while framing the recommendations.

1.2.6 Shri D.M. Sukthankar Committee (II) - to prepare a National Coastal Zone Policy of India (NCZP)

The above Committee was constituted in March, 2000 and the report of the Committee was submitted to the Ministry in September, 2000. For the first time Ministry had constituted an Expert Committee to examine the issues of coastal zone management in a holistic manner.

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The report was submitted in September, 2000. The report suggested a legislative framework for framing Coastal Zone Management Policy. The recommendations of the report were based on the study report prepared by CESS.

The report recommended that the coastal zone should be demarcated based on risk from erosion and flooding. The report listed out areas/features that have to be protected and the high-risk zone and low risk zone in the coastal area. List of various developmental activities were also annexed in the report, which can be taken up in low risk and high risk areas. The report also suggested the environmental clearance procedure to be adopted for such developmental activities. No action was taken on the report.

This Committee feels that the Ministry should have initiated actions with regard to demarcation of sediment cell and preparation of shoreline management plan maps as suggested by the Committee. The recommendations of the Committee for siting developing activities based on the vulnerability to the coast due to natural hazards such as erosion and flooding is a right approach.

1.2.7 Dr. Arcot Ramachandran Committee – on Ocean Regulation Zone

The Department of Ocean Development constituted an expert committee under the Chairmanship of Dr. Arcot Ramachandran, former Secretary, DST to recommend the activities that need to be included in the seaward side of the coast. The Committee submitted its report in the year 1996. The Committee suggested inclusion of several activities for prohibition/regulation in the ocean part of the coastal zone. These activities include construction of Ports and Harbours, waste disposal, sea bed mining, OTEC plant, oil and natural gas exploration, ship breaking, etc., which are not covered under CRZ. The ocean area from Low Tide Line upto territorial waters was proposed as Ocean Regulation Zone (ORZ) and this zone was categorised into Ecologically sensitive area (ORZ-I), Sea off developed areas (ORZ-II) and Sea off undeveloped and underdeveloped areas (ORZ-III). The activities that are to be prohibited in ORZ-I include construction of civil and other manmade structures like breakwaters, disposal of untreated waste etc. Exceptions to these activities were to be given based on the no impact distance from the outer limits of the ecologically sensitive areas. The reclamation of seabed for human settlement, construction of artificial islands, etc., dumping of plastics are also to be prohibited in all the three zones. Regarding permissible activities in ORZ II and ORZ III, some of them include disposal of treated wastes, the volume and characteristics of which will be limited within the waste assimilative capacity of receiving seawater body. EIA was made mandatory for all the activities irrespective of the zones. The report was received by the Ministry of Environment & Forests from Department of Ocean Development and no action was taken on the report by Ministry of Environment & Forests.

This Committee is of the opinion that the ocean waters upto the territorial limits should be an integral part of the coastal zone management. There are several activities in the coastal areas such as dredging, seawall constructions, breakwater construction, jetties, etc. which have direct impacts on the inter-tidal area. Therefore, it is necessary that such activities taken up in the waters are examined from the point of coastal zone management.

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1.2.8. Prof. M. S. Swaminathan Committee – to review the CRZ Notification, 1991

The present Committee was constituted by the Ministry to carry out quick but comprehensive review of the CRZ Notification, 1991 in the light of the findings and recommendations of all the previous Committees, judicial pronouncements, representations of various stakeholders and suggest suitable amendments to make the regulatory framework consistent with well-established scientific principles of coastal zone management. The Terms of Reference of the Committee are given in the Order constituting the Committee.

1.2.9. Summary of the Recommendations of the Committees on which the Ministry had taken action

(i) **Shri B. B. Vohra Committee** – on issues relating to tourism.

Sl. No.	Issues	Recommendations	Action Ministry of Environment & Forests
1.	Depth of the No Development Zone (Hotel industry will require 20-30 km of coastline).	FHI – To reduce the No Development Zone (NDZ) in identified areas. NGO – Concerns of SLR, ecology. Reduction of No Development Zone based on Region specific features with Environmental Impact Assessment.	Amended on 18th August, 1994. • Reduced NDZ along the tidal water bodies to 50 mts uniformly. • Permitted construction in NDZ. • Quashed by Supreme Court in 1996.
2.	High Tide Line demarcation	Not defined clearly. MoEF to define and decide the agency for demarcation.	Amended on 8th August, 1994 and 2000. • 7 agencies authorized – NHO, Centre for Earth Science Studies, IRS Anna University, Space Application Centre, National Institute of Oceanography, IWED, NIOT. • Guidelines issued.
3.	Depth of NDZ along tidal water bodies	Ministry of Environment & Forests to decide	Amended on 8th August, 1994 and 21st May, 2002 • Upto the point of tidal influence i.e., 5 PPT during summer.
4.	Groundwater drawl in NDZ (Hotel asso, to draw by mechanical pumps in NDZ)	No change to be made only manual extraction in 200 – 500 mts	-
5.	Landuse in NDZ	Landscaping can be done in NDZ by dressing of sand dunes. Live fencing. Playfields but no	Amended on 8th August, 1994 • No flattening of sand dunes.

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		swimming pool in NDZ.	
6.	Height and FSI	No change. Basement based on No Objection Certificate from Groundwater Board. Ground + one.	No change
7.	Corridors between hotels	Gap of 6 mts instead of 20 mts.	No change
8.		To improve enforcement. High Unhygienic conditions prevailing.	No action

(ii) **Fr. Saldanha Committee** - to advise on withdrawal of groundwater and extraction of sand in A&N Islands.

Sl. No.	Issues	Recommendations	Action Ministry of Environment & Forests
1.	Availability of water	• Water supply is less acute. • Large scale groundwater not permitted. • Alternative sources to be studies.	Amended on 31.1.97 • Permitting manual drawl of groundwater in 50-200 metres.
2.	Sand from Coastal Regulation Zone area	• Sand in Coastal Regulation Zone can be mined for a short period for 1 or 2 years only. • Alternate sources to studied.	Amended on 31.1.1997 Permitting mining of sand in CRZ area on yearly basis.

(iii) **Father Saldhana Committee – (II)** – to examine specific issues relating CRZ

Sl. No.	Issues	Recommendations	Action Ministry of Environment & Forests
1.	Criteria to reduce CRZ along tidal water bodies	Can be reduced if – • Areas falls in CRZ-II, • Population density is more then 400 person/km, • 1/3rd area of panchayat is built up, • Area of the barrier island is less than 1000 metres, • Area elevated more than 100 mtres.	Draft amendment 11th January, 2002 but not finalized in view of large number of objections from NGOs from Bombay.
2.	Criteria for construction of dwelling within 200 mts in CRZ-III	Dwelling of fisherman and bonafide traditional settlers, subject to – • Where the area is	-do-

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		protected. • Landward side of existing building. • Constructions permitted upto 4.5 mt with 100 sq. mts plinth.	

(iv) **Prof. Balakrishnan Nair** - on issues relating to Kerala

Sl. No.	Issues	Recommendations	Action Ministry of Environment & Forests
1.	Setback of 500 mts – Notification does not taken into account the unique features of the coastal areas and is detrimental to development on long run. Untenable and unjustified.	A multidisciplinary Committee to be constituted.	No action.
2.	Delineation of CRZ-II • To include census towns and panchayat substantially built up.	No action proposed	No action.
3.	Extent of CRZ inland incase of tidal water bodies	No action proposed	No action
4.	Operation of Ports and Harbours	No action proposed	No action
5.	Port related industries recognized the need to permit port related industries.	No actions proposed in absence of concrete suggestions	No action
6.	Handling, storage and distribution at ports.	To permit handling of substances as mentioned in 2(ii)	Amended on 9.7.1997 Permitting 13 POL products. The list was provided by Ministry of Petroleum & Gas
7.	Powers to be delegated for reclamation	Not agreed	No action
8.	Already approved projects land reclamation to be permitted	No comments	Amended on 9.7.1997 Reclamation for construction modernization and expansion of ports.
9.	Non polluting industries to be included	Multidisciplinary Committee to be assigned to permit industries with additional environmental safeguards and pollution control measures.	No action
10.	Bunding for	No comments.	No action

	Aquaculture		
11.	Relaxation for tourism area	To be studies by Multidisciplinary Committee.	No action
12.	Construction of fishermen houses in 200-500 mts	To permit construction	Fr. Saldhana Committee constituted to frame criteria for such constructions.
13.	Drawl of Groundwater	Manual drawing of groundwater in 0-200 mts	Amended on 9.7.1997 Permitting manual drawl of groundwater in 50-200 mts for the entire country.
14.	Fish processing units to be permitted	To permit for modernizing and to equip effluent treatment plants.	Amended on 9.7.1997
15.	Setback as 50 mts along tidal water bodies.	To reduce to 50 mts due the unique conditions of Kerala.	No action.

(v) **Shri D. M. Sukthankar (I)** - on Mumbai

Sl. No.	Issues	Recommendations	Action Ministry of Environment & Forests.
1.	To increase FSI for the SRD.	To permit increase in FSI for such SRD schemes	No action in view of the judgment of the High Court of Mumbai.
2.	To increase FSI for the dilapidated str. MoEF has issued a clarification the FSI shall be as on 19.2.1991.	To permit increase in FSI for such schemes	No action in view of the judgment of the High Court of Mumbai.
3.	To permit TDR in CRZ area	To permit TDR generated in CRZ within CRZ	No Action
4.	Violation of CRZ by construction of Navi Mumbai by destruction of mangroves.	To permit Navi Mumbai as there is need of counter magnet townships.	No action.
5.	To permit dumping of solid waste	Not recommended.	Supreme Court directed Government of Maharashtra to relocate landfill sites.
6.	Constructions within inter-tidal areas	To permit where already construction carried out	No action since CRZ to be amended.
7.	To permit Government housing schemes already initiated prior to 19.2.1991.	Recommended	Amended on 21st May, 2002.
8.	Missing link roads in CRZ-I areas to be permitted.	Recommended.	No action.

1.3 Coastal Zone Management - International Best Practices

1.3.1 Developed countries

(i) United States of America

It is estimated that about 60% of the population are living along the coastal areas of USA. The maritime jurisdiction is 12 nautical miles from the shore. The major coastal and marine issues are discharge of effluents , decline in fishery stocks, development of off-shore oil platforms , coastal erosion and natural coastal hazards including storm surges. For the purpose of protecting the coastal environment, USA has issued marine and coastal sectoral laws in 1972, which is called Coastal Zone Management Act in 1972. The Act lays-down a framework for voluntary cooperation between Federal Government and coastal States. The approach for coastal zone management is top down and bottom up and is focused on regulatory mechanism including coastal planning.

The Coastal Zone Management is supervised by National Oceanic and Atmospheric Administration (NOAA) of Department of Commerce. The Coastal Zone includes coastal waters upto 3 miles of shore with land boundary being flexible in order to protect the sea from the effects of land based activities or to deal with sea level rise. The Act identifies 10 National Policy objectives such as Protection of natural resources, coastal development, public access, etc. Each coastal State brings out its own Act such as California Coastal Act of 1976, Connecticut Coastal Management Act, Massachusetts Coastal Zone Management Programme. Federal grants are provided to the coastal States to develop, administer and manage the programmes. The main activities at all levels of government are directly linked. Under the Coastal Zone Management Authority all three levels of government, federal, state and local, are given important roles to play and considerable flexibility in defining those roles.

At the national level the OCRM is the administering office. It interprets the statute through rules and regulations, interacts with oversight and reauthorize committees in the Congress, and approves (or rejects) state management programmes and programme amendment submitted to it for approval. Additionally, it awards grants to states for planning and administration of coastal programs, evaluates the progress of the states in implementation and oversees implementation of federal consistency provisions of the Coastal Zone Management Authority.

The states are the action arm of the coastal management systems. The states follow the frame and guidelines laid out in the federal act. States, for example, determine the boundaries of the coastal zone, the key coastal problems, the policies and laws that address them, and the state and local organization required to be involved in implementation. Within each state, a designated lead agency is the author and lead implementor of the coastal management programme and the recipient of federal grants and matching funds for planning or administration. Frequently, the states provide technical assistance to other entities, build constituencies, research coastal management issues and trends, and promote new policies.

Local Government, includes cities, counties and substate regional entities, are often primary implementors of state coastal polices and programs. They use traditional land use power and infrastructure improvement to achieve coastal policies objectives. Another

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important means of implementation is through state agencies with resource management mandate, such as state agencies with submerged lands, fish and wildlife, or environmental responsibilities. These units work closely with the lead state agency, and as a result can receive federal funds and benefit from the federal consistency under the Coastal Zone Management Authority.

(ii) The United Kingdom

The major coastal and marine issues are pollution from industrial and townships, damage to productive ecosystems, resource depletion, erosion of coastal areas. In United Kingdom, there are various laws for protecting the marine sectoral laws and for the coastal environment. There is no single law for protecting the coastal environment. There are laws for fishery conservation, special ecological zones and other flora and fauna. About 30 legislations apply to coastal developmental activities. Most of them are sectoral and applies either to the land or to the sea. The urban areas are planned as per Town & Country Planning Act, 1990. Due to lack of an integrated policy for protection of coastal environment, the coastal zone management is not implemented properly. Erosion and flooding are the major issues. Shoreline management plans based on sediment cell concept have been prepared on priority and are being implemented.

(iii) Canada

About 25% of the population of Canada is supposed to be living along the coastal areas. Some of the major issues of Canada coast is loss of wetland, decline in fishery stocks resource conflict, pollution from non-point and point sources including off-shore oil development. There are various laws and Acts, which include Fraser River Estuary Management Programme of 1985, Great Lakes Water Quality Programme, 1987, Atlantic Coastal Action Plan, 1986 and Canada Ocean Act, 1996. The Ocean Act has the framework for integrated management of sea and protection of the marine environment from land based activities that have an impact on estuaries, coastal waters. The Act has 3 parts, Part-I defines Maritime Zones (12 mile territorial sea, 24 mile contiguous zone & 200 mile EEZ) in accordance with UNCLOS. The Part-II of the Act has management of ecosystems while the Part III has responsibilities and jurisdiction of agencies. The approach adopted for the coastal zone management programme under Canada Ocean Act is top down. There is also involvement of consensus building. It has been observed that community based programmes are highly effective.

(iv) The Netherlands

About 60% of the total population is known to be residing along the coastal areas of Netherlands. The major coastal problems of the Netherlands include impacts due to construction of coastal defence, water pollution from industries and agricultural areas, loss of wetland, sea level rise, adverse environmental effects due to sand mining, off-shore oil and gas platforms. The coastal management is mainly at the national level. For the purpose of protecting the coastal environment, the Netherlands has North Sea Harmonisation Policy, 1984, Dynamic Preservation Strategy, 1991 and Coastal Defence Act, 1995.

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(v) Australia

About 75% of the population is known to be living along the coast. The marine zone includes 12 nautical miles of territorial sea and 200 nautical miles of EEZ. The main problems faced by the Australian coast are habitat destruction, resource depletion, stakeholder conflict, and Government fragmentation due to sectoral approach, offshore development programmes, and excessive coastal fisheries. The primary level of coastal management is mainly the responsibility of the State and the national and local levels. Various laws have been enacted which include State level and Federal level legislations/policies such as Western Australia State Coastal Review of 1994 and 1995, Queensland Coastal Management Bill, 1995, Victoria Coastal and Bay Management Act, 1995, New South Wales, Revised Coastal Policy, 1996, Tasmanian Draft State Coastal Policy. The Commonwealth Coastal Policy, 1997 and the National Ocean Policy of 1996. The Australian Government is moving towards Integrated Coastal Policy.

(vi) Spain

About 35% of the population are living along the coastal areas of Spain. Coastal erosion, tourism development, general urbanisation, sedimentation, loss of productive ecosystems, inter-governmental duplication, marine pollution, competition for fishery resources. The coastal management programmes are mainly initiated at the national level but the regional and local levels government play a role. Some of the legislations include Shore Act, 1988, Regional Guidelines for Coastal Zone, 1992 have been put in place. The Coastal Management Programmes are mainly regulatory in nature having top down and bottom up approach. There has been very little move towards integrated coastal policy.

1.3.2 Developing Countries

(i) Brazil

About 38% of the population is living along the coastal areas of the country. The major coastal and ocean issues include destruction of mangroves, coastal erosion, large scale tourism, urbanisation, shipyard development, non-point source of pollution, multiple use competitions, excessive offshore fisheries. The primary level of implementing coastal zone management programmes are at national level. Various legislations have been enacted by the Brazilian Government, which included Ocean Planning of 1974, Environmental Laws of 1980, Coastal Programme, 1983. The approach for coastal zone management is top up especially for protecting coastal ecosystem. Very little effort has been taken for integrating coastal zone management issues.

(ii) Thailand

About 70% of the population is residing in the coastal stretches of the country. The main issues of coastal and marine areas are destruction of coral reefs, mangrove deforestation, decline in fishery stocks and pollution from agricultural areas. The primary enforcement of coastal management programmes is from the national level. Various national initiatives have been taken up which includes National Coral Reef Management Strategy, 1991, Integrated Coastal Management Plan in Ban Don Bay and Phangaga Bay. The coastal zone management has been moderately effective and some initiatives have been taken up for integrated management of the coastal area.

(iii) Malaysia

About 70% of the population is living along the coastal areas of Malaysia. The main coastal and marine issues are erosion, mangrove destruction, coral reef destruction, and pollution from tourism and industries. The initiatives taken for coastal zone management are mostly at national level, which includes National Coastal Erosion Study, 1984, National and Coastal Resource Management Policy, 1992, South Johore Coastal Plan, 1992. The approach is mostly regulatory for preventing erosion and conservation of mangrove forest. Few initiatives have been taken for integrated coastal zone policy.

(iv) China

About 40% of the population is living along the coastal areas of China. The major environmental issues include large scale economic development, pollution, reclamation, mangrove loss, coral, sand mining and fishery depletion. The initiative taken for coastal management is generally by the Provincial Governments. There is no comprehensive regulatory framework for managing the coastal activities. Pilot studies of integrated coastal zone management programmes have been initiated in Xiamin Province. Very little initiatives have been taken for the protection of the coastal environment.

(v) Sri Lanka

About 34% of the population lives in coastal areas in the country. The coastal stretches are thickly populated. The provincial level has autonomy to implement coastal programmes. The initiatives taken for coastal protection is mainly national. The various coastal and management programmes and legislations include Coast Conservation Division, 1978, Coast Conservation Act, 1983, Coast Permit System, 1988, Coastal Zone Management Plan, 1980, Marine Pollution Prevention Authority, 1990 and Special Area Management Plan, 1996. The setback line on the landward side is 300 mts based on coastal erosion rate, exposure to cyclones, geomorphological characteristics, vulnerability to coastal habitats, cultural sites, etc. The seaward reference line is mean sea level. Developmental activities are regulated in the zone. The coastal zone management plans are prepared for each of the identified sites and enforced by the local bodies. Sri Lanka has taken initiatives for integration of coastal zone management programmes and has been relatively effective.

1.3.3. International agencies

The coastal zone management approach suggested by various multilateral and bilateral agencies such as:

(i) United Nations Conference on Environment and Development (UNCED) (AGENDA 21)

Chapter 17 deals with Protection of the Oceans, all kinds of Seas, including Enclosed and Semi-enclosed Seas, and Coastal Areas and the protection, Rational use and Development of their living resources. This chapter recommends Integrated Management and Sustainable Development including EEZ, with emphasis on marine environment protection, sustainable use & conservation of living resources and climate change. It also recommends integrated policy and decision making process for all sectors, identification of existing and

projected use of coastal areas and their interactions, concentration on well-defined issues concerning coastal management, application of preventive and precautionary principles in planning and implementation of major projects, address issues of pollution, erosion, loss of resources and habitat destruction to be addressed with participation of people in planning and decision making.

(ii) United Nation Environment Programme (UNEP) Guidelines

The guidelines state "integrated management of coastal areas is required to lay the foundation for sustainable development." ICZM guidelines are given in three main stages: initiation, planning (preparation of ICZM master plan), and plan implementation. Many of the challenges to sustainable development (population pressure, industry growth, coastal tourism) are illustrated in the context of the Mediterranean region. UNEP suggests multi-disciplinary approach, problem solving, not problem transfer, priority on prevention rather than cure and precautionary approach. With regard to the management area UNEP does not recommend specific boundaries. However, the first step of the planning stage is to prescribe definition of coastal area boundaries. The goals are to provide guidelines for legal and institutional strategy in area management and planning, form ad hoc committees for dispute resolution and combine land use control and economic tools for pollution control and conservation. The guidelines endorse use of the National Coastal Management Act or other legal means of ensuring enforcement of various sectoral laws. Guidelines utilise a "top-down" approach.

UNEP suggests an administrative structure which includes national and regional government budgets, for infrastructure and pollution control by means of fees, taxes, economic incentives and for conservation and also allocate funds from interested environmental groups, park entry fees, etc.

(iii) Organisation of Economic Cooperation and Development (OECD) Guidelines

These guidelines are the result of investigations using country information papers prepared by respondents in several countries and a survey carried out. The main stress is on ecologically sustainable development of the coastal zone. Recommendations are given for structure and processes for Integrated Coastal Management (ICM), including creation of the institutional body, generation of information, assessment of current policies, preparation of alternative plans, selection of a final plan, and monitoring and evaluation. OECD recommends multidisciplinary approach, problem solving, not problem transfer, priority on prevention rather than cure and precautionary approach. Guidelines do not recommend specific boundaries. However, the first step of the planning stage is precise definition of coastal area boundaries. The Functions/Goals are to achieve and maintain critical stocks of resources, maintain or enhance critical environmental quality, preserve certain natural resources (usually public goods) and maintain the amenity value of the coastal zone.

The guidelines suggest that legislation is needed to create institutional bodies or the management council (legal agency) and to allow for coordination. Of importance is "a consistent government policy at national or regional level that provides clear direction and support for integration."

Guidelines state that a major factor of successful ICM is how well the government implementing the programme can raise its own funds, either independently or with assistance

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from the national government. This flow of financial resources must be dependable and ongoing. It is emphasised that scientific analysis, natural resource monitoring, and impact assessment play a crucial role in successful ICM.

(iv) International Union for Conservation of Nature (IUCN) Guidelines

Guidelines are provided for the development of a coastal area plan that can be applied at a national level, through a review of coastal problems and the need for Integrated Cross-Sectoral Management (ICSM). The process by which ICSM can be achieved by seven steps which include problem definition, assessment and analysis, issues and options, formulation, adoption, implementation and monitoring and evaluation. Guidelines state that the starting point of ICSM is sustainable development. Therefore, the guidelines endorse a long-term and intra and inter-generational focus. To be effective, the effort should be holistic, that is, interdisciplinary, combining social and natural sciences.

However, the guidelines provide no specific recommendations or suggestions for setting up those legal and institutional arrangements; they only emphasise the need for integration among the legal, administrative, socio-economic, and biogeophysical components among the public, scientists, managers, and users, including some form of dispute resolution.

(v) World Bank

Guidelines are designed to "ensure that development and management plans for coastal zones are integrated with environmental (including social) goals and are made with the participation of those affected." Included are sections on institutional roles and responsibilities and on triggering of the need for ICZM. A three-stage process of plan formulation, programme implementation, and monitoring, enforcement, and evaluation is recommended. The principles are based on precautionary principle, "polluter pays" principle, use of proper resource accounting, Transboudnary responsibility, and Inter-generational equity. The management zone includes all of the coastal resources of interest and all activities that are capable of affecting the resources and waters of the coastal zone (implies from the watershed to the 200 nautical mile limit).Functions suggested are to strengthen and harmonize sectoral management, to preserve and protect the productivity and biological diversity of coastal ecosystems and to promote rational development and sustainable utilization of coastal resources. The goals set are Agreed-on goals and objectives by line agencies and sub-national governments. Legislation for boundary setting and zoning of the coastal area but not necessarily a comprehensive coastal zone act. Funding to put ICZM programme in place can come from budgets of existing government agencies. New funding for research needs and new institutional arrangements should come from the national government, with assistance from international agencies. The guidelines also suggest to give the value of natural coastal resources and the fact that the coastal zone is a "dynamic area with frequently changing biological, chemical and geological attributes."

(vi) World Coast Conference Report

Guidelines stress the urgent need for coastal states to strengthen their capabilities for ICZM; and the need to develop strategies and programmes by the year 2000. ICZM is described as the most appropriate process for anticipating and responding to long-term concerns and needs while addressing the present day challenges. It is to be achieved through a planning process involving data collection and analysis, monitoring and evaluation, and an

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implementation process. The Principles follow the principles set out in the Rio Declaration – in particular, sustainable development and its long-term focus and the precautionary principles. Case studies illustrate a wide diversity of strategies, from only the land side of the coastal zone to somewhat integrated coastal and ocean management. The ICM functions/goals are to anticipate and respond to long-term concerns while addressing present-day challenges and opportunities, stimulate sustainable development of coastal areas and promote increased economic development and benefits. The guideline suggests strong tie between the IPCC and the World Coast Conference, natural science aspects are stressed, with emphasis on the role of vulnerability assessments in ICZM and the effects of sea level rise.

1.4 Scientific Principles in Coastal Zone Management

Conflicts in coastal management are primarily because coast requires space for functioning whereas coastal space is required for various uses. In addition to this there are competitions for resources among various stakeholders.

Current approaches in Coastal Zone Management are based on environment protection and conservation of resources rather than sustainable development and this is not adequate.

Coastal Zone Management based on Environmental Protection approach is defensive or remedial in practice (National Parks and Sanctuaries), relies primarily upon regulations and zoning to set limits on environmental damage and works well where Governments have the resources and will to impose regulations and it also aims towards long term preservation of ecosystem.

1.4.1 Specific Management Methodologies to implement Coastal Zone Management

1.4.1.1 Zoning

A popular management action employed as part of Integrated Planning and management is zonation. A zonation scheme aggregates activities that are appropriate to one another and segregates those that are contrary. Likewise, it ensures that areas that are able to sustain multipurpose development are identified and those for protection are covered by legislation. Therefore, areas of coastal erosion and flood control, vulnerable areas to natural hazards, water catchments, habitat protection, and marine resources management, including fisheries, can be identified and mapped. Suitable areas for aquaculture, recreation, tourism, industrial use and sand mining can also be identified. Zonation is a useful tool in development and planning. Using a zonation strategy and resource specific management plans, action plans could be developed for specific sites that are currently experiencing critical resource use conflicts or have proposed resource development that may result in such conflicts.

1.4.1.2 Vulnerability Mapping

Most of the developed countries such as USA, UK, New Zealand have prepared the vulnerability maps of the coastal areas. The New Zealand vulnerability map is based on rate of erosion and flooding of coastal areas. The western coast of USA, has been mapped based on the vulnerability to natural disasters. For the purpose of demarcating vulnerability map along the western coast of USA, seven parameters have been taken into consideration, which include evaluation, geology, geomorphology, sea level trends, horizontal shoreline

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displacement, tidal ranges and wave heights. The document pertaining to "Coastal Hazard Database for the U.S. West Coast" (available from National Technical Service, US, Departemnt of Commerce, 5285, Port Royal Road, Springfield, VA 22161) shows in detail the procedure adopted for mapping the vulnerability line based on the above seven parameters. All developmental activities are located based on the vulnerability map. In case of U.K., the vulnerability maps are prepared on the basis of erosion and flooding.

1.4.1.3 Setback zones

According to shoreline setbacks or exclusion zones, certain uses are restricted within a specified distance. The benefits of setback zones are:

(a) Avoidance of risks arising due to cyclone, flooding, erosion and other geomorphologic/geological events such as tsunamis.
(b) Sufficient spaces for the functioning of the coast.
(c) Protection of sensitive ecosystems.
(d) Public access and preservation of the natural beauty of the shoreline.

Different set back zones for different activities on their impacts:

e.g.	Housing	20 m-200 mts
	Tourism	50 m-200 mts
	Non-polluting Industries	300 m-500 mts
	Polluting Industries	more than 1000 m

Different Setback Zones in different areas based on their importance:

e.g.	Critical Habitats	1000 m
	Infrastructure developed areas	200 m
	Under developed areas	500 m

Different Setback Zones in different areas based on their risk

Based on geomorphic events such as erosion and natural hazards such as earthquakes, cyclones, etc., the coast could be classified into the following zones and setback distances are determined accordingly.

e.g. High Risk Zone
Low Risk Zone
No Risk Zone

Different Setback Zones in different areas based on geomorphology/geology

Based on geomorphology of the coast such as rocky cliff, muddy coast or sandy coast, the setback zones could be decided.

Different Governments have adopted, different setback zone based on developed activities, geomorphology, ecosystems etc. The setback zones adopted by different countries/States are as given below:

COUNTRIES	SETBACK ZONE
Brazil	33 m
Colombia	50 m
Costa Rica (Public Zone)	50 m
Costa Rica (Restricted Zone)	50-200 m
Chile	80 m
Denmark	1000 – 3000 m
Ecuador	8 m
France	100 m
Greece	500 m
Hawaii	13 m
India	500 m
Indonesia	50/400 m*
Mexico	20 m
New Zealand	22 m
Norway	100 m
Oregon	Permanent vegetation line (variable)
Philippines (Mangrove Green Belt)	20 m
Sweden	100 m
Spain	100-200 m
Uruguay	250 m
USSR-Coast of the Black Sea	3000 m
Venezuela	50 m

1.4.1.4 Special Area Management Plans

Advantages of Area Specific Management Plans:

- Considers the physical settings of the coast, its resource and its developmental potentials.
- Considers the area specific issues and problems.
- Enables the participation of local uses and communities.
- ICZM approach is much easier because of limited areas.
- Easy to implement and easy to correct.
- Designed for sustainable development.

The Coastal Zone Management has two Approaches:

(i) Top Down – In this approach, there is no participation of people. Decisions are made by Governments. The decisions of the public are not given due weightage.

(ii) Bottom Up – In this approach there is participation of public in planning and development. There is also provision for collaborative management through multi-stakeholder process/voluntary participation of all the parties concerned.

1.4.1.5 Integrated Coastal Zone Management (ICZM)

ICZM is a continuous and dynamic process that unites government and the community, science and management, sectoral and public interests in preparing and implementing an integrated plan for the protection and development of coastal systems and resources. ICZM is a unitary programme and it has to manage development and conserve natural resources and, while doing so, it has to integrate the concerns of all relevant sectors of society and of the economy. Also, it is important that coastal economic development be generated for the people of a country, not just for those who are already rich and powerful. The goal of the ICZM is to improve the quality of life of human communities who depend upon coastal resources while maintaining the biological diversity and productivity of coastal ecosystems.

Major functions of Integrated Coastal Zone Management:

- Area Planning - plan for present and future uses of coastal and marine areas; provide a long term vision.
- Promotion of Economic Development - promote appropriate uses of coastal and marine areas (e.g. marine aquaculture, ecotourism).
- Stewardship of Resources – protect the ecological base of coastal and marine areas; Preserve biological diversity; ensure sustainability of uses.
- Conflict Resolution - harmonize and balance existing and potential uses; address conflicts among coastal and marine uses.
- Protect of Public Safety - protect public safety in coastal and marine areas typically prone to significant natural, as well as human-made hazards.
- Proprietorship of Public Submerged Lands and Waters - as Government's are often outright owners of specific coastal and marine areas, manage government-held areas and resources wisely and with good economic returns to the public.

The status of ICZM programmes in different countries

Country	Research and inventory	CZM authority linkages between departments	Sectoral plan	ICZM planning	Implementation in progress	Evaluation and feedback
Bangladesh	✓	X	✓	X	X	X
Barbado	✓	✓	X	✓	X	X
Belize	✓	✓	✓	✓	X	X
China	✓	✓	✓	✓	X	X
Ecuador	✓	✓	✓	✓	✓	✓
Egypt	✓	✓	X	X	X	X
Israel	✓	X	✓	✓	✓	✓
Netherlands	✓	✓	✓	✓	✓	✓
New Zealand	✓	✓	✓	✓	✓	✓
Sri Lanka	✓	✓	✓	✓	✓	✓
Syria	✓	✓	✓	✓	✓	✓

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USA	✓	✓	✓	✓	✓	✓
Croatia	✓	✓	✓	✓	✓	✓
Turkey	✓	X	✓	✓	X	✓
Germany	✓	X	X	X	X	X
Greece	✓	X	X	✓	✓	X
Indonesia	✓	✓	✓	X	X	X
Malaysia	✓	✓	✓	✓	X	X
Mexico	✓	X	✓	✓	X	X
Philippines	✓	✓	✓	✓	✓	✓
Tanzania	✓	✓	X	✓	X	X
Thailand	✓	✓	✓	X	✓	X

CHAPTER-2

2.0 COASTAL AND MARINE RESOURCES – THREAT & SAFEGUARDS

2.1.0 Non-Living Resources in coastal and marine areas

The non-living resources include the sand, rocks, heritage and archeological sites etc. The coastal and marine areas have a wealth of minerals resources. Some of these minerals have high economic potential such as oil and gas, monozite, rutile etc. Apart from these minerals the sand, rocks, cliffs etc. not only play a major role in maintaining the functional integrity of the coastal but also provides a substrata for the several organism. Sandy beaches are required for turtle nesting sites. There are several valuable man made and natural sites that have archeological and heritage importance. These may be of prehistoric and/or historic significance. The importance of some of the non-living resources is described below-

2.1.1 Hydrocarbons

Hydrocarbon sector in India has been the key driver of energy security in the country in recent times, as nearly 45% of the total energy needs of the economy are accounted by oil and gas. In order to boost exploration activities in a time bound manner, Government have initiated programmes of reforms in the hydrocarbon sector.

Most of the oil and gas reserves are found in inland and shallow offshore areas. Some oil and gas fields are also located in the deep water areas. Since most of the available areas are totally virgin, significant efforts are required to build the geological knowledge base through aggressive data acquisition programs. Major petroleum reserves have been identified in the onshore and offshore region like Bombay High, Gulf of Kachch, Godavari basin, offshore regions of Andhra Pradesh. Keeping in view the importance of oil and gas for the nation's economy and security this sector should be encouraged to develop after taking into consideration all the environmental issues.

2.1.2 Placers and other Minerals

Placer deposits are found as a result of selective concentration of valuable minerals lineated by mechanical disintegration from preexisting rock. A placer deposit is conceived as segregated group of sediments that correspond to a common tectonic and geomorphological processes and climatic setting. The coast of India has large deposits of the placer minerals, which are distributed in pockets along the east and west coast of the country. Some of the minerals are found at the seabed at varying depths. It is reported that the Maharashtra and Goa coast have deposits of ilmenite, magnetite deposits in pockets and also along the sea bed with depth ranging from 1m to 17 m. While the Kerala and Karnataka coast have the large deposits of ilmenite, monoxide, zircon, rutile, and garnet. These deposits are found from the shore to a depth of 15 m. The Chavara and Varkala sector in Kerala have deposits ranging upto 25 sq kms. Along the east coast Tamil Nadu, Andhra Pradesh and Orissa sector has some of the riches deposits ilmenite, magnetite, garnet, sillimanite, zircon, rutile and other heavy minerals. Along Tamil Nadu these deposits are found upto the depth of 1m from the shore while in Andhra Pradesh and Orissa the deposits are found from the shoreline to a depth of 15 m. It is estimated that of the coast line of 7,500 kms placer mineral deposits are found in 2,643 kms stretch with a resource availability of 340 metric tonnes. At present, mining of these minerals are being undertaken by Indian Rare Earth Minerals, Kerala Rare

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Earth Minerals and few private sector units. The mining of placer minerals and other minerals, which are not found elsewhere should be permitted to be mined, subject to incorporating appropriate environmental safeguard measures in their mining plan.

2.1.3 Salt and Chemicals

The high temperatures and windy conditions prevailing along the coastline are congenial for several salt pan activities. These saltpan activities are mainly concentrated along the coast of Gujarat, Tamil Nadu and Andhra Pradesh. The methods adopted for this activity are a simple technique where a tidal water is embanked and taken into the pans located in the along the inter tidal areas of the coastal stretch. Salt is formed in these pans by natural evaporation of the seawater. In case of the coastal areas of Tamil Nadu especially in Tuticorin the brine is pumped from the groundwater, which are taken into the pans for solar evaporation.

The coastal stretches of Gujarat have also several industries, which are based on salt as raw material. The saltpan activities not only provide livelihood for large number of unskilled workers but also provides raw material for several such chemical industries. The adverse impact of the saltpan activities includes salinity ingress into groundwater, destruction of mangroves and mudflats. There is also occupational health hazards associated with this activity, since the workers in the salt pans are in constant contact with the high concentration of brine solution. This activity needs to be regulated.

2.1.4 Fresh Water

The freshwater for the coastal areas of the country mainly comes from surface water (pumped from inland sources) and ground water. Rainwater harvesting and desalination are beginning to be practiced in areas facing scarcity. Since the demand for the surface water sources are ever-increasing in the hinterland, the sustainable source for freshwater requirement of the coastal areas is groundwater.

The principal aquifers in the coastal area belong to unconsolidated sediments of Quaternary and Upper Tertiary age, deposited under various sedimentary environments like fluviatile, back swamp, deltaic, sub-marine and marine environments. These aquifers occur both in unconfined and confined condition. Two major problems are likely to be cropped up consequent to extensive ground water development in coastal areas are saltwater intrusion and land subsidence.

The Cenozoic sedimentary formations constitute the regionally extensive coastal aquifers in Malabar and Coromandal coasts (artesian aquifers encountered down to a depth of 400 m) and coastal fringes in Kutch and Saurashtra. Alluvial and Deccan Trap formations also form part of west coast aquifers. In eastern coasts, the coastal belts constitute a narrow elongated crescent shaped area, formed in the outfall regions of the major rivers like Mahanadi, Godavari, etc., where the groundwater is saline down to a depth of 100-135 metres.

The coastal area of West Bengal comprised of Bengal Delta formed by Hoogly-Bhagirathi river systems and underlain by unconsolidated fluvial sediments. Groundwater is saline down to a depth of 110-150 m within 20-30 km inland from the coast. The quality of groundwater in coastal areas by and large is fresh, except in certain areas where it is found to

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be saline/brackish, either due to salinity ingress or inherent salinity in the geological formations constituting the aquifer systems.

Table: Groundwater resource potential in coastal states.

State/Union Territory	Resources (Million ha. metre/yr)	Development (%)
Andhra Pradesh	3.52909	26.10
Goa	0.02182	8.30
Gujarat	2.03767	49.29
Karnataka	1.61750	33.06
Kerala	0.79003	18.99
Maharashtra	3.78677	34.70
Orissa	2.01287	15.22
Tamil Nadu	2.64069	62.55
West Bengal	2.30914	32.19
UT of Dadra & NH	0.00422	12.81
UT of Daman	0.00071	80.00
UT of Diu	0.00037	94.84
UT of Lakshadweep	0.003042	39.12
UT of Pondicherry	0.01746	77.63
Total	**18.79875**	**Average 35.38**

The major problems in the groundwater sector of coastal areas are over development leading to the ever-increasing fresh water demands, declining water table leading to reduction in sustainability of tubewells and salinity ingress in coastal aquifers. A regulated development regime is crucial particularly, in the coastal areas due to the high vulnerability for salinity intrusions causing and permanent damage of the aquifers. Similarly, groundwater recharge schemes need to be taken in the coastal areas on a priority.

If the fresh water withdrawal results into a critical situation for salt water intrusion, groundwater development may be regulated. Once the aquifer is already threatened with the danger of salt water intrusion, the following remedial measures like limited water usage, artificial recharge, creation of pumping trough, construction of cut-off walls and direct salt water removal are adopted. To increase the amount of stored water in otherwise depleted aquifer consequent to extensive developmental activities, artificial recharge by injecting fresh water can be done. To break the contact between fresh and salt water an artificial impervious barrier, may be constructed which will close the aquifer near the sea to store the fresh water and prevent it from being wasted as well as isolating it from the sea water. Drilling a battery of deep wells, close to the sea-front and along a line parallel to that front in order to pump salt water only would deepen the fresh water zone and would compel the salt water mound to retreat towards sea. Subsidence of the ground surface due to heavy pumping of confined aquifers have occurred in the coastal areas.

The roof water and other rainwater harvesting techniques practiced in Lakshadweep and in a few villages of Kerala, Tamil Nadu, etc., need to spread to the entire coastal belt for the sustainability of the groundwater, which should be used only in emergencies. For larger requirements, if surface water sources are inadequate, instead of depending on the traditional

systems desalination schemes needs to be adopted as it is declared for Chennai. It is worth mentioning at this point that desalination has been successfully practiced by the industrial units and some localities (e.g. Narippayur, Ramnad in Tamil Nadu).

2.1.5 Renewable Energy Resources (OTEC, Wave Energy, Tidal Energy, Wind Energy etc.)

The ocean energy is due to wave action, tidal action, thermal differences between the bottom and the surface layer called Ocean Thermal Energy Conversion (OTEC), salinity gradient and ocean currents. Usage of ocean energy sources for generation of electricity is in experimental stage all over the world including in India.

The wave energy potential in India varies from location to location and an experimental 150KW wave energy plant of DOD is operational at present at Vizhinjam, Kerala. The plant has structures like caisson on which the wind turbine is mounted. Wave action generates wind force in the caisson and the movement of wind due to wave action rotates the turbine, which is used to generate electricity. Since the power developed from the wave energy plant is low, variable and cost prohibitive, a stand alone wave energy power plant is not economical for the coast of the mainland. However in isolated remote locations like islands they might be economically viable.

OTEC is based on the principle of evaporating liquid ammonia by circulating the warm ocean surface water in a chamber and the vapour generated is used to derive turbine to generate electricity. The vapour ammonia is cooled to become liquid using ocean bottom water that has a temperature of 8 to 10 Deg. Celsius. Location of deep water with a temperature of 8 deg. In tropical waters holds key for the economic viability of the OTEC system. Such locations are available close to islands of Lakshadweep and Andaman and Nicobar. The National Institute of Ocean Technology (NIOT) has already fabricated a floating OTEC plant, which is under testing in the sea off Tuticorin. OTEC has good potential for application in India. The major impact from the OTEC plants is sudden change in temperature of the surrounding seawater due to discharge of cold water from the plant and as it may affect the biota around the discharge area.

Extraction of electricity using tidal energy almost resembles the energy generation methods adopted in hydro-electric power systems. In areas, where the tidal amplitude is more like Gulf of Khambhat, Gulf of Kachchhh and Hooghly estuary, the high tide water is encircled in a dam like structure and during low tide, the sluice gates are opened to derive the turbine located at the gate. The rotation of turbine generates electricity. The Committee feels that such non-conventional energy methods should be promoted especially in the coastal villages and in the islands of A&N and Lakshadweep.

2.2.0 Areas of Incomparable Value

Significant or irreversible risk and harm to human health and life as well as critical to ecological systems and resources including unique species and other natural and manmade entities such as Monsoon cycles, Royal Bengal Tiger, Valley of Flowers, resulting in serious and large scale detrimental impact, would be considered incomparable. As such the society will not accept and measure these risks and harm in terms of monetary or conventional goods

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and services. Being irreplaceable and invaluable, they shall be given special and overriding priority for allocation of resources for protection and conservation.

2.2.1 Areas of Scenic Aesthetic Value, Heritage and Archaeological Sites and Areas of Outstanding Natural Beauty

Sea and its coast is an aesthetic gift of God, only comparable with the majestic mountains. The sound and serenity provided by the sea is one of the most sought after endowments of nature. Therefore, aesthetic considerations should play a significant role in development of the coastal areas.

The view of the vast expanse of the sea is in itself of great aesthetic value. Therefore any development that obstructs the view of the sea is undesirable. Unfortunately, it is not physically possible to provide unobstructed views from everywhere in built up settlements. Very careful analysis of topography, physical features and built form is called for to ensure that certain vantage points are protected to provide unobstructed views and the beach areas should be free from any obtrusive structure. The identification of locations, and control over development can only be ensured through the Development Plan prepared by the local civic authority. Close interaction between MOEF and local civic bodies is called for to ensure environmentally sustainable development.

Apart from the view of the sea, the landform, vegetation, etc around the coastal area are of aesthetic value, which deserves conservation. The same process of careful analysis is called for by the civic authorities while preparing Development Plans so that these areas of scenic beauty are conserved and kept out of obtrusive development. Some of these areas of scenic beauties may be classified as areas of outstanding natural beauty, and these may be graded for their significance and ecological importance.

There are several man made structures in and around the coastal stretches, which are of heritage value. Only a small number of them have been listed by the ASI as monuments of national importance or by the State Archaeological Survey of India (ASI) as monuments. Majority of the ancient structures are unprotected by any legislation although they are of significant historic and/or architectural value, at least to the local people.

In order to protect these monuments and conserve them, the British practice of recording is based on fairly systematic and transparent criteria; which are as follows: (i) world heritage monuments, (ii) monuments of national importance, (iii) monuments of local importance which are graded into three classes of A, B, and C according to their; (a) architectural merit, (b) historic value, (c) part of an ensemble of buildings, where a collection of buildings form a homogenous architectural presence, e.g.; Regents Park Crescent, Bath Crescent etc. (d) modern buildings by great modern architects; e.g. the National Centre for Performing Arts in Mumbai at Nariman Point . The local civic authority then determines the degree of protection they would accord in accordance with the grading. The process of listing is transparent and accessible in the public domain. These monuments become part of the development control ensured through the Development Plan.

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2.3.0 Living Resources in coastal and marine areas

Several coastal ecosystems like coral reefs, mangroves etc., have high species diversity. At the same time beaches are poor in biodiversity. With all the threats to marine ecosystems, there is little evidence for an imminent major loss of marine biodiversity at the species level. A distinction of the sea is its limited endemism: marine species and subspecies are only rarely confined to limited areas. There is great mixing of the oceans and its species and few sharply defined bio-geographic provinces with unique species composition. Since very few species are confined to narrowly bounded habitats, the chance that any species would be extinguished by human activities is very low.

Many human interventions/activities diminish biodiversity. Pollution through discharge of effluents or otherwise cause mortality, which may lead to extinction. Restrictions of freshwater flow into estuaries and reclamation have also affect biodiversity. Over fishing and selective fishing is against sustaining biodiversity. Introduction of exotic species and diseases are other detrimental factors. There are two levels of production. First the primary level comprising autotrophs (primary producers), who rely on photosynthesis and use inorganic compounds to accomplish growth. The main primary producers are green plant and are dependent on light availability. In coastal environments, the rapid attenuation of light in water places a restriction in primary productivity to only a few metres from the surface. Secondly heterotrophs or secondary producers, grow by the devouring and digesting of organic matter. These are chiefly animals.

A productive ecosystem is characterized by a high degree of biological diversity. It contains a large assemblage of plant and animal organisms in which each species has a well-defined role to play. A high level of species diversity in an ecosystem, therefore guarantee stability because many species provide numerous path ways for the energy flow. Thus each species plays its role in the food cycle, and if, because of human activities, there is destruction of one group of organisms, it would lead to the predominance of the other which had earlier formed its food components, thus leading to an inevitable ecological disturbance.

2.3.1 Marine Biodiversity

The coastal areas of the country experiencing tropical climate and having a diverse geological geomorphologic set up favours a multitude of coastal and offshore marine ecosystems. A total of 208 species of protozoan, foraminifera, tintinnid, dinoflagellate, sponges, cnidarian, Hydrozoa, siphanophores, polychaetes Crustacea, Copepoda have been reported in India, which includes 15 families and 60 genera. Among the four major reef areas of India, Andaman and Nicobar Islands are found to be very rich and Gulf of Kachchh is poor in species diversity. Lakshadweep Islands have more number of species than the Gulf of Mannar. Among the deepwater (ahermatypic) corals, so far 686 species belonging to 110 genera and 12 families have been reported from the world, of which 227 species belonging to 71 genera and 12 families have been reported from the Indian Ocean region. However, in India so far only 44 species have been reported and very little attention was paid to deep water corals.

The diversity of the fish population in the Indian waters is explained by 2,546 species of fish belonging to 969 genera, 254 families and 40 orders. Fifty seven percent of the Indian marine fish genera are common to the Indian Ocean and to the Atlantic and Mediterranean.

The reptilian population that the coastal and marine habitat harbours consist of the 26 species of sea snakes, 5 species of sea turtles. Nesting sites of an amphibious snake is reported from the shores of North Andaman Islands. Leatherback sea turtle, Dermochelys coriacea is the sole representative of the family Dermochelyidae and is a rare species. The remaining four species namely the Green turtle (Chelonia mydas), the Olive Ridley (Lepidochelys olivacea), the Hawksbill (Eretmochelys imbricata), and the Loggerhead (Caretta caretta) are contained in a single family, Cheloniidae. Various mammals that are present in the Indian waters are in endangered list. All the five species nest on Indian coast. Marine mammals belong to three orders Cetacea, Carnivora and Sirenia. 120 species occur worldwide and of these 40 are reported from Indian Ocean. 25 species of marine mammals belonging to the order Cetacea and Sirenia are reported from Indian waters. Sea cow, Dugong dugon occurs in near shore waters of Gulf of Mannar, Gulf of Kachchh and Andaman and Nicobar Islands. Dolphins and some whales live or breed in tropical waters, such as humpbacks, are occasionally seen near shore areas.

The coastal habitat and marine environment offers areas for reproduction, recruitment, feeding and shelter and should be proteced .The euphotic zone of the sea (of nearly 200 m depth) is teaming with life having phyto-zooplankton, copepods, eggs, larvae of fishes, jelly fishes, molluscs, pelagic fishes, turtles and mammals. The sediments and chemicals, the runoff water carries to the sea, have profound effect on fertilization of eggs of marine species. Many areas in Andaman and Nicobar Islands, Gulf of Kachchh and Gulf of Mannar have large quantities of sediment laden freshwater runoff impinging on coastal reefs, causing high levels of coral mortality. The conservation of these faunal resources will help in the sustainability of coastal fishery and thereby ensure livelihood of the coastal communities.

2.3.2 Fisheries

The fisheries in India as such can be put under 4 phases namely underdeveloped, developing, mature and senescent. Some of the fishes and shellfishes are over exploited and some are underexploited and 51 resource groups contribute more than 75% of the total marine fish landings of India. About 40% of the resource groups are in mature or senescent phase, 60% in developing phase and tending towards the next phase. Most of the stock exploited at near optimal/beyond optimal level. The fishery sector provides employment to 1 million active fishermen of which 0.2 million are in the mechanized sector, 0.63 million are artisanal and the post-harvest employs 1.2 million (25% women). The annual production is 2.7 million tonnes. There is a need for concern in the fisheries sector since there is dwindling catches over the last 4 years. Low quality catch have led to unemployment and there is no alternative employment or means of income generation for the fishing communities.

There are 33 minor and 6 major fishing harbours serving as base for over 20,800 traditional non-mechanised crafts, 55,000 small scale beach landing motorised crafts, 51,500 mechanised crafts and 180 deep sea fishing vessels.

Variety of gears and methods are adopted in the fisheries sector. The small mesh (8-10 mm) targeting for juvenile prawns leads not only in depleting the stock as also traps non targeted groups leading to significant discards. A species of catfishes is extinct as the brooders have been indiscriminately caught and the trawlers have been destroying the entire sea bottom of coastal waters where several of the demersal species inhabit. Experts opined that gill nets and hooks and lines are the best gear to exploit the resource. According to them

a Mechanised bottom trawling within 30 m depths has to be regulated and purse seines should avoid catching brooders. To ease pressure on the fisheries sector such as usage of Multi-gear, targeting multi-species, Open Access Fisheries etc., can be adopted. There is no National Marine Fisheries Policy and there is a need for popularization of code of conduct for responsible fisheries.

India has 3,638 fishing villages and 2,251 fish landing centres. The total marine fish production is about 2.695 million tonnes. Out of which, nearly 50% comes from nearshore waters and contributed by traditional fishermen. The major problems in coastal fisheries are overfishing, habitat destruction and degradation, pollution, post-harvest damages due to lack of infrastructure, fishing during monsoon, conflicts, among mechanised and traditional sectors, inter-state problems, etc. In addition to these, fishing communities also face compensation from other resource users. For example, coastal tourism interferes with traditional fishermen in their activities by replacing them and denying access to their traditional fishing grounds and beaches. Thus, the livelihood of the fishermen is threatened.

Fisheries experts are unanimous in the need for preserving the coastal areas, particularly on the guidelines to preserve the beaches, mangroves, lagoons, estuaries, intertidal habitats, rocky outcrops, swamps, mudflats, coral reefs, oceanic islands, small highly populated islands ("Thuruthu") of west coast backwater system etc. Fisherman require freedom for construction of sheds for dry docking boats and storage of fishing gear, engines etc., for construction of fish drying platforms, construction of fish curing tanks, storage sheds, construction of ice plants, cold rooms, ice storages, erection of repair yards for small crafts, diesel and kerosene supply installations, boat building and repair, construction of sheds for net mending, storage, auction of fish, construction of dwelling houses, public facilities, community halls, places of worship, construction of permanent hatcheries, seawater intake systems, effluent treatment tanks, nursery ponds, grow out ponds, pump houses, Seawater reservoirs, traditional curing of fish in pits and tanks, drying of fish (cement platforms), racks, peeling of shrimp in sheds, handling and packaging of processed and semi-processed fish/shellfish in sheds, ice storage, cold room storage of fish and ice vending, storage of dried fish before weekly sale to wholesalers, traditional fish processing in "Chappas" by small scale fish processors, crab and lobster fattening in tanks with seawater pumping, beach ponds for recreational fish keeping, educational ponds for marine biodiversity, dolphinaria, oceanaria, marine aquaria, turtle conservatories, constructions related to open sea mariculture, laboratories working on live marine fish and shellfish breeding, wet labs where flowing seawater is needed, pollution control labs, coastal fish survey and monitoring stations, fisheries patrols, etc.

2.4.0 Coastal Ecosystems

The Indian coast has diverse coastal flora and fauna. Some of them are endemic to certain areas. The Islands of Andaman & Nicobar and Lakshadweep and the Sunderbans are some of the hot spots where such endemic flora and fauna are found. These costal ecosystems are not only protect the coast from the natural phenomena but also provide livelihood security to nearly one quarter of the Indian population. Some of the major ecosystems are listed below along with their importance and threats -

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2.4.1 Mangroves

Mangrove vegetation is found in the tropical and subtropical coasts. Mangroves consist of a number of spices of trees and shrubs that are adapted to survival in the inter-tidal zone. They are basically land plants growing on sheltered shores, typically on tidal flats, deltas, estuaries, bays, creeks and the barrier islands. The best locations are where abundant silt is brought down by rivers or on the backshore of accreting sandy beaches. Their physiological adaptation to salinity stress and to water logged anaerobic mud is high. They require high solar radiation and have the ability to absorb fresh water from saline/brackish water. Mangroves occur in variety of configurations. Some species (e.g. *Rhizophora*) send arching prop roots down into the water. While other (e.g. *Avicennia*) send vertical "*Pneumatophores*" or air roots up from the mud. In size, mangroves range from bushy stands of dwarf mangroves found in Gulf of Kuchchh, to 30 m or taller stands found in the Sunderbans. Mangroves propagate by producing water borne "propaguls", which are not seeds but rather embryonic plants.

The mangrove swamp harbours a complicated community of animals, which are not evident. The roots provide a rich substratum for variety of attached animals, especially barnacles, bivalves, worms and truncates. Fish, molluscs and crustaceans find shelter in between roots. In the mud there are large numbers of burrowing crabs, molluses and fishes. The branches of the trees are evidently habitats of insects, lizards, snakes and birds, including the migratory ones. All the animals depend on the leaves and detritus which when carried by the estuary contribute to the production of organic matter, which is the basic food available to other animals and plants. Plankton and other micro organisms, which proliferate in the mangrove and its surroundings, are eaten by fishes, prawns, crabs and mollusc larvae. Many of them are commercially important, such as king and banana prawns, mud crabs, *barramunds, mackrel, mullet, threadfin salmon, bream, whiting, huderik* and *flatheas*. Mangroves provide the nutrients and rich feeding grounds for many marine species from various tropic levels. The fertility generated by the mangroves extend also to the marine areas. Hence many productive fishing grounds of the world are found adjacent to mangrove areas. The mangrove forest is also a special nurturing ground for the juveniles of many important species of finfish and crustaceans.

Almost the entire Indian Coast was rich in mangrove vegetation till the resent past. Significant mangroves are still available in Sunderbans (West Bengal), the deltaic regions of Mahanadi of the Bhitarkanika area (Orissa), the Krishna and Godavai delta in the Andra Pradesh, fringing the coast in Andaman and Nicobar islands, on the coral reefs and fringing the mainland in the Gult of Kachchh, the deltaic regions of Kori creek in Gujarat coast and Pichavarm-Vedaranyam of the Tamil Nadu coast. Compared to the estimate of mangrove spread of the late eighties of 6740 Sq km, the present estimate of 4120 sq. km show that the mangroves are fast degrading in the country. They are destroyed due to their use as fuel, fodder and conversion of these area for agricultural, aquacultural and industrial purposes.

The mangroves of Sundarbans are the largest single block of tidal holophytic mangroves of the world. The major species of this dense mangrove forest include *Heritiera fames, Rhizophora spp., Bruguiera spp., Ceriops decandra, Sonneratia spp.* and *Avicennia spp., Nypa fruticans* are found along the creeks. This mangrove forest is famous for the Royal Bengal Tiger and crocodiles. Mangrove areas are being cleared for agricultural use. The mangroves of Bhitarkanika (Orissa), which is the second largest in the Indian sub-

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continent, harbour high concentration of typical mangrove species and high genetic diversity. Mangrove swamps occur in profusion in the intertidal mudflats on both side of the creeks in the Godavari-Krishna deltaic regions of Andhra Pradesh. These and the well-developed mangroves of Pichavaram and Vedaranyam are degraded mainly due to construction of aquaculture ponds and salt pans.

On the west coast of India, mangroves, mostly scrubby and degraded occur along the intertidal region of estuaries and creeks in Maharashtra, Goa and Karnataka. The mangrove vegetation in the coastal zone of Kerala is very sparse and thin. In Gujarat (north-west coast) mangroves *Avicennia marine*, *Avicennia officinalis* and *Rhizophora mucronata* are found mainly in Gulf of Kachchh and the Kori creek. Mangroves are of scrubby type with stunted growth, forming narrow, discontinuous patches on soft clayey mud. The condition of the mangroves is improving especially in the Kori creek region, which is a paleodelta of the Indus river. On the Andaman & Nicobar Islands, the small tidal estuaries, neritic inlets and the lagoons support a dense and diverse undisturbed mangrove flora.

In addition to the diversity of the habitat, the mangroves play an important role in a sediment repository, steabilises shoreline, a buffer against storm surges (that would otherwise have a more damaging effect on the coast. Its positive impact was noticed in the Bangladesh cyclone of 1991. In the recent Gujarat and Orissa cyclones the devastation was reported to have been lesser where sufficient mangrove buffers were present. The major ecosystems provide a safe and favourable environment for breeding, spawning, rearing of several fish and shell fish, reptiles and mammals. Some of the shellfish and fishes are highly economically important.

Threats to mangrove ecosystems:

While mangrove forests have specific ecological role in the coastal ecosystem and they provide a life support system and income for millions of people, thus destruction is wide spread for shorter economic benefits. This happens because mangroves are too often considered wastelands of little or no value unless they are "developed". In the recent times there has been increased ingress to convert them into agricultural areas. The irony of the situation is that the conversion of mangroves for aquaculture is detrimental to the very same activity as the shrimp fry (baby shrimp) availability decreases, as the mangroves are the natural wild fry collection habitats. The overdose of chemical fertilizers and pesticides not only destroy the aquaculture farms but also become detrimental to the remaining mangrove ecosystems in the vicinity. Even in the case of capture fisheries low recruitment will consequently affect production. With the fishing grounds already overexploited, mangrove destruction can only further reduce stock recruitment and production.

In general the mangroves are resistant to many kind of environmental perturbations and stresses. However, mangrove species are sensitive to excessive siltation or sedimentation, stagnation, surface water impoundment and major oil spills. Salinities high enough to kill mangroves result from reductions in the freshwater inflow and alterations in flushing patterns from dams, dredging and bulk heading. Seawalls, bunds and other coastal structures often restrict tidal flow, resulting in the killing of mangroves.

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It is important to recognize that many of the forces, which detrimentally alter mangroves, have their origin outside the mangrove ecosystem. Traditional settlers of the mangrove area normally do not cause destruction to the system.

Management approach:

The value of the mangrove resource in terms of its marketed products can be expressed in economic terms. The "free" services provided by the mangroves are difficult to measure and consequently are often ignored. These "free services would cost considerable energy, technology or money if provided from other than natural resources. Since these values are seldom taken into account in the governmental decision process, the total value of the mangrove resource is most often quite significantly understated.

With the purpose of conserving the remaining mangroves the CRZ declared total prohibition on development in the mangrove areas. This has created awareness on its importance. Afforestation programmes are initiated at least in a few locations. Substantial reduction in the conversion of mangrove forest into aquaculture farms was noticed particularly after the Hon'ble Supreme Court's intervention in 1994/95. Mapping and research on mangroves improved. The management issues include developers consider the ban on mangroves as a threat and destroy them directly and indirectly reducing its coverage, the Sundarban mangrove biosphere area which has about 3 lakh resident population has to be given special provisions for certain developmental activities. The local governments, at several occasions, neither endorsed central government's view nor evolved efficient mechanisms to protect, resulting in their turning blind eyes to the wanton destruction. Distinction between mangroves and their associates are required.

The committee recognizes the importance of the mangroves in protecting the coastal areas and the coastal communities from storm, cyclones, flooding etc. Government should take up aggressive programmes to conserve the existing mangroves and initiate intensive mangrove plantation programmes at identified mangrove potential sites so as to develop bioshields.

2.4.2 Coral Reefs

Coral reefs are one of the most productive and complex coastal ecosystems with high biological diversity. They occur in shallow tropical areas where the sea water is clean, clear and warm. The high productivity is owing to the combination of its own primary production and support from its surrounding habitat. Reef building corals are a symbolic association of coral animals and xooxanthellae, the microscopic algae from 160 to 800 tonnes of calcium carbonate per acre are deposited each year on coral reefs. The corals are generally slow growing colonies of animals with growth rate ranging between one and ten centimeters in height annually. Even though corals live in nutrient poor waters, their capability to recycle the scarce nutrients (by the whole nutrient community) is enormous. This nutritional advantage, the exotic marine life of different hues and shapes combined with their ability to build physical habitat -the limestone structures built by the corals with the aid of their xooxanthellae - makes the coral community a truly remarkable habitat.

The coral reefs are classified depending on their locations into fringing, patch, barrier and atoll. The fringing reefs are contiguous with the shore and they are' the most common - by occurring reef form, found in Andamans. Patch reefs are isolated and discontinuous

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patches, lying shoreward of offshore reef structures as seen in the Gulfs of Mannar and Katchchh. Barrier reefs are linear offshore reef structures that run parallel to coastlines and arise from submerged shelf platforms. The water body between the reef and the shore is termed as lagoon. Barrier reefs are seen in Nicobar and Lakshadweep. Atolls are circular or semi circular reefs that arise from subsiding sea floor platforms as coral reef building keeps ahead of subsidence. The examples are the atolls of Lakshadweep and Nicobar. When the reef building do not keep pace with subsidence reefs become submerged banks as seen again in Lakshadweep.

Indian coral reefs are mainly in the Andaman and Nicobar and Lakshadweep islands. On the main land coral reef formations are found in the Palk Bay, Gulf of Mannar, Gulf of Kutchchh and Malwan coast. When sea grasses grow on Kavaratti atoll, mangroves are prevalent on Andaman and Nicobar coral reefs. Primary productivity of Indian coral reefs is comparable with that of the reefs of the rest of the world.

Functions of Coral Reefs

- Coral reefs are natural protective barriers against erosion and storm surge The coral animals are highly adapted for capturing plankton from the water, thereby capturing nutrients
- Largest biogenic calcium carbonate producer
- They provide substrate for mangroves
- Coral reefs provide habitat for a large variety of animals and plants including avifauna.

Threats to Coral Reefs

Coral reefs are constantly degraded. The degradation is both due to natural and anthropologenic reasons. The natural causes may be due to the outbreak of reef destroying animals, storms, "bleaching" and depletion of essential symbiotants. According to a study, the most destructive cause of coral reefs is man. The destruction may be due to chemical pollution, mechanical damage, nutrient loading or sediment loading. The pesticides or fertilizers reaching coral reefs from agricultural areas, destructive fishing practices, heavy metals from industrial sources, petroleum hydrocarbons. etc chemically damage the corals. Dredging, shipping, tourism, mining or collection is detrimental to the coral reefs. Nutrient loading due to aquaculture practices sewage discharge both from land and ships cause pollution leading to eutrophication and oxygen depletion. Similarly sediment loading resulting from construction activity, run off of sediments, dredging and turbidity can choke the coral growth.

The corals of Indian mainland consisting of fringing reefs and coral patches are severely threatened by siltation, pollution from industry, sewerage from settlement, shipping, thermal plants, tourism, mining and collection, fishing etc. Symptoms of degradation are visible in the islands also mainly due to mining and fishing.

Management Approach

All the development activities in the coral areas are at present prohibited. Considerable awareness and research also was initiated after adoption of CRZ. Future management action shall include. Effective enforcement / punishment mechanisms against illegal mining is still lacking. The industries and activities existing before the initiation of

CRZ have damaged the coral reefs. Necessary actions are required to check further damage. Schemes for enhancing the present coverage by suitable intervention including financial support are necessary. The implementing agencies though are convinced about the need for regulation needs further vitalisation.

The committee suggests that the government should take up measures in protecting and conserving the coral areas on war footing.

2.4.3 Seagrass Beds

Sea grasses are specialised angiosperms that resemble grass in appearance and form dense underwater meadows. They are the only group of higher plants adapted to life in the salt water. They occur in shallow nearshore coastal waters that are sheltered from high wave energy and in estuaries and lagoons.

Major Sea grass meadows in India occur along the south east coast of Tamil Nadu and in the lagoons of a few Lakshadweep Islands. There are some grass beds around Andaman and Nicobar islands also, but they are poorly documented. Flora comprises 14 species of sea grass dominated by *Thalassia hemprichii* and *Cymodocea species*. The total standing crop is species of marine algae have been observed in the beds of sea grass. Few economically important species of algae such as *Gracilaria edulia* could be cultivated in the sea grass beds on a large scale.

Functions of Seagrasses

Seagrasses function as stabilizers and sediment accumulators of inter tidal and sub tidal areas of the coast. There are only 58 described species of sea grass worldwide, within 12 genera, 4 families and 2 orders. IUCN has accorded high priority for the conservation of sea grass. Fourteen species of seagrasses have been recorded from Indian coast. They are commonly distributed from inter-tidal to sub-tidal region down to 8 m depth. Associated faunal population, especially juveniles are abundant in the seagrass and algal bed areas. In the lagoons wherever seagrass beds are widespread, in such areas, the population of fish and migratory birds is also higher. It is due to the availability of food and shelter in such habitat. It is reported that the net primary production of Cymodocea serrulata was 6.4 $g/cm^2/d$ and this was 6 times more than that by the phytoplankton. They trap the nutrients and supply them to the ecosystems. *Halophila ovalis* biomass in Ashtamudi estuary varies from 3.6-48 g/m^2 (dry weight). Common seagrasses found in Lakshadweep coral island are *Thalassia Lakshadweep* coral islands are *Thalassia hemprichii, Cymodocea rotundata, Halophila ovata, Syringodium isoetifolium* and *Halophila univervis*. The seagrass *Portesia coarctata* is an important socio-economic component distributed in and around certain island of Sunderbans.

In Tamil Nadu, seagrass species diversity is high in Gulf of Mannar and Palk Bay while it is low in the Bay of Bengal. The rich growth of seagrasses along the Tamil Nadu coast and Lakshadweep islands is mainly due to high salinity, clarity of the water and sandy substratum. Since the seagrass require comparatively calm areas for distribution, about 30% of the total lagoon area was covered by seagrass meadows. The green tigerprawn *Penaeus semisulcatus* contributes over 50% of total prawn catch of Palk Bay, and it is mostly captured from the seagrass meadows.

Sea grass ecosystems provide a sheltered, nutrient rich habitat for diverse flora and fauna. Sea grass beds physically help to reduce wave and current energy, help to filter suspended sediments from the water and stabilise bottom sediments to control erosion. The habitat complexity within sea grass beds enhances the diversity and abundance of animals. Sea grasses on reef flats and near estuaries are also nutrient sinks, buffering or filtering nutrient and chemical inputs to the marine environment. They provide a direct source of food for herbivorous animals such as some urchins and fish, green turtles and dugongs. They form a nursery and often feeding areas for fish, crustaceans, molluses and other invertibrates many of which are economically important (e.g Penacid shrimp, pearl oysters). They are a major input to food chains, which provide an indirect source of food for many marine organisms (e.g Sea urchins, turtles). The high primary production rates of sea grass are closely linked to the high production rates of associated fisheries. The associated economic values of sea grass beds are also very large, although not always easy to quantify.

Threats to sea grass beds

Large scale exploitation of marine algae is depleting these resources. A sea grass called Enhalus acaroids is now a threatened species. Dugong, a mammal dependent on sea grass for food, is also on the verge of extinction. Several causes have been suggested for deterioration of sea grass beds. Eutrophication, siltation, trawling, coastal engineering constructions and removal for commercial purposes are the major threats for sea grass beds.

Sea grass occurs in shallow water bodies and since water bodies are not brought under regulations, the CRZ notification is ineffective to protect sea grass beds as the seagrass beds are below the Low Tide Line. The major seagrass beds should be mapped and identifying areas for preservation. Dredging should be carried out far away from seagrass beds as siltation /turbidity destroys seagrass beds.

2.4.4 Sea Weeds

Seaweeds, the larger and visible marine plants, are one of the important living resources of the oceans. These are found attached to rocks, corals and other submerged strata in the intertidal and shallow subtidal zones of the sea. To be very specific, seaweeds are thalloid plants called algae, which means they have no differentiation of true tissues found in land plants such as roots, stems and leaves. They only have leaf-like appendages. Based on the colour of their pigmentation, sea weeds are broadly classified into different classes and families such as Cyanophyceae (blue- green), Chlorophyceae (green), Phaeophyceae (brown), Rhodophyceae (red) etc.

In Indian coast about 770 species of seaweed species are distributed, of this 184 species are green (Chlorphyta) 166 species are brown (Phaeophyta) and 420 species are red algae (Rhodophyta). Seaweeds are growing in shallow coastal waters wherever sizable substata is available. It is estimated that the total standing crop of seaweeds available in India is 91,339 tonnes (wet weight) consisting of 6,000 tonnes of agar yielding seaweeds, 16,000 tonnes of algin yielding seaweeds. The standing crop of algae yielding seaweeds, *Saragassum* and *Turbinaria* is abundant in Indian waters. In Kerala, the biomass of seaweed is around 0.5 kg/m^2 and mostly they are present upto 0.15 m depth level. By the biodegradation of seaweeds methane like economically important gases can be produced in large quantities. Extracts of selected seaweed species show antibacterial activity. Iodine yielding seaweed (*Asparagopsis taxiformis*) resources are available in the sub-tidal reefs of Saurashtra coast.

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Seaweeds are also used as the potential indicators of pollution in coastal ecosystem, particularly heavy metal pollution due to their ability to bind and accumulate metals strongly.

The total world seaweed production is estimated to be about 1821 x 10 4 tonnes (wet weight) annually. Of this, about 4.83% is being harvested from the eastern and western Indian Ocean. The potential harvest from the Indian Ocean is 870,000 tonnes of wet weight. From this, only 22,000 tonnes, largely red and brown sea weeds are actually harvested from both western and eastern Indian Ocean. About 20,000 marine algal species are reported to be distributed throughout the world whereas it has been estimated that the yield of seaweeds along the Indian coast is only about 70,000 tonnes on fresh weight basis. About 624 marine algal species of various groups are recorded from Indian waters, with a maximum number of 302 species in Tamil Nadu, followed by 202 species in Gujarat, 152 species in Maharashtra, 89 species in the Lakshadweep group of island and 75 in Goa.

Uses of sea weeds

Seaweeds are important as food for humans, feed for animals, fertilizer for plants. Seaweeds are used as a drug for goiter treatment, intestinal and stomach disorders. Products like agar-agar and alginates, which are of commercial value, are extracted from seaweeds.

Functions of seaweeds

Food for marine organism, habitat for breeding grounds, source of sediment.

Threats to seaweeds

Over exploitation for commercial uses and CRZ regulations do not apply to as the water part hence sea weeds are not covered.

2.4.5 Horseshoe (HS) Crab Habitats

Horseshoe crab is an important component of the food chain. Beach geomorphology is the most important factor in determining beach stability for the nesting behaviour of marine animals. Nesting behaviour of the Indian horseshoe crab, *Tachpleus gigas* (Muller) in India. The H.S Crab breeds practically through out the year. Migration and concentration in large numbers of mating pairs, in the intertidal zone, is a characteristic feature of the life history of horse shoe crab. Along the coast of India, *T.gigas* is common in selected beaches in the north east coast. Balramgari in Orissa is one of the favourite breeding spots. Urgent measures need to be taken up for the protection and conservation of horseshoe crabs as these habitats are being destroyed by various developmental activities.

2.4.6 Turtle Nesting Grounds

Most of the turtle locate their nesting grounds when they mature. Of the seven or eight species of sea turtles, two species are unique in displaying one of the most spectacular reproductive phenomena, the mass nesting. In India there are three major mass-nesting sites of the olive ridley (*Lepidochelys Olivacea*), all on the east coast, in Orissa. The nesting at Gahirmata (a part of Bhitarkanika sanctuary) at the mouth of the river Maipura near Dhamra is the largest sea turtle rookery in the world with 100,000 to 500,000 turtles nesting there each year. There are smaller rookeries at the mouth of the Devi River (north of Puri) and

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Rushikulya in Ganjam district in Southern Orissa. Recently a small nesting site has been located in Payyoli beach, north Kerala.

2.4.7 Coastal Forests and Wildlife

The coastal forest includes the natural forest and the shelter bed plantations undertaken by the Forest Department. These coastal forests are not only habitats for several flora and fauna including wildlife but also protect the shoreline from erosion, cyclones and flooding. Most of the coastal forests are found in along the western ghats including western coastal part of Maharashtra, Goa, Karnataka and Kerala. Coastal forests are found along the Tamil Nadu and Andhra Pradesh coasts. Several of the local communities depend upon the resources from these forest areas.

2.4.8 Protected areas - Marine Parks and Sanctuaries

The following definition of marine protected areas was developed at the 4th world Wilderness Congress and adopted by IUCN at its 17th General Assembly in 1988:

Any area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment.

Sites, which fit in this definition, have been given a variety of names. In common with protected areas on land they may be called 'reserves', 'sanctuaries', 'parks', or have some other title. To clarify the situation and guide protected area managers, the IUCN, through its Commission on National Parks and Protected Areas, has developed and refined a list of the categories of protected area. Ten categories were identified in 1978 and, following the most recent review, the list has been reduced to six. These are areas managed mainly for:-

I. Strict protection (i.e., Strict Nature Reserve/wilderness Areas)
II. Ecosystem conservation ad recreation (i.e., National Park)
III. Conservation of natural features (i.e., Natural Monument)
IV. Conservation through active management (i.e., Habitat/Species Management Area)
V. Landscape/seascape conservation and recreation (i.e., Protected Landscape/Seascape)
VI. Sustainable use of natural ecosystems (i.e., Managed Resource Protected Area).

The current focus on biodiversity conservation is an important influence on MPA programmes. This has implications for site selection but it remains unclear whether much will change. The types of area listed by IUCN as especially important for marine biodiversity, for example, are the sorts of site which have been selected traditionally as MPAs:

- Areas of high diversity
- Areas of high endemism
- Areas of high productivity
- Spawning areas that serve as a source of recruits
- Nursery grounds
- Migration stopover points and bottlenecks.

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The need for community involvement in Marine Protected Areas (MPAs) cannot be stressed strongly enough, Members of the community can be involved in roles as varied as identifying sites, putting forward proposals, being involved in consultations and being responsible for the management of MPAs. In addition to the existing marine sanctuaries and protected areas, the government may identify similar areas, where there is occurrence of high marine biodiversity including migratory sites of fauna, nursery grounds of fishes and reptiles and declare such sites as protected areas.

2.5.0 Coastal Geomorphic Systems

2.5.1 Coastal Dynamics

Coastal environments are among the most changeable on the earth's surface, although this statement must be qualified as there are several facets to "change." At the outset, it must be emphasized that many coastal changes are circulatory in space or periodic in time. The idea of change is not a new one in coastal studies. Descriptions of coastal changes date from the Middle Ages, especially in the context of harbour silting and seafood harvests. What is new is a realization that these changes may be linked, perhaps via tortuous pathways. Testing-out these links from a data mass is a considerable challenge. For coastal scientists, many of the best clues come from geologists, meteorologists and biologists. In recent years, all these disciplines have undergone a revolution in approach, with greater emphasis being placed on dynamic processes rather than static description. Allied to this has been a general stiffening of methodology and increasing sophistication in techniques. The widespread introduction of information technology and attendant data acquisition and handling methods is beginning to have a profound effect on the field sciences, coastal studies included.

While careful assessment of coastal changes must form the cornerstone of effective coastal management, it is often insufficient to monitor sequential variations without paying due regard to the causes of change. There are several good reasons for this:

(i) By exploring the root cause it is possible to provide a better basis for understanding, thus allowing more confident prediction.
(ii) The results of such an examination are likely to be more universally applicable.
(iii) Reliance only upon indicators of response may understate the overall problem.
(iv) Environmental reaction may be tempered or buffered by external influences.
(v) Reaction may be incremental, or related to thresholds. An obvious case arises with cliff erosion. Simply measuring the retreat of the cliff top says very little about the causative factors, which may in time accelerate or decelerate the process.

Knowledge of these causes would obviously assist attempts at stabilization. The human influence on coastlines looms large. Man is a major factor in coastal change, at various scales. The impact may take many forms: it can be gradual or sudden, premediated or inadvertent. The ability of coastal environments to buffer such impacts is crucial. Hence it is important to understand the interaction between the solid and fluid media, which characterises the coastal environment.

Coastal geomorphological features like beach, sand dune, mudflat, estuaries, cliffs, etc. are characterised by unique ecosystems like mangroves, coral reefs, seagrass beds, etc.

These ecosystems are important for the sustainability of the biodiversity and productivity of the coastal zone.

Some of the features/formations due to these interactions are described below:

2.5.1.1 Mudbanks

Mudbanks, defined as transient accumulations of dense fine-sediment suspensions, which form sub-circular/elliptical depositional areas having dimensions from 2-5 km alongshore and 1.5 to 4 km offshore, occur yearly along some stretches of the west coast of southern India. Mud banks nearly always occur shortly after the arrival of the southwest monsoon in late May/June. However, instances of earlier formation (and sometimes of no formation) have been noticed. They usually form in the same place each year and often show a down coast migration during their brief existence (generally 1.5 months). When active they are noted for their wave damping effects that a 1.8 m high wave outside the mud bank is reduced to 0.5 m within the mud bank, within a distance of 1.1 km. This reduction can be 100% in a fully developed mud bank. The mud bank also provides protection to the coastal zone, by way of allowing accretion. However due to the presence of mud banks the downcoast, areas are found to be eroding during the monsoon. The mud bank provides an attractive environment to the local fishermen in which they can continue fishing while the 2-3 m high monsoon waves make fishing outside the mud bank impossible. The mud bank appears to be a biologically fertile, perhaps due to the abundance of organic matter (≥5%) attached to the sediment particles or perhaps due to the reduced turbulence and the enhanced turbidity, which seem to attract the juvenile fishes and the larger fishes, which feed upon them. Mudbank accretes the coast behind, boosts fishing and it is a economic harbinger to the fisher folk. However, it erodes the down coast and it is unpredictable. The challenges are to predict mud bank formation, artificial generation, take precautions against down coast erosion, integrated management of mud bank areas taking into account the phenomena, coastal protection, socio-economics and infrastructure development.

2.5.1.2 Beaches

Beaches consist of accumulated, unconsolidated sediments transported to shore and moulded into characteristic forms by wave generated water motion. Beaches are located between the lowest low tide level and a landward limit, which is usually defined by a coastal cliff, a foredune ridge, and permanent vegetation or, by some physical man-made structure. Quantitative limit can be broadly termed as the highest high tide line. The unconsolidated sediments range in size from rock fragments to fine-grained sands and mud. The general composition of beach materials tends to vary with locations, but the processes that create and maintain beaches throughout the world are similar.

Beaches are not stable entities, but rather are dynamic landforms that are constantly subjected to erosion and/or accretion. The changes on a beach are responses to processes acting from outside the beach. These include waves and currents as well as inland dune systems, which induce the erosional and depositional cycles. Difference in beach form (or type) and position reflect the local balance or imbalance between deposition and erosion.

Functions

- Beaches act as a buffer against coastal erosion

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- Habitats for many plants and animals
- Spawning ground for turtles
- Provide the energy base to support the beach's diverse population of deposit and filter-feeding organisms
- At highest level of food web, beaches serve as energy sources for many species of coastal birds and fish
- Aesthetics

Major uses

- Supports fishing and related activities
- Acts as the activity area for coastal population including settlements
- Beach sand serves as a major source of construction aggregate though declared illegal
- Mining of placer deposits & minerals
- Recreation and Tourist attraction
- Construction of ports, wharfs or piers over the beaches
- Agriculture

Threats

- Industrial and settlement siting and related constructions
- Overexploitation by sand mining (for construction and minerals)
- Constructions on the beach decrease the aesthetic value of beaches
- Activities which accelerate the erosional processes (such as river dams, barrages, and diversions that either trap sedimentary materials, thus preventing their entry into the coastal zone, or reduce the river water's transport power)
- Poorly designed coastal engineering works (that alter longshore currents or wave forces and lead to undesirable erosion and deposition patterns)
- Coastal dredging/mining projects (that remove beach-building materials from the longshore transport process)

Management approach

- Site specific studies may be required at each locality to ensure wise planning decisions
- Develop a setback line for construction activities
- Where a major obstruction to longshore sand transport is built, plan adequate sand by e-passing system or replenishment
- Use soft solution rather than hard solution to solve beach erosion problems i.e. nature-synchronous techniques
- Maintain a prominent fore dune ridge
- Restrict mining of sand from dune, beach or nearshore if it induces erosion
- If storm alters the beach, let the normal beach cycle return the sand
- Identify sustainable multiple use like: Tourism/human settlement/ agriculture: Spawning ground/source of food for humans; Tourism/spawning ground/food.

2.5.1.3 Sand Dunes

Coastal Sand dunes develop where the sediment transport by the wind is impaired through the interaction of air stream with surface vegetation in the coastal region. The

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sediment for dunes is derived from marine sand delivered to the beach by waves. Dunes range from well vegetated, coast parallel ridges to non-vegetated irregular topography. Fore dunes are in a pioneer stage of dune formation and are susceptible to removal by storms or high tides. They will be still receiving a significant wind-blown sand-input. Rear dunes are in an intermediate or mature stage and are stable. The embryo dune, which occurs within 200 mts from the shore should not be altered/disturbed.

Man's impact on coastal dunes has caused extensive ecological and geomorphological changes. Increasing pressures place the dune communities under immense physiological stress, both from direct damage (trampling, grazing) and indirect damage through alterations in climate, soil and moisture regimes. Many dune systems around the world are in advanced stages of despoliation as a result of man's activities. In some cases the dunes have been completely removed.

Functions

- Acts as sand reserve for coastal protection and stability
- Provide protection and shelter for supply and recharge of fresh water aquifer in coastal areas.
- Habitat for several plants and animals
- Constitute important agricultural, industrial and recreational resource
- Protects the coast and the coastal communities living behind the dunes from tidal surges, large waves such as the tsunami waves.

Major uses

Dune-based activities include agriculture, mineral extraction, active and passive recreation. Over the last century the impact of recreation has been considerable, many dune systems having suffered badly from an uncontrolled influx of visitors. In some countries the coastal dunes are an essential part of integrated shore protection measures (as in Netherlands, UK, USA).

Threats

- Sand mining for minerals and construction
- Dressing of sand dunes
- Leveling for construction of beach resorts
- Leveling for industries.
- Road, rail and other infrastructure development included unplanned tourism facilities.

Management approach

- Conservation of fore dunes
- Preservation of rear dunes in the intermediate stage
- Restriction of sand mining
- Promote usage of alternative materials for construction activities
- Develop setback lines for beach resorts
- Develop setback lines for siting industries
- Develop artificial dunes and stimulate dune growth

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- Identify multiple uses like coastal protection, water recharge, recreation, agriculture and urban/industrial use and zonate for different uses.

2.5.1.4 Earth Cliffs

The most important characteristic of 'earth cliffs' is their tendency to instability and rapid change, unlike 'rock' cliffs where change is infrequent and particularly localized.

The form of earth cliffs and the process by which they are changed depend primarily upon rock cohesion, groundwater conditions, the effectiveness of marine erosion of the foreshore, the cliff foot, and the debris derived from the cliff, the amount and effectiveness of cliff-foot protection, both natural and man-made, offshore relief, sea level change;

Marine cliffs are usually considered to be special case of slope development in which the removal of weathered material from the base is especially efficient. The type and structure of the rock in which the cliffs are cut affect to a considerable extent not only the cliff form but also the dominant processes modifying it.

Usage

Cliffs and the immediate cliff-top are used mainly for the establishment of resorts, all forms of agriculture and recreation. Earth cliffs in coastal areas act as barriers against strong winds, cyclonic storms thereby protecting the life and property at the area. The urban use of cliff-top land poses most problems for the management of cliffs.

2.5.1.5 Rocky Cliffs

The principal value of rocky cliffs does not lie in agriculture, forestry, or any other commercial development, but in their exhilarating scenery and wildlife. Rocky cliffs are usually composed of hard materials such as sandstone, limestone, slate, basalt, serpentine, or granite. They are rarely smooth: the action of wind and sand, waves and spray, picks out the softer materials to form a complex pattern of ledges, flats, cracks, and gullies. This provides some flatter surfaces on which vegetation can establish with lichens nearest the sea, salt-tolerant flowering plants higher up and more normal, inland vegetation towards the cliff-tops. Rocky cliffs are distinctive in terms of their habitat and vegetation. The rocky cliffs are natural barriers to strong winds especially during the cyclonic conditions. Hence, the rocky cliffs should be protected.

Uses & threats

The economic uses of rocky cliffs are extremely limited. The rock itself is sometimes used for the extraction of valuable minerals, e.g. chromium from serpentine, or as a road stone as with granite and basalt, limestone for cement factories. These activities usually produce serious scars but are localized. A few industrial plants may be located on cliff-tops and whilst these are generally considered visual intrusions in the landscape, their effects are again fairly local.

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2.5.1.6 Rocky Foreshores

Rocky foreshores occur most extensively where the coastal region is mountainous or atleast rugged. Topographically they are more variable than other coastal habitats. Depending on the geological character of the coast they range from steep, inaccessible cliffs to wide, gently-sloping platforms. The majority of rocky shores, on open coasts, experience the relatively stable conditions of fully marine situations. The CRZ notification prohibits mining of rock in the CRZ area.

Functions

- Provide anchorage for many types of algae and mussels
- Habitat for different crabs and molluscs
- Provide aesthetically important site
- Coastal protection

Uses

- Tourism
- Commercial exploitation of algae

Threats

- Unplanned tourism structures
- Pollution
- Mining of rocks for construction purposes.

2.5.1.7 Sand Bars

Sand bars in the nearshore and longshore area and swales on the beaches are sand reserves. These sand bars play a very important role in coastal processes. These are formed by wave beach interaction.

2.5.1.8 Estuaries

An estuary is a semi-enclosed coastal body of water, which has a free connection with the open sea and within which sea water is measurably diluted with fresh water derived from 'land drainage'. Estuaries depend upon fresh-water flow from upland rivers in order to maintain their characteristic processes. The two-way flow of estuaries, the currents set up by the mixing of fresh and saline water and the continuous variations, which take place in both velocity and discharge through the tidal cycle all provide a marked contrast with fluvial processes.

The most important control of estuarine processes is the tidal range. This determines the tidal current and residual current velocities, which in turn has impact on sediment movements.

When tidal range is less than 2 m (microtidal) the estuarine processes are dominated by fresh-water discharge from upstream of the estuary mouth and by wind-driven waves

outside the mouth. The dominant fresh-water flow produces a salt-wedge estuary with a delta at its mouth. However, on the seawards of this delta, wind waves produce spits and barrier islands, which enclose a bar-built estuary. It is often difficult to distinguish between different types of estuaries.

Estuaries which experience tidal ranges between 2 m and 4 m (the meso-tidal range) are no longer dominated by salt-wedge circulation, instead tidal currents begin to assume importance.

The outstanding feature of estuaries, from the aspect of applied ecology, is the high productivity, which results from the constant supply of nutrients to a sheltered but dynamic habitat. Estuaries and tidal marshes are regarded as amongst the most fertile natural areas in the world. The greatest immediate commercial value of this high productivity, however, lies in fisheries within the estuary, mostly for bivalve molluscs.

The CRZ notification regulates all developmental activities along the CRZ area of the estuaries upto the extent of 5 Parts Per Thousand (PPT) of salinity felt upstream of the estuary. The measure of 5 PPT salinity during the driest period is one of the issues for implementing the CRZ Notification, 1991. Some of the estuaries become dry during peak summer seasons as there is no flow of fresh water. In some situations based on the geomorphological characteristics and hydro dynamics of the estuary, a salt wedge is formed at the bottom of the estuary while the upper surface has freshwater. Further, due to constructions of barrages, dams, upstream of the river, the salt water flow from the sea is also affected in the estuaries. Hence the Committee feels that biological indicators such as the extent of mangroves found upstream and presence of salt marshes may also be taken into consideration along with the salinity level of 5 PPT measured at the bottom of the estuary for determining the extent of tidal influence in the estuary.

Major Functions

- Spawning, nursery and feeding ground
- Beds for clams and mussels and sea grass beds
- Sites of mangrove, marsh stability
- Shifts sediments, creates mudflats
- Controls coastal stability
- Controls salinity
- Transports nutrients
- Cleanses the system of pollutants by flushing away the waste products
- Absorbs wave energy
- Absorbs floods

Major uses

- Human settlement and urbanisation on the banks
- Industrial sites
- Sheltered sites for locating ports and harbours
- Fishing grounds
- Sources for clams and mussels
- Aquaculture and mussel culture
- Transportation routes

- Filtration ponds
- Salt production
- Tourism
- Disposal grounds for urban and industrial waste

Threats

- Reclamation
- Pollution from urban and industrial waste disposal
- Reduction in fresh water discharge due to dams
- Prevention of fresh water flow.
- Dredging for water-ways

Management approach

- Restrict reclamation for essential activities
- Prohibit disposal of untreated waste
- Ensure sufficient fresh water discharge to maintain estuarine characteristics
- Ensure sufficient tidal exchange
- Determine the waste treatment level based on the assimilative capacity of the particular estuarine system and away from critical habitats
- Zonate areas for aquaculture, salt manufacture, ports & industries and tourism to avoid critical habitats and conflicts in use
- Avoid locating chemical plants with toxic discharge near estuaries

2.5.1.9 Lagoons

Lagoon is shallow body of brackish or seawater partially separated from an adjacent coastal sea by barriers of sand or shingle, which may leave narrow openings through which seawater can flow. Coastal lagoons are usually found on low-lying coasts and are normally aligned with their largest diameter parallel to the seashore. In general, lagoons are associated with coastlines, which have experienced or are experiencing change in the relative land-sea level. Lagoons associated with coral reefs of atolls have different characteristics and functions. These are treated separately with corals.

Human activities often affect the structure of lagoons, primarily by hydraulic works (e.g. dikes, dams, and artificial bars), also by land-reclamation activities and through changes in the inland watershed. Lagoons are highly productive ecosystems. Large oscillations in the populations of individual species occur. Many species migrate into lagoons to feed, thereby taking advantage of the considerable production of organic matter and the lack of competing species: although phytoplankton and benthic plants are the primary producers upon which the ecosystem ultimately depends, much of their production is consumed only after its decay and decomposition by microbial organisms, i.e. the detritus food-chains are quantitatively important in lagoons. The CRZ notification lists lagoons as tidal influenced water bodies. However, the water part of the lagoon is not covered in the notification.

Functions

- Nursery, breeding and feeding grounds for marine fauna
- Habitat for mussels and clams

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- Seagrass beds
- Absorbs flood waters
- Absorbs wave energy
- Influences shoreline stability
- Act as sediment buffers

Uses

- Natural sites for harbours
- Potential aquaculture sites
- Recreational uses
- Sites for industrial purpose
- Culture and removal of mussels, shrimps, crabs, fish, etc. for human consumption and forms a valuable source of protein for the populations

Threats

- Reclamation
- Pollution due to urban and industrial waste disposal
- Modifications for aquaculture
- Discharge from aquafarms
- Constructions like dike, artificial bars, jetties affect the structure of lagoons.
- Construction of dams affect the freshwater discharge

Management approach

- Reclamation be permitted only for essential activities based on EIA
- Discharge of untreated effluents be prohibited
- The number of boats for recreation be restricted based on carrying capacity estimates
- Discharge points be decided based on studies on circulation systems of lagoon
- Discharge points be away from critical habitats, like sea grass beds and mussel and clam beds
- Zonate areas for multiple uses like recreation, aquaculture etc.

2.5.1.10 Mudflats

Mudflat is formed by the deposition of fine inorganic material and organic debris in particulate form, which has been held in suspension in the sea or in estuaries. Because of the fine texture of this material, deposition tends to occur where the turbulence of the sea is most abated and the gradient of the underlying land is low. Mud-flats are thus formed in the sheltered parts of embayments, inlets, and estuaries or behind the protection of shingle spits or dune systems. Mudflats are also referred as tidal flats.

This environment is rich in invertebrate life. Moreover, mudflats possess special ecological significance because they are the main feeding grounds for many migratory birds and wild fowls, which congregate on the coast in great numbers during migration periods and in the winter months.

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The CRZ notification is silent about the protection/conservation of mudflats. However, the Coastal Zone Management Plans have listed the mudflats as eco-sensitive areas.

Functions

- Mudflats that harbour large populations of several species of birds and other fauna.
- Act as flood plains controlling floods
- Controls flow regions and act as sediment source for the shore
- Coastal stabilisation

Major uses

- Fishing grounds
- Nursery grounds
- Potential area for agriculture
- Potential new land for development

Threats

- Reclamation
- Urban and industrial waste disposal
- Waste disposal/effluent discharge

Management approach

- Restrict reclamation
- Prohibit discharge of untreated waste
- Restrict dumping of dredge spoil
- Identify multiple uses and zonate for different uses
- Ensure enough amount of sediment laden water to sustain fertility of mud flats.

2.5.1.11 Deltaic Areas

Deltas form where riverine and marine systems meet. The piling up of carried sediments at the mouth of the river creates deltas of various sizes and shapes. Deltas are highly productive and have fertile soils, which attract large agricultural settlements. The CRZ notification is silent about the delta formation.

Functions

- Barriers to tide, wind and wave actions
- Sites of mangrove, marsh and seagrass beds

Uses

- Human settlements
- Industrial sites, ports and harbours
- Agriculture
- Salt production

Threats

- Reclamation
- Flooding

Management approach

- Identify multiple uses and zonate different uses
- Take into account threats due to floods/cyclones
- Ensure sufficient drainage and tidal flow

2.5.1.12 Tidal Inlets

Tidal inlets form at the confluence of terrestrial fluvial systems with the sea. Inlets play an important role in coastal ecosystems facilitating mixing of water, sediments, nutrients and organisms between terrestrial and marine environments. These are also the water routes across the coast for ships between inland harbours and the open sea. Efforts to keep the inlets permanently open and in the same position necessitate dredging and stabilisation structures. The tidal inlets are grouped under the tidal influenced water bodies with CRZ notification. The water part of the tidal inlets is not covered under the notification.

Major uses & Functions

- Helps to sustain the brackish water systems
- Provides water routes between inland waters and open sea
- Provides the route for marine organism to estuarine habitat for breeding/spawning

Threats

- Dredging for maintaining the channel increases turbidity
- Channel stabilisation disrupts the natural by e-passing of sediment.

Management approach

- Channel dredging and stabilisation should consider its impacts on shoreline stability
- Tidal inlet stabilisation interventions be avoided at identified critical habitats

2.5.1.13 Barrier Islands

Barrier islands occur along the lowland coasts. They run parallel to the mainland coast but are separated from the mainland by lagoons and bays. Barriers are best developed where the tidal range is relatively low and the wave energy is low. Barrier islands are formed by the long-shore extension of spits, which subsequently are broken through by storms - forming series of disconnected islands. They also form due to the post-glacial sea level transgressions, which swept sediments to the present day coastline. The best examples of barrier island formation in India are the stretch of barrier beaches extending along the Kerala coast. The CRZ notification does not put any separate regulation for such islands.

Threats

Sand mining, pollution from tourism activities and erosion.

Management approach

Discourage settlements and agriculture, regulate tourism activities, restrict permanent constructions.

2.5.1.14 Lakes

Many of the processes found along the shores of lakes are similar to those found on seacoast. There are several distinctive aspects about the lakes shores particularly with relating to geomorphology, hydrodynamics and the ecosystems. The Pulikat lake is comparatively different from that of Chilika lake. These semi enclosed water bodies act as breeding and spawning grounds for several fishes and shellfishes. The local communities depend upon these resources. The lakes are categorised as tidal influenced water bodies under a CRZ notification however the water part is not covered in the notification.

2.5.1.15 Salt-marshes

Salt-marsh can be defined as natural or semi-natural halophytic grassland and dwarf brushwood on the alluvial sediments bordering saline water bodies whose water level fluctuates either tidally or non-tidally.

Salt marshes are a source of minerals (clay, salts, sand) trapped from the floods, which will be resupplied after removal. They are also a source of plant materials, which can be utilized for agricultural purposes. A part of these materials may be transported, as detritus, towards the near –shore waters, contributing to their fertility. The salt marshes are one of the most productive habitats .The marshes act as buffer areas during flooding and storm surges. Direct protection of tidal marshes against pollution from the sea seems to be practically impossible, as an open relationship with the tides is a prerequisite for the survival of the marsh ecosystem. The CRZ notification does not included such salt marshes.

Functions

Habitat for various flora and fauna helps recharging of groundwater by trapping rainfall and provide protection to the coast.

Threats

Reclamation, cutting and removal of marsh vegetation for agriculture and construction of embankments.

Management approach

Regulate reclamation, development activities to be permitted based on EIA and only treated effluent be allowed.

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2.5.1.16 Islands

Islands are created by geologic processes like changes in the sea level or the eruption of volcanoes or through coral building process. For many small islands, such as Lakshadweep and Andaman- Nicobar, the entire area of the island can be considered to be the coastal zone.

It is well known that islands are particularly vulnerable to natural phenomena such as cyclones, subsidence, etc. and coastal management and planning efforts should take into consideration the likelihood of such occurrences.

The Andaman and Nicobar group of Islands and Lakshadweep Islands are the major marine islands in the country. The former has 325 islands out of which 38 are inhabited while the latter is an archipelago of 36 tiny islands of which 10 are inhabited. The Andaman-Nicobar islands have forests and hilly terrains in many islands. Though narrow, the islands are marked by bays, lagoons, creeks and reefs. Lakshadweep islands are basically coral atoll formation. The CRZ notification categorises Andaman & Nicobar, Lakshadweep Islands as CRZ-IV and has stipulated separate conditions for developmental activities in the CRZ area. It was brought to the notice of the Committee that in most cases the width of the island is much less than 500 metres. These groups of Islands harbour some of the richest and unique biodiversity in the world. Due to their scenic beauty, the islands are considered to be tourism potential zones. Keeping in view the need for economic development of the island communities, the activities such as high yielding agriculture, fisheries and tourism may be promoted. The Committee is of the opinion that a holistic approach may be adopted rather than sectoral approach. An ICZM approach is one of the most appropriate management tools for managing the fragile island environment.

2.6 Coastal Communities

About 20% of the Indian population resides in the coastal area and they desire their resources from the coast. The coastal population is dependent on fisheries, agriculture, aquaculture, horticulture, tourism, boat building, traditional manufacturing units and allied activities.

From both on economic and livelihood perspective, fisheries are one of the most important of the resources available in coastal areas. It is estimated that the fishermen population living along the coastal areas of the country is around 67,30,300 (as per livestock census 1992) of which 26,86,000 are males, 19,80,000 are females and 23,64, 000 are children. This fishing population are involved in full time or part time fishing. The population involved in full time fisheries is around 7,38,000 while part time fishing is 7,13,000. The population, which is involved in marketing and other allied activity pertaining to fishing are about 6,89,000.

Living aquatic resources make a crucial contribution to food security, particularly in the coastal zone, as a source of high-value protein, providing the sustenance that supports livelihoods, social structures and economic development. For example, in South Asia, fish contributes more than half of the animal protein intake in the diets of coastal communities. In the Maldives and Bangladesh, for instance, fish contributes as much as 80 percent of the animal protein intake. This has direct nutritional implications for the fishery-dependant and poor marginalised coastal communities.

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2.6.1 Livelihood and Social Dimension

A focus on the social dimension, although intertwined with the environmental, physical economic and the political remind us that development is about peo0ple and not merely about economic growth captured in macro statistics. In this context, the concerns of the poor and marginalised sections of the coastal communities must be reflected in the state policy. The fact that development is conflict ridden must be recognised and the role of the state in resolving such conflicts has not been unproblematic.

India's natural capital – land, water, forest and air – is being depleted at an alarming rate and those communities who depend on it for their livelihood are being displaced and marginalised.

The CRZ policy, the goals of biodiversity conservation and local people's livelihood security need to be placed at the centre stage of all decision making pertaining to infrastructure development or economic considerations of revenue generation. If objectives and principles of National Environment Policy, 2004 are to be upheld, governance structures become significant.

We must recognise the ecological, human and economic significance of coastal areas, and of the resources within them. These dimensions have not been sufficiently incorporated in the implementation of environmental laws and regulations and in the macroeconomic policies. Often n it is the alert interventions by public interest groups the positive attitude of the judiciary which has played a crucial role in protecting and enhancing environmental resource conservation in India.

In a country like India, where a large number of people are dependent on natural resources for their survival, social dimensions of livelihood and ecological security have to be incorporated. In Coastal Regulation Zone policy, the goals of biodiversity conservation and local people's livelihood security need to be placed at the centre stage of all decision making pertaining to infrastructure development or economic considerations of revenue generation. If objectives and principles of National Environment Policy, 2004 are to be upheld, governance structures become significant. In harnessing scientific and technological know-hows the key ideas to be included in the new Coastal Regulation Zone policy framework are:

(i) Recognise the vital contribution that coastal ecosystems make a sustaining livelihoods, particularly of fishing communities.
(ii) Distinguish clearly between needs of locals for drinking water and other natural resources and those of commercial interests. Under the garb of permissible "human activity", commercial interests have plundered the environment.
(iii) Institute inadequate institutional mechanisms to implement and enforce the new Coastal Regulation Zone legislation.
(iv) Facilitate the preparation of well-coordinated land-use project plans, site plans, using GI and other planning methods through multidisciplinary teams.

There is a general obligation to protect threatened or endangered species and natural systems, of special importance to sustaining life, providing livelihood, or general well-being. If for exceptional reasons of overriding public interest such a protection can not be ensured, there shall be due process for the purpose and offsetting measures that must be taken, by the proponents of such activity, for the purpose will include restoration or replacement as far as

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possible of the lost environmental value to the same public as well as the critical ecological systems. This, however, may be permissible only in the rarest of the rare cases and not allowed as a pretext for laxity in complying with statutory obligations, to provide fait accompli for relaxation of established norms or obligations emanating from public trust.

2.7.0 Infrastructure

Development infrastructure such as electricity, water, gas, roads, bridges etc., are designed to serve multiple uses and is usually planned and provided by Government. Developing infrastructure systems in coastal zones can have wide arrange of environmental impacts. The details of some of the infrastructure and its impact on the costal environment is described below -

2.7.1 Zonation and Planning for Locating Infrastructure Facilities

Several major urban centres have come up along the coast line. The average coastal population density is 432 persons per sq. km as against 256 persons for the entire country. Apart from protecting the community and resources, there is a need for providing necessary infrastrcutural facilities for the communities to maintain a better standard of living and their economic development. While the coastal areas have a tremendous developmental potential, there needs to be proper planning process so as to integrate developmental process with the Regional Plans. Coastal Regional Plans are required to work out broad Regional Policy for development under the concerned State Town and Country Planning Act. The Regional Plans should indicate broad settlement system depending upon the potential of development and the Coastal Zone Management Plans should be an integral part of the regional plan. This plan should give broad framework for development code and the regulations for controlling constructions and building activities. It must be ensured that the development and management should be incorporated within this plan. For the purpose of protection from natural hazards, the development plan also should indicate protection measures against the natural hazards.

2.7.2 Coastal Aquaculture and Mariculture

The potential area available in the coastal regions of the country for aquaculture is estimated between 1.2 to 1.4 million hectares. Presently, about 157 000 ha area is under shrimp farming with an average production of about 100 000 tonnes of shrimp per year. Andhra Pradesh is the most important State for tiger shrimp (*Penaeus monodon*) farming. In 2002 - 2003, it accounted for 47.1 percent of the total production of farmed shrimp, followed by West Bengal (26.3 percent), Orissa (11.0 percent), Kerala (5.73 percent), Tamil Nadu (5.3 percent) and Karnataka (1.6 percent). The practices adopted by the shrimp farmers range from traditional to improved traditional within the Coastal Regulation Zone (CRZ) and extensive shrimp farming outside the CRZ, with an average productivity of 660 kg per hectare per year. About 91 per cent of the shrimp growers in the country have farm holdings in between 0 to 2 ha, 6 per cent between 2 to 5 ha and the remaining 3 per cent have an area of 5 ha and above. Farmed shrimps contribute about 50 per cent of the total shrimp exports. The State-wise details on potential brackishwater area, area under culture and production as on 31.3.2004 are given in Tables 1 and

Presently, about 280 shrimp hatcheries have been set-up in the coastal States with an installed capacity of 12 475 million seed (Post larvae) per annum. Out of this, as many as 148 are set up in Andhra Pradesh, followed by 73 in Tamil Nadu. As P. *monodon* is the most

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popular farmed species in India, most hatcheries raise tiger shrimp. However, some hatcheries also breed *P. indicus* and freshwater prawn – also known as scampi (*Macrobrachium rosenbergii*). The state–wise details of shrimp/ scampi hatcheries is given in Table 3.

It is estimated that there are about 33 feed mills producing shrimp feed in the country with an installed production capacity of 1 50 000 metric tonnes. Besides, there are a large number of small-scale feed manufacturers, mostly located in Andhra Pradesh. The current feed requirement of the sector is about 1 35 000 metric tonnes. Shrimp farming provides direct employment to about 0.3 million people and ancillary units provides employment to about 0.6 – 0.7 million people.

The Supreme Court's delivered its judgment on shrimp aquaculture in December 1996. The judgment said that that aquaculture is an industry and hence covered by the prohibition in the CRZ Notification, 1991. The Court permitted traditional and improved traditional practices within the CRZ. It further directed that farming practices outside CRZ were to be regulated to ensure that there was no impact on the environment. As setting up of shrimp hatcheries is a permitted activity in the CRZ Notification, 1991, the Court maintained a status quo on the setting up of shrimp hatcheries in its above-referred judgment.

The Aquaculture Authority has been set up under Section 3 (3) of the Environment (Protection) Act, 1986 to perform the functions indicated in the Supreme Court judgment delivered on 11 December 1996. Constituted vide Ministry of Environment and Forests' Notification No SO 88 (E) dated 6 February, 1997, the Authority is functioning under the administrative control of the Government of India in the Ministry of Agriculture, with its headquarters at Chennai. Justice G. Ramanujam, a retired Judge of Madras High Court, heads the Authority, which has seven-member composition.

The Aquaculture Authority is mandated to exercise powers under section 5 of the Environment (Protection) Act, 1986 for issuing directions and for taking measures with respect to matters referred to in clauses (v), (vi), (vii), (viii), (ix) and (xiii) of subsection (2) of Section 3 of the said Act. The Authority is further responsible to ensure that agricultural lands, salt pan lands, mangroves, wet lands, forest lands, land for village common purposes and the land meant for public purposes should not be used (or) converted for construction of shrimp farms and it shall also implement the "Precautionary Principle" and the "Polluter Pays Principle" in sustainable development of coastal shrimp farming activities.

There are few economic activities, which have globally witnessed high growth rates as shrimp farming in a large number of countries, situated both in the eastern and western hemispheres during the last two decades. In India, commercial-scale shrimp culture started gaining roots during the mid-eighties. It was a relatively late start in India; by this time, shrimp farming had reached peak in most of the neighbouring Asian countries, especially China and Taiwan. The boom period of commercial-scale shrimp culture in India started in 1990 and the bust came in 1995-96, with the large-scale outbreak of white spot disease (w.s.d). The fact that some States in India were new to commercial-scale shrimp farming, the general ignorance of good farming practices, and the lack of suitable extension services, led to a host of problems. Presently, the repeated occurrence of w.s.d and the lack of good quality shrimp broodstock are the major constraints faced by the shrimp aquaculture sector.

Sustainable shrimp farming entails issues ranging from farm level management to integration of shrimp farming into coastal area management, shrimp health management and

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policy, socio-economic and legal issues. However, it must be admitted that the days of production-oriented shrimp farming are gone. Present day production has to take note of not only the markets but a host of technical issues as well as the concerns of the environment.

In many areas, shrimp farms have developed in close proximity (in clusters) along the creeks and estuarine watercourses. The Kandaleru creek in Andhra Pradesh is an excellent example of farms set up in large-scale clusters. As sustained development of shrimp culture relies on good-quality source water, over-development of shrimp farms – either through management intensification or increased farm area – along a creek can impact estuarine water quality to levels unacceptable for shrimp farming. This brings to focus the need for investigations on carrying capacity, which will address not only the physical areas of shrimp farms, but also their density and geographical distribution along a watercourse.

Of the many good management practices that are currently in vogue and adopted by the farmers, low stocking densities in grow out ponds have proved to be successful in attaining sustainability. The Aquaculture Authority permits up to 6-nos/ m^2 for farms within the CRZ and up to 10-nos/ m^2 outside the CRZ. Adoption of low stocking densities is one of the key elements of sustainability of shrimp farming in the country.

While production from capture fisheries around the world has stagnated, aquaculture is viewed as a strong option to increase fish production, and play a vital role in providing food and nutritional security. Returns from shrimp farming continue to be rewarding, benefiting small-scale farmers and communities, as well as entrepreneurs engaged in seed production, farming operations or ancillary activities. Sustainable utilisation of available areas and infrastructure can lead to the development of unexploited resources with the potential of generating a large number of jobs and enormous social and economic benefits to the coastal regions of the country. The Committee feels that:

- In many areas, shrimp farms have developed in close proximity (in clusters) along the creeks and estuarine watercourses. Setting up of farms in such areas should be considered after an assessment of the carrying capacity of the open water (or Environment Impact Assessment) and incorporation of remedial measures like common wastewater treatment plants to reduce organic loading in the open waters.

- Potential areas for shrimp aquaculture in the country should be re-assessed through remote sensing. The identified areas should also find a place in the Integrated Coastal Zone Management Plan of the coastal States/ Union Territories to ensure optimal utilisation of the scarce coastal resources and planned and sustained development of the coastal region in future. This would also avoid inter-sectoral conflicts with the other legitimate users of the coastal resources.

- No drawal of groundwater should be permitted for carrying out shrimp farming within or outside the CRZ. The other restrictions imposed by the Supreme Court (example: ban on conversion of agriculture land, use of mangrove forests, etc.) should continue to ensure that shrimp farming is only done in inherently saline and degraded land, which otherwise is unsuitable for any other productive purposes. The latter category should also include such agricultural lands, which are classified as agricultural land in the revenue records, but have been rendered unproductive due to long disuse.

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- Shrimp hatcheries (and also hatcheries for freshwater prawn and fin fishes requiring sea water) should continue to be a permitted activity within the CRZ and there should be no restrictions on their location/ proximity to the waterfront.

- Several illegal aquaculture ponds have come up after reclamation of mangrove lands. Such aquaculture activities should be stopped and action should be initiated with regard to restoration of mangroves.

Mariculture involves rearing of marine forms in the marine environment itself. Generally the habitat chosen for mariculture is the coastal waters, in-shore base, coves, inlets and can be in circumscribed floating cages in the open sea as well. In the recent years, many maritime countries have taken up mariculture in a big way. In India mariculture is still in its infant stages. CMFRI has been carrying out several activities and undertaken research projects for the purpose of pearl oysters, edible oysters, mussels, clams and cockles. Several economically important shell fishers such as lobsters, prawns, crabs, sea cucumber have also been tried and some of them have been successful. Fishes like the pearl spot, mullets, milk fish, eels have been experimented. The Committee feels that mariculture should be promoted so that the local communities are benefitted.

2.7.3 Ports and Harbours

There are twelve major ports and 185 minor ports situated all along the entire coastline of India. The major ports are the autonomous bodies under the Administrative control of the Ministry of Shipping. The Ennore Port, which is under Companies Act. The management of the minor ports vested with the concerned Maritime State Government/Union Territories.

Around 95% of India's foreign trade by volume and 70% by value is being carried out through sea transportation, where ports is being carried out through sea transportation. Such a transfer of cargoes require necessary infrastructure facilities such as Jetties, Berths, SBM, Cruise terminal, etc. Similarly, for the efficient port operation, the cargoes are to be transferred to the land, for which on land transport system such as railways, roads, pipelines and adequate transit storage facilities are to be necessarily created within the ports of shipping industry require facilities like dry docking, slipways, bunkering, ship building, etc. which are also to be necessarily created in the port area.

The Chennai, Ennore, Tuticorin, Paradip ports are situated along the coast on artificial harbours, whereas ports like Cochin is situated in the backwaters with reclaimed land. Kandla is in creek/estuary, Kolkata/Haldia are Riverine ports and Jawaharlal Nehru Port has been developed as an offshore port. With the natural site conditions, implementation of the Coastal Regulation Zone Regulation and the conditions being stipulated by the Ministry of Environment & Forests for various projects at the time of its clearance widely vary from port to port. Ports are not only an one time fixed infrastructure for transfer of the cargo from the shop to shore or from shore to ship, but it also require the backup area on the land side (which incidentally falls within the Coastal Regulation Zone) which is very crucial considering the required development for the port related activities, like port based industries, processing units, container freight stations, container yards, storage sheds, POL storage facilities, SEZs, petrol pumps, service centres, recreational facilities, etc. Ports are to serve for a long period and have to consider all the development in the subsequent years.

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The minor ports handled about 115 Million MT during 2003-2004. As per the Tenth Plan document for port sector, projection of 415 Million Tonnes have been made for all the major ports by the terminal year 2006-07. A number of development projects have been identified during Tenth Plan period with a total investments of around Rs.16,000 crores and the targeted capacity to be created will be around 470 Million Tonnes. In addition, the Minor Ports are poised to handle around 150 million MT by the end of Tenth Five Year Plan.

In addition there are engineering structures to protect the ports, harbours, intake structures, inlets and entrance channels (breakwaters).

2.7.4 Coastal Protection Structures

The Indian coastline is marked with a variety of geomorphological features, namely tidal flats off the Gujarat coast, flat beaches off Goa and a few regions off Maharashtra and Karnataka, mud banks off the Kerala coast, presence of the large number of outcrops particularly, off the Tamil Nadu coast on the western coast, the Southern tip of the Indian peninsula, the culmination of India, Arabian Sea and Bay of Bengal, although the wave activity is severe, the sediment movement in this stretch is not significant. The west coast is exposed to the wave activity being seasonal, net "Littoral drift" or the sediment transport is quite varied. There are pockets of net drift towards North, pockets of nil net littoral drift as well as pockets of net drift towards the South.

In the east coast, the seabed is generally steep, frequently exposed to cyclones, so the wave activity is seasonal. The net drift is to an extent of about 1 X 106 m3/annum. This quantity of sediment transport focused towards one direction is probably the larges in the world, which indeed is a challenging task to Coastal Engineers, planners and managers.

The general problems along the Indian coast are:

- Silting up of entrance channels
- Closing of river mouths
- Problems concerning aquaculture
- Silting up of intake structure
- Inundation into land
- Sand bar formation near mouths of inlets, rivers and estuaries
- Erosion of the coast.

Of all these problems, coastal erosion is a major concern, while other problems being equally important to be addressed. Coastal protection need to be given top priority as this is extremely important even for the fixing of the High Tide Line. Any structure (hard measure) should be considered only if soft measure is not possible. The agency considering the hard measure, particularly groins or breakwaters should be made responsible for protecting the shoreline at least 500 m on either side of the shoreline from erosion. In case of breakwaters for harbours, the stretch of the shoreline to be considered for protection should be atleast 1 km on either side of the structure. The agency responsible for the construction of the said structures should be made responsible for the monitoring of the shoreline for a minimum period of one year so as to cover the seasonal variation in the wave climate, which dictates its dynamics.

Similarly, within the said distance, if rivers, inlets or any water course is blocked by sand bar formation on its up drift side due to the construction of barriers jetting into the sea,

suitable control measures are to be incorporated in the planning state of the project. Here again, the agency responsible for the construction of the said structures should be made responsible for the monitoring f the shoreline for a minimum period of one year.

At locations, where shoreline advances towards the ocean, construction of huts, houses to be banned (strict enforcement absolutely essential).

The construction sequence as per the season is extremely important. This should be spelt out clearly prior to obtaining the necessary clearance/sanction from the appropriate authority/body.

The sizes of the stones usually adopted for the construction of seawalls, groins or breakwaters are arrived at using empirical formulae. If the weight of the individual stones adopted for construction is underestimated, this would result in the scattering of such stones all over the seafloor resulting in several other problems (typical examples are the seawalls along Royapuram in Tamil Nadu, North of Paradip port, a long stretch of the coast of Karnataka and few other locations). Verification of the stability of the cover layer of these structures in Laboratories (CWPRS, IIT Madras, NIT Karnataka, IHH Poondi are some of the Institutes that carry out such studies) should be made mandatory prior to the commencement of such projects.

2.7.5 Settlements (including cities)

It is estimated nearly one quarter of the Indian population is living along the coastal area. This population is likely to grow in coming years. The settlement along the coast includes large metropolitan cities towns, census towns etc. The majority of the coastline has a settlement, which are of rural nature inhabitant by fisherman, agricultural, cottage industries etc. The shoreline real estate is in strong demand for human settlement agriculture trade industry amenity and marine support activities for shipping, fishing and recreation. While the waterfront expansion may be necessary or the coastal cities it may jeopardize costal resources. The sewage let out from these major cities and towns are the major source of pollution of coastal waters. Expansion of townships and cities has put certain ecosystems such as mangroves, salt marshes, and mudflats under pressure. The settlements of local communities have to be protected against natural calamities. The coastal areas of some of the major coastal cities are also place where several unplanned constructions have cropped up such as the slums. These slums are located mostly in the seafront. The unhygienic conditions of such slums and the adverse environmental impact caused by these slums are a matter of concern which the Ministry has to address and take action in a time bound manner in order to provide decent housing and living conditions for all communities living along the coast.

2.7.6 Tourism

It is universally accepted that the tourism industry is an infrastructure industry, an economic driver and is an intrinsic part of the development of a region. It is the country's largest employment generator and foreign exchange earner. The Ministry of Tourism aims to increase foreign tourist arrivals from the present level of 2.8 million to 5.0 million. Coastal states are unable to tap this great economic potential to their advantage. Due to the high aesthetic value of the coast there is an enormous potential for tourism development. High capital investments in various sectors like beach resorts, location of industrial complexes, human settlements are being planned in the coastal zone for the economic development of the

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country. The Tourism in the coastal areas of India has been on a high growth curve during the last few years and particularly during the last two years i.e., 2003-2004 and 2004-2005 .The foreign tourist arrivals to places like Kerala and Goa have been booming to unprecedented levels, showing a growth of 25 to 30% every year. These coastal states are the most sought after by foreign tourists. At the same time there is a very high demand for such beach tourism among the domestic tourists also. Particularly in Goa a large number of charter flights are landing every week bringing foreign tourists to the state.

Kerala is also developing new beach resorts in Bekal area and Maharashtra is developing the coastal area of Sindhu Durg for tourism. Similar developments are also taking place in coastal areas of other states, like Tamil Nadu, Andhara Pradesh and Orissa.

It is expected that there will be 20% plus growth in tourism in all the developed coastal areas and beach resorts during the next five years. There is already a shortage of hotel rooms in many such areas, particularly in Kerala and Goa. It is expected that there will be high demand for new construction of hotels in the coastal areas during the next five years, particularly during the next three years. State governments will also be taking action in extending the areas of existing developments and looking for new sights

2.7.7 Infrastructure for National Security

Extensive security interests exist in the coastal zone and the coastal seas because they are the frontiers where invasion and other anti-national activities like smuggling might occur. Naval ports and harbours, coastal airfields, and special bases of all kinds are sited in the coastal zone, usually with high priority and intense security.

2.8.0 Natural Hazards

Storms, cyclones, tidal surges, flooding, erosion etc. bring about large scale destruction of life, property and natural resources in the coastal regions of the country every year. In Bay of Bengal, storm surges attain heights of several meters, causing severe devastation. The 1999 "Super Cyclone" which devastated the Orissa coast was one of the severest to hit Indian coasts. In addition, heavy monsoonal rainfall and the swelling up of river discharge augment the coastal floods. The result is that water piles up along the low lying coast as a surge flooding vast areas and causing loss of life and damage to property. The country has been experiencing loss of resources and degradation of coastal ecosystems as a result of changes in the shoreline due to erosion

However, the intensity of natural hazards such as storms, cyclones, tides, waves etc are not felt to the same extent along the inland tidal water bodies as they do along the coast facing the sea. Tides, tidal currents and river discharge are the main physical processes in the inland tidal water bodies.

2.8.1 Coastal Erosion

Coastal erosion is a common problem in many parts of the country. The causes of beach erosion are either natural or man-made. Sometimes, it is a combination of both. While the former is a relentless process which is often impossible to resist, the latter is often due to man's ill-planned activities and can certainly be contained, or even reversed. Coastal erosion in one area may lead to accretion in another area, which is a transient phenomenon. The cause

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of erosion and accretion can be due to natural and/or anthropogenic activities (See Table below).

No.	Nature	Man Made
1.	Rise in sea level	Dams, dykes and other coastal structures causing rise and concentration of tides.
2.	Protruding head lands, Reefs, Rocks causing erosion on the down drift side	Groins, Breakwaters or jetties causing erosion on the down drift side.
3.	Tidal entrances & river mouths causing interruption of littoral drift	Manmade entrances causing interruption of littoral drift
4.	Shoreline geometry causing rapid increase of drift quantity	Fills protruding in the ocean to an extent that they change local shoreline geometry radically. Such fills are often bulk headed.
5.	Removal of beach material by wind drift	Removal of material from Beaches for construction and other purposes.
6.	Removal of beach material by sudden outbursts of flood water.	Digging or dredging of new inlets, channels and entrances. Offshore dumping of materials.

Erosion due to natural phenomena: The combined action of different processes on the coastline like waves and tides maintain the stability of the shoreline. If, for any reason, the sediment supply to a section of beach is reduced due to littoral drift/sea level rise or constant impact of waves, it can cause severe erosion. Even cliffs can get undermined at their base and slumped.

River deltas are especially prone to dramatic changes. Shift in the course of rivers leads to changes in the sediment supply. Tributaries are abandoned as the river shifts its course. The abandoned delta lobes, having lost their sediment supply, erode as a result of wave action and tidal flow. New deltas are created and protrude into the sea when there is sufficient sediment supply.

Catastrophic events like severe storms, tidal surges and cyclones cause the sea level to rise to abnormal heights and cause severe erosion.

Man-induced erosion

Coastal activities can also directly or indirectly result in beach erosion. The following are some examples:

(i) Dams on rivers reduce or arrest the river-borne sediment supply to the sea, upset the sediment budget and can, in some cases, deprive the beach of its normal source of sand.

(ii) Harbours often have shore-perpendicular/inclined solid quays and breakwaters, which obstruct the longshore transport of sand and cause accretion on the updrift side, and erosion downdrift.

(iii) Sand removal above replinishable quantities from the coast upsets the longshore sand transport budget and can result in erosion downdrift.

(iv) Groins and jetties and other structures on the coast/shoreline interfere with longshore sand transport and can result in erosion when these are ill-designed.

(v) Artificial inlets, when they are very narrow can often have high current velocities which prevent long shore sand transfer from one side to the other, resulting in erosion.

(vi) Seawalls, bulkheads and breakwaters, which are shore protective structures, have side effects in terms of erosion of adjacent areas.

Precautions against erosion: The three nature friendly options are 'do nothing', 'retreat' and 'supply sediment' to the affected area. Removing the causes for coastal erosion is another method. There are other technological options available to control/prevent erosion. One of the most practised methods is to construct seawalls on the eroding coast. Over a period, it has been concluded that there is more harm done to the coast by these seawalls, since they disturb natural sediment budget, which leads to erosion in adjacent coastal area. Soft engineering measures such as coastal vegetation, beach nourishment, etc. are preferred for coastal protection. Setback limits are fixed in coastal areas so as to prevent major developments coming up in the eroding zone and reduce the impact of erosion. The location of these lines is based on scientific criterion taking into account the extent and nature of beach erosion.

The purpose of the establishment of setback lines is two-fold. In the first place, they are intended to ensure that beach erosion is not triggered or worsened as a result of coastal construction activity, which interferes with beach processes. However, this may not always be possible or successful. For example, the location of a harbour or an artificial inlet is often determined by economic or physical needs, rather than by the consideration of erosion. The consequences have to be managed if it is decided to carry out construction activity beyond the limits. In the second place, perhaps the primary objective is to protect buildings and investments, e.g. housing, roads or plantations, by locating them away from the zone of probable worst-case erosion.

2.8.2 Cyclones and Storm Surges

Concerned State Government/UT has to identify the coastal areas, which are prone to cyclone and storm surges. Though it may not be possible to relocate the people and property from such areas, the Governments ought to take up measures to minimise the risk by installation of early warning systems/alarms, communication systems, cyclone shelters, early evacuation measures and movement of relief measures to the affected.

2.8.3 Flooding

Flooding due to cyclones, storm surges etc: Coastal storms can be devastating because of their sheer speed and effects on coastal water level. Onshore winds and atmospheric pressure fluctuations combined with wave effects create storm surges. The magnitude of a storm surge at a given point depends on wind vectors, shoaling depth gradients and coastal configuration. In semi-enclosed seas like the Bay of Bengal, storm surges may attain heights of several metres. Surges plus high waves penetrate considerable distance inland, especially on low-lying coasts like mudflats and deltas. Heavy loss of lives and damage to properties usually accompany storm surges. Salt intrusion and ground water

contamination are also part of storm surge damage. With the present technology and information, the occurrence of cyclones can be predicted but it would be still difficult to pinpoint the exact nature and magnitude of the hazard that would occur in the coastal area. Sometimes the magnitude of the cyclone is so large that it brings about devastation not only in the coastal districts but also well interior into the hinterlands. Even the most developed countries with sophisticated early warning systems suffer huge loss of property and lives in the coastal areas due to flooding caused by hurricanes, typhoons, tidal waves, tsunamis and storm surges.

Flooding due to river discharge in inland tidal water bodies (still water flooding): Banks of water bodies get flooded due to rise of water level as a result of precipitation and river discharge. This rise in the water level without the influence of wind leads to water logging in the adjacent areas. Data is available in historical records with the Central Water Commission/ irrigation departments and these flood lines are also depicted in the topo sheets for certain areas. This flood line if demarcated shall also include the unforeseen rise of water due to man's intervention.

2.8.4 Sea level rise due to Greenhouse effect

Sea level rise is one of the major factors influencing coastal erosion. As the sea level rises low lying areas will be inundated, the reach of active marine forces like the waves will be raised relative to the land surface, which will lead to coastal erosion and drowning of estuaries. Recent estimates of global sea level rise vary from a high scenario of one metre to a low scenario of 15 cm during the next century.

2.8.5 Salt Water Intrusion

Many coastal communities rely on potable ground water for requirements of water. Often it is the only reliable source, seawater not being potable without expensive desalination. Both fresh and salt water seep into the coastal terrain; the fresh water, being less dense, overrides the salt water often forming a shallow lens between the recharge and the discharge zones. In these shallow, unconfined aquifers, permeability is often very high, due to porous or even cavernous sediments, and consequently the through flow (transmissibility) is rapid. Thus natural fluctuations in the in the freshwater head, often due to seasonal factors., can have a marked effect on the position of the saltwater-freshwater interface. Several processes disturb this relationship. Perhaps the most common is the abstraction of ground water by pumping. Lowering of the freshwater head encourages the incursion of salt water, which can rapidly render the supply undrinkable. Removal or lowering of coastal dunes has similar effect. Dunes act both as recharge zones and as support for an elevated water table. Draining of coastal wetlands, and cutting or dredging of coastal navigation channels may breach the brackish interfacial zone often leading to increase in salinity. The projected rises of world sea level in the next century may also lead to severe salt intrusion problems. The shallow coastal aquifer is liable to pollution. Coastal ground water extraction may lead to subsidence. Siting wells and boreholes further inland is not a long-term solution and alternative supplies may have to be provided.

2.8.6 Tsunami

The devastating earthquake of magnitude 9 occurred off the west coast of northern Sumatra which lies in the Andaman-Nicobar Island are on December 26, 2004 at 06:28:50

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IST. This earthquake has generated tsunami which travelled crossing the boundaries of Sumatra and reached the entire Bay of Bengal rim, Indian Ocean islands, west coast of India and African coast.

The Andaman - Nicobar Arc in the Bay of Bengal is a zone of frequent earthquakes. The earthquake is generated by the subduction of the Indo-Australian plate under the Asian (Burma) plate below the Andaman archipelago. It is known to the scientific community that all under-sea earthquakes do not generate tsunamis. Only those earthquakes with a maximum intensity and right characteristics generate tsunami. The tsunami waves generated at the earthquake site off Sumatra travelled in all directions.

As per the known scientific information, the tsunami waves travel at a speed of more than 700 km in deep sea. The tsunami waves have a very long wave length of more than 750 km and a very short crest of height often less than 1m. Hence in the deep sea areas, the ships and other ocean vessels do not even notice them. These waves slow down when they enter continental shelf areas due to which the wave length decreases and the crest starts peaking up. Very near to the shore line, the crest takes the shape of a wall and enters the coast. It is reported that during the present tsunami the height of the crest near the shore reached around 10 meters in the east coast and 5 meters in the Kerala coast. There was a general belief that the waves will not reach the shadow zone. But in the present instance the waves reached the shadow zone (e.g. Kerala), which is believed to be due to processes such as wave diffraction and reflection.

It has been observed that the tsunami waves reached the coast unawares. In the directly exposed coasts, they approached as waves, which broke at different points in the shelf and finally entered the land. But in the shadow zones, enclosed bay areas, deep sea islands without a shelf (eg. Maldives & Lakshadweep), they were felt as sudden increase in the water level at the coast. Once the waves entered the land, they generated a flood flow. The affected areas were submerged and the high speed and turbulence of the flow uprooted houses and trees in addition to throwing away of the floating objects. In those coasts where the land was sloping towards the sea, the entire water returned to the sea with tremendous force, carrying whatever was uprooted.

The Andaman- Sumatra section of subduction zone had produced many large and destructive earthquakes in the past some of which also generated destructive tsunamis. The M8.7 earthquake of 1833 is reported to have ruptured about 550 Km segment of this arc southeast of the current source; it also generated a tsunami. Another great earthquake of 1861 (M8.5) broke a segment north of the Equator, also triggering tsunami. 1833 and 1861 earthquakes and the attendant tsunamis occurred before the introduction of harbour tide gauges data for these events. However, there are better documents of tsunamis due to earthquake s of 31 December 1881 and 26 June 1941, both of which caused a run-up in the eastern coast of India. The 1941 earthquake occurred during the Japanese occupation of the Andaman islands. It appears to have ruptured the region near the Andaman Islands. There are anecdotal accounts of 3,000 deaths from the eastern coast, resulting from a tsunami associated with this earthquake.

Historically an earlier earthquake appears to have occurred in the Andaman Islands on 28 January 1679, with its felt area similar to the 1941 north Andaman event. This earthquake may have also generated tsunami, which was probably not properly documented.

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In the context of CRZ provisions, during the present episode of tsunami in the Indian coast, the following preliminary observations are made:

a) The maximum damage has occurred in low lying areas near the coast.
b) High causalities are found in most thickly populated areas.
c) The mangroves, forests, sand dunes and coastal cliffs provided the best natural barriers against the tsunami.
d) Heavy damage is reported in areas where sand dunes were heavily mined (eg. Nagapatinam & Kolachal) and where coastal vegetation was less.

The buffer provided in the Coastal Zone and our approaches for conservation of mangroves/sand dunes/coral reefs/coastal forests were all put to test during this event and were found to be reasonably effective even in calamities of this magnitude. This leads us to the necessity for effective mechanism to correct our approaches and to incorporate vulnerability indices in the management practices of the coastal zone.

2.9.0 Coastal Pollution

The major activities that are responsible for coastal pollution in India are discharge and disposal of untreated domestic and industrial wastes, discharges of coolant waters, harbour activities such as dredging, cargo handling, dumping of ship wastes, spilling of cargo's chemicals and metal ores, oil transport, fishing activities, etc. The mechanised fishing activities such as draining of waste oil, painting of fishing vessels, scrapping of metal linings of fishing boats, dumping of waste and trash fishes, etc. The oil transport, oil exploration and oil refining activities, ship breaking, recreation and tourism activities, salt production, etc. also create concern in the coastal pollution sector.

Domestic wastes are discharged mostly in untreated conditions due to lack of treatment facilities in most of the cities and towns. It has been estimated that approximately, 5,060 km mld reach the coastal waters of the country (Table below).

Table: State & Union Territory-wise Wastewater Generation, Treatment and Disposal in Cities and Towns along the Coast (source: CPCB).

State	No. of Cities/ Towns	Wastewater Generated (MLD)	Treatment Facility Available (MLD)	Untreated Wastewater Disposed (MLD).
Andhra Pradesh	8	203.90	0.00	203.90
Goa	3	17.00	38.50	0.00
Gujarat	13	329.06	76.00	253.06
Karnataka	3	72.00	27.50	44.50
Kerala	19	326.45	27.50	298.95
Maharashtra	6	2,508.6	126.00	2,382.64
Orissa	4	114.90	0.00	114.90
Tamil Nadu	12	488.02	226.01	262.02
West Bengal	6	1,466.0	0.00	1,466.08
Andaman & Nicobar Islands	1	6.00	0.00	6.00
Pondicherry	2	28.94	0.00	28.94
Total	**77**	**5,560.90**	**521.51**	**5,060.68**

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India is one of the largest industrialized nations in the world. Major industrial cities and towns of the country such as Surat, Bombay, Cochin, Madras, Vishakapatnam and Calcutta are situated on or near the coastline. The estimated total quantity of waste discharged by about 308 large and medium industries is estimated to be approximately 1.35 million cu. metres per day as per the Central Pollution Control Board.

There have been cases of accidental spillages and leaks from the offshore and on shore oil installations leading to pollution of coastal areas and waters of the country. The responsibility for the prevention of pollution is shared by the Coastal States and the Central Government. The pollution control boards of the maritime States/Union Territories work in close coordination with the Central Government's Ministry of Surface Transport (MoST) through the Indian Merchant Shipping Act(1958) (for control of pollution from and offshore platforms in the EEZ), and the Indian Ports Act (1963); the Ministry of Petroleum and Natural Gas (MPNG) (concerning pollution oil platforms and structures); and the Ministry of Environment and Forests'(MEF) Water (Prevention and Control Pollution) Act (1974) ,Environmental (Protection) Act 1986, and Coastal Regulation Zone Notification 1991,(for the control of pollution arising from land-based sources in the sea).

In 1996, the Coast Guard formulated National Oil Spill Disaster Contingency Plan (NOS-DCP). This lays down a series of actions to be taken in the event of a major disaster. It also contains standard formats for reporting spills as well as forwarding data on equipment holding in the country. It maintains oil pollution response equipment and chemicals.

But there is a need to strengthen the infrastructure of Pollution Control Boards and Coast Guards in the area of surveillance, monitoring and immediate response action for mitigating spills and accidental discharges into the water.

The quantity of waste water discharged by aquaculture farms is 10-12 MLD. Pesticides and fertilizers used in agriculture also find its way into the coastal waters. Government of India formulated comprehensive policy statement for abatement of pollution. The policy aims at prevention of pollution at source, apply the best available technology, implementation of the principle of 'polluter pays' policy, emphasis on protection of heavily polluted areas and river stretches, involvement of the public in decision making.

Control measures taken in the country at the present are providing treatment facilities for municipal sewage, providing effective treatment facilities for industries, development and implementation of industry specific effluent standards and primary criteria for coastal water quality, identification of 17 categories of highly polluting industries and CREP programme adopted for effective implementation, National River Action Plans, industrial zoning, implementation of effluent treatment system for aquaculture, implementation of National Oil Spill Disaster Contingency Plan, enactment of environmental laws and Acts and its implementation.

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CHAPTER-3

3.0 COASTAL REGULATION ZONE NOTIFICATION - REVISITED

3.1 Background

As per Allocation of Business Rules framed by the work allotted to the Ministry of Environment and Forests includes "Environment and Ecology, including Environment in Coastal Waters, in mangroves and coral reefs but excluding marine environment on the high seas". The Ministry of Environment and Forests is responsible for framing legislations and implementing measures for protecting and conserving the environment of the country including the marine environment upto EEZ. For the purpose of protecting and conserving the environment the Environment (Protection) Act 1986, (EPA) umbrella legislation has been enacted.

Under EPA, Ministry of Environment & Forests has issued various Notifications for control of pollution and conservation of environmentally sensitive areas. Keeping in view, the fact that multifarious activities in coastal zone has resulted in over exploitation of marine and coastal resources and marked degradation of the quality of coastal habitats and environments, the Coastal Regulation Zone Notification has been issued on 19th February, 1991 under the provisions of the Environment (Protection) Act, 1986.

Origin of Coastal Regulation Zone Notification

In 1981, the then Prime Minister wrote to the Chief Ministers of all the coastal States directing them to keep clear of all activities upto 500 metres from the water at the maximum high tide along the coast. In the wake of this direction, the then Department of Environment set up a Working Group on "Environmental Guidelines for Development of Beaches." This Working Group was to address issues relating to land/marine interact eco-system and to prepare guidelines for environmental management of beaches. It comprised experts in Pollution Control, Town and Country Planning, Tourism, Oceanography, Ecology and Human Settlement. The report of the Working Group submitted in June, 1983 was prepared after a scientific study taking into account the coastal and marine environment, natural hazards, socio-economic problems and developmental activities.

These guidelines were prepared in consultation with the coastal States and Union Territories. These guidelines also suggested that construction along the coast, irrespective of their location, i.e., even beyond 500 metres of the high tide mark, should be subjected to environmental impact assessment studies. These guidelines were circulated to all coastal States and Union Territories in March, 1984. However, at that time, none of the States or Union Territories prepared Environmental Management Plans for coastal areas as suggested by the Department of Environment.

As neither the Prime Minister's directive nor the guidelines issued by the then Department of Environment were followed by the State Governments, the Ministry of Environment and Forests issued a notification under the Environment (Protection) Act, 1986 regulating developmental activities in the coastal area.

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Issue of Coastal Regulation Zone (CRZ) Notification, 1991

Keeping in view the degradation of the coastal environment and rampant construction activities along the coastal areas, MoEF issued a draft CRZ Notification twice inviting suggestions and objections from the public on June 27, 1990 and 18th December, 1990. Based on the suggestions and objections received, the Ministry issued the CRZ Notification declaring coastal stretches as Coastal Regulation Zone (CRZ) and regulating activities in the CRZ. As per this, the CRZ area is defined as coastal stretches of seas, bays, estuaries, creeks, rivers and backwaters which are influenced by tidal action (in the landward side). As per the notification 500 metres on the landward side from the High Tide Line (HTL) and the land area between the Low Tide Line (LTL) and HTL including 500 metres along the tidal influenced water bodies subject to a minimum of 100 m on the width of the water body, whichever is less is declared as CRZ area. Based on the ecological sensitivity, geomorphological feature and demographic distribution, the CRZ area is classified into four categories namely, CRZ-I (sensitive and inter tidal), CRZ- II (urban or developed), CRZ-III (rural or undeveloped), CRZ-IV (Andaman & Nicobar and Lakshadweep Islands).

3.1.1 Prohibited and Permissible Activity

The Notification regulates developmental activities in the CRZ area by prohibiting certain activities and permitting the essential activities. The prohibited activities include setting up of new industries and expansion of existing industries, manufacture or handling or storage and handling of hazardous substances (except specified petroleum products in port areas), fish processing units, disposal of wastes and effluents, mining of sands, rocks and other rare minerals and mechanized drawal of ground water. The permissible activities include those activities that require water front and foreshore facilities such as construction activities related to defence requirements for which foreshore facilities are essential (e.g. slipways, jetties, etc.), operational constructions for ports and harbours and construction of hotels and resorts in specified areas.

3.1.2 Amendments to the CRZ Notification

The Ministry of Environment and Forests has been receiving proposals from the coastal States/Central Ministries, industry associations, local communities and NGOs requesting for amendment to CRZ notification on certain specific issues. The Ministry after examining the proposals had constituted Committees to examine the specific issues. Based on the recommendations of the Committee/request made by the various agencies the Ministry had amended the CRZ Notification, 1991 as per the provisions laid down in the Environment (Protection) Act, 1986. Some of the amendments constituted to look into specific issues are:

- S.O.595(E), dated 18th August, 1994 – Relaxed Coastal Regulation Zone area to 50 mts along the tidal influenced water bodies. This was based on B. B. Vohra Committees report. However, the Supreme Court in the Writ Petition 664 of 1993 quashed the above amendment.
- S.O.73(E), dated 31st January, 1997 – Permitted mining of sand and drawal of groundwater in the Coastal Regulation Zone area in Andaman and Nicobar.
- S.O.494(E), dated 9th July, 1997 – Permitted reclamation within port limits, constructions for operation expansion and modernization of ports. Development of public utilities within Sunderbans areas and storage of 13 POL products within port limits.

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- S.O.730(E), dated 4th August, 2000 – Permitted storage of LNG in the inter-tidal area and exploration and extraction of oil and gas in Coastal Regulation Zone areas
- S.O.329(E), dated 12th April, 2001 – Permitting setting up of projects and Department of Atomic Energy, Pipelines and conveying systems in Coastal Regulation Zone areas.
- S.O.550 (E), dated 21st May, 2002 – Permitted non polluting industries in the field of IT and other service industries in the Coastal Regulation Zone area of special economic zones. Housing schemes of State Urban development Authorities initiated prior to 19.2.1991was also permitted.
- S.O.110(E), dated 19th October, 2002 – Permitted non conventional energy facilities, desalination plans, air strips in Coastal Regulation Zone of A&N and a Lakshadweep. Storage of non-hazardous cargo such as edible oil, fertilizer and food grain was also permitted.
- S.O.460(E), dated 22nd April, 2003 – Project costing more than 5 crores requires clearance from Ministry of Environment and Forests.
- S.O.636(E), dated 30th May, 2003 – Permitted construction of embarkation facilities for Lakshadweep in Coastal Regulation Zone –I areas.
- S.O.725(E), dated 24th June, 2003 – Permitted construction of trans-harbour sea links passing through Coastal Regulation Zone –I areas.
- S.O.838(E), dated 24th July, 2003 – Relaxed No Development Zone to 50 mts from 200 mts from HTL in A&N and Lakshadweep for promoting tourism based on Integrated Coastal Zone Management study.

Based on the reports of the above committees and the requests made by Central Ministries, State Governments and NGOs, the Ministry had from time to time carried out amendments to the CRZ Notification.

3.2.0 Working of the CRZ Notification

3.2.1 Efforts by the Ministry and the Courts

Neither the Ministry nor the State Governments had taken serious note of the CRZ Notification. A Writ Petition was filed in the Supreme Court in 1993 by Enviro Legal Action Group Vs. Union of India regarding non-implementation of CRZ Notification, 1991. The Supreme Court in its order in April, 1996 directed the State Governments of coastal States and UT Administration to prepare the Coastal Zone Management Plans (CZMPs) and get them approved from the Ministry within 3 months. The CZMPs submitted by the State Governments/UTs were accorded approval by the Ministry of Environment and Forests on 27th September, 1996, subject to the incorporation of some general conditions and other conditions specific to each coastal State/Union Territory. Each of the coastal States/UTs were required to prepare the revised CZMPs incorporating the suggestions and modifications which are still pending.

For preparing the CZMPs, demarcation of the HTL/LTL is required to be carried out in the Coastal Regulation Zone area. For this purpose, the Ministry has authorized seven institutes for demarcating. Guidelines have also been issued for demarcating HTL and LTL.

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Those projects, which are permissible as per the provisions of the CRZ Notification are examined and environmental clearance procedure similar to that under EIA Notification is followed for approval of such projects.

3.2.2 Enforcement and monitoring of Coastal Regulation Zone Notification

The Coastal Zone Management Authorities (CZMAs) are responsible for enforcement and monitoring of the CRZ notification and the CZMPs. For taking punitive action against the violations Section 5 of Environment (Protection) Act, 1986, powers have also been delegated to the Authorities.

3.2.3 Positive aspects of the CRZ Notification, 1991

The CRZ Notification has created awareness among the decision makers and the people regarding the importance of the coastal environment. The Notification has been responsible in maintaining *status quo* by not permitting major developmental activities along the coast. It has established the traditional rights of fishing community. It emphasized the need for planned development of the coast. By disallowing polluting industries and controlling effluent/sewage disposal, the stage has been set for the control of pollution of the coastal areas. Protection of life and property from natural hazards such as erosion, flooding, sea level rise etc., has been largely ensured. All these measures will have positive impact on fisheries, which will ensure the economic development, fisherman community in particular and the coastal areas in general. The protected coastal environment has envisaged in the CRZ is expected to enhance the tourism potential of the coast.

3.2.4 Violations of the Notification

The violations of the CRZ area include destruction of CRZ-I areas such as mangroves, coral reefs, breeding sites of endangered species, etc., Illegal constructions coming up in No Development Zones of CRZ-III, construction in CRZ-II areas without adhering to the norms laid down in the Notification and constructions within CRZ-I areas are some of the major violations of the Notification. The State Governments have insufficient infrastructures facilities to take action against such violations. Further there is lack of will of the concerned and inadequate enforcement machinery. This is one of the reasons for the high number of Cases pending in various Courts in the States and Supreme Court.

3.2.5 Constraints/Problems

The precautionary principle approach of the Notification, which lays down uniform regulations for the diverse coastal environment, is one of the major constraint areas for implementation of the notification. This is the reason why the Ministry has been, time and again constituting expert committees with eminent scientist to address some of the problem areas and carrying out amendments based on the recommendations of the reports. Some of the constraints faced by the implementing agencies include ambiguities and lack of clarity of terminologies existing in the Notification. Further, the Notification is badly structured. A common man cannot easily understand the Notification hence he is put into great difficulties even for undertaking a small dwelling unit.

There had been lack of agreement on satisfactory definition of the coastal zone. It has been criticized that the CRZ lacks a scientific approach. The State Governments and

development agencies complaint that the notification is too restrictive in nature and lacks statements on the objectives expected to be achieved. Though, there is enormous private investment in coastal area the notification treats it as a common property resource. The Notification does not provide information sufficient for take decisions and there is no motivation for conservation of the ecosystems. Lack of awareness, lack of enforcement, lack of funding and attitudinal problems are enlisted as some of the reasons for the difficulties in implementing the CRZ notification.

3.3.0 Issues raised by Governments with regard to Coastal Regulation Zone Notification

3.3.1 General issues

Due to various constraints faced by the implementing agencies, which include the State Governments and the State Coastal Zone Management Authorities, the Ministry has been providing clarifications and amendments to the Notification from time to time. However, there are several areas, which have not been addressed adequately by the Central Government even after a decade of issuing the CRZ Notification, 1991. The critical issues include the demarcation of High Tide Line, permission for constructions of dwelling units for local communities, etc. Most of the States have expressed their inability to implement the Notification, since they lack adequate infrastructure including funding mechanism. Lack of maps indicating CRZ-I, II, III and IV areas in the implementing scales, which is 1:4,000 is also attributed for not implementing the Notification. Some of the States where there is tremendous pressure due to increasing urbanization faces rampant violations of the Notification.

3.3.2 Mechanism and Funding

As per the Supreme Court's Order in W.P. No.664 of 1993, the Ministry has constituted the NCZMA and State CZMA for enforcement and monitoring of the CRZ Notification. These Authorities have been delegated powers under Section 5 of the Environment (Protection) Act, 1986 for taking punitive action against the violations. Further, the State Environment Departments, which also are responsible for enforcing the Notification.

No funding mechanism is available under the Notification for undertaking pro-active role by the State Governments in preservation and conservation of the coastal area. In most of the cases, the State Governments have to depend upon the internal finance available, which is highly inadequate. It is seen that in some States scrutiny fee is being levied while assessing the development project. However, there is no information available with regard to utilization of such funds.

3.4.0 Issues pertaining to Economic Development

3.4.1 General

The developing country like India is experiencing increased economic activity due to changing economic policies. The economic activities, which include infrastructure development such as port and harbours, road networks, special economic zones etc., are

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located along the coastal stretches since the port and harbours are corridors for economic activity.

Many of the economic activities are site specific such as mining of rare earth minerals, setting up of coastal tourism facilities, ports and harbours, fishing activities, etc. Most of the developmental activities in the mainland directly or indirectly depend upon the infrastructure available along the coastal areas. Due to the stringent provisions of the CRZ notification several economic activities are affected. Under the CRZ Notification about 67 activities are listed. These developmental activities can be carried out based on the norms provided in the CRZ notification and the Coastal Zone Management Plans of the concerned States/UTs. The table below summarizes the various activities that can be taken up in the Coastal Regulation Zone area and the locations where they can be set up based on the category of the Coastal Regulation Zone is given below.

Sl. No.	Activities	CRZ-I (i)	CRZ-I (ii)	CRZ-II	CRZ-III (HTL-200)	CRZ-III (200-500)	CRZ-IV
1.	Agriculture	X	✓	✓	✓	✓	✓
2.	Airstrips	X	X	X	X	X	✓ (Lak)
3.	Ash from TPS	X	X	X	X	X	X
4.	Blasting Underwater	X	X	X	X	X	X
5.	Bridges	X	✓	✓	✓	✓	✓
6.	Complex commercial	X	X	✓	X	X	X
7.	Control erosion	X	✓	✓	✓	✓	✓
8.	Conveying systems	✓	✓	✓	✓	✓	✓
9.	Demolition/reconstruction of archaeological, heritage, public structures	X	X	✓	X	X	X
10.	Dispensaries	✓ (SB)	X	✓	✓	X	X
11.	Drainage	X	X	✓	✓	✓	✓
12.	Drains storm water	X	X	✓	✓	✓	✓
13.	Drawal groundwater	X	X	✓	X	✓	✓
14.	Drying fish	X	X	✓	✓	✓	✓
15.	Edible oils storage of	X	✓	✓	✓	✓	✓
16.	Effluents treated	X	X	✓	✓	✓	✓
17.	Energy non-conventional	X	X	X	✓	✓	✓
18.	Energy projects atomic	✓	✓	✓	✓	✓	✓
19.	Facility embarkation	X	X	X	X	X	X (Lak)
20.	Fertlizers storage of	X	✓	✓	✓	✓	✓
21.	Fields play	X	X	✓	✓	✓	✓
22.	Fisheries (aquaculture)	X	X	X	X	✓	✓
23.	Food grains storage of	X	✓	✓	✓	✓	✓
24.	Forestry	X	X	✓	✓	✓	✓
25.	Hatchery	X	X	✓	✓	X	✓

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26.	Horticulture	X	✓	✓	✓	✓	✓
27.	Industries expansion	X	X	X	X	X	X
28.	Industries new	X	X	X	X	X	X
29.	Information technology	X	X	X	✓ (SEZ)	✓ (SEZ)	X
30.	Jetty	X	✓	✓	✓	✓	✓
31.	Landfill	X	X	X	X	X	X
32.	Lines transmission	✓	✓	✓	✓	✓	✓
33.	LNG	✓	✓	✓	✓	✓	✓
34.	Minerals rare	X	X	✓	✓	✓	✓
35.	Mining coral	X	X	X	X	X	X
36.	Oil and gas exploration	✓	✓	✓	✓	✓	✓
37.	Parks	X	X	✓	✓	✓	✓
38.	Pipelines	✓	✓	✓	✓	✓	✓
39.	Plants desalination	X	X	✓	✓	✓	✓
40.	Plants thermal power	X	X	X	X	X	X
41.	Ports/harbours expansion of	X	✓	✓	✓	✓	✓
42.	Prevention of salinity ingression	X	✓	✓	✓	✓	✓
43.	Processing fish	X	X	X	X	X	X
44.	Products POL	X	X	X	✓	✓	
45.	Projects defense	X	✓	✓	✓	✓	✓
46.	Projects SEZ	X	X	X	✓ (SEZ)	✓ (SEZ)	X
47.	Quays	X	✓	✓	✓	✓	✓
48.	Radars weather	✓	✓	✓	✓	✓	✓
49.	Rain shelters public	✓ (SB)	X	✓	✓	X	X
50.	Reclamation of land	X	✓ (P&H)	✓ (P&H)	✓ (P&H)	✓ (P&H)	✓ (P&H)
51.	Regulators tidal	X	✓	✓	✓	✓	✓
52.	Resorts beach	X	X	✓	X	✓	✓
53.	Roads	X	X	✓	✓	✓	X
54.	Saltpan	X	✓	✓	✓	✓	✓
55.	Sand dunes altering	X	X	X	X	X	X
56.	Sand/rock mining	X	X	X	X	X	X
57.	Schemes housing	X	X	✓	X	X	X
58.	Schools	✓ (SB)	X	✓	✓	X	X
59.	Sea-links	✓	✓	✓	✓	✓	✓
60.	Sewerage	X	X	✓	✓	✓	✓
61.	Shipways	X	✓	✓	✓	✓	✓
62.	Structures reconstruction of	X	X	✓	✓	✓	✓
63.	Supply water	X	✓	✓	✓	✓	✓
64.	Toilets community	✓ (SB)	X	✓	✓	X	X
65.	Units dwelling	X	X	✓	X	✓	✓

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66.	Waste municipal	X	X	X	X	X	X
67.	Wharves	X	✓	✓	✓	✓	✓

Legend

CRZ-I (i) – Ecologically sensitive areas
CRZ-I (ii) – Inter-tidal areas
CRZ-II – Built up areas
CRZ-III – Rural areas
CRZ-III (HTL to 200 metres) – No Development Zone within rural areas
CRZ-IV – Andaman & Nicobar Islands and Lakshwadweep Islands
Lak - Lakshadweep
P&H – Port & Harbours
SB - Sunderbans
SEZ – Special Economic Zone

3.4.2 Dwelling Units of Local Communities

Most of the fishermen associations are satisfied with the present CRZ regime as it safeguards the coastal and marine ecosystems with the areas protected and no large developmental activities being permitted in the CRZ area. The No Development Zone of 200 mts in the rural areas, i.e., in the CRZ III areas have helped the fishermen to berth their boats, drying fish, mend nets, etc., thereby protecting their fishing rights. The CRZ notification permits construction of such dwelling units in the CRZ area other than the CRZ-I and the NDZ area of CRZ-III. These restrictions affect the construction of dwelling units of local communities especially living along the backwaters of Kerala. The situation in Kerala have to be considered separately as the State has the highest population of 2176 persons per Sq Km living along the coastal and backwater areas of Kerala. The restrictions of the CRZ Notification have affected the constructions of public amenities and housing in the CRZ area.

As can be seen from a table most of the developmental activities are not permitted in the CRZ-I(i) and (ii) areas except foreshore requiring facilities such as port and harbours, jetties etc., in the inter tidal area. The large inter tidal mangrove area in case of Sunderbans is also a place where more than 3 lakh population are living. The Ministry has amended the notification for providing certain basic amenities such as schools, dispensaries etc for the local population. However, for the welfare and upliftment of communities living in eco-sensitive areas such as Sunderbans, Chilka, Pulikat, etc., special provision in the notification have to be provided and which have to be integrated within the integrated area management plan.

Keeping in view the impact of Tsunami's it is necessary to protect mangroves and take up shelterbed plantations along the habitatations, prevent reclamations of sand dunes, mudflats, lagoons, etc. to locate dwelling units behind appropriate set back zone. This set back zone should be demarcated on the basis of the vulnerability of the coast to natural hazards. The Government may consider ICZM approach for locating the dwelling units of the communities.

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3.4.3 Ports and Harbours and other Foreshore Activities

Ports and harbours are one of the major gateways for economic development of the country. At present there are 14 major ports and several minor ports. These ports are experiencing increasing economic activities. Further, there are proposals from the Central Governments and State Governments for setting up of new ports and harbours including upgradation and expansion of the ports and linkages between the ports. The CRZ notification provides for setting up of expansion of ports and harbours except in areas classified as eco-sensitive areas. Capital dredging and maintenance dredging are some of the serious environmental concerns. These aspects of port development are not covered under the notification, since the jurisdiction of the CRZ ends at Low Tide Line and does not include the water part. Hence, the Committee is of the opinion that the marine part should be included within the jurisdiction of the new coastal regulation regime whereby dredging, maintenance dredging, deepening, dumping of the dredged material can be adequately regulated.

3.4.4 Setting up and Expansion of Industrial Units

As per para 2(i) of Coastal Regulation Zone Notification setting up of new industries and expansion of existing industries except for project of atomic energy, non-polluting industries such as Information Technology etc., to be located in SEZ areas are prohibited activity. This prohibition has affected setting up of certain important non-polluting industries activities such as cement, fertilizer, pharmaceutical, chemical, gas handling, packaging./bottling units even within the port area. The Committee is of the opinion that while prohibiting the polluting industries care may be taken that some of the non-polluting industries may be permitted along the identified stretch of the coastline after taking adequate environmental safeguard as per EIA.

3.4.5 Mining Activities

Para 2(ix) of the Coastal Regulation Zone Notification permits mining of rare minerals, oil and gas in the Coastal Regulation Zone area and prohibits mining of all other materials. The word ' rare- mineral' has not been explained which has led to confusion among the State Governments and the mine operators. The word 'rare minerals' can be replaced with 'placer minerals' and shall be permitted to be mined in the coastal areas since these minerals are not found elsewhere.

With regard to other minerals found in the coastal and off-shore areas, mining can be permitted subject to Environmental Impact Assessment (EIA) studies. However, mining of sand, clay, rocks, pebbles, shells and corals shall not be permitted to be mined.

3.4.6 Non Conventional Energy

The Coastal Regulation Zone Notification permits setting up of non-conventional energy equipments such as solar panels etc. however, the notification silent about wind mills, OTEC's, wave energy etc. In view of increasing energy sources the Committee is of the opinion that such non-conventional energy resources should be promoted in a big way all along the coastal areas of the country since, as these energy will benefit the local communities. But it may be ensured that EIA is carried out before implementation of such programmes.

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3.4.7 Fishery and Allied Activities

The notification permits construction of fishing jetties and harbours in the Coastal Regulation Zone area other than the eco-sensitive areas. However, the allied facilities for a fishing harbours such as storage halls, ice factories, ice crushing units, fish processing units, workshops, storage units, fish ware housing are not permissible. The fish and shell fish being highly perishable commodity the port harvest technology are very important for improving the shelf life of fish for purpose of marketing and processing. Therefore, the Committee is of the opinion that an integrated fishing unit should be setup after adequate environmental safety measures are incorporated in the project.

3.4.8 Structures to prevent Erosion and Salinity Ingression

The notification [para 2(viii)] provides for taking measures against erosion and salinity ingress. However, the notification is silent about the type of erosion measures to be taken in the various stretches of the coastal areas. Some of the erosion measures such as seawalls and their hard structures can be detrimental to a mangrove or coral ecosystem. Hence, adequate care needs to be taken with regard to the type of erosion measures and its location. World wide there has been change in the erosion control measures. Some of the developed countries are using soft measures such as beach nourishment, shelter bed plantation, geo-textile measures etc. these methods have to be carefully studied before implementation.

3.4.9 Extraction of Oil and Gas

The notification [para 2(ix)] provides for exploration and extraction of oil and natural gas. However, the exploration in the ocean part i.e. below the Low Tide Line is not covered under the notification. Keeping in view, the importance of this sector the Committee is of the opinion that exploration and exploitation of oil and gas should be permissible in the coastal and marine areas after incorporating adequate environmental safety measures. Proper monitoring mechanism should be inbuilt and should be assigned to the Coast Guards for monitoring and enforcing the regulations since the Coast Guards are equipped with necessary infrastructure including oil spill combating. The Ministry has to draw up guidelines to speed up the clearance procedure for this sector since delay would cause huge economic loss to the public.

3.4.10 Extraction of Groundwater

The notification provides for drawal of groundwater by only manual method in the Coastal Regulation Zone area beyond 200 mts on the landward side. Keeping in view, the facts and figures provided by Central Ground Water Boards, the groundwater situation along the country is highly distressing. The Ministry should come out with a comprehensive plan to map areas of ground water depletion, the drawal of groundwater and take up recharging of the aquifers. Desalination, water recycling, rainwater harvesting should be some of the methods which should be encouraged in coastal areas.

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3.4.11 Land Reclamation

The Notification [para 2(viii)] prohibits land reclamation in the coastal area except for expansion of port and harbours. The Committee is of the opinion that this prohibition is necessary since reclamation causes ecological and geomorphological changes, which can have adverse impact on other areas. Reclamation can be permitted only in places such as within special economic zones, port and harbours, defence units, for construction of bridges, sea links after detailed EIA studies.

3.4.12 Storage of Chemicals and Petroleum Products

The notification [para 2(ii)] permits storage of 14 petroleum products and food grains, edible oil etc. The notification is silent about several other materials and chemicals, which are handled all over the world such as iron ore, coal, sulphur including variety of chemicals and products. The Committee is of the opinion that within a port and harbours all handling and storage facilities should be governed by the Ports Act. The Ministry may draw up specific guidelines for handling and storing of the chemicals and other commodities within such port and harbours area including EIA procedures.

3.4.13 Discharge of Effluents

The notification [para 2(v) and (vi) and (viii)] prohibits discharge of untreated effluents from industries and cities, dumping of solid waste including fly ash. As per the information provided by Central Pollution Control Board (CPCB) it is observed that most of the cities/settlements are letting out their sewage without any treatment into the coastal waters. The upstream rivers are also bringing along large quantities of effluents from the settlements and industrial units into the estuary and then to the coastal waters. The Ministry had done very little to overcome this problem. In view of this, the Ministry should take adequate measures to regulate such pollution in a time bound manner.

3.4.14 Transportation Systems

The notification prohibits construction of roads those not approved in the Coastal Zone Management Plans, airstrips, railway lines etc., in the Coastal Regulation Zone area. Airstrips have been permitted only in Lakshadweep and Andamans. This provision needs to be reconsidered in view of the growing economic activity of the ports, which need connectivity to the major cities. The Committee is of the opinion that the roads and airstrips may not be laid in eco-sensitive areas. Roads along the coastal stretches for the purpose of decongestion of cities, industrial towns etc. may be approved after proper EIA studies are carried out.

3.4.15 Agriculture Activities

Agriculture, horticulture activities etc., are permissible under the notification except in eco-sensitive areas. The Committee agrees with this provision. The Committee is also of the opinion that the Ministry should map such agriculture and horticulture areas and prevent change of land use of such areas for the purpose of safeguarding the livelihood security of the local communities.

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3.4.16 Defence Projects

The notification provides for locating defence units along the coastal areas, but are subject to scrutiny by a separate Committee constituted in the Ministry. Since, there are no major criticism about the procedure the Committee has no view on the subject.

3.4.17 Transmission Projects

The notification provides for laying of transmission and conveying systems including eco-sensitive areas. The Committee has no comments on this item.

3.4.18 Public Amenities

As per the notification public amenities such as dispensaries, schools, rain shelter, community toilet, bridges, roads, water supply, drainage, sewerage are permissible in the rural areas including in Sunderbans. However, as per the notification toilets, drinking water facility, rain shelter, medical care centers, telecom booths cannot be set up on the beaches for the tourist where tourism facilities are located. This not only causes inconvenience to the tourist but also spoils the beaches. Therefore, the Committee is of the opinion that certain public amenities which are of essential nature should not be prohibited in the coastal areas.

3.4.19 Salt Pans

The saltpan activities are permissible in the inter tidal areas other than eco-sensitive areas. The Committee agrees with this provision.

3.4.20 Recreational and tourism

The notification provides for setting up of hotels and tourism projects beyond 200 mts on the landward side form the High Tide Line. The tourism associations have indicated that this provision is too stringent and has been detrimental to the tourism projects. While the NGOs are of the opinion that this provision should not be relaxed, the Committee keeping in view the potential for the beach tourism development in the country, is of the opinion that the concerned Ministry may identify tourism potential areas along the country and draw up integrated tourism management plans for promoting this industry. All developments in the identified tourism areas shall be taken up based on the ICZMP.

3.4.21 Housing and Settlements

The notification provides for construction of houses behind authorized structure on the landward side in municipal areas in CRZ II areas. It also permits construction of dwelling units for local communities beyond 200mts from the High Tide Line on the landward side in rural areas i.e CRZ III. For the purpose of undertaking constructions, Floor Space Index and Floor Area Ratio have been frozen as on 19.2.1991. On account of this provision, several housing schemes such as slum redevelopment and rehabilitation schemes, rehabilitation of old structures have been affected. The Committee is of the view that developments within municipal limits and other populated areas may be taken up based on ICZMP taking into consideration the vulnerability of the area, to coastal hazards.

3.4.22 Projects of Department of Atomic power

As per para 6(2) (a) sub-heading CRZ-I of Coastal Regulation Zone Notification, 1991 projects relating to Department of Atomic Energy has been included vide the amendment dated May, 2002. Keeping in view the impact of tsunami on the Kalpakam Atomic Power Plant, it would be advisable if such nuclear power plants are located a little away from the coast rather than very near the coast.

3.4.23 Categorization of the CRZ Areas

The CRZ Notification, 1991 [para 6(i) and 6(ii)] categorizes the CRZ areas into CRZ-I, II, III and IV. The para 6(ii) lists specific activities that can be taken in each of these categories. The categorization of the CRZ area is based on the eco-sensitivity of the coastal zone and the extent of development. But it is seen from the list under CRZ-I it includes several of the eco-sensitive areas and areas, which are very subjective and cannot be defined for example, areas of outstanding natural beauty, areas rich in genetic diversity. Such subjective and broad base terminologies have led to problems in demarcating CRZ-I areas by the State Governments in their CZMP maps. The Committee is of the opinion that there needs to be a clearly defined terminology alongwith a boundary for the purpose of Administration of such identified areas. Similarly, under CRZ-II and III the terminologies used are highly vague and subjective such as 'developed area, substantially built up, relatively undisturbed areas, legally designated urban areas etc'. For the purpose of implementation and enforcing the CRZ policy the Committee is of the view that there needs to be a clearly defined terminologies along with the administrative boundaries. In the absence of such clarity, there will be confusion within the enforcing machinery, which will lead to hardship for the local communities and also for taking up developmental activities.

3.4.24 Demarcation of High Tide Line, Low Tide Line and CRZ Boundaries

As per para 1(i), of the notification High Tide Line needs to be demarcated uniformly by an authorized demarcating agency. For this purpose the Ministry has issued guidelines and also identified 7 Central and State Government agencies for demarcating the HTL and LTL. The Committee has noted that the definition given for High Tide Line demarcation has led to confusion among various authorized agencies. The guidelines issued are also being interpreted differently by the different agencies. Since, each of the authorized agency employ different methodologies for demarcation there is significant variation between the High Tide Lines drawn by one agency to that of the other for the same area. Further, there is also no clarity with regard to the scale at which the demarcations have to be carried out. Most of the High Tide Line maps are classified hence cannot be accessible by common man. This has put the local communities into great difficulties even to construct small dwelling units, schools, village roads etc. Further the expense towards High Tide Line demarcation cannot be afforded by small entrepreneurs.

In view of the above difficulties and the complications involved in the entire process, the Committee is of the opinion that this procedure of High Tide Line demarcation should be simplified or done away with. The Ministry may think of the other methods such as providing permanent structures (safe for the period of last 20 years along the sea front as a line of setback) in the metropolitan cities and towns. In case of eco-sensitive areas the administrative boundary or the biological boundaries drawn by some of the scientific

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institutions or available in the State plans/revenue map shall be taken into consideration. In case of the rural areas the demarcation of such High Tide Line may not be necessary. The development in rural areas can be taken up as per the revenue maps after leaving adequate buffer from the shoreline indicated in the revenue maps.

3.4.25 Preparation of Coastal Zone Management Plans

In compliance with the Supreme Court Orders vide Writ Petition No.664 of 1993 the State Governments had prepared the Coastal Zone Management Plan maps within period of 3 years. Such a hurried exercise undertaken by the State Government for the fulfilling the Court direction contains lots of mistakes and factual errors. The Ministry also, in order to comply with the Court directions, approved these Coastal Zone Management Plans on 27th September, 1996 with certain conditions and modification and directed the State Governments to submit the revised management plans within a period of 3 months. However, till date no State Government has submitted the revised CZMPs for the entire states as per the procedure laid down in the CRZ notification. In the absence of such approved revised CZMPs is very difficult for a developer to undertake developmental activities in the coastal area. Further, lack of clarification in the notification with regard to the categorization, High Tide Line demarcation, scale of the maps have led to further confusion.

The Committee is of the opinion that Ministry should revise the procedure and bring out a simplified Coastal Zone Management preparation guideline, which will be easy for a common man to understand.

3.4.26 Clearance Procedure for Developmental Projects under CRZ Notification

Para 3(i) and 3(ii) of the notification lays down clearance procedures for permissible projects in CRZ area. It is not clear which of these activities require clearance from the Central or State level agencies. The method and documents required for obtaining clearance under the notification is also not laid down. The entire procedure is very vague. It is left to the Ministry and the State Governments to request for information/details from the entrepreneurs. Such discretionary powers are hurdle to developmental project. It is also observed that even a small project less than Rs.1 lakh worth tourist resort project needs to come to the Ministry for clearance for which the project proponent has to come to Delhi for making a presentation before the Expert Committee for Infrastructure Development and Miscellaneous Projects.

Further, as per the same notification a major project such as a maintenance dredging or ship breaking unit can get away from the notification since, they are located below the Low Tide Line. It is also observed that the monitoring and enforcement of such cleared projects are lacking.

The Committee is of the opinion that the Ministry should lay down a clear procedure, documents required, list out activities that require central clearance, state clearance or clearance from local bodies in the guidelines. The Ministry should also maintain database with regard to the baseline information for the purpose of preparing EIA for the marine sector since it is difficult and expensive to obtain information with regard to flora and fauna in the marine areas. The monitoring programmes for the cleared project should be undertaken at regular periods.

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3.5.0 Enforcement and monitoring of Coastal Regulation Zone Notification, 1991

In compliance to the same orders of the Supreme Court in Writ Petition No.664 of 1993 the Ministry has constituted National Coastal Zone Management at the Central level and 13 State and Union Territory level Coastal Zone Management Authorities under the Environment (Protection) Act, 1986. These Authorities have about 8 members, of which 4 of them are bureaucrats from concerned Departments of the State Government and 4 experts in the field of coastal management. The scope of work of the Authority include enforcement and monitoring. For this purpose necessary provision of Environment (Protection) Act, 1986 has been delegated. The State and UT Authorities have also a technical role to play such as preparation of Integrated Coastal Zone Management Plans, awareness creation etc. But till date no major technical activities have been taken up by the Authorities.

During the meetings of the Committee and the interactions with the NGOs it was brought to the notice that these Authorities have not taken up proactive role in the Coastal Zone Management programmes initiated by the Ministry. None of the Authorities have prepared the Coastal Zone Management Plans for the entire State. Very few violations have been booked by the State Coastal Zone Management Authorities. The reasons for such weak enforcement by the Authorities are mainly due to lack of infrastructure, funds and training to the officials. The Ministry should help these Authorities to strengthen their capacities and provide adequate infrastructure to thee State and Union Territory Authorities. Appropriate representation of NGOs involved in coastal management should be made.

3.6.0 NGOs perceptions

Due to lack of sufficient motivation from the concerned State Governments, lack of adequate financial mechanisms, weak enforcements, the NGOs have been playing a critical role in identifying the violations and bringing them to the notice of the concerned governments. In several cases, the NGOs have taken up the matter to the Courts. The NGOs have been playing a very proactive role in protecting the coastal environment. However it is seen that most of the activities of the NGOs are confined to areas such as Mumbai, Goa and Kerala.

3.6.1 Suggestions made by the NGOs

Most of the NGOs are of the opinion that the CRZ Notification has been relaxed time and again. The NGOs have raised the issue with the Ministry stating that the CRZ Notification has been amended about 17 times and in each amendment relaxations have been made for taking up developmental activities which are contrary to the principle of Environment (Protection) Act, 1986 and the objective of the CRZ Notification. The NGOs have indicated that stringent enforcement mechanism should be put in place for implementing the notification. The CZMPs should be prepared and put on the website and other public domain for transparency in implementing the notification. They also suggested that the livelihood security of the communities should be adequately addressed and the notification should be further strengthened by protecting the rights of the fishermen communities and other communities, who are dependent upon the coastal resources. For this purpose, the NGOs have indicated that the ocean part should be brought under the CRZ notification. They are also of the opinion that the Coastal Zone Management Authorities have been highly ineffective in enforcing the Notification hence; the NGOs should be included in the Authority.

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3.6.2 R&D Sector

The CRZ Notification and the efforts to implement had created an awakening among the research community on the challenges in the management of coastal resources. The scientific community also came forward with both appreciation and criticism on the various provisions of the regulatory regime. It has also created opportunities for the application of the latest tools such as IT, GIS, GPS and remote sensing, of which the latter was extensively used and became particularly handy both in high speed mapping and monitoring. The high rate of degradation of the coastal ecosystems/violation of the CRZ came to the limelight in this process. There had been substantial contribution from rational, state and private institutions and played an important role in exposing the criticality of the ecosystems.

Inspite of the increased vigour in scientific research, the community had not been able to address several vital issues related to CRZ and come out with well-studied suggestions. Some of these include the impact of sea level rise, the impact of settlements on the coastal waters, the delicacy of groundwater aquifer, the limit upto which activities to be regulated in the inland tidal water bodies, etc. However, there had been positive inputs on the type, extend of regulation for the coastal geomorphic units, management of mangroves, ICZM, etc. Even then studies are yet to reach their logical conclusions.

Considering the increased importance on one side and the greater vulnerability due to developmental demands on the other in the coastal areas the strengthening of R & D sector has become more important. There is R&D agencies that have been working in the areas of coastal environment include the Central, State and private. Coastal Systems Research (CSR) which takes into account both sea and land surfaces in an integrated manner needs to be fostered. CSR will help to promote the sustainable and equitable use of coastal bioresources.

3.7.0 Summary of current of CZM

3.7.1 Weak Implementation by State Governments

The Committee has observed that there have been very few initiatives taken by the concerned State Governments and Union Territories for preparing the Coastal Zone Management Plans. The Ministry had directed the State Governments to prepare the revised CZMPs in September, 1996 within a period of one year. However, till date no State Government has come up with a detailed CZMP for the entire State. This has led to non-development in some areas and delay in project implementation. The State Governments have not earmarked sufficient funds and created infrastructure for the implementation of the Notification. As on today only the state like Kerala and Tamil Nadu have scientific institutions to advise the State Governments with regard to the implementation of the notification. In the absence of such scientific institutions the implementation programme was grossly inadequate. The weak implementatioin by the State Governments are one of the reasons for increasing number of court cases which are pending in the Supreme Court and various High Courts.

3.7.2 Initiatives by the Centre

The Ministry time and again has been amending the Notification based on the recommendations of the various Expert Committee and in-house exercise. However, there

has been no concrete effort in addressing some of the major issues such as degradation of the eco-systems due to anthropogenic activities, pollution of coastal areas and coastal waters due to effluents, sewage and solid waste. There has also been no effort by the Ministry for strengthening the enforcement mechanism by the State Governments. The Committee takes a serious note of the lack of manpower and infrastructure existing within the Ministry itself, which is entrusted with protecting and conserving the vast coastal and marine resources. There has been a vast change in the management approach of the coastal and marine area worldwide. The Ministry has done very little work to initiate the programmes in a integrated way. There has been no initiative in strengthening or setting up of scientific institutions dealing with coastal management. Training programmes to the officials have been carried out very few times and there is no continuity in the programmes. All these factors have accounted for failure of the notification to a large extent. The Committee also observed that the Ministry has no special norms for the EIA procedure to be undertaken in coastal and marine areas. The EIA procedure followed for a breakwater project is similar to the EIA procedure for a road project. Lack of database is another area of major concern. The Ministry should take initiatives in identifying specialized institutions such as ZSI, BSI, Universities and other R&D institutions to address this issue and provide authorisation for preparing a database of various resources of coastal and marine areas and for conducting specialized studies for the coastal resources managements and ICZM.

3.7.3 Awareness Programmes

The Ministry inspite of having a separate division called as environmental education and information division has done very little in creating awareness. Till date no brochures, information material, guidelines etc., have been published by the Ministry. The developers, industry associations, central Ministries, NGOs and other stakeholders have no information with regard to various norms and procedures prevailing under the notification for obtaining environmental clearance. Several of the procedures have not been brought into the public domain. This has lead to delay in project implementation, though, it may be permissible under the notification.

3.7.4 Conflict Resolution

The Ministry has not been active on addressing the conflict issues between the stakeholders except in resolving certain specific cases. This is evident from the increase in number of court cases. The conflict resolution is one of the major areas, which the Ministry has to address while according clearance to the projects. It is observed that there is no public hearing mandatory for the projects falling in CRZ. In the absence of involvement of the public in decision making there is bound to be conflicts occurring during the implementation and operation of the project.

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CHAPTER-4

4.0 SUGGESTIONS OF THE COMMITTEE FOR INTEGRATED COASTAL ZONE MANAGEMENT

Since 1991, various Expert Committees have gone into specific issues relating to Coastal Regulation Zone Notification, 1991. There have also been several judicial pronouncements., Large-scale violations of the regulatory framework in coastal areas are also being reported from time to time. Anthropogenic pressures on several fragile ecosystems have been growing, particularly with reference to housing, tourism and hotel industry, sand mining and industrial projects. Coastal pollution has also become a major issue of concern. It is in this background that the present Committee was set up to review the current situation with reference to Coastal Regulation Zone and suggest ways of ensuring that the principles of ecology, intra-and inter-generational equity and the livelihood security of the fisher and farm families living near the coast, become fundamental to the management of our coastal zone.

Due to pressures of development, recreational and housing activities, the Coastal Regulation Zone Notification has been frequently amended. Aquaculture enterprises have often led to the denudation of precious mangrove forests. Large-scale sand mining, extraction of coral reefs and dumping of sewage and toxic wastes into the sea are still in progress. While the Committee started its work in this background, it ended its deliberations in the context of the extensive damage caused by the titanic tsunami to lives, livelihood and property on 26th December, 2004. **Tsunami served as a wake-up call**. Any further neglect of sustainable Coastal Zone Management practices will spell doom to the future of coastal communities. Good ecology alone can ensure sustainable human security to coastal habitations. Compounding the serious problems arising from demographic and commercial pressures as well as the greed of the rich and the genuine needs of the poor, which confront us today, we have also to be prepared to face the prospect of sea level rise within the next few decades as a result of global warming and the consequent melting of glaciers and the artic and antarctic ice deposits.

Based on in-depth discussions and widespread consultations with the principal stakeholders, the Committee developed the following 12 basic guiding principles, which should govern future decisions on coastal zone management:

(1) Ecological and cultural security, livelihood security and national security should be the cornerstones of an integrated coastal zone management policy.

(2) The coastal zone will include an area from territorial limits (12 nautical miles), including its sea-bed to the administrative boundaries or the biological boundaries demarcated on the landward side of the sea coast. The coastal zone management will also include the inland tidal water bodies influenced by tidal action and the land area along such water bodies. This area should be taken up for an integrated, cohesive, multi-disciplinary and multi-sectoral coastal area management and regulatory system.

(3) Regulation, education and social mobilization should be the three major components of a participatory and sustainable Coastal Zone Management strategy.

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Panchayati Raj institutions in coastal areas should be fully involved in the educational and social mobilization programmes.

(4) The protection and sustainable development of the marine and coastal environment and its resources should be in conformity with international law, as laid down in 1982 UNCLOS, as well as with the suggestions contained in Chapter 17 of Agenda 21. The Draft National Environment Policy of India also contains useful guidelines. Every effort should be made towards ensuring an Integrated Marine and Coastal Area Management (IMCAM) as prescribed in the 1995 Jakarta Mandate under the 1992 Convention on Biological Diversity.

(5) Coastal regulation needs to be based on sound, scientific and ecological principles and should safeguard both natural and cultural heritage. Heritage sites need particular care and should be conserved in their pristine purity. These include buildings, artifacts, precincts of spiritual, historical, aesthetic, architectural or areas of environmental significance such as richness of biodiversity and scenic beauty. Bird sanctuaries and parks and breeding grounds of migratory birds should be protected.

(6) The precautionary approach should be used where there are potential threats of serious or irreversible damage to ecologically fragile critical coastal systems and to living aquatic resources. Scientific uncertainty should not be used as an excuse for the unsustainable exploitation of coastal resources – both living and non-living as well as to prevent environmental degradation, injustice and harm.

(7) Significant or irreversible risks and harm to human health and life, critical coastal systems and resources including cultural and architectural heritage would be considered unacceptable. Ecological economics should underpin economic activities, so that present day interests and future prospects are not antagonistic. Significant biological, cultural and natural assets should be considered incomparable, invaluable and irreplaceable and should receive overriding priority in the allocation of resources for coastal area protection and conservation.

(8) Coastal policy and regulations should be guided by the principles of gender and social equity as well as intra-generational and inter-generational equity, (i.e., the interests of future generations). They should be based on Mahatma Gandhi's dictum, "Nature provides for everyone's needs, but not for everyone's greed." All stakeholders should be involved in decision-making. Precious biological wealth, coming under Marine Biosphere Reserves, should be managed in a Trusteeship mode, with all the stakeholders protecting the unique natural wealth of biosphere reserves as Trustees and not as owners. A case study should be made on how the Gulf of Mannar Biosphere Trust is functioning, so that the Trusteeship pattern of sustainable management by the principal stakeholders can be replicated.

(9) Coastal protection and bio-resources conservation policies should be guided by techno economic efficiency, the precautionary approach, 'polluter-pays' principle(s) and 'public trust' doctrine. There should be strict liability on the part of those engaged in hazardous or inherently dangerous coastal activities, including the liability to compensate the victims of all human made hazards such as marine pollution and fish contamination. They should also bear the cost of restoring the

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coastal environmental degradation. The onus of proof in such cases should be on the developer/industrialist for demonstrating that their "development" activities are environmentally benign.

(10) The principles contained in the Biodiversity Act (2002), should be applied to coastal bio-resources management. This will involve concurrent attention to conservation, sustainable use and equitable sharing of benefits. To address the issue of pressures on marine and coastal ecosystems, as defined in the Johannesburg Plan of Implementation (Part IV) adopted at the 2002 World Summit on Sustainable Development, every effort should be made to promote sustainable fisheries, prevent loss of biological diversity, prevent all forms of marine pollution and ensure that coastal area development and urbanization are eco-friendly.

(11) The regeneration of mangrove wetlands, coral reefs and sea grass beds as well as the promotion of coastal forestry and agro-forestry will confer both short and long term ecological and livelihood benefits. Carbon sequestration through coastal bio-shields will make an important contribution to promoting a balance between carbon emission and absorption, in addition to offering protection during coastal storms and calamities like Tsunami. An important lesson taught by the tsunami disaster is that the rehabilitation of degraded mangrove forests and the raising of coastal plantations of salicornia, casuarina and appropriate species of halophytes will represent a "win-win" situation both for nature and coastal human habitations. No further time should be lost in initiating a national coastal bio-shield movement along the coasts of the mainland of India as well as islands. This can be a priority task under the National Rural Employment Guarantee and Food for Work Programmes.

(12) The severe loss of life and livelihoods as well as property caused by Tsunami in Andaman & Nicobar Islands and in the coastal regions of Tamil Nadu, Kerala, Andhra Pradesh and Pondicherry teaches us that short term commercial interests should not be allowed to undermine the ecological security of our coastal areas. Human memory tends to be short and neglecting the lessons of Tsunami will be equivalent to writing off the future of coastal communities.

Thus, Coastal Zone Management requires cohesive, multi-disciplinary approaches as well as multi-dimensional vision. Sustainable human security in all its dimensions - ecological, economic, ethical, cultural and human well-being, in terms of the health and happiness both man and nature, should be the goals of an enlightened Coastal Zone Management policy. The implementation of such a policy will require appropriate regulations supported by effective monitoring systems as well as education, public and political understanding of risks and benefits of development activities and above all, social mobilization through Panchayati Raj institutions.

It is on the basis of the above 12 guiding principles that we have formulated our recommendations. We appeal that our recommendations may be considered in toto and not in a fragmented manner and that both the letter and the spirit of the recommendations be respected.

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4.1 Recommendations with regard to Terms of Reference

4.1.1 ToR-(I) To review the reports of various Committees appointed by the Ministry of Environment & Forests on coastal zone management, international practices ad suggest the scientific principles for an integrated coastal zone management best suited for the country;

(i) The Coastal Regulation Zone Notification, 1991 has been framed with an objective to protect the coastal environment. In the process, the notification has laid rigid regulatory measures for undertaking developmental activities including those activities, which are essential for coastal fishing communities such as dwelling units. The Ministry of Environment and Forests has been receiving several representations and requests from various stakeholders in the coastal areas, which include central Ministries, coastal State Governments and Union Territories, developmental associations and civil society organisations. Keeping in view these representations the Ministry has been appointing Expert Committees from time to time to examine the issues raised by the stakeholders and suggest measures for addressing these issues. The reports submitted by these Committees were examined in detail by this Committee. After examination of the recommendations of the various Committees and the action taken by the Ministry with regard to each of the recommendations, this Committee is of the opinion that the recommendations of the earlier Committees contained in their reports are quite comprehensive and address the specific issues in detail. However, the Ministry has selectively chosen specific recommendations and have amended the Coastal Regulation Zone notification. Such a selective approach has being described by the NGOs and conservationists as dilution of the notification. Had the Ministry taken note of all the recommendations of each of the Committees constituted so far, the Coastal Regulation Zone notification would not only have been strengthened but also brought clarity for implementation.

(ii) The Committee is of the view that for addressing the coastal problems in a holistic manner, the water part i.e., the ocean, tidal water bodies should be included.

(iii) The Committee examined various international practices of Coastal Zone Management adopted by both developed countries and developing countries. The Committee found that the practices followed by these countries are not confined to regulatory systems. The practices provide greater emphasis on the management approach rather than merely on regulation. Further it also reveals that the developed countries have adopted a more pragmatic approach in their coastal zone management programme, while giving due attention to protection and conservation of ecological systems, geomorphic features, water bodies and the vulnerability of the coastal areas to natural hazards.

(iv) An integrated, multidisciplinary and multi-sectoral coastal land and sea area management system is an urgent need. The regulatory framework should aim at integrated and sustainable coastal zone management.

(v) It is necessary to encourage collective and democratic initiatives at the level of the local communities for preparation and implementation of Integrated Coastal Zone Management. This will encourage using, caring for and managing the coastal

environment and resources on the principle of common property resources, and not private ownership.

(vi) It is necessary to ensure that area and region-specific plans are prepared and a regulatory framework is put into place. The Coastal Regulation Zone framework has been used to protect principles of maintenance of ecological diversity and social justice. The principles of the notification can be strengthened by well-thought out, sensitive and firm policy mechanism to prevent any further degradation of coastal zones from irreversible consequences.

(vii) An Integrated Coastal Area Management (ICAM) approach will address problems in coastal areas in an integrated and inter-sectoral manner so as to achieve environmentally and socially sustainable development. It seeks to identify the links between environmental problems in coastal areas with activities that take place outside it, in inland areas or in the deep seas. It seeks to bring together users of coastal resources, together with government agencies active in the coastal zone, to evolve a plan for eco-development of coastal resources. A major objective should be to coordinate, manage and reduce conflicts between the activities of various sectors in coastal areas for a long-term sustainability of coastal resources. It is suggested that various resource users be brought together in the planning process. Coordinating the activities of various government departments with jurisdiction in the coastal zone is crucial.

(viii) Stakeholders participation and decentralization of decision-making processes and management are desirable objectives in their own right. For example, if the classified categories are retained, suggestions must be invited from the public and stakeholders regarding the new classification of areas being proposed as 'ecologically sensitive areas', 'areas of particular concern' and 'other open areas', "islands of Andaman & Nicobar and Lakshadweep". It is also difficult for the government to watch every part of the coastal zone. Powers must be devolved to the local self-governing bodies in accordance with the letter and spirit of the 73rd and 74th Constitutional Amendments. Grassroot democratic institutions need to be harnessed by the new Coastal Regulation Zone Management system. The MoEF should consider any projects proposed within the coastal zone for clearance only after fair, transparent and due public hearing. Institutions of the local self-government must be given adequate authority and resources and a clear role in community development as well as in conserving and enhancing biodiversity. Local-level institutions need to be supported by, and should work in co-operation with, appropriate decision-making bodies at the state/provincial and national levels. Management needs to be oriented towards actually controlling and guiding the development process in a manner which benefits coastal communities in an environmentally sustainable manner. There is a need to recognize the advantages of allocating appropriate responsibilities at different levels. In projects where public hearings are mandatory, a public awareness programme should precede so that the local citizens can be well informed about the purpose and rationale. The right to information must be respected.

(ix) It is also necessary that Central and State Governments ensure that different Departments are unambiguous on the allocation of responsibility and accountability. While many characteristics and needs of local communities

dependent on coastal resources such as fisheries are unique, there are several aspects which need to be integrated into a broader approach to coastal area management. In particular, there is a need to harmonize policy objectives between different natural resource users, and to establish mechanisms for conflict resolution. All aquaculture projects should be strictly reviewed so as to ensure that these projects do not destroy the natural bio-shields such as mangroves, corals and are not detrimental to the coastal ecological security.

(x) Environmental as well as social impact assessments should be a compulsory part of the procedures in the approval process for potential developmental activity. Provisions for a public review process should be made mandatory. In the present Environment Protection Act (1986), compulsory public hearing is applicable only to projects subjected to EIA. 'Social Assessment' refers to analyzing, monitoring and managing social dimensions or consequences of a development process or of planned interventions such as policies, programmes, plans and projects. These consequences may be intended or unintended. The primary orientation of social assessment is to bring about a more sustainable and equitable biophysical and human environment. The direction for ICZM will come from a detailed mapping of ecological and social/community dimensions which must constitute the base-line information of all decision making for proposed development projects. Further, environmental impact assessments (EIAs) of new developmental projects must be prepared in the context of existing activity in the area and their burden on the ecosystem. EIAs need to take traditional as well as 'modern' scientific knowledge into consideration. Wherever the information base is poor, or the likely adverse impact can not be predicted with adequate certainty, the 'precautionary approach' must be applied, and developmental activities should not be undertaken. All EIAs should account for the social and economic costs which environmental degradation causes to local communities. There must also be ways and means for accounting for the costs to be borne by future generations whose rights may be jeopardized by current developments. We recommend that MoEF may help to strengthen national capacity in the area of assessing the economics of inter-generational equity. Our capacity in this area is very meager at present. Once such costs are internalized, a purely economic rationale to pursue many 'development' policies or projects must cease to exist. There are clearly many areas where harmonious development is possible, and these areas need to be identified and prioritized.

(xi) Defense related projects though necessary for national security, should also be subjected to assessment process in order to avoid possible negative social and ecological outcomes. Such environmental and social assessment processes can help to reduce the resistance of local populations to the defense projects by helping to address the concerns and also to mitigate possible hazardous environmental impacts. All projects including defense projects should go through a well-defined process of identifying impacts so that efforts can be made in mitigating them while clearing important projects.

(xii) It is essential that balance must be maintained between development and conservation, i.e. while it is essential to promote socio-economic development, it is equally essential to maintain the unique scientific and cultural values of the sites. Coastal Zone Managers, well versed in the principles of ecology, economics

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and social and gender equity, will have to be trained in suitable institutions. Capacity building in the science and art of environmentally and ethically sustainable development is an urgent need.

4.1.2 ToR-(II) To define and enlist various coastal and marine resources and recommend the methodology for their identification and the extent of safeguards required for conservation and protection;

(i) The coastal resources and issues have to be viewed in an integrated and inter sectoral manner. It is necessary to identify the links between environmental problems in coastal areas with activities that take place outside in inland areas and in the deep seas. Therefore, it is necessary to bring together impacts of all developments on the coastal zone and all the concerned agencies, to evolve a plan for the sustainable utilization of coastal resources. The Committee examined the different living or non-living resources of the coastal zones and the threats and safeguards involved in their utilization particularly, in the context of their finite nature. It is necessary to prepare a biodiversity index for the coastal and marine areas, which is to be integrated into ICZMP. There is a need to distinguish clearly between the genuine needs of local communities and those of commercial interests.

(ii) The Committee, after discussing in detail various coastal and marine resources, came to a conclusion that it may not be possible to conserve and protect each of the entities. Already much has been lost, as for example in the Krusodi island in the Gulf of Mannar which was formerly described in Zoological literature as a "paradise for crustaceans." The resources which need priority attention are mangroves, coral reefs, sand dunes, inland tidal water bodies such as estuaries, lagoons, lakes, creeks, straits, mudflats, marine parks and sanctuaries, coastal forest and wildlife, coastal freshwater lakes, salt marshes, turtle nesting sites, horse shoe crab habitats, sea grass beds, sea weeds and breeding grounds for migratory birds. These ecosystems/features should be demarcated as ecological sensitive areas and an Integrated Coastal Zone Management plan should be prepared for the protection and conservation of these resources.

(iii) The well recognized protection role of sand dunes, beaches, sand bars, coastal cliffs and such other geomorphologic features on one side and the ecosystems such as mangroves, coastal forests, corals, bio-shields, etc., on other side against coastal and marine natural hazards shall be respected and integrated into the coastal area management schemes.

(iv) There is need for initiating a coastal 'bio-shield' movement by raising mangroves, plantations of casuarinas, saliconnia, leucaena, atriplex, palms, bamboo and other tree species and hatophytes that can grow near the sea. These will serve as speed breakers in the event of coastal hazards like cyclones, storm surges, tsunami, and monsoonal and high wave activity. Community nurseries can be raised for this purpose. There is a need for people's participation in the conservation and enhancement of mangroves, other wetlands, reefs, coastal/marine biodiversity and coastal geomorphology. It is necessary to prepare a comprehensive biodiversity index for the coastal and marine areas, which can be integrated into ICZMP. The National Institute of Disaster Management has prepared a state wise vulnerability atlas for the entire country. This needs to be integrated in the ICZMP. In the ecologically sensitive areas while adopting restoration mechanisms necessary precautions have to be taken to avoid entry of exotic and invasive alien species.

and it is necessary to ensure propagation of indigenous species. The conservation, preservation and development of the areas of ecological sensitive nature and particular concern shall be on the basis of the Integrated Coastal Zone Management Plan prepared based on the guidelines issued by the Central Government.

(v) The Committee is of the view that there are several issues and resources such as heritage sites of unmeasurable value, ecological security, livelihood security, traditional rights, national security, cultural heritage, bio-diversity and food security which are non negotiable. Site specific taxes in public domain, lease rights and ecological cess especially for mining, chemical industries and other hazardous industries need to be introduced to account for socio-economic and environment cost. Ecological mining principles should be fully enforced.

(vi) Closely interrelated with natural resources are cultural resources, and along the Indian coastline are regions and sites of great cultural and spiritual significance encompassing a precious and vulnerable range of heritage both tangible and intangible. The total number protected by the Centre and States constitute a very small percentage of the total wealth distributed over the country, and apart from these, few are, indeed, even listed. Thus only a fraction of the total wealth of India's built heritage is actually known. The Archaeological Survey of India, jointly with the State Departments of Archaeology and the Ministry of Environment and Forests, would need to identify such heritage sites within and relevant to the coast, prepare a comprehensive inventory pertaining to their components and demarcate their respective regulatory zones. Structures for their management and conservation would need to be in evidence in order to integrating the sites into the overall framework of the CRZ. Special attention must be given to declare World Heritage Sites and potential World Heritage Sites. In the coastal zone management plans prepared by the concerned States, a majority of heritage sites have not been delineated, and where they have been, the States and Union Territories are yet to formulate their approach and plans for conservation management and future development. It must be noted that there are various kinds of built heritage and heritage sites related to the Indian coast (living heritage areas such as historic/*Adivasi* settlements, monuments of worship, imperial centers, ports, colonial heritage, traditional settlements, forts, urban landscapes, cultural landscapes; walls, pillars, towers, water-structures and systems; archaeological parks, underwater/underground heritage, and natural landscapes, sanctuaries and particular physical and biological formations). These may exist singly as apparently isolated forms, natural formations, structures or remains; in groups or clusters; within/a part of/around living settlements; or a site may cover several square kilometers. There is an urgent need to identify, define, and protect a large number of these sites that are currently neglected.

(vii) The Committee recommends that the burden of proof should be on the developers (including government agencies) to show that their activities will not cause harm to the coastal environment or the coastal communities. In cases of coastal areas of 'incomparable value', the developers shall have strict and absolute liability. Moreover, consultation and involvement of the local communities or representatives of the affected communities, including women and members of disadvantaged groups, in all phases of planning and implementation must be made obligatory.

(viii) **Ground water in coastal areas must be declared as a social resource.** Limit for exploitation need to be placed while prioritizing drinking water needs. Indiscriminate

extraction, especially near the coast can prove disastrous. Along the coast of Gujarat, limestone mining has extended towards the coast. Exploitation of ground water, if not regulated, results in salinity ingress into fresh water aquifers near the coast. Monitoring and enforcement structures remain weak. A clear regulatory framework on ICZM must include the dimension of the sustainable management of the aquifer.

(ix) Significant or irreversible risk and harm to human health and life as well as critical coastal systems and resources including cultural and heritage sites, resulting in serious and large-scale detrimental impact, would be considered 'incomparable' and unacceptable. As such, they will not be measured in terms of monetary or conventional goods and services. Being irreplaceable and invaluable, they shall be given special and overriding priority for allocation of resources for coastal protection and conservation. Coastal policy and regulations shall be guided by the principle of 'equity', both in entitlements to and participation of the relevant public in processes of fair, just and transparent environmental decision-making especially as regards critical coastal systems and resources including those of cultural and heritage value.

(x) A comprehensive policy with respect to heritage sites specific to coastal zones needs to be arrived at, detailed and integrated with the CRZ regulations. Based on this, a workable control and monitoring mechanism should be determined and made operational. The Ministry of Culture should accomplish this process as soon as possible.

(xi) Addressing the issue of pressures on marine and coastal ecosystems, as defined in the Johannesburg Plan of Implementation (Part IV) adopted at the 2002 World Summit on Sustainable Development (WSSD), every effort shall be made to promote sustainable fisheries, prevent biological diversity loss and pollution from various sources including land-based sources of marine pollution, ship-generated marine pollution, oil spills, hazardous waste dumping, contaminated ships brought for breaking purposes, etc., and minimize/nullify impacts of coastal development and urbanization.

(xii) Every effort shall be made towards ensuring 'integrated marine and coastal area management (IMCAM), as prescribed in the Jakarta Mandate (1995) and its Programme of Action (1998) under the 1992 Convention on Biological Diversity, as the best tool for the conservation and sustainable use of marine and coastal biodiversity.

(xiii) As required under the 1992 UN Framework Convention on Climate Change, climate - related impacts would require response options that could also address issues such as sustainable coastal development and the protection of mangroves and other ecosystems. Coastal bio-shields will help to enhance carbon sequestration.

(xiv) Coastal village communities and school children should be encouraged and enabled to prepare local level biodiversity and cultural heritage registers, as is now being done with reference to community bio-diversity registers. This will also be helpful in implementing the provisions relating to prior informed consent and benefit sharing enshrined in the Biodiversity Act (2002).

(xv) Coastal bioresources conservation needs the understanding and support of all those who are currently using both the living and non-living aquatic resources in the ocean. For example, modern fishing trawlers have destroyed sea grass beds and this in turn has led to the destruction of the habitat of dugongs. Unfortunately, there is no mechanism for a

proactive action-reaction analysis before this so called "modernization" of coastal commercial activities including fishing is undertaken. There is need to build the capacity of local Panchayats, educational institutions and civil society organizations, as well as of relevant government departments in conducting environmental and biodiversity audits. This will enable greater public understanding and participation in the conservation and enhancement of coastal bio-resources, both on the landward and seaward sides of the coast. Many precious halophytes occur on the coast and these are now endangered with the threat of extinction. The Botanical and Zoological Surveys of India should undertake a massive programme of coastal bioiresources inventorisation and conservation together with the National Bioresources Board, the National Medicinal Plants Board and the National Bureau of Plant, Animal and Fish Genetic Resources.

4.1.3 ToR-(III) To revisit the CRZ, Notification, 1991 in the light of above and recommend necessary amendments to make the regulatory framework consistent with recommendations on (a) and (b) above and the Environment (Protection) Act, 1986.

(i) On the basis of various presentations made before the Committee, representations made by different stakeholders, deliberations among the members of the Committee, as well as based upon the 12 basic principles, the different issues relating to Coastal Regulation Zone Notification were addressed. The Committee is of the opinion that there needs to be a comprehensive, holistic and transparent approach towards management of the coastal zone, which is lacking in the present Coastal Regulation Zone Notification, 1991.

(ii) The range of amendments presents a trend that has allowed commercial and industrial expansion in coastal areas. Many of these activities have proved to be extremely harmful to the ecological and livelihood security of the coastal areas. The Committee is of the view that CRZ notification needs to be strengthened and made more scientific in its overall approach, keeping in mind both the needs of the coastal communities (including fishing, agricultural) and the conservation of the coast.

(iii) The several amendments brought into the original notification have to some extent distracted from the original objectives and the spirit of the Coastal Regulation Zone Notification, 1991.

(iv) As already stressed, coastal policy and regulation for protection and conservation of the coastline will be governed by principles of ecological economics and polluter pays. As such there shall be absolute liability for those who engage in hazardous or inherently dangerous coastal activity including the liability to compensate the victims of all man made hazards, including pollution as well as the cost of restoring the coastal environmental degradation. The 'onus of proof' in such cases shall be on the actor/developer to show that his/her action is environmentally benign.

(v) Coastal policy and regulations overall approach shall be to protect fragile coastal zones of India, in view of the growing demographic and economic pressures, especially to protect and regenerate the mangroves and the coral reefs as well as other ecologically sensitive areas. In the wake of the serious loss of life, property

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and the destruction of precious habitats caused by unprecedented Tsunami that ravaged Andaman and Nicobar Islands and coastal states such as Tamil Nadu, Kerala, Andhra Pradesh and Pondicherry on 26th December, 2004, it should be ensured that short-term commercial interests do not undermine the ecological security of Indian coastal areas. The strategies for disaster preparedness shall comprise emphatic prohibition on construction of any permanent structures within the vulnerable areas, except for those required to protect the community such as disaster shelters, infrastructure for rescue and relief, sea walls, where essential, to prevent erosion and ingress of sea water, look-out posts, etc.

(vi) That Coastal Zone Management requires multi-disciplinary approaches as no single field or sector adequately addresses all the complex issues of conservation, preservation, restoration and development of coastal resources and ecosystems including livelihood security and food security and the security of cultural and heritage sites.

(vii) There are complex issues which were not addressed in the Coastal Regulation Zone notification adequately such as different property right regimes and the benefits generated by the coastal resources, living and non-living resources in term of marketable values, non-market benefits, immeasurable and intangible benefits. Many of the conflicts arise because of difficulty in resolving intra-generational and inter-generational equity and a mechanism should be put in place to resolve such conflicts in the policy and regulatory framework concerning the coastal areas. There shall be code of conduct for coastal management and ecological security including a package of rewards for initiatives in the areas of landward and seaward oriented buildings, energy efficient construction, use of non-conventional energy sources, rainwater harvesting, effluent treatment and use of biodegradable material. The coastal ecological security literacy programme should bring to the attention of builders the opportunities now available for mainstreaming ecology in building design and construction.

(viii) Although there are several R&D institutions engaged in coastal zone conservation and management in the country, there is no well-planned and coordinated effort. We suggest that MoEF in cooperation with Department of Ocean Development sponsor an all India Coordinated Research Project for Sustainable and Integrated Coastal Zone Management. Such an All India Coordinated Project should bring together various institutions now functioning under Indian Council of Agriculture Research (ICAR), Council for Scientific and Industrial Research (CSIR), DoD, Department of Science & Technology (DST), Indian Space Research Organisation (ISRO), Department of Atomic Energy (DAE), Defence Research & Development Organisation (DRDO), Indian Institute of Technologies (IITs) and Universities, into a working partnership based on a sharply focused and prioritized agenda. This will also help to fill gaps in ongoing work, particularly in the areas of ecological economics and the economics of inter-generational equity. Coordinated efforts will help to maximize the benefits of the vast R&D infrastructure available in the country and will minimize avoidable duplication and transaction costs.

(ix) There is need to identify and notify areas such as sensitive areas, hotspots, potential land based and sea based mariculture sites, etc. The mandated

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institutions under the various Ministries may be approached to prepare the GIS based sitemaps, which should be notified and legalized by the MOEF for future developmental and conservational activities. The issue of demarcating the High Tide Marks perhaps could be done away with and a more distinct natural boundary may be adopted. Coastal people particularly fishermen and women are severely affected by some of the existing provisions of the CRZ regulations and are targeted by local authorities by denial of traditional and essential activities on the coasts.

(x) Sustainable livelihood strategy should be based on the principles of social inclusion and gender equity. It must cover fisher and land-based farming communities as well as landless labour families. Male fishers who are unemployed for about half of the year and the women who are under employed shall be brought under the sustainable livelihood strategy by introducing agrarian reforms, integrated capture and culture fisheries, seawater farming, coastal biovillages, a coastal grid of farm schools and demonstration centers, etc. A Network of Rural Knowledge Centres should be established all along the coast, as soon as possible, with good connectivity, a digital gateway and capacity building for care and management.

(xi) Enforcement is the weakest dimension of most of the environmental legislation. Unless strict penal measures are instituted, policies will remain on paper. Fixing of responsibility on the bureaucrat /state official as well as elected representatives, as per the 'public trust doctrine', will be necessary to create a higher level of political will and commitment. The implementation of the provisions of notification should be rigorously enforced. Placing within the public domain full details of projects proposed within the Zone can generate the necessary public and media attention and involvement.

(xii) At present, the extent of the coastal zone is defined in various ways and is managed by a multiple set of agencies. Various Government departments such as the Public Works Department, Port Department, Department of Mines and Geology, Forest Department, Fisheries Department, Department of Ocean Development, Coast Guard etc. control various features and activities on the coast. In the presentations made by the various Departments of the Government before this Committee, it was clear that there an urgent need for greater inter-departmental interaction and cooperation when it comes to the conservation of the coastline. Data sharing as well as sharing of plans and procedures are important. Furthermore, it is critical that there is an awareness related to national security, biodiversity conservation, livelihood and related issues simultaneously in all these Departments.

(xiii) All activities that are permissible within the coastal zone need to be allowed only after a comprehensive EIA and safety/disaster planning analysis that takes into account climate change implications and extreme events. All aquaculture projects should be reviewed so as to ensure that these projects are not destroying mangroves, corals, etc. or polluting the ground water. No new roads should be permitted within the CRZ unless EIAs are conducted and ICZM Plans are put in place, except for providing fisher communities access to the sea.

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(xiv) The construction of sea walls has been proposed by some States as one of the solutions for preventing damage by tidal waves. However, the construction of sea walls alters long-shore currents and modifies coastal geomorphology. In many places it also causes loss and fragmentation of coastal habitats. As a result it also prevents the access to the beach and estuaries which marine organisms need for breeding and rearing their young. Estuaries, which serve as habitats of mangrove species will be affected. Structures for preventing coastal erosion should be located beyond the High Tide Line. Instead of building concrete seawalls, it will be advisable to initiate a programme of raising bio-shields and coastal green belts. Construction of concrete sea walls can be restricted to areas, which are very vulnerable to sea erosion.

(xv) Sand mining is the foremost factor leading to erosion of beaches. There are studies to indicate that at least 21 beaches have been lost in the Nicobar to sand mining in a period of ten years. It is critical that alternate and environment friendly technologies for controlling erosion are employed. These include replanting sand dune vegetation and mangroves where they existed earlier. All natural barriers – such as coral reefs, mangroves and sand dunes must be protected at all costs. No activities that affect these natural assets should be permitted. Earthen bunds can also be encouraged wherever possible. These activities can be built into coastal zone management plans and can be monitored by the CZMAs. Any structure (hard measure) should be considered only if soft measures are not possible. The agency considering the hard measure particularly groins or breakwaters should be responsible for protecting the shoreline at least 500 mts on either side of the shoreline from erosion. In case of breakwaters for harbours, the stretch of the shoreline to be considered for protection should be at least 1.5 km on either side of the structure. The agency undertaking the construction of the said structures should be responsible for the monitoring of the shoreline for a minimum period of one year so as to cover the seasonal variation in the wave climate, which dictates its dynamics. Here again, the agency responsible for the construction of the said structures should be responsible for the monitoring of the shoreline for a minimum period of one year.

(xvi) At locations, where, shoreline advances towards the ocean, due to shore defense measures undertaken by the Government, construction of huts and houses should be totally banned. The local Panchayat could monitor and report to the District Collector or enforcing department. The construction sequence as per the season is extremely important. This should be spelt out clearly in consultation with an expert in the field of specialization prior to obtaining the necessary clearance/sanction from the appropriate authority/body. The sizes of the stones usually adopted for the construction of seawalls, groins or breakwaters are arrived at using empirical formulae. If the weight of the individual stones used for construction is underestimated, this would result in the scattering of such stones all over the seafloor resulting in several other problems. (Typical examples are the seawalls along Royapuram in Tamilnadu, North of Paradeep port, a long stretch of the coast of Karnataka and a few other locations). Verification of the stability of the cover layer of these structures through physical modeling in Laboratories is absolutely essential prior to the commencement of such projects.

(xvii) Vacant plots within municipal limits should be left open. They can be used for parks, gardens, playgrounds etc. All efforts should be made to discourage and reduce population densities and new activities in these areas. There is need to sensitise Panchayat Members on the population supporting capacity of fragile ecosystems. No construction activities, pipelines, cables, jetties, reclamation, should be permitted in ecologically sensitive areas. Only repairs of existing authorized structures should be permitted within open spaces. Reclamation for ports and harbours should be kept to the barest minimum.

(xviii) Coastal tourism and recreational facilities may be promoted in identified tourism potential areas after taking into consideration the social issues of the area, vulnerability and resources. Ecological literacy programmes should be initiated for tourists, so that they do not dump non-biodegradable plastics and other wastes in the coastal areas. There should be pride in preserving areas of great scenic beauty.

(xix) The notification permits construction of fishing jetties and harbours in the coastal zones other than the ecologically sensitive areas. However, the allied facilities for fishing harbours such as storage stalls, ice factories, ice-pressing units, processing units, workshops, storage units, fish warehousing are not permissible. The fish and shell fish being highly perishable commodities, the post-harvest technologies are very important for improving the self-life of fish for the purpose of marketing and processing. Therefore, the Committee is of the opinion that integrated fish processing units should be allowed after adequate environmental safety measures are incorporated in the decision making process. Land for such purposes should be made available on a priority basis by the district administration. Eventually, the maps of the town and country planning departments could be amended to make these allocations possible. Improved post-harvest technology is essential for ensuring the quality and nutritional safety of fish and to prevent *Salmonella* infection.

(xx) The role of the Coastal Zone Management Authorities needs to be expanded from a mere a policing the coast for conservation purposes to one of sustainable and integrated management. National and State Coastal Zone Management Authorities have been constituted by the Central Government. However, in most cases their composition is imbalanced, having none or very few local community representation. These CZMAs if they are to be effective, both at national and state level need to be reconstituted such that they have representatives of local communities; community based organizations and non-governmental organizations. The CZMAs need to be constituted at district levels as well, perhaps in the form of district level authorities. At present, the state level CZMAs have too large an area to monitor efficiently. There needs to be an active participation of local communities in the planning and monitoring of activities on the coast. This also dovetails with the point that local community representatives need to be on CZMAs. At present this is missing at both national as well as state levels. It should be incorporated at any other level also where such monitoring is taking place. Unfortunately, because this aspect has not been explicitly stated in the notification, it is ignored in practice.

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4.2 For implementing the National Coastal Management Programme, the Central Government should strengthen the technical and human resource capacity. It may be useful to establish the following institutional structures for this purpose:

1. A separate Division in the Ministry of Environment and Forests to handle Coastal Zone Management in the country headed by an eminent technical expert. This Division may service the proposed All India Coordinated Research Project on Integrated and Sustainable Coastal Zone Management.
2. A National Board for Sustainable Coastal Zone Management may be set up on similar lines to that of the Wildlife Board of India. This Board may consist of about 21 members including representatives of all major stakeholders:

    i. Union Minister for Environment and Forests - Chairman,
    ii. Union Minister for Ocean Development – Co-Chair.
    iii. Technical experts from reputed national and State Government Institutes in the area of coastal and marine management/research.
    iv. Representative of the National Commission for Women.
    v. Representatives of electronics and print media.
    vi. Representatives from fisheries, aquaculture, tourism, hotel, industries, mining, shipping, sectors.
    vii. Legal experts (national and international law).
    viii. Representatives from selected coastal Panchayats.
    ix. Representatives from Andaman & Nicobar and Lakshadweep islands.
    x. Representatives from Non-Governmental Organisations involved in activities related to coastal zone management, fishermen welfare and conservation of bioiresources and cultural heritage.
    xi. Early warning and Disaster Management experts.

    - The Board may meet as often necessary.

3. National and State/UT level Coastal Zone Management Authorities:

    (i) A National Coastal Zone Management Authority may be set up to monitor the state of environment in the coastal zone and to suggest implementation procedures for the decisions made by the National Board for Sustainable Coastal Zone Management. The Authority should be headed by an eminent expert in the area of Sustainable Coastal Zone Management.

4. National Institute for Sustainable Coastal Zone Management:

The proposed National Institute should be autonomous but may be located in an appropriate existing Institution/University.

(i) Functions:

a. This Institute shall be set up to address policy and legal issues of coastal zone management and to undertake conflict resolution studies.
b. Awareness and education programmes in the areas of coastal zone management and ecological literacy.

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c. Litigations, violations and other issues referred to by the National and State/Union Territory Coastal Zone Management Authorities.

(ii) Under the National Institute, two regional centers may be set up to address the issues of:

(a) Andaman & Nicobar Islands.
(b) Lakshadweep Island.

(iii) A digital gateway for sustainable coastal zone management may be set up within the National Institute for Sustainable Coastal Zone Management. The gateway shall be responsible for providing uptodate information on integrated sustainable coastal zone management.

Thus, we are proposing a 3 tier structure to strengthen our national capacity in the area of environmentally and socially sustainable integrated coastal zone management:

1) A National Board for Sustainable Coastal Zone Management for policy guidance.
2) A professionally led Sustainable Coastal Zone Authority for task implementation.
3) A National Institute supported by 2 island centers for serving as repositories of policy and legal decisions and guidelines, undertaking conflict resolution studies and for promoting ecological literacy as related to sustainable coastal zone management.

In addition, we have proposed the initiation of an Inter-organisational and inter-disciplinary All India Coordinated Research Project on Integrated and Sustainable Coastal Zone Management, in order to achieve convergence and synergy among numerous on-going R&D efforts and to fill gaps in critical areas such as social and gender audit, economics of inter-generational equity and technological empowerment of Panchayati Raj institutions.

An organogram indicating the Institutional Structure for Sustainable Coastal Zone Management is placed at item 6.5 at page 108.

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CHAPTER-5

5.0 Conclusion of the Committee

We should build on the strengths of existing regulations and institutional structures, eliminate weaknesses in regulatory procedures and fill gaps in core areas, such as ecological economics and social and gender audit, where our national competence is inadequate.

Our goal should not be just conservation but also enhancement of the living and non-living resources of the coastal zone. This is our duty to the generations yet to be born. For example, we should rehabilitate all damaged mangrove wetlands and involve local youth in preserving coral reefs and promoting the creation of artificial coral reefs. The coastal ecological literacy movement should place emphasis on both conservation and natural resources enhancement.

Above all, we should create structures for generating coordinated and cooperative action among the different Central and State Government agencies. The absence of inter-departmental and Centre-State coordination is the biggest obstacle to fostering a Sustainable Coastal Zone Management Strategy. We hope that the proposed National Board will help to fill this void.

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CHAPTER-6

6.0 A NATIONAL COASTAL ZONE MANAGEMENT ACTION PLAN

6.1.1 Objective

The objective of the coastal zone management is to protect with peoples participation the livelihood security of the coastal fisher and other communities and, the ecosystems which sustain productivity of the coastal; areas while promoting sustainable development that contribute to nation's economy and prosperity.

6.1.2 Definition

Coastal zone is defined as an area from the territorial waters limit (12 nautical miles) including its sea bed upto the landward boundary of the local self government abutting the sea coast.

Coastal zone also includes inland water bodies influenced by tidal action including its bed and the adjacent land area upto the landward boundary of the local self-government abutting such water bodies.

In case of ecologically sensitive areas, the entire notified area/biological boundary of the area will be included.

6.1.3 Classification

For the purpose of management, the coastal zone is divided into four:

(i) **Coastal Management Zone-I (CMZ-I)** – consists of areas designated as ecologically sensitive (ESA), which are listed in Annexure-II.

(ii) **Coastal Management Zone-II (CMZ-II)** – consists of areas identified as areas of particular concern (APC) such as economically important areas, high population areas and culturally/strategically important areas. The administrative boundaries of these areas would be boundaries of CZM-II. The list of such areas is given at Annexure-III.

(iii) **Coastal Management Zone-III (CMZ-III)** – consists of all other open areas including the coastal seas but excluding those areas classified as CMZ-I, CMZ-II and CMZ –IV.

(iv) **Coastal Management Zone-IV (CMZ- IV)** - consists of Islands of The Andaman and Nicobar and Lakshadeep.

6.1.4 Management Methodology

As part of the management of the coastal zone, the following preservation, conservation and development criteria are to be followed in the zones identified above:

(i) **Coastal Management Zone-I** – MoEF shall identify and declare the ecologically sensitive areas falling under this zone. An indicative list of these areas is enclosed in Annexure-II. Integrated Management Plans for these sensitive areas shall be prepared by the Ministry of Environment & Forests

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through scientific institutions which will be implemented by the concerned States/Union Territory and monitored by the Coastal Zone Management Authority of State/Union Territory. Necessary funding will be earmarked and provided by MoEF.

(ii) **Coastal Management Zone-II** –Integrated Management Plans (IMP) prepared by the local bodies /concerned agencies following the guidelines which will include vulnerability status (demarcated as per the guidelines in Annexure-I). Necessary funding for the preparation of Integrated Management Plans (IMPs) will be provided by the Ministry of Environment. The guidelines for the preparation of IMPs are given in Annexure IV.

(iii) **Coastal Management Zone-III** - The activities to be permitted or prohibited on the seaward side of the vulnerability line and the agencies responsible are enlisted in the Annexure-V.

(iv) **Coastal Management Zone-IV** - The management of the Andaman and Nicobar and Lakshadeep islands will be based on the Integrated Coastal Zone Management plan prepared by the MOEF.

6.2 Funding

The MoEF shall have funding mechanism for preparation of ICZMP for ESAs, IMP for APCs monitoring and enforcement, capacity building, awareness programme, bio-shields afforestation, women empowerment, participatory planning and development, warning systems and shelters against natural hazards and all other programmes necessary for the integrated coastal area management in the country etc.

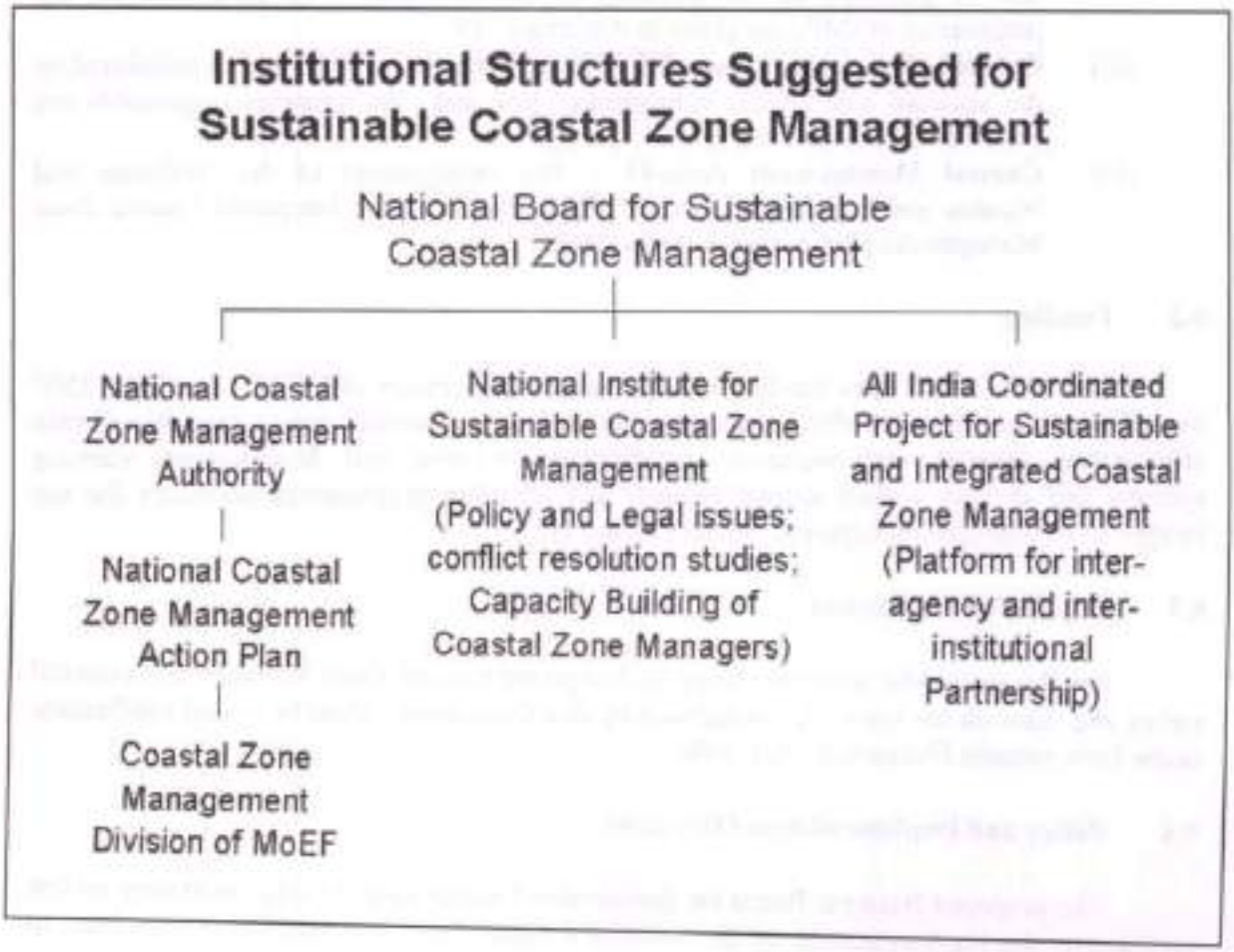
6.3 Legislative mechanism

For the successful implementation of Integrated Coastal Zone Management a coastal policy and rules on the lines recommended by this Committee shall be issued notification under Environment (Protection) Act, 1986.

6.4 Policy and Implementation Oversight

The proposed National Board for Sustainable Coastal Zone Management may review periodically the implementation of the National Coastal Zone Management Action Plan, to initiate timely mid-corrections, where needed.

6.5 ORGANOGRAM INDICATING THE INSTITUTIONAL STRUCTURE SUGGESTED FOR SUSTAINABLE COASTAL ZONE MANAGEMENT



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Annexure I

VULNERABILITY MAPPING

The setback lines in the zones categorized as CMZ –II and III will be based on vulnerability of the coast to natural and manmade hazards. This procedure is followed in many countries including USA where the coast has been mapped for vulnerability to coastal hazards.

For the purpose of mapping the vulnerability of the coast seven parameters are taken into account: elevation, geology, geomorphology, sea level trends, horizontal shoreline displacement (erosion/accretion), tidal ranges and wave heights. A brief on each of the parameter which can be considered for drawing up the vulnerability line are given below:

(i) **Elevation**: - The elevation data shall be obtained from the available coastal toposheets satellite data surveys.

(ii) **Geology**: - The geology identifies the rock types for all coastal segments.

(iii) **Geomorphology**:- the land forms will be identified on the maps based on the available toposheet and remote sensing data. Bathymetry to be derived from naval Hydrographic Charts on location specific surveys

(iv) **Sea level trends**: - The sea level trend data shall be obtained from the data available in the Ministry prepared based on primary data published by Survey of India.

(v) **Horizontal shoreline displacement**: - The erosion/accretion data used for horizontal shoreline displacement shall be obtained from long term information derived from Survey of India Topographic maps (1967) and the latest satellite data.

(vi) **Tidal ranges**: - Tide table published by the Survey of India.

(vii) **Wave heights**: - Wave heights obtained from ship observations published by National Institute of Oceanography or other locally available measured data.

Based on the above data a relative risk factor chart will be drawn up indicating vulnerability of the coast.

The vulnerability lines will be demarcated based on the above parameters using the guidelines for the entire country on cadastral scale (1:4000) by the NISCM proposed by Ministry of Environment & Forests.

Early warning systems are available for few of the hazards like cyclones, storm surges and Tsunamis (being put in place). Earthquakes however cannot be predicted. For protecting the population from these hazards appropriate resistant buildings units, disaster shelters and other necessary infrastructure facilities need to be provided.

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Annexure-II

CMZ-I: INDICATIVE LIST OF ECOLOGICALLY SENSITIVE AREAS (ESA)

(i) Mangroves
(ii) Coral reefs
(iii) Sand Dunes
(iv) Inland tide/ water bodies such as estuaries, lakes, lagoons, creeks & straits
(v) Mudflats
(vi) Marine parks and sanctuaries
(vii) Coastal forests & wildlife
(viii) Coastal fresh water lakes
(ix) Salt Marshes
(x) Turtle nesting grounds
(xi) Horse shoe crabs habitats
(xii) Seagrass beds
(xiii) Sea weed beds
(xiv) Nesting grounds of migratory birds.

Guidelines for preparation of ICZMP of CMZ-I

- The above ecologically sensitive areas will be mapped and notified by the Ministry of Environment & Forests.
- The NISCM under Ministry of Environment & Forests will prepare the ICZMP to protect the notified areas.

Activities, which are essential shall be permitted in the area based on the ICZMP and after public hearing.

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Annexure-III

CMZ- II : AREAS OF PARTICULAR CONCERN (CMZ II)

(i) Coastal Municipalities/Corporations
(ii) Coastal Panchayats with population density more than 400/sqkm.
(iii) Ports & harbours
(iv) Declared Tourism Areas
(v) Mining sites
(vi) Approved Industrial Estates
(vii) SEZ
(viii) Heritage areas.
(ix) Archaeological sites
(x) Defence areas/installations
(xi) Atomic/thermal/other power plants

The guidelines for the preparation of the integrated management plans for these notified area are given in Annexure IV.

Annexure-IV

GUIDELINES FOR PREPARATION OF INTEGRATED MANAGEMENT PLAN FOR CMZ II AREAS

- The entire notified Corporation, Municipality, Panchayat, revenue area, shall be the outer boundary of the APC.
- IMPs will be prepared for these areas indicating all present and future developments, conservation and preservation schemes.
- Integrated Management will address vulnerability to human life and property based on vulnarability lines prepared by Ministry of Environment & Forests.
- No constructions shall be permitted on the seaward side of any existing (as on 2004) approved building or a tarred or surfaced road in the area.
- All the existing roads including the internal roads shall be strengthened, as these roads will serve for the purpose of livelihood, communication, relief and evacuation measures.
- Adequate cyclone shelters shall be constructed taking into account the population of the area.
- The new schools, market areas and other public facilities where large number of public congregate shall be located beyond the vulnerable area.
- Along the seaward side sufficient bio shield with local vegetation, trees including mangroves shall be planted
- The beaches shall be left free of any development.
- Appropriate coastal protection structures be constructed where ever required on a scientific basis
- New houses and settlements be planned landward of the vulnerability line.
- Sand dunes being natural speed breakers in the event of hazards shall be maintained or regenerated by planting shrubs or through appropriate measures.
- All the areas notified by the Ministry of Environment & Forests as CMZ I be clearly demarcated in the plan and for their conservation by the Ministry of Environment & Forests.
- The IMPs will be approved by the proposed NISCM of the Ministry.
- The enforcement and monitoring will be the responsibility of the concerned state/Union Territory Coastal Zone Management Authorities.

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Annexure -V

CMZ III: PERMISSIBLE DEVELOPMENTAL ACTIVITIES ON THE LANDWARD SIDE OF THE VULNERABILITY LINE

(i) Activities, which are permitted by the local/concerned authorities without CMZ clearance

- Boating, shipping and navigation.
- Fisheries including traditional fish processing units and ice crushing facilities.
- Mariculture including hatcheries and traditional aquaculture.
- Agriculture and horticulture.
- Public toilets and rain /cyclone shelters.
- Repair of existing buildings including reconstructions.

(ii) **Activities to be permitted with the approval of State/UT Authority**

- Temporary construction for tourism facilities.
- Construction of boat jetties and fishing harbours to be approved with EIA.
- Coastal Protection-the approach shall be to avoid hard engineering; soft engineering options shall be preferred.
- Bunding for the purpose of preventing coastal erosion, salinity ingress, maintenance of waterways.
- Saltpans-making salt by solar evaporation of seawater.
- Water sports and recreation facilities.
- Discharge of treated effluents shall be permitted as per the State/UT pollution Control Boards norms.
- Forest related activities.
- Boat building and repair.
- Boat re-fuelling facilities

(iii) **Activities that can be permitted with EIA and EMP to be approved by MoEF.**

- Integrated port, harbour, jetties and moored facilities.
- Dredging and disposal of dredged materials.
- Reclamation within port limits and for coastal protection.
- Bridges and sea links and approaches and reclamation therefor.
- Hydrocarbon exploration and extraction.
- Mining of placer minerals and offshore mining.
- Constructions of communication, power supply, lighthouses and water supply.
- Pipelines for transfer of petroleum /chemicals, storage facilities for storage of petroleum/chemical products and regasification facilities.
- Defence related projects.
- Shipbuilding yards.
- Ship-breaking in existing locations.
- Non conventional energy
- Any other activity which requires foreshore facilities.

(ii) Mangrove, corals and other bio shields afforestation activities in CMZ-III will be supported by Ministry of Environment & Forests

(v) All other activities are prohibited.

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Annexure- VII

ABBRIVIATIONS USED IN THE REPORT

APC - Areas of Particular Concern

CRZ - Coastal Regulation Zone

CWC - Centre Water Commission

CZM - Coastal Zone Management

ESA - Ecologically Sensitive Areas

EIA - Environmental Impact Assessment

EMP - Environmental Management Plan

HHTL - Highest High Tide Line

IRS - Indian Remote Sensing Satellite

MoEF - Ministry of Environment and Forests

NCZMA - National Coastal Zone Management Authority

SBL - Setback Line

SCZMA - State Coastal Zone Management Authority

SOI - Survey of India

PWD - Public Works Department

UT - Union Territory

UTCZMA - Union Territory Coastal Zone Management Authority

NISCM - National Institute for Sustainable Coastal Management

IMP - Integrated Management Plan

ICZMP - Integrated Coastal Zone Management Plan

ICT – Information Communication Technology

ANNEXURE A-5

(To be published in the Gazette of India, Extraordinary, Part-II, Section 3, Sub-section (ii) of dated the 6th January, 2011)

COASTAL REGULATION ZONE NOTIFICATION
MINISTRY OF ENVIRONMENT AND FORESTS
(Department of Environment, Forests and Wildlife)

S.O.19(E).- WHEREAS a draft notification under sub-section (1) of section and clause (V) of sub-section (2) of section 3 of the Environment (Protection) Act, 1986 was issued inviting objections and suggestions for the declaration of coastal stretches as Coastal Regulation Zone and imposing restrictions on industries, operations and processes in the CRZ was published vide S.O.No.2291 (E), dated 15th September, 2010.;

AND WHEREAS, copies of the said Gazette were made available to the public on 15th September, 2010.;

AND WHEREAS, the suggestions and objections received from the public have been considered by the Central Government.;

Now, therefore, in exercise of the powers conferred by sub-section (1) and clause (v) of sub-section (2) of section 3 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government, with a view to ensure livelihood security to the fisher communities and other local communities, living in the coastal areas, to conserve and protect coastal stretches, its unique environment and its marine area and to promote development through sustainable manner based on scientific principles taking into account the dangers of natural hazards in the coastal areas, sea level rise due to global warming, does hereby, declare the coastal stretches of the country and the water area upto its territorial water limit, excluding the islands of Andaman and Nicobar and Lakshadweep and the marine areas surrounding these islands upto its territorial limit, as Coastal Regulation Zone (hereinafter referred to as the CRZ) and restricts the setting up and expansion of any industry, operations or processes and manufacture or handling or storage or disposal of hazardous substances as specified in the Hazardous Substances (Handling, Management and Transboundary Movement) Rules, 2009 in the aforesaid CRZ.; and

In exercise of powers also conferred by clause (d) and sub rule (3) of rule 5 of Environment (Protection) Act, 1986 and in supersession of the notification of the Government of India in the Ministry of Environment and Forests, number S.O.114(E), dated the 19th February, 1991 except as respects things done or omitted to be done before such supercession, the Central Government hereby declares the following areas as CRZ and imposes with effect from the date of the notification the following restrictions on the setting up and expansion of industries, operations or processes and the like in the CRZ,-

(i) the land area from High Tide Line (hereinafter referred to as the HTL) to 500mts on the landward side along the sea front.

(ii) CRZ shall apply to the land area between HTL to 100 mts or width of the creek whichever is less on the landward side along the tidal influenced water bodies that are connected to the sea and the distance upto which development along such tidal influenced water bodies is to be regulated shall be governed by the distance upto which the tidal effects are experienced which shall be determined based on salinity concentration of 5 parts per thousand (ppt) measured during the driest period of the year and distance upto which tidal effects are experienced shall be clearly identified and demarcated accordingly in the Coastal Zone Management Plans (hereinafter referred to as the CZMPs).

Explanation.- For the purposes of this sub-paragraph the expression tidal influenced water bodies means the water bodies influenced by tidal effects from sea, in the bays, estuaries, rivers, creeks, backwaters, lagoons, ponds connected to the sea or creeks and the like.

(iii) the land area falling between the hazard line and 500mts from HTL on the landward side, in case of seafront and between the hazard line and 100mts line in case of tidal influenced water body the word 'hazard line' denotes the line demarcated by Ministry of Environment and Forests (hereinafter referred to as the MoEF) through the Survey of India (hereinafter referred to as the SoI) taking into account tides, waves, sea level rise and shoreline changes.

(iv)land area between HTL and Low Tide Line (hereinafter referred to as the LTL) which will be termed as the intertidal zone.

(v) the water and the bed area between the LTL to the territorial water limit (12 Nm) in case of sea and the water and the bed area between LTL at the bank to the LTL on the opposite side of the bank, of tidal influenced water bodies.

2. For the purposes of this notification, the HTL means the line on the land upto which the highest water line reaches during the spring tide and shall be demarcated uniformly in all parts of the country by the demarcating authority(s) so authorized by the MoEF in accordance with the general guidelines issued at Annexure-I. HTL shall be demarcated within one year from the date of issue of this notification.

3. Prohibited activities within CRZ,- The following are declared as prohibited activities within the CRZ,-

(i) Setting up of new industries and expansion of existing industries except,-

(a) those directly related to waterfront or directly needing foreshore facilities;

Explanation: The expression "foreshore facilities" means those activities permissible under this notification and they require waterfront for their operations such as ports and harbours, jetties, quays, wharves, erosion control measures, breakwaters, pipelines, lighthouses, navigational safety facilities, coastal police stations and the like.;

(b) projects of Department of Atomic Energy;

(c) facilities for generating power by non-conventional energy sources and setting up of desalination plants in the areas not classified as CRZ-I(i) based on an impact assessment study including social impacts.;

(d) development of green field Airport already permitted only at Navi Mumbai;

(e) reconstruction, repair works of dwelling units of local communities including fishers in accordance with local town and country planning regulations.

(ii) manufacture or handling oil storage or disposal of hazardous substance as specified in the notification of Ministry of Environment and Forests, No. S.O.594 (E), dated the 28th July 1989, S.O.No.966(E), dated the 27th November, 1989 and GSR 1037 (E), dated the 5th

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(a) transfer of hazardous substances from ships to ports, terminals and refineries and vice versa;

(b) facilities for receipt and storage of petroleum products and liquefied natural gas as specified in Annexure-II appended to this notification and facilities for regasification of Liquefied Natural Gas (hereinafter referred to as the LNG) in the areas not classified as CRZ- I(i) subject to implementation of safety regulations including guidelines issued by the Oil Industry Safety Directorate in the Ministry of Petroleum and Natural Gas and guidelines issued by MoEF and subject to further terms and conditions for implementation of ameliorative and restorative measures in relation to environment as may be stipulated by in MoEF.

Provided that facilities for receipt and storage of fertilizers and raw materials required for manufacture of fertilizers like ammonia, phosphoric acid, sulphur, sulphuric acid, nitric acid and the like, shall be permitted within the said zone in the areas not classified as CRZ-I(i).

(iii) Setting up and expansion of fish processing units including warehousing except hatchery and natural fish drying in permitted areas:

(iv) Land reclamation, bunding or disturbing the natural course of seawater except those,-

(a) required for setting up, construction or modernisation or expansion of foreshore facilities like ports, harbours, jetties, wharves, quays, slipways, bridges, sealink, road on stilts, and such as meant for defence and security purpose and for other facilities that are essential for activities permissible under the notification;
(b) measures for control of erosion, based on scientific including Environmental Impact Assessment (hereinafter referred to as the EIA) studies
(c) maintenance or clearing of waterways, channels and ports, based on EIA studies;

(d) measures to prevent sand bars, installation of tidal regulators, laying of storm water drains or for structures for prevention of salinity ingress and freshwater recharge based on carried out by any agency to be specified by MoEF.

(v) Setting up and expansion of units or mechanism for disposal of wastes and effluents except facilities required for,-

(a) discharging treated effluents into the water course with approval under the Water (Prevention and Control of Pollution) Act, 1974 (6 of 1974);
(b) storm water drains and ancillary structures for pumping;
(c) treatment of waste and effluents arising from hotels, beach resorts and human settlements located in CRZ areas other than CRZ-I and disposal of treated wastes and effluents;

(vi) Discharge of untreated waste and effluents from industries, cities or towns, and other human settlements. The concerned authorities shall implement schemes for phasing out existing discharge of this nature, if any, within a time period not exceeding two years from the date of issue of this notification.

(vii) Dumping of city or town wastes including construction debris, industrial solid wastes, fly-

ash for the purpose of land filling and the like and the concerned authority shall implement schemes for phasing out any existing practice, if any, shall be phased out within a period of one year from date of commencement of this notification.

Note:-The MoEF will issue a separate instruction to the State Governments and Union territory Administration in respect of preparation of Action Plans and their implementation as also monitoring including the time schedule thereof, in respect of paras (v), (vi) and (vii).

(viii) Port and harbour projects in high eroding stretches of the coast, except those projects classified as strategic and defence related in terms of EIA notification, 2006 identified by MoEF based on scientific studies and in consultation with the State Government or the Union territory Administration.

(ix) Reclamation for commercial purposes such as shopping and housing complexes, hotels and entertainment activities.

(x) Mining of sand, rocks and other sub-strata materials except,-

(a)those rare minerals not available outside the CRZ area,
(b) exploration and exploitation of Oil and Natural Gas.

(xi) Drawl of groundwater and construction related thereto, within 200mts of HTL; except the following:-

(a) in the areas which are inhabited by the local communities and only for their use.
(b) In the area between 200mts-500mts zone the drawl of groundwater shall be permitted only when done manually through ordinary wells for drinking, horticulture, agriculture and fisheries and where no other source of water is available.

Note:-Restrictions for such drawl may be imposed by the Authority designated by the State Government and Union territory Administration in the areas affected by sea water intrusion.

(xi) Construction activities in CRZ-I except those specified in para 8 of this notification.

(xiii) Dressing or altering the sand dunes, hills, natural features including landscape changes for beautification, recreation and other such purpose.

(xiv) Facilities required for patrolling and vigilance activities of marine/coastal police stations.

4. Regulation of permissible activities in CRZ area.- The following activities shall be regulated except those prohibited in para 3 above,-

(i)(a) clearance shall be given for any activity within the CRZ only if it requires waterfront and foreshore facilities;

(b) for those projects which are listed under this notification and also attract EIA notification, 2006 (S.O.1533 (E), dated the 14th September, 2006), for such projects clearance under EIA notification only shall be required subject to being recommended by the concerned State or Union territory Coastal Zone Management Authority (hereinafter referred to as the CZMA).

(c) Housing schemes in CRZ as specified in paragraph 8 of this notification;

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(d) Construction involving more than 20,000sq mts built-up area in CRZ-II shall be considered in accordance with EIA notification, 2006 and in case of projects less than 20,000sq mts built-up area shall be approved by the concerned State or Union territory Planning authorities in accordance with this notification after obtaining recommendations from the concerned CZMA and prior recommendations of the concern CZMA shall be essential for considering the grant of environmental clearance under EIA notification, 2006 or grant of approval by the relevant planning authority.

(e) MoEF may under a specific or general order specify projects which require prior public hearing of project affected people.

(f) construction and operation for ports and harbours, jetties, wharves, quays, slipways, ship construction yards, breakwaters, groynes, erosion control measures;

(ii) the following activities shall require clearance from MoEF, namely:-

(a) those activities not listed in the EIA notification, 2006.

(b) construction activities relating to projects of Department of Atomic Energy or Defence requirements for which foreshore facilities are essential such as, slipways, jetties, wharves, quays; except for classified operational component of defence projects. Residential buildings, office buildings, hospital complexes, workshops of strategic and defence projects in terms of EIA notification, 2006.;

(c) construction, operation of lighthouses;

(d) laying of pipelines, conveying systems, transmission line;

(e) exploration and extraction of oil and natural gas and all associated activities and facilities thereto;

(f) Foreshore requiring facilities for transport of raw materials, facilities for intake of cooling water and outfall for discharge of treated wastewater or cooling water from thermal power plants. MoEF may specify for category of projects such as at (f), (g) and (h) of para 4;

(g) Mining of rare minerals as listed by the Department of Atomic Energy;

(h) Facilities for generating power by non-conventional energy resources, desalination plants and weather radars;

(i) Demolition and reconstruction of (a) buildings of archaeological and historical importance, (ii) heritage buildings; and buildings under public use which means buildings such as for the purposes of worship, education, medical care and cultural activities;

4.2 Procedure for clearance of permissible activities.- All projects attracting this notification shall be considered for CRZ clearance as per the following procedure, namely:-

(i) The project proponents shall apply with the following documents seeking prior clearance under CRZ notification to the concerned State or the Union territory Coastal Zone Management Authority,-

(a) Form-1 (Annexure-IV of the notification);

(b) Rapid EIA Report including marine and terrestrial component except for construction projects listed under 4(c) and (d)

(c) Comprehensive EIA with cumulative studies for projects in the stretches classified as low and medium eroding by MoEF based on scientific studies and in consultation with the State Governments and Union territory Administration;

(d) Disaster Management Report, Risk Assessment Report and Management Plan;

(e) CRZ map indicating HTL and LTL demarcated by one of the authorized agency (as indicated in para 2) in 1:4000 scale;

(f) Project layout superimposed on the above map indicated at (e) above;

(g) The CRZ map normally covering 7km radius around the project site.
(h) The CRZ map indicating the CRZ-I, II, III and IV areas including other notified ecologically sensitive areas;
(i) No Objection Certificate from the concerned State Pollution Control Boards or Union territory Pollution Control Committees for the projects involving discharge of effluents, solid wastes, sewage and the like.;

(ii) The concerned CZMA shall examine the above documents in accordance with the approved CZMP and in compliance with CRZ notification and make recommendations within a period of sixty days from date of receipt of complete application,-

(a) MoEF or State Environmental Impact Assessment Authority (hereinafter referred to as the SEIAA) as the case may be for the project attracting EIA notification, 2006;
(b) MoEF for the projects not covered in the EIA notification, 2006 but attracting para 4(ii) of the CRZ notification;

(iii) MoEF or SEIAA shall consider such projects for clearance based on the recommendations of the concerned CZMA within a period of sixty days.

(vi) The clearance accorded to the projects under the CRZ notification shall be valid for the period of five years from the date of issue of the clearance for commencement of construction and operation.

(v) For Post clearance monitoring – (a) it shall be mandatory for the project proponent to submit half-yearly compliance reports in respect of the stipulated terms and conditions of the environmental clearance in hard and soft copies to the regulatory authority(s) concerned, on 1st June and 31st December of each calendar year and all such compliance reports submitted by the project proponent shall be published in public domain and its copies shall be given to any person on application to the concerned CZMA.

(b) the compliance report shall also be displayed on the website of the concerned regulatory authority.

(vi) To maintain transparency in the working of the CZMAs it shall be the responsibility of the CZMA to create a dedicated website and post the agenda, minutes, decisions taken, clearance letters, violations, action taken on the violations and court matters including the Orders of the Hon'ble Court as also the approved CZMPs of the respective State Government or Union territory.

5. Preparation of Coastal Zone Management Plans.

(i) The MoEF may obtain the CZMPs prepared through the respective State Government or Union territory;

(ii) The CZMPs may be prepared by the coastal State Government or Union territory by engaging reputed and experienced scientific institution(s) or the agencies including the National Centre for Sustainable Coastal Management (hereinafter referred to as the NCSCM) of MoEF and in consultation with the concerned stakeholders;

(iii) The hazard line shall be mapped by MoEF through SoI all along the coastline of the country and the hazard line shall be demarcated taking into account, tide, waves, sea level

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rise and shoreline changes;

(iv)For the purpose of depicting the flooding due to tides, waves and sea level rise in the next fifty and hundred years, the contour mapping of the coastline shall be carried out at 0.5m interval normally upto 7km from HTL on the landward side, and the shoreline changes shall be demarcated based on historical data by comparing the previous satellite imageries with the recent satellite imageries;

(v) Mapping of the hazard line shall be carried out in 1:25,000 scale for macro level planning and 1:10,000 scale or cadastral scale for micro level mapping and the hazard line shall be taken into consideration while preparing the land use plan of the coastal areas;

(vi)The coastal States and Union Territory will prepare within a period of twenty four months from the date of issue this notification, draft CZMPs in 1:25,000 scale map identifying and classifying the CRZ areas within the respective territories in accordance with the guidelines given in Annexure-I of the notification, which involve public consultation;

(vii) The draft CZMPs shall be submitted by the State Government or Union territory to the concerned CZMA for appraisal, including appropriate consultations, and recommendations in accordance with the procedure(s) laid down in the Environment (Protection) Act, 1986;

(viii) The State Government or Union territory CZMA shall submit the draft CZMPs to MoEF alongwith its recommendations on the CZMP within a period of six months after incorporating the suggestions and objections received from the stakeholders;

(ix)MoEF shall thereafter consider and approve the CZMPs within a period of four months from the date of receipt of the CZMPs complete in all respects;

(x) All developmental activities listed in this notification shall be regulated by the State Government, Union Territory Administration, the local authority or the concerned CZMA within the framework of such approved CZMPs as the case may be in accordance with provisions of this notification;

(xi) The CZMPs shall not normally be revised before a period of five years after which, the concerned State Government or the Union territory may consider undertaking revision of the maps following the above procedures;

(xii) The CZMPs already approved under CRZ notification, 1991 shall be valid for a period of twenty four months unless the aforesaid period is extended by MoEF by a specific notification subject to such terms and conditions as may be specified therein.

6. Enforcement of the CRZ, notification, 2011-

(a) For the purpose of implementation and enforcement of the provisions this notification and compliance with conditions stipulated thereunder, the powers either original or delegated are available under Environment (Protection) Act, 1986 with the MoEF, State Government or the Union territory Administration NCZMA and SCZMAs;

(b) The composition, tenure and mandate of NCZMA and State Government of the Union territory CZMAs have already been notified by MoEF in terms of Orders of Hon'ble

Supreme Court in Writ Petition 664 of 1993;

(c) the State Government or the Union territory CZMAs shall primarily be responsible for enforcing and monitoring of this notification and to assist in this task, the State Government and the Union territory shall constitute district level Committees under the Chairmanship of the District Magistrate concerned containing atleast three representatives of local traditional coastal communities including from fisherfolk;

(d) The dwelling units of the traditional coastal communities including fisherfolk, tribals as were permissible under the provisions of the CRZ notification, 1991, but which have not obtained formal approval from concerned authorities under the aforesaid notification shall be considered by the respective Union territory CZMAs and the dwelling units shall be regularized subject to the following condition, namely-

(i) these are not used for any commercial activity
(ii) these are not sold or transferred to non-traditional coastal community.

7. Classification of the CRZ – For the purpose of conserving and protecting the coastal areas and marine waters, the CRZ area shall be classified as follows, namely:-

(i) CRZ-I,–

A. The areas that are ecologically sensitive and the geomorphological features which play a role in the maintaining the integrity of the coast,-

(a) Mangroves, in case mangrove area is more than 1000 sq mts, a buffer of 50meters along the mangroves shall be provided;
(b) Corals and coral reefs and associated biodiversity;
(c) Sand Dunes;
(d) Mudflats which are biologically active;
(e) National parks, marine parks, sanctuaries, reserve forests, wildlife habitats and other protected areas under the provisions of Wild Life (Protection) Act, 1972 (53 of 1972), the Forest (Conservation) Act, 1980 (69 of 1980) or Environment (Protection) Act, 1986 (29 of 1986); including Biosphere Reserves;
(f) Salt Marshes;
(g) Turtle nesting grounds;
(h) Horse shoe crabs habitats;
(i) Sea grass beds;
(j) Nesting grounds of birds;
(k) Areas or structures of archaeological importance and heritage sites.

B. The area between Low Tide Line and High Tide Line;

(ii) CRZ-II,-

The areas that have been developed upto or close to the shoreline.

Explanation.- For the purposes of the expression "developed area" is referred to as that area within the existing municipal limits or in other existing legally designated urban areas which are substantially built-up and has been provided with drainage and approach roads and other infrastructural facilities, such as water supply and sewerage mains;

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(iii) CRZ-III,-

Areas that are relatively undisturbed and those do not belong to either CRZ-I or II which include coastal zone in the rural areas (developed and undeveloped) and also areas within municipal limits or in other legally designated urban areas, which are not substantially built up.

(iv.) *CRZ-IV*,-

A. the water area from the Low Tide Line to twelve nautical miles on the seaward side;

B. shall include the water area of the tidal influenced water body from the mouth of the water body at the sea upto the influence of tide which is measured as five parts per thousand during the driest season of the year.

(v) Areas requiring special consideration for the purpose of protecting the critical coastal environment and difficulties faced by local communities,-

A. (i) CRZ area falling within municipal limits of Greater Mumbai;
(ii) the CRZ areas of Kerala including the backwaters and backwater islands;
(iii) CRZ areas of Goa.

B. Critically Vulnerable Coastal Areas (CVCA) such as Sunderbans region of West Bengal and other ecologically sensitive areas identified as under Environment (Protection) Act, 1986 and managed with the involvement of coastal communities including fisherfolk.

8. Norms for regulation of activities permissible under this notification,-

(i) The development or construction activities in different categories of CRZ shall be regulated by the concerned CZMA in accordance with the following norms, namely:-

Note:- The word existing use hereinafter in relation to existence of various features or existence of regularisation or norms shall mean existence of these features or regularisation or norms as on 19.2.1991 wherein CRZ notification, was notified.

I. CRZ-I,-

(i) no new construction shall be permitted in CRZ-I except,-

(a) projects relating to Department of Atomic Energy;
(b) pipelines, conveying systems including transmission lines;
(c) facilities that are essential for activities permissible under CRZ-I;
(d) installation of weather radar for monitoring of cyclones movement and prediction by Indian Meteorological Department;
(e) construction of trans harbour sea link and without affecting the tidal flow of water, between LTL and HTL.
(f) development of green field airport already approved at only Navi Mumbai;

(ii) Areas between LTL and HTL which are not ecologically sensitive, necessary safety measures will be incorporated while permitting the following, namely:-

(a) exploration and extraction of natural gas;
(b) construction of dispensaries, schools, public rainshelter, community toilets, bridges, roads, jetties, water supply, drainage, sewerage which are required for traditional inhabitants living within the biosphere reserves after obtaining approval from concerned CZMA.
(c) necessary safety measure shall be incorporated while permitting such developmental activities in the area falling in the hazard zone;
(d) salt harvesting by solar evaporation of seawater;
(e) desalination plants;
(f) storage of non-hazardous cargo such as edible oil, fertilizers and food grain within notified ports;
(g) construction of trans harbour sea links, roads on stilts or pillars without affecting the tidal flow of water.

II. CRZ-II,-

(i) buildings shall be permitted only on the landward side of the existing road, or on the landward side of existing authorized structures;
(ii) buildings permitted on the landward side of the existing and proposed roads or existing authorized structures shall be subject to the existing local town and country planning regulations including the 'existing' norms of Floor Space Index or Floor Area Ratio:
Provided that no permission for construction of buildings shall be given on landward side of any new roads which are constructed on the seaward side of an existing road:
(iii) reconstruction of authorized building to be permitted subject with the existing Floor Space Index or Floor Area Ratio Norms and without change in present use;
(iv) facilities for receipt and storage of petroleum products and liquefied natural gas as specified in Annexure-II appended to this notification and facilities for regasification of Liquefied Natural Gas subject to the conditions as mentioned in sub-paragraph (ii) of paragraph 3;
(v) desalination plants and associated facilities;
(vi) storage of non-hazardous cargo, such as edible oil, fertilizers and food grain in notified ports;
(vii) facilities for generating power by non-conventional power sources and associated facilities;

III. CRZ-III,-

A. Area upto 200mts from HTL on the landward side in case of seafront and 100mts along tidal influenced water bodies or width of the creek whichever is less is to be earmarked as "No Development Zone (NDZ)",-

(i) the NDZ shall not be applicable in such area falling within any notified port limits;

(ii) No construction shall be permitted within NDZ except for repairs or reconstruction of existing authorized structure not exceeding existing Floor Space Index, existing plinth area and existing density and for permissible activities under the notification including facilities essential for activities; Construction/reconstruction of dwelling units of traditional coastal communities including fisherfolk may be permitted between 100 and 200 metres from the HTL along the seafront in accordance with a comprehensive plan prepared by the State Government or the Union territory in consultation with the traditional coastal

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communities including fisherfolk and incorporating the necessary disaster management provision, sanitation and recommended by the concerned State or the Union territory CZMA to NCZMA for approval by MoEF;

(iii) however, the following activities may be permitted in NDZ –

(a) agriculture, horticulture, gardens, pasture, parks, play field, and forestry;
(b) projects relating to Department of Atomic Energy;
(c) mining of rare minerals;
(d) salt manufacture from seawater;
(e) facilities for receipt and storage of petroleum products and liquefied natural gas as specified in Annexure-II;
(f) facilities for regasification of liquefied natural gas subject to conditions as mentioned in subparagraph (ii) of paragraph 3;
(g) facilities for generating power by non conventional energy sources;
(h) Foreshore facilities for desalination plants and associated facilities;
(i) weather radars;
(j) construction of dispensaries, schools, public rain shelter, community toilets, bridges, roads, provision of facilities for water supply, drainage, sewerage, crematoria, cemeteries and electric sub-station which are required for the local inhabitants may be permitted on a case to case basis by CZMA;
(k) construction of units or auxiliary thereto for domestic sewage, treatment and disposal with the prior approval of the concerned Pollution Control Board or Committee;
(l) facilities required for local fishing communities such as fish drying yards, auction halls, net mending yards, traditional boat building yards, ice plant, ice crushing units, fish curing facilities and the like;
(m) development of green field airport already permitted only at Navi Mumbai.

B. Area between 200mts to 500mts,-

The following activities shall be permissible in the above areas:

(i) development of vacant plot in designated areas for construction of hotels or beach resorts for tourists or visitors subject to the conditions as specified in the guidelines at Annexure-III ;
(ii) facilities for receipt and storage of petroleum products and liquefied natural gas as specified in Annexure-II;
(iii) facilities for regasification of liquefied natural gas subject to conditions as mentioned in sub-paragraph (ii) of paragraph 3;
(iv) storage of non-hazardous cargo such as, edible oil, fertilizers, food grain in notified ports;
(v) foreshore facilities for desalination plants and associated facilities;
(vi) facilities for generating power by non-conventional energy sources;
(vii) construction or reconstruction of dwelling units so long it is within the ambit of traditional rights and customary uses such as existing fishing villages and Gaothan. Building permission for such construction or reconstruction will be subject to local town and country planning rules with overall height of construction not exceeding 9mts with two floors (ground + one floor);
(viii) Construction of public rain shelters, community toilets, water supply, drainage, sewerage, roads and bridges by CZMA who may also permit construction of

schools and dispensaries for local inhabitants of the area for those panchayats, the major part of which falls within CRZ if no other area is available for construction of such facilities;

(ix) reconstruction or alteration of existing authorised building subject to sub-paragraph (vii), (viii);

(x) development of green field airport already permitted only at Navi Mumbai.

(IV) In CRZ-IV areas,-

The activities impugning on the sea and tidal influenced water bodies will be regulated except for traditional fishing and related activities undertaken by local communities as follows:-

(a)No untreated sewage, effluents, ballast water, ship washes, fly ash or solid waste from all activities including from aquaculture operations shall be let off or dumped. A comprehensive plan for treatment of sewage generating from the coastal towns and cities shall be formulated within a period of one year in consultation with stakeholders including traditional coastal communities, traditional fisherfolk and implemented;

(b) Pollution from oil and gas exploration and drilling, mining, boat house and shipping;

(c) There shall be no restriction on the traditional fishing and allied activities undertaken by local communities.

V. Areas requiring special consideration,-

1. CRZ areas falling within municipal limits of the Greater Mumbai.

(i) Developmental activities in the CRZ area of the Greater Mumbai because of the environmental issues, relating to degradation of mangroves, pollution of creeks and coastal waters, due to discharge of untreated effluents and disposal of solid waste, the need to provide decent housing to the poor section of society and lack of suitable alternatives in the inter connected islands of Greater Mumbai shall be regulated as follows, namely:-

A. Construction of roads - In CRZ-I areas indicated at sub-paragraph (i) of paragraph 7 of the notification the following activities only can be taken up:-

(a) Construction of roads, approach roads and missing link roads approved in the Developmental Plan of Greater Mumbai on stilts ensuring that the free flow of tidal water is not affected, without any benefit of CRZ-II accruing on the landward side of such constructed roads or approach roads subject to the following conditions:-

(i) All mangrove areas shall be mapped and notified as protected forest and necessary protection and conservation measures for the identified mangrove areas shall be initiated.

(ii) Five times the number of mangroves destroyed/cut during the construction process shall be replanted.

B. Solid waste disposal sites shall be identified outside the CRZ area and thereafter within two years the existing conventional solid waste sites shall be relocated outside the CRZ area.

(ii) In CRZ-II areas-

(a) The development or redevelopment shall continue to be undertaken in accordance with the norms laid down in the Town and Country Planning Regulations as they existed on the date of issue of the notification dated the 19th February, 1991, unless specified

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otherwise in this notification.

(b) SLUM REHABITATION SCHEMES,-

1. In the Greater Mumbai area there are large slum clusters with lakhs of families residing therein and the living conditions in these slums are deplorable and the civic agencies are not able to provide basic infrastructure such as drinking water, electricity, roads, drainage and the like because the slums come up in an unplanned and congested manner and the slums in the coastal area are at great risk in the event of cyclones, storm surges or tsunamis, in view of the difficulties in providing rescue, relief and evacuation.
2. To provide a safe and decent dwelling to the slum dwellers, the State Government may implement slum redevelopment schemes as identified as on the date of issue of this notification directly or through its parastatal agencies like Maharashtra Housing and Area Development Authority (MHADA), Shivshahi Punarvasan Prakalp Limited (SPPL), Mumbai Metropolitan Region Development Authority (MMRDA) and the like.:

Provided that,-

(i) such redevelopment schemes shall be undertaken directly or through joint ventures or through public private partnerships or other similar models ensuring that the stake of the State Government or its parastatal entities shall be not less than 51%;

(ii) the Floor Space Index or Floor Area Ratio for such redevelopment schemes shall be in accordance with the Town and Country Planning Regulations prevailing as on the date on which the project is granted approval by the competent authority;

(iii) it shall be the duty of the project proponent undertaking the redevelopment through conditions (i) (2) above along with the State Government to ensure that all legally regularized tenants are provided houses in situ or as per norms laid down by the State Government in this regard.

(c) REDEVELOPMENT OF DILAPIDATED, CESSED AND UNSAFE BUILDINGS:

1. In the Greater Mumbai, there are, also a large number of old and dilapidated, cessed and unsafe buildings in the CRZ areas and due to their age these structures are extremely vulnerable and disaster prone and therefore there is an urgent need for the redevelopment or reconstruction of these identified buildings.

2. These projects shall be taken up subject to the following conditions and safeguards:

(i) such redevelopment or reconstruction projects as identified on the date of issue of this notification shall be allowed to be taken up involving the owners of these buildings either above or with private developers in accordance with the prevailing Regulation, directly or through joint ventures or through other similar models.
(ii) the Floor Space Index or Floor Area Ratio for such redevelopment schemes shall be in accordance with the Town and Country Planning Regulations prevailing as on the date on which the project is granted approval by the competent authority.

(iii) suitable accommodation to the original tenants of the specified buildings shall be ensured during the course of redevelopment or reconstruction of the buildings by the project proponents, undertaking the redevelopment through condition 2(i) above.

(d) Notwithstanding anything contained in this notification, the developmental activities for slums and for dilapidated, cessed and unsafe buildings as specified at paras (b) and (c) above shall be carried out in an accountable and transparent manner by the project proponents mentioned therein which shall include the following pre-condition measures, wherever applicable;-

1. (i) applicability of the Right to Information Act, 2005 to all redevelopment or reconstruction projects granted clearance by the Competent Authorities;
(ii) MoEF shall issue an order constituting the CPIO and the first Appellate Authority of appropriate ranks in consultation with Government of Maharashtra;
(iii) details of the Slum Rehabilitation Scheme, including the complete proposal and the names of the eligible slum dwellers will be declared suo-moto as a requirement of Section 4 of compliance of the Right to Information Act, 2005 by the appropriate authority in the Government of Maharashtra in one month before approving it;
(iv) the implementing or executing agency at the State Government with regard to projects indicated at sub-item (b) and (c) of item (iii) of sub-paragraph V shall display on a large notice boards at the site and at the office of the implementing or executing agency the names of the eligible builders, total number of tenements being made, names of eligible slum dwellers who are to be provided the dwelling units and the extra area available for free sale.
(v) Projects being developed under sub-items (b) and (c) of item (iii) of sub-paragraph V shall be given permission only if the project proponent agree to be covered under the Right to Information Act, 2005.

2. MoEF may appoint statutory auditors, who are empanelled by the Comptroller and auditor General (hereinafter referred to as the C&AG) to undertake performance and fiscal audit in respect of the projects relating to redevelopment of dilapidated, cessed and unsafe buildings and the projects relating to Slum Rehabilitation Scheme shall be audited by C&AG.

3. A High Level Oversight Committee may be set up by the Government of Maharashtra for periodic review of implementation of V(iii)(b) and (c) which shall include eminent representatives of various Stakeholders, like Architects, Urban Planner, Engineers, and Civil Society, besides the local urban bodies, the State Government and the Central Government.

4. The individual projects under V(iii)(b) and (c) shall be undertaken only after public consultation in which views of only the legally entitled slum dweller or the legally entitled tenent of the dilapidated or cessed buildings shall be obtained in accordance with the procedures laid down in EIA notification, 2006.

(e) In order to protect and preserve the 'green lung' of the Greater Mumbai area, all open spaces, parks, gardens, playgrounds indicated in development plans within CRZ-II shall be categorized as CRZ-III, that is, 'no development zone'.
The Floor Space Index upto 15% shall be allowed only for construction of civic amenities, stadium and gymnasium meant for recreational or sports related activities and no residential or commercial use of such open spaces shall not be permissible.

(g) Koliwada namely, fishing settlement areas as identified in the Development Plan of 1981 or relevant records of the Government of Maharashtra, shall be mapped and declared as CRZ-III so that any development, including construction and reconstruction of dwelling units within these settlements shall be undertaken in accordance with applicable as per local Town and Country Planning Regulations.

(h) Reconstruction and repair works of the dwelling units, belonging to fisher communities and other local communities identified by the State Government, shall be considered and granted permission by the Competent Authorities on a priority basis, in accordance with the applicable Town and Country Planning Regulations.

2. CRZ for Kerala

In view of the unique coastal systems of backwater and backwater islands alongwith space limitation present in the coastal stretches of the State of Kerala, the following activities in CRZ shall be regulated as follows, namely:-

(i) all the islands in the backwaters of Kerala shall be covered under the CRZ notification;

(ii) the islands within the backwaters shall have 50mts width from the High Tide Line on the landward side as the CRZ area;

(iii) within 50mts from the HTL of these backwater islands existing dwelling units of local communities may be repaired or reconstructed however no new construction shall be permitted;

(iv) beyond 50mts from the HTL on the landward side of backwater islands, dwelling units of local communities may be constructed with the prior permission of the Gram panchayat;

(v) foreshore facilities such as fishing jetty, fish drying yards, net mending yard, fishing processing by traditional methods, boat building yards, ice plant, boat repairs and the like, may be taken up within 50mts width from HTL of these backwater islands.

3. CRZ of Goa.-

In view of the peculiar circumstances of the State Goa including past history and other developments, the specific activities shall be regulated and various measures shall be undertaken as follows:-

(i) the Government of Goa shall notify the fishing villages wherein all foreshore facilities required for fishing and fishery allied activities such as traditional fish processing yards, boat building or repair yards, net mending yards, ice plants, ice storage, auction hall, jetties may be permitted by Grama Panchayat in the CRZ area;

(ii) reconstruction, repair works of the structures of local communities including fishermen community shall be permissible in CRZ;

(iii) purely temporary and seasonal structures customarily put up between the months of September to May;

(iv) the eco sensitive low lying areas which are influenced by tidal action known as khazan lands shall be mapped;

(v) the mangroves along such as khazan land shall be protected and a management plan for the khazan land prepared and no developmental activities shall be permitted in the khazan land;

(vi) sand dunes, beach stretches along the bays and creeks shall be surveyed and mapped. No activity shall be permitted on such sand dune areas;

(vii) the beaches such as Mandrem, Morjim, Galgiba and Agonda has been designated as turtle nesting sites and protected under the Wildlife Protection Act, 1972 and these areas

shall be surveyed and management plan prepared for protection of these turtle nesting sites;

(viii) no developmental activities shall be permitted in the turtle breeding areas referred to in sub-paragraph (vii).

4 (a) Critical Vulnerable Coastal Areas (CVCA) which includes Sunderbans and other identified ecological sensitive areas which shall be managed with the involvement of the local coastal communities including the fisher folk;-

(b) the entire Sunderbans mangrove area and other identified ecologically important areas such as Gulf of Khambat and Gulf of Kutchchh in Gujarat, Malvan, Achra-Ratnagiri in Maharashtra, Karwar and Coondapur in Karnataka, Vembanad in Kerala, Gulf of Mannar in Tamil Nadu, Bhaitarkanika in Orissa, Coringa, East Godavari and Krishna in Andhra Pradesh shall be declared as Critical Vulnerable Coastal Areas (CVCA) through a process of consultation with local fisher and other communities inhabiting the area and depend on its resources for their livelihood with the objective of promoting conservation and sustainable use of coastal resources and habitats;

(c) the process of identifying planning, notifying and implementing CVCA shall be detailed in the guideline which will be developed and notified by MoEF in consultations with the stakeholders like the State Government, local coastal communities and fisherfolk and the like inhabiting the area;

(d) the Integrated Management Plans (IMPs) prepared for such CVCA shall interalia keep in view the conservation and management of mangroves, needs of local communities such as, dispensaries, schools, public rain shelter, community toilets, bridges, roads, jetties, water supply, drainage, sewerage and the impact of sea level rise and other natural disasters and the IMPs will be prepared in line with the para 5 above for preparation of Coastal Zone Management Plans;

(e) till such time the IMPs are approved and notified, construction of dispensaries, schools, public rain shelters, community toilets, bridges, roads, jetties, water supply, drainage, sewerage which are required for traditional inhabitants shall be permitted on a case to case basis, by the CZMA with due regards to the views of coastal communities including fisherfolk.

[F.No.11-83/2005-IA-III]
J. M. MAUSKAR, Addl. Secy.



ANNEXURE I

GUIDELINES FOR PREPARATION OF COASTAL ZONE MANAGEMENT PLANS

I. A. Demarcation of High Tide Line

1. Demarcation of High Tide Line (HTL) and Low Tide Line (LTL) shall be carried out by one of the agencies authorised by MoEF based on the recommendations of the National Centre for Sustainable Coastal Management (NCSCM).
2. Demarcation of the High Tide Line or LTL shall be made on the Coastal Zone Management (CZM) Maps of scale 1:25,000 prepared by the agencies identified by the MoEF.
3. Local level CZM Maps shall be prepared for use of officials of local bodies for determination of the CRZ.
4. The local level CZM Maps shall be prepared on a Cadastral scale in accordance with the CZM Maps approved by the Central Government.

B. Preparation of CZM Maps

5. Base Maps of 1:25,000 scale shall be acquired from the Survey of India (SOI) and wherever 1:25,000 maps are not available, 1:50,000 maps shall be enlarged to 1:25,000 for the purpose of base map preparation and these maps will be of the standard specification given below:

Unit	:	7.5 minutes X 7.5minutes
Numbering	:	Survey of India Sheet Numbering System
Horizontal Datum	:	Everest or WGS 84
Vertical Datum	:	Mean Sea Level (MSL)
Topography	:	Topography in the SOI maps will be updated using latest satellite imageries or aerial photographs

6. The High Water Level (HWL) and Low Water Level (LWL) marked on the Base maps will be transferred to the CZM maps.
7. Coastal geomorphological signatures in the field or satellite imageries or aerial photographs will be used for appropriate adjustment, in the HWL or LWL for demarcating HTL or LTL in accordance with the CRZ notification.
8. The following geomorphological features shall be considered while demarcating in HTL or LTL:
   Landward (monsoonal) berm crest in the case of sandy beaches
   Rocks, Headlands, Cliffs
   Seawalls or revetments or embankments
9. 500 meter and 200 metre lines will be demarcated with respect of HTL.
10. HTL (as defined in the CRZ notification) and LTL shall also be demarcated in the CZM maps along the banks of tidal influenced inland water bodies with the help of the geomorphological signatures or features.
11. Classification of different coastal zones shall be done as per the CRZ notification
12. Standard national or international colour codes shall be used to highlight sub-classification of data.

C. Local level CZM Maps

Local level CZM Maps are for the use of local bodies and other agencies to facilitate implementation of the Coastal Zone Management Plans

13. Cadastral (village) maps in 1:3960 or the nearest scale, shall be used as the base maps.

14. These maps are available with revenue Authorities and are prepared as per standard norms.
15. HTL (as defined in the CRZ notification) and LTL will be demarcated in the cadastral map based on detailed physical verification using coastal geomorphological signatures or features in accordance with the CZM Maps approved by the Central Government.
16. 500metre and 200metre lines shall be demarcated with respect to the HTL thus marked.
17. HTL (as defined in the CRZ notification, 1991) and LTL will also be demarcated along the banks of tidal influenced inland water bodies with the help of geomorphological signatures or features.
18. Classifications shall be transferred into local level CZM maps from the CZM Plans.
19. Symbols will be adopted from CZM Maps.
20. Colour codes as given in CZM Maps shall be used.
21. Demarcation of cadastral maps will be done by local agencies approved by the Central Government. The local agencies shall work under the guidance of the concerned State Government or Union Territory Coastal Zone Management Authorities.

D. Hazard mapping:-

II. Classification of CRZ areas

1. The CZM Maps shall be prepared in accordance with para 5 of the CRZ notification demarcating CRZ I, II, III, IV and V.
2. The CZM Maps shall clearly demarcate the land use plan of the area and lists out the CRZ-I areas. All the CRZ-I areas listed under para 7(I)A and B shall be clearly demarcated and colour codes given so that each of the CRZ-I areas can be clearly identified.
3. Buffer zone along mangrove areas of more than 1000sq mts shall be stipulated with a different colour distinguishing from the mangrove area.
4. The buffer zone shall also be classified as CRZ-I area.
5. The hazard line to be drawn up by MoEF shall be superimposed on the CZM maps in 1:25,000 scale and also on the cadastral scale maps.
6. The CRZ-II areas shall be those areas which have been substantially built-up with a ratio of built-up plots to that of total plots is more than 50%.
7. In the CRZ areas, the fishing villages, common properties of the fishermen communities, fishing jetties, ice plants, fish drying platforms or areas infrastructure facilities of fishing and local communities such as dispensaries, roads, schools, and the like, shall be indicated on the cadastral scale maps. States shall prepare detailed plans for long term housing needs of coastal fisher communities in view of expansion and other needs, provisions of basic services including sanitation, safety, and disaster preparedness.
8. No developmental activities other than those listed above shall be permitted in the areas between the hazard line and 500mts or 100mts or width of the creek on the landward side. The dwelling unit of the local communities including that of the fishers will not be relocated if the dwelling units are located on the seaward side of the hazard line. The State Government will provide necessary safeguards from natural disaster to such dwelling units of local communities.
9. The water areas of CRZ IV shall be demarcated and clearly demarcated if the water body is sea, lagoon, backwater, creek, bay, estuary and for such classification of the water bodies the terminology used by Naval Hydrographic Office shall be relied upon.
10. The fishing Zones in the water bodies and the fish breeding areas shall be clearly marked.
11. The water area shall be demarcated indicating the pollution levels as per Central Pollution Control Board standards on water quality.
12. In the CRZ V areas the land use maps shall be superimposed on the Coastal Zone Management Plan and clearly demarcating the CRZ I, II, III, IV.
13. The existing authorized developments on the sea ward side shall be clearly demarcated.

14. The features like cyclone shelters, rain shelters, helipads and other infrastructure including road network may be clearly indicated on the CZM Maps for the purpose of rescue and relief operations during cyclones, storms, tsunami and the like.

III. CZMPs approved by MoEF in accordance with CRZ notification, 1991

1. While preparing the CZMPs under CRZ notification, 2011, the CZMPs that have been approved under the CRZ Notification, 1991 shall be compared. A justification shall be provided by the concerned CZMA in case the CZMPs prepared under CRZ notification, 2011 varies with respect to the approved CZMP prepared under CRZ notification, 1991.

IV. Public Views on the CZMP.

a) The draft CZMPs prepared shall be given wide publicity and suggestions and objections received in accordance with the Environment (Protection) Act, 1986. Public hearing on the draft CZMPs shall be held at district level by the concerned CZMAs.
b) Based on the suggestions and objections received the CZMPs shall be revised and approval of MoEF shall be obtained.
c) The approved CZMP shall be put up on the website of MoEF, concerned website of the State, Union Territory CZMA and hard copy made available in the panchayat office, District collector office and the like.

V. Revision of Coastal Zone Management Plans

1. Whenever there is a doubt the concerned State or Union territory Coastal Zone Management Authority shall refer the matter to the National Centre for Sustainable Coastal Management who shall verify the CZMP based on latest satellite imagery and ground truthing.
2. The rectified map would be submitted to MoEF for its record.

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Annexure-II

List of petroleum and chemical products permitted for storage in [CRZ except CRZ-I(A)]

(i) Crude oil;

(ii) Liquefied Petroleum Gas;

(iii) Motor spirit;

(iv) Kerosene;

(v) Aviation fuel;

(vi) High speed diesel;

(vii) Lubricating oil;

(viii) Butane;

(ix) Propane;

(x) Compressed Natural Gas;

(xi) Naphtha;

(xii) Furnace oil;

(xiii) Low Sulphur Heavy Stock;

(xiv) Liquefied Natural Gas;

(xv) Fertilizers and raw materials for manufacture of fertilizers.

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Annexure-III

Guidelines for development of beach resorts or hotels in the designated areas of CRZ-III and CRZ-II for occupation of tourist or visitors with prior approval of the Ministry of Environment and Forests

I. Construction of beach resorts or hotels with prior approval of MoEF in designated areas of CRZ-II and III for occupation of tourist or visitors shall be subject to the following conditions, namely:-

(a) The project proponent shall not undertake any construction within 200 metres in the landward side of High Tide Line and within the area between Low Tide Line and High Tide Line;

(b) The proposed constructions shall be beyond the hazard line or 200mts from the High Tide Line whichever is more;

(c) live fencing and barbed wire fencing with vegetative cover may be allowed around private properties subject to the condition that such fencing shall in no way hamper public access to the beach;

(d) no flattening of sand dunes shall be carried out;

(e) no permanent structures for sports facilities shall be permitted except construction of goal posts, net posts and lamp posts;

(f) Construction of basement may be allowed subject to the condition that no objection certification is obtained from the State Ground Water Authority to the effect that such construction will not adversely affect fee flow of groundwater in that area;

(g) the State Ground Water Authority shall take into consideration the guidelines issued by Central Government before granting such no objection certificate;

(h) though no construction is allowed in the no development zone for the purposes of calculation of Floor Space Index, the area of entire plot including the portion which falls within the no development zone shall be taken into account;

(i) the total plot size shall not be less than 0.4 hectares and the total covered area on all floors shall not exceed 33 percent of the plot size i.e., the Floor Space Index shall not exceed 0.33 and the open area shall be suitably landscaped with appropriate vegetal cover;

(j) the construction shall be consistent with the surrounding landscape and local architectural style;

(k) the overall height of construction upto the highest ridge of the roof, shall not exceed 9metres and the construction shall not be more than two floors (ground floor plus one upper floor);

(l) groundwater shall not be tapped within 200metre of the High Tide Line; within the 200metre 500metre zone it can be tapped only with the concurrence of the Central or State Ground Water Board;

(m) extraction of sand, leveling or digging of sandy stretches except for structural foundation of building, swimming pool shall not be permitted within 500metres of the High Tide Line;

(n) the quality of treated effluents, solid wastes, emissions and noise levels and the like, from the project area must conform to the standards laid down by the competent authorities including the Central or State Pollution Control Board and under the Environment (Protection) Act, 1986;

(o) necessary arrangements for the treatment of the effluents and solid wastes must be made and it must be ensured that the untreated effluents and solid wastes are not discharged into the water or on the beach; and no effluent or solid waste shall be discharged on the beach;

(p) to allow public access to the beach, atleast a gap of 20metres width shall be provided between any two hotels or beach resorts; and in no case shall gaps be less than 500metres apart; and

(q) if the project involves diversion of forestland for non-forest purposes, clearance as required under the Forest (Conservation) Act, 1980 shall be obtained and the requirements of other Central and State laws as applicable to the project shall be met with; and

(r) approval of the State or Union territory Tourism Department shall be obtained.

II. In ecologically sensitive areas (such as marine parks, mangroves, coral reefs, breeding and spawning grounds of fish, wildlife habitats and such other area as may be notified by the Central or State Government Union territories) construction of beach resorts or hotels shall not be permitted

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Annexure-IV

Form-I for seeking clearance for project attracting CRZ notification

Basic information:

Name of the Project:-

Location or site alternatives under consideration:-

Size of the project (in terms of total area) :-

CRZ classification of the area :-

Expected cost of the project:-

Contact Information:-

(II) Activity

1. Construction, operation or decommissioning of the Project involving actions, which will cause physical changes in the locality (topography, land use, changes in water bodies, and the like)

S. No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
1.1	Permanent or temporary change in land use, land cover or topography including increase in intensity of land use (with respect to local land use plan)		
1.2	Details of CRZ classification as per the approved Coastal Zone Management Plan?		
1.3	Whether located in CRZ-I area?		
1.4	The distance from the CRZ-I areas.		
1.5	Whether located within the hazard zone as mapped by Ministry of Environment and Forests/National Disaster Management Authority?		
1.6	Whether the area is prone to cyclone, tsunami, tidal surge, subduction, earthquake etc.?		
1.7	Whether the area is prone for saltwater ingress?		
1.8	Clearance of existing land, vegetation and buildings?		
1.9	Creation of new land uses?		
1.10	Pre-construction investigations e.g. bore hole, soil testing?		
1.11	Construction works?		

1.12	Demolition works?		
1.13	Temporary sites used for construction works or housing of construction workers?		
1.14	Above ground buildings, structures or earthworks including linear structures, cut and fill or excavations		
1.15	Underground works including mining or tunneling?		
1.16	Reclamation works?		
1.17	Dredging/reclamation/land filling/disposal of dredged material etc.?		
1.18	Offshore structures?		
1.19	Production and manufacturing processes?		
1.20	Facilities for storage of goods or materials?		
1.21	Facilities for treatment or disposal of solid waste or liquid effluents?		
1.22	Facilities for long term housing of operational workers?		
1.23	New road, rail or sea traffic during construction or operation?		
1.24	New road, rail, air waterborne or other transport infrastructure including new or altered routes and stations, ports, airports etc?		
1.25	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?		
1.26	New or diverted transmission lines or pipelines?		
1.27	Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?		
1.28	Stream and river crossings?		
1.29	Abstraction or transfers of water form ground or surface waters?		
1.30	Changes in water bodies or the land surface affecting drainage or run-off?		
1.31	Transport of personnel or materials for construction, operation or decommissioning?		
1.32	Long-term dismantling or decommissioning or restoration works?		
1.33	Ongoing activity during decommissioning which could have an impact on the environment?		
1.34	Influx of people to an area in either temporarily or permanently?		
1.35	Introduction of alien species?		
1.36	Loss of native species or genetic diversity?		
1.37	Any other actions?		

2. Use of Natural resources for construction or operation of the Project (such as land, water, materials or energy, especially any resources which are non-renewable or in short supply):

S. No.	Information/checklist confirmation	Yes/No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
2.1	Land especially undeveloped or agricultural land (ha)		
2.2	Water (expected source & competing users) unit: KLD		
2.3	Minerals (MT)		
2.4	Construction material – stone, aggregates, sand/soil (expected source – MT)		
2.5	Forests and timber (source – MT)		
2.6	Energy including electricity and fuels (source, competing users) Unit: fuel (MT), energy (MW)		
2.7	Any other natural resources (use appropriate standard units)		

3. Use, storage, transport, handling or production of substances or materials, which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health.

S. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
3.1	Use of substances or materials, which are hazardous (as per MSIHC rules) to human health or the environment (flora, fauna, and water supplies)		
3.2	Changes in occurrence of disease or affect disease vectors (e.g. insect or water borne diseases)		
3.3	Affect the welfare of people e.g. by changing living conditions?		
3.4	Vulnerable groups of people who could be affected by the project e.g. hospital patients, children, the elderly etc.,		
3.5	Any other causes, that would affect local communities, fisherfolk, their livelihood, dwelling units of traditional local communities etc		

4. Production of solid wastes during construction or operation or decommissioning (MT/month)

S. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data

4.1	Spoil, overburden or mine wastes		
4.2	Municipal waste (domestic and or commercial wastes)		
4.3	Hazardous wastes (as per Hazardous Waste Management Rules)		
4.4	Other industrial process wastes		
4.5	Surplus product		
4.6	Sewage sludge or other sludge from effluent treatment		
4.7	Construction or demolition wastes		
4.8	Redundant machinery or equipment		
4.9	Contaminated soils or other materials		
4.10	Agricultural wastes		
4.11	Other solid wastes		

5. Release of pollutants or any hazardous, toxic or noxious substances to air (Kg/hr)

S. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources		
5.2	Emissions from production processes		
5.3	Emissions from materials handling including storage or transport		
5.4	Emissions from construction activities including plant and equipment		
5.5	Dust or odours from handling of materials including construction materials, sewage and waste		
5.6	Emissions from incineration of waste		
5.7	Emissions from burning of waste in open air (e.g. slash materials, construction debris)		
5.8	Emissions from any other sources		

6. Generation of Noise and Vibration, and Emissions of Light and Heat:

S. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data with source of information data
6.1	From operation of equipment e.g. engines, ventilation plant, crushers		
6.2	From industrial or similar processes		
6.3	From construction or demolition		
6.4	From blasting or piling		
6.5	From construction or operational traffic		
6.6	From lighting or cooling systems		

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6.7	From any other sources		

7. Risks of contamination of land or water from releases of pollutants into the ground or into sewers, surface waters, groundwater, coastal waters or the sea:

S. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
7.1	From handling, storage, use or spillage of hazardous materials		
7.2	From discharge of sewage or other effluents to water or the land (expected mode and place of discharge)		
7.3	By deposition of pollutants emitted to air into the land or into water		
7.4	From any other sources		
7.5	Is there a risk of long term build up of pollutants in the environment from these sources?		

8. Risk of accidents during construction or operation of the Project, which could affect human health or the environment

S. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
8.1	From explosions, spillages, fires etc from storage, handling, use or production of hazardous substances		
8.2	From any other causes		
8.3	Could the project be affected by natural disasters causing environmental damage (e.g., floods, earthquakes, landslides, cloudburst etc)?		

9. Factors which should be considered (such as consequential development) which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality

S. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
9.1	Lead to development of supporting. lities, ancillary development or development stimulated by the project which could have impact on the environment e.g.: Supporting infrastructure (roads, power supply, waste or waste water treatment, etc.)		

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	housing development extractive industries supply industries other		
9.2	Lead to after-use of the site, which could have an impact on the environment		
9.3	Set a precedent for later developments		
9.4	Have cumulative effects due to proximity to other existing or planned projects with similar effects		

III. Environmental Sensitivity

S. No.	Areas	Name/ Identity	Aerial distance (within 15 km.) Proposed project location boundary
1	Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value		
2	Areas which are important or sensitive for ecological reasons - Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests		
3	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration		
4	Inland, coastal, marine or underground waters		
5	State, National boundaries		
6	Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas		
7	Defence installations		
8	Densely populated or built-up area		
9	Areas occupied by sensitive man-made land uses (hospitals, schools, places of worship, community facilities)		
10	Areas containing important, high quality or scarce resources (ground water resources, surface resources, forestry, agriculture, fisheries, tourism, minerals)		
11	Areas already subjected to pollution or environmental damage. (those where existing legal environmental standards are exceeded)		
12	Areas susceptible to natural hazard which could cause the project to present environmental problems (earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions)		

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ANNEXURE A-6

F.No. 19-112/2013-IA-III
Government of India
Ministry of Environment, Forest and Climate Change
(IA-III Division)

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Dated:18.04.2018

PUBLIC NOTICE

Sub: Draft Coastal Regulation Zone Notification, 2018 – reg.

Based on the representations received from various Coastal States and Union Territories and other stake holders including recommendations made by the Committee under the Chairmanship of DrShaileshNayak, the Ministry of Environment, Forest and Climate Change hereby issues the Draft Coastal Regulation Zone Notification, 2018 for seeking comments / suggestions from all concerned. The aforesaid draft notification is available in this Ministry's website in public domain. Comments/suggestions (if any) may be sent either by e-mail or at the address of the undersigned given above within **60 (sixty)** days.

(Arvind Nautiyal)
Director

To,
All Stakeholders

NOTARY
GOVT. OF GOA

DRAFT CRZ NOTIFICATION 2018

[TO BE PUBLISHED IN THE GAZETTE OF INDIA, EXTRAORDINARY, PART II, SECTION 3, SUB-SECTION (i)]
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

NOTIFICATION

New Delhi, dated....., 2018

G.S.R.....(E).-Whereas by notification of the Government of India in the Ministry of Environment and Forests number S.O.19 (E), dated the 6th January, 2011 (hereinafter referred to as the Coastal Regulation Zone Notification, 2011), the Central Government declared certain coastal stretches as Coastal Regulation Zone (hereinafter referred to as the CRZ); under Section 3 of Environment (Protection) Act, 1986;

And whereas, the Ministry of Environment, Forest and Climate Change (MoEF&CC) has received representations from various coastal States and Union Territories (UTs),besides other stakeholders, regarding certain provisions in the CRZ Notification, 2011 related to management and conservation of marine and coastal ecosystems, development in coastal areas, eco-tourism, livelihood options and sustainable development of coastal communities etc;

And whereas, various State Governments/UTs and stakeholders have requested the MoEF&CC to address the concerns related to Coastal Environment and sustainable development w.r.t. the CRZ Notification, 2011;

Whereas MoEF&CC had constituted a committee under the chairmanship of Dr Shailesh Nayak to examine various issues & concerns of coastal states / Union Territories and various stakeholders, relating to the CRZ Notification 2011 and to recommend appropriate changes in the said Notification;

Whereas the report submitted by Dr Shailesh Nayak Committee has been examined in the Ministry and consultations have been held with various stakeholders in this regard;

Now, therefore in exercise of the powers conferred by sub-section (1) and clause (v) of sub-section (2) of section 3 of the Environment (Protection) Act, 1986 and in supersession of Coastal Regulation Zone Notification 2011, the Central Government, with a view to conserve and protect the unique environment of coastal stretches and marine areas ,besides livelihood security to the fisher communities and other local communities in the coastal areas and to promote sustainable development based on scientific principles taking into account the dangers of natural hazards, sea level rise due to global warming, does hereby, declare the coastal stretches of the country and the water area up to its territorial water limit, excluding the islands of Andaman and Nicobar and Lakshadweep and the marine areas surrounding these islands, as Coastal Regulation Zone as under:

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(i) The land area from High Tide Line (hereinafter referred to as the HTL) to 500 mts on the landward side along the sea front.

For the purposes of this Notification, the HTL means the line on the land upto which the highest water line reaches during the spring tide, as demarcated by the National Centre for Sustainable Coastal Management (NCSCM) in accordance with the laid down procedures and made available to various coastal States /UTs.

(ii) CRZ shall apply to the land area between HTL to 50 mts or width of the creek whichever is less on the landward side along the tidal influenced water bodies that are connected to the sea and the distance upto which development along such tidal influenced water bodies is to be regulated shall be governed by the distance upto which the tidal effects are experienced which shall be determined based on salinity concentration of 5 parts per thousand (ppt) measured during the driest period of the year and distance up to which tidal effects are experienced shall be clearly identified and demarcated accordingly in the Coastal Zone Management Plans (hereinafter referred to as the CZMPs).

This CRZ limit of 50 mts or width of the creek whichever is less, shall however be subject to revision and final approval of the respective CZMPs as per this Notification, framed with due consultative process/ public hearing etc. and environmental safeguards enlisted therein. Till such time the CZMP to this notification is approved, the limit of 100 mts or width of the creek whichever is less, shall continue to apply.

Explanation: - For the purposes of this sub-paragraph the expression tidal influenced water bodies means the water bodies influenced by tidal effects from sea in the bays, estuaries, rivers, creeks, backwaters, lagoons and ponds etc. that are connected to the sea.

(iii) The intertidal zone i.e. land area between the HTL and the Low Tide Line (hereinafter referred to as the LTL).

(iv) The water and the bed area between the LTL to the territorial water limit (12 Nm) in case of sea and the water and the bed area between LTL at the bank to the LTL on the opposite side of the bank, of tidal influenced water bodies.

2. **Classification of the CRZ –** For the purpose of conserving and protecting the coastal areas and marine waters, the CRZ area shall be classified as follows, namely:-

2.1 **CRZ-I** areas are environmentally most critical and shall be further classified as under:

2.1.1 **CRZ-I A:**

(a) CRZ-I A shall constitute the following ecologically sensitive areas and the geo-morphological features which play a role in the maintaining the integrity of the coast viz.:

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(i) Mangroves. In case mangrove area is more than 1000 sq. mts, a buffer of 50meters along the mangroves shall be provided and such area shall also constitute CRZ –I A.

(ii) Corals and coral reefs;

(iii) Sand Dunes;

(iv) Biologically active Mudflats;

(v) National parks, marine parks, sanctuaries, reserve forests, wildlife habitats and other protected areas under the provisions of Wild Life (Protection) Act, the Forest (Conservation) Act or Environment (Protection) Act, including Biosphere Reserves;

(vi) Salt Marshes;

(vii) Turtle nesting grounds;

(viii) Horse shoe crabs habitats;

(ix) Sea grass beds;

(x) Nesting grounds of birds;

(xi) Areas or structures of archaeological importance and heritage sites.

(b) **A detailed environment management plan shall be formulated by the States/UTs for such ESAs in respective territories, as mapped out by NCSCM, based on guidelines as contained in Annexure-I and integrated in the CZMPs.**

2.1.2 CRZ-I B:

The intertidal zone i.e. the area between Low Tide Line and High Tide Line shall constitute the CRZ-I B.

2.2 CRZ-II

CRZ-II shall constitute the developed land areas up to or close to the shoreline, within the existing municipal limits or in other existing legally designated urban areas, which are substantially built-up with a ratio of built up plots to that of total plots being more than 50% and have been provided with drainage and approach roads and other infrastructural facilities, such as water supply and sewerage mains etc.

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2.3 CRZ-III

Land areas that are relatively undisturbed (viz rural areas etc) and those do not fall under CRZ-II, shall constitute CRZ –III. CRZ-III shall be further classified into following categories:

2.3.1 CRZ-III A

Such densely populated CRZ-III areas, where the population density is more than 2161 per sq km as per 2011 census base, shall be designated as CRZ –III A. In CRZ-III A, area up to 50 mts from the HTL on the landward side shall be earmarked as the No Development Zone (NDZ), provided the CZMPs as per this Notification, framed with due consultative process, have been approved, failing which, a NDZ of 200 mts shall continue to apply.

2.3.2 CRZ-III B

All other CRZ-III areas with population density of less than 2161 per sq km, as per 2011 census base, shall be designated as CRZ-III B. In CRZ-III B, the area up to 200 mts. from the HTL on the landward side shall be earmarked as the No Development Zone (NDZ).

2.3.3

Land area up to 50 mts. from the HTL, or width of the creek whichever is less, along the tidal influenced water bodies, shall also be earmarked as the NDZ in CRZ III areas.

Note: The NDZ shall not be applicable in such areas falling within notified Port limits.

2.4 CRZ- IV:

The CRZ - IV shall constitute the water area and shall be further classified as under:

2.4.1 CRZ- IV A

The water area and the sea bed area between the Low Tide Line up to twelve (12) nautical miles on the seaward side shall constitute CRZ-IV A.

2.4.2 CRZ- IV B

CRZ-IV B areas shall include the water area and the bed area between LTL at the bank of the tidal influenced water body to the LTL on the opposite side of the bank, extending from the mouth of the water body at the sea up to the influence of tide, i.e., salinity of five parts per thousand (ppt) during the driest season of the year.

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3. Areas requiring special consideration in the CRZ

Following coastal areas shall be accorded special consideration for the purpose of protecting the critical coastal environment and difficulties faced by local communities:-

3.1 Critically Vulnerable Coastal Areas (CVCA)

Sunderban region of West Bengal and other ecologically sensitive areas identified as under Environment (Protection) Act, 1986 such as Gulf of Khambat and Gulf of Kutchchh in Gujarat, Malvan, Achra-Ratnagiri in Maharashtra, Karwar and Coondapur in Karnataka, Vembanad in Kerala, Gulf of Mannar in Tamil Nadu, Bhaitarkanika in Odisha, Coringa, East Godavari and Krishna in Andhra Pradesh shall be treated as Critical Vulnerable Coastal Areas (CVCA) and managed with the involvement of coastal communities including fisher folk who depend on coastal resources for their sustainable livelihood.

3.2 CRZ for inland Backwater islands and islands along the mainland coast.

3.3 CRZ falling within municipal limits of Greater Mumbai.

4. Prohibited activities within CRZ

The following activities shall be prohibited, in general, within the entire CRZ. Exceptions to these and other permissible/ regulated activities in specific CRZ categories viz. CRZ-I, II, III & IV, shall however be governed by the provisions under para 5 of this Notification.

(i) Setting up of new industries and expansion of existing industries, operations or processes.
(ii) Manufacture or handling of oil, storage or disposal of hazardous substances as specified in the notification of Ministry of Environment, Forest & Climate Change.
(iii) Setting up of new fish processing units.
(iv) Land reclamation, bunding or disturbing the natural course of seawater
(v) Discharge of untreated waste and effluents from industries, cities or towns and other human settlements.
(vi) Dumping of city or town wastes including construction debris, industrial solid wastes, fly ash for the purpose of land filling.
(vii) Port and harbour projects in high eroding stretches of the coast.
(viii) Mining of sand, rocks and other sub-strata materials.
(ix) Dressing or altering active sand dunes.
(x) In order to safeguard the aquatic system and marine life, disposal of plastic into the coastal waters shall be prohibited. Adequate measures for management and disposal of plastic materials shall be undertaken in the CRZ.

5. Regulation of permissible activities in the CRZ

5.1 CRZ- I

5.1.1. CRZ–I A

These areas are ecologically most sensitive and generally no activities shall be permitted to be carried out in the CRZ-I A areas, with following exceptions:

(i) Eco-tourism activities such as mangrove walks, tree huts, nature trails, etc., in identified stretches areas subject to such eco-tourism plan featuring in the approved CZMPs as per this Notification, framed with due consultative process/ public hearing etc. and further subject to environmental safeguards and precautions related to the Ecologically Sensitive Areas, as enlisted in the CZMPs.

(ii) In the mangrove buffer, only such activities shall be permitted like laying of pipelines, transmission lines, conveyance systems/mechanisms and construction of road on stilts etc. that are required for public utilities.

(iii) Construction of roads and roads on stilts, by way of reclamation in CRZ-I areas, shall be permitted only in exceptional cases for defence , strategic purposes and public utilities, subject to a detailed marine/terrestrial environment impact assessment, to be recommended by the Coastal Zone Management Authority and approved by the Ministry of Environment, Forest and Climate Change; and in case construction of such roads passes through mangrove areas or is likely to damage the mangroves, a minimum three times the mangrove area affected/ destroyed /cut during the construction process shall be taken up for compensatory plantation of mangroves.

5.1.2 CRZ- I B - The inter tidal areas

Activities shall be regulated /permissible in the CRZ-I B areas as under:

(i) Land reclamation and bunding etc. shall be permitted only for activities such as;

(a) Foreshore facilities like ports, harbours, Jetties, wharves, quays, slipway, bridges and sea links etc.

(b) Projects for defence, strategic and security purpose;

(c) Road on stilts, provided that such roads shall not be authorized for permitting development on the landward side of such roads, till the existing High Tide Line.

Provided further that the use of reclaimed land may be permitted only for public utilities such as mass rapid or multimodal transit system, construction and installation of all necessary associated public utilities and infrastructure to operate such transit or transport system including those for electrical or electronic signaling

system, transit stopover of permitted designs; except for any industrial operation, repair and maintenance.

(d) Measures for control of erosion.

(e) Maintenance and clearing of waterways, channels and ports.

(f) Measures to prevent sand bars, installation of tidal regulators, laying of storm water drains or for structure for prevention of salinity ingress and freshwater recharge.

(ii) Activities related to waterfront or directly needing foreshore facilities such as ports and harbours, jetties, quays, wharves, erosion control measures, breakwaters, pipelines, lighthouses, navigational safety facilities, coastal police stations and the like.

(iii) Power by non-conventional energy sources and associated facilities.

(iv) Transfer of hazardous substances from ships to Ports, terminals and refineries and vice versa.

(v) Facilities for receipt and storage of petroleum products and liquefied natural gas as specified in Annexure-II, subject to implementation of safety regulations including guidelines issued by the Oil Industry Safety Directorate in the Ministry of Petroleum and Natural Gas and guidelines issued by MoEF&CC, provided that such facilities are for receipt and storage of fertilizers and raw materials required for fertilizers, like ammonia, phosphoric acid, sulphur, sulphuric acid, nitric acid etc.

(vi) Storage of non-hazardous cargo i.e.edible oil, fertilizers & food grains in notified Ports.

(vii) Hatchery and natural fish drying.

(viii) Existing fish processing units may utilize 25% additional plinth area for modernization purposes (only for additional equipments and pollution control measures) subject to the following:

(a) FSI of such reconstruction not exceeding the permissible FSI permissible as per prevalent town and country planning regulations.
(b) Additional plinth area is constructed only to the landward side.
(c) Approval of the concerned SPCB/ PCC.

(ix) Treatment facilities for waste and effluents and conveyance of treated effluents.

(x) Storm water drains.

(xi) Projects classified as Strategic, Defence related projects & Projects of Department of Atomic Energy.

(xii) Manual mining of atomic mineral(s) notified under Part-B of First Schedule of Mining and Minerals (Development) Act, 1957 occurring as such or in association with one or

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other minerals in the inter-tidal zone by such agencies as authorised by Department of Atomic Energy, as per mining plan approved by the Department of Atomic Energy.

Provided that the manual mining operations are carried out only by deploying persons using baskets and hand spades for collection of ore or mineral within the intertidal zone and as per approved mining plan, without deploying or using drilling and blasting or Heavy Earth Moving Machinery in the intertidal zone.

(xiii) Exploration and extraction of oil and natural gas and all associated activities and facilities thereto;

(xiv) Foreshore requiring facilities for transport of raw materials, facilities for intake of cooling water and outfall for discharge of treated wastewater or cooling water from thermal power plants, in conformity with the environmental standards notified by MoEF&CC and relevant directions of Central Pollution Control Board (CPCB)/SPCB/PCC.

(xv) Pipelines, conveying systems including transmission lines.

(xvi) Weather radar for monitoring of cyclones movement and prediction and associated facilities.

(xvii) Salt harvesting and associated facilities.

(xviii) Desalination plants and associated facilities.

5.2 CRZ-II

(i) Activities as permitted in CRZ-I B, shall also be permissible in CRZ-II, as applicable.

(ii) Construction of buildings for residential purposes, schools, hospitals, institutions, offices, public places etc shall be permitted only on the landward side of the existing road, or on the landward side of existing authorized fixed structures; provided that no permission for construction of buildings shall be given on landward side of any new roads which are constructed on the seaward side of an existing road.

(iii) Buildings permitted as in (ii) above, shall be subject to the local town and country planning regulations as applicable from time to time, and the norms for the Floor Space Index or Floor Area Ratio prevailing as on the date of this Notification. It shall be the responsibility of the concerned Town Planning Authority to ensure that the Solid Wastes are handled as per respective SWM rules and no untreated sewage is discharged on to the coast or coastal waters.

(iv) **Reconstruction of authorized buildings shall be permitted, without change in present land use, subject to the local town and country planning regulations as applicable from time to time, and the norms for the Floor Space Index or Floor Area Ratio, prevailing as on the date of this Notification. It shall be the responsibility of the concerned Town Planning Authority to ensure that the Solid Wastes are handled as per respective SWM rules and no untreated sewage is discharged on to the coast or coastal waters.**

(v) Development of vacant plots in designated areas for construction of beach resorts/hotels subject to the conditions / guidelines at Annexure-III.

(vi) Temporary tourism facilities shall be permissible in the beaches. Such temporary facilities shall only include shacks, toilets/washrooms, change rooms, shower panels; walk ways constructed using interlocking paver blocks etc., drinking water facilities, seating arrangements etc. Such facilities shall however be permitted only subject to the tourism plan featuring in the approved CZMPs as per this Notification, framed with due consultative process/ public hearing etc. and further subject to environmental safeguards enlisted in the CZMPs.

5.3 CRZ-III

(i) Activities as permitted in CRZ-I B, shall also be permissible in CRZ-III, as applicable.

(ii) Regulation of activities in the **NDZ:**

Following shall be permissible / regulated in the NDZ:

(a) No construction shall be permitted within NDZ in CRZ III, except for repairs or reconstruction of existing authorized structure not exceeding existing Floor Space Index, existing plinth area and existing density; for permissible activities under the notification including facilities essential for activities and construction/reconstruction of dwelling units of traditional coastal communities including fisher folk, incorporating necessary disaster management provisions and proper sanitation arrangements.

(b) Agriculture, horticulture, gardens, pastures, parks, playfields and forestry.

(c) Construction of dispensaries, schools, public rain shelter, community toilets, bridges, roads, provision of facilities for water supply, drainage, sewerage, crematoria, cemeteries and electric sub-station which are required for the local inhabitants may be permitted on a case to case basis by CZMA.

(d) Construction of units or auxiliary thereto for domestic sewage, treatment and disposal with the prior approval of the concerned Pollution Control Board or Committee.

(e) Facilities required for local fishing communities such as fish drying yards, auction halls, net mending yards, traditional boat building yards, ice plant, ice crushing units, fish curing facilities and the like;

(f) **Wherever there is a national or state highway passing through the NDZ of CRZ-III areas, temporary tourism facilities such as toilets, change rooms, drinking water facility and temporary shacks can be taken up on the seaward side of the road.**

On landward side of such roads in the NDZ, Resorts / hotels and associated tourism facilities shall be permitted. Such facilities shall, however, be permitted only subject to the incorporation of tourism plan in the approved CZMPs as per this Notification and the conditions / guidelines at Annexure-III, as applicable.

(g) **Temporary tourism facilities shall be permissible in the NDZ of CRZ-III areas. Such temporary facilities shall only include shacks, toilets/washrooms, change rooms, shower panels; walk ways constructed using interlocking paver blocks etc, drinking water facilities, seating arrangements etc. Such facilities shall however be permitted only subject to the tourism plan featuring in the approved CZMPs as per this Notification.**

(iii) For CRZ–III Areas beyond the NDZ, activities shall be permissible/regulated as under:

(a) Development of vacant plots in designated areas for construction of beach resorts/hotels subject to the conditions / guidelines at Annexure-III ;

(b) Construction or reconstruction of dwelling units so long it is within the ambit of traditional rights and customary uses such as existing fishing villages etc. Building permission for such construction or reconstruction will be subject to local town and country planning rules with overall height of construction not exceeding 9mts. with two floors (ground + one floor);

(c) **The local communities including fishermen can be permitted to facilitate tourism through 'home stay' without changing the plinth area/ design or facade of the existing houses.**

(d) Construction of public rain shelters, community toilets, water supply drainage, sewerage, roads and bridges etc.

(e) Limestone Mining:

Selective mining of limestone minerals may be permitted in specific identified areas under the mining plans, which are adequately above the height of HTL, based on the recommendations of reputed National Institutes in the mining field such as CSIR, Central Mining Research Institute etc. provided that the extraction of minerals is

carried out not below a height of 1 mtr. above HTL and an adequate barrier is created so as to safeguard against saline water incursion and subject to appropriate safeguards related to pollution of coastal waters and prevention of coastal erosion.

(iv) Drawing of groundwater and construction related thereto shall be prohibited within 200 mts. of HTL except for the use of local communities in areas inhabited by them. In the areas between 200mts.-500 mts. of the HTL, groundwater withdrawal can be permitted only through manual means from ordinary wells for drinking, horticulture, agriculture and fisheries etc. where no other source of water is available. Restrictions for such drawal may be imposed by the designated Authority by State Government/UT Administration in the areas affected by sea water intrusion.

5.4 CRZ-IV

(i) Traditional fishing and allied activities undertaken by local communities.

(ii) Land reclamation and bunding etc to be permitted only for activities such as;

(a) Foreshore facilities like ports, harbours, Jetties, wharves, quays, slipway, bridges and sea links etc.
(b) Projects for defence, strategic and security purpose.
(c) Measures for control of erosion.
(d) Maintenance and clearing of waterways, channels and ports.
(e) Measures to prevent sand bars, installation of tidal regulators, laying of storm water drains or for structure for prevention of salinity ingress and freshwater recharge.

(iii) Activities related to waterfront or directly needing foreshore facilities such as ports and harbours, jetties, quays, wharves, erosion control measures, breakwaters, pipelines, navigational safety facilities, and the like.

(iv) Power by non-conventional energy sources and associated facilities.

(v) Transfer of hazardous substances from ships to Ports.

(vi) Storage of non-hazardous cargo like edible oil, fertilizers and food grains in notified Ports.

(vii) Facilities for discharging treated effluents into the water course.

(viii) Projects classified as Strategic and Defence related projects.

(ix) Projects of Department of Atomic Energy.

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(x) Exploration and extraction of oil and natural gas and all associated activities and facilities thereto;

(xi) Foreshore requiring facilities for transport of raw materials, facilities for intake of cooling water and outfall for discharge of treated wastewater or cooling water from thermal

power plants. Foreshore requiring facilities for transport of raw materials, facilities for intake of cooling water and outfall for discharge of treated wastewater or cooling water from thermal power plants, in conformity with the environmental standards notified by MoEF&CC and relevant directions of CPCB/SPCB/PCC.

(xii) Pipelines, conveying systems including transmission lines.

(xiii) Weather radar for monitoring of cyclone prediction, movement and associated facilities.

(xiv) Construction of memorials/monuments and allied facilities by the concerned State Government in CRZ-IV (A) areas, in exceptional cases, with adequate environmental safeguards, subject to the following, namely:-

(a) The concerned State Government shall submit justification for locating the project in CRZ–IV A area along with details of alternate sites considered and weightage matrix on various parameters including environmental parameters, to State CZMA who will examine the project and make recommendation to the Central Government (MoEF&CC) for grant of Terms of Reference (ToRs) for preparation of an environmental impact assessment report by the State Government;

(b) On grant of ToRs by the Central Government, the concerned State Government shall submit the draft Environmental Impact Assessment report (EIA) with Environmental Management Plan (EMP), draft Risk Assessment Report with Disaster Management Plan (DMP) including on-site and off-site emergency plan and evacuation plan during emergency, to the State Pollution Control Board for conduct of public hearing for the proposed project in accordance with the procedure laid down under the Environment Impact Assessment notification;

(c) The concerned State Government shall, after addressing the relevant issues raised by the public during the public hearing referred to in sub-item (b), submit the final EIA, EMP, Risk Assessment and DMP, to the State CZMA for their examination and recommendation to MoEF&CC;

(d) The Central Government may, if it considers necessary so to do, dispense with the requirement of public hearing referred to in sub-item (b), if it is satisfied that the

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project will not involve rehabilitation and resettlement of the public or the project site is located away from human habitation.

6. Coastal Zone Management Plans (CZMPs)

(i) All coastal States/UTs shall revise / update their respective coastal zone management plan (CZMP) framed under CRZ Notification, 2011, as per provisions of this Notification and submit to MoEF&CC for approval at the earliest. All the project activities attracting the provisions of this Notification shall be required to be appraised as per the updated CZMPs to this Notification. Until and unless the CZMPs are so revised/updated, provisions of this Notification shall not come in force and the CZMPs as per provisions of CRZ Notification, 2011 shall continue to be followed for appraisal and CRZ clearance to such projects;

(ii) The CZMPs may be prepared/updated by the coastal State Government or Union territory by engaging reputed and experienced scientific institution(s) or the agencies including the National Centre for Sustainable Coastal Management (hereinafter referred to as the NCSCM) of MoEF&CC and in consultation with the concerned stakeholders;

(iii) The coastal States and Union Territory shall prepare draft CZMPs in 1:25,000 scale map identifying and classifying the CRZ areas within the respective territories in accordance with the guidelines given in Annexure-IV of the notification, which involve public consultation;

All developmental activities listed in this notification shall be regulated by the State Government, Union Territory Administration, the local authority or the concerned CZMA within the framework of such approved CZMPs as the case may be in accordance with provisions of this notification;

(iv) The draft CZMPs shall be submitted by the State Government or Union territory to the concerned CZMA for appraisal, including appropriate consultations, and recommendations in accordance with the procedure(s) laid down in the Environment (Protection) Act, 1986;

(v) MoEF&CC shall thereafter consider and approve the respective CZMPs of concerned State Governments/UTs.

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(vi) The CZMPs shall not normally be revised before a period of five years after which, the concerned State Government or the Union territory may consider undertaking a revision.

7. CRZ clearance for permissible/ regulated activities- Delegations

(i) All permitted / regulated project activities attracting the provisions of this notification shall be required to obtain CRZ clearance prior to their commencement.

(ii) **All development activities/projects in CRZ-I and CRZ-IV areas, which are regulated/ permissible as per this notification, shall be dealt with by MOEF&CC for CRZ clearance, based on the recommendation of the concerned CZMA.**

(iii) For all other permissible/regulated activities as per this Notification, which fall purely in CRZ–II / CRZ-III areas, the CRZ clearance shall be considered by the concerned CZMAs. Such projects in CRZ –II and III, which also happen to be traversing through CRZ–I and/or CRZ-IV areas, CRZ clearance shall, however be considered only by MoEF&CC, based on recommendations of the concerned CZMA.

(iv) Projects / activities which attract the provisions of this Notification as also the provisions of EIA Notification 2006, shall be dealt with for a composite Environmental and CRZ clearance under EIA Notification 2006 by the concerned approving Authority, based on recommendations of concerned CZMA, as per delegations i.e., State Environmental Impact Assessment Authority (hereinafter referred to as the SEIAA) or MoEF&CC for category 'B' and category 'A' projects respectively.

(v) In case of building/construction projects with built-up area less than the threshold limit stipulated for attracting the provisions of the EIA Notification, these shall be approved by the concerned local State or Union Territory Planning Authorities in accordance with this notification, after obtaining recommendations of concerned CZMA.

(vi) Only for self dwelling units up to a total built up area of 300 sq mts, approval shall be accorded by the concerned local Authority, without the requirement of recommendations of concerned CZMA. Such authorities shall, however, examine the proposal from the perspective of the CRZ Notification before according approval.

8. Procedure for CRZ clearance for permissible/regulated activities

(i) The project proponents shall apply with the following documents to the concerned State or the Union territory Coastal Zone Management Authority for seeking prior clearance under CRZ Notification:

(a) Project summary details as per Annexure-V of the notification.
(b) Rapid EIA Report including marine and terrestrial component, as applicable, except for building construction projects / housing schemes.
(c) Comprehensive EIA with cumulative studies for projects, if located in low and medium eroding stretches, as per the CZMP to this notification.
(d) Risk Assessment Report and Disaster Management Plan.
(e) CRZ map in 1:4000 scale, drawn up by any of the agencies identified by the MoEF&CC vide its Office order number J-17011/8/92-IA-III dated 14th March 2014 using the demarcation of the High Tide Line or LTL, as carried out by NCSCM.
(f) Project layout superimposed on the above map duly indicating the project boundaries and the CRZ category of the project location.
(g) The CRZ map normally covering 7km radius around the project site also indicating the CRZ-I, II, III and IV areas including other notified ecologically sensitive areas.
(h) "Consent to establish" or NOC from the concerned State Pollution Control Boards or Union Territory Pollution Control Committees for the projects involving discharge of industrial effluents.

(ii) The concerned CZMA shall examine the documents as in (i) above, in accordance with the approved CZMP and in compliance with CRZ notification and make recommendations within a period of sixty days from date of receipt of complete application:-

(a) To MoEF&CC or SEIAA for category 'A' and category 'B' projects respectively, as the case may be, for the projects also attracting EIA Notification, 2006; as per delegations in the EIA Notification 2006.For such Category 'B' projects located in CRZ-I or CRZ-IV areas, final recommendation for CRZ clearance shall however be made only by MoEFCC to the concerned SEIAA to enable it accord a composite EC and CRZ clearance to the proposal.

(b) To MoEF&CC for the projects/activities not covered in the EIA notification, 2006, but attracting CRZ Notification and located in CRZ-I or CRZ-IV areas.

(c) To SEIAA for the projects/activities not covered in the EIA notification, 2006, but attracting CRZ Notification and located in CRZ-II or CRZ-III areas.

(d) To the concerned State or Union territory planning authorities, in case of construction projects with built-up area less than the threshold limit stipulated for attracting the provisions of the EIA Notification 2006.

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(iii) MoEF&CC, SEIAA or the concerned State / Union territory planning authority shall consider such projects for clearance based on the recommendations of the concerned CZMA, within a period of sixty days.

(v) In case the CZMAs are not in operation due to their reconstitution or any other reasons, then it shall be responsibility of the Department of Environment in the State Government or Union territory Administrations, who are the custodian of the CZMPs of respective States or Union Territories, to provide comments and recommend the proposals in terms of the provisions of the said notification.

(vi) The clearance accorded to the projects under this notification shall be valid for a period of seven years, provided that the construction activities are completed and the operations commence within seven years from the date of issue of such clearance.

The validity may be further extended for a maximum period of three years, provided an application is made to the concerned authority by the applicant within the validity period, along with recommendation for extension of validity of the clearance by the concerned State/ Union Territory Coastal Zone Management Authority.

(vii) Post clearance monitoring:-

(a) It shall be mandatory for the project proponent to submit half-yearly compliance reports in respect of the stipulated terms and conditions of the environmental clearance in hard and soft copies to the regulatory authority(s) concerned, on 1st June and 31st December of each calendar year and all such compliance reports submitted by the project proponent shall be published in public domain and its copies shall be given to any person on application to the concerned CZMA.

(b) The compliance report shall also be displayed on the website of the concerned regulatory authority.

(viii) To maintain transparency in the working of the CZMAs, it shall be the responsibility of the CZMA to create a dedicated website and post the agenda, minutes, decisions taken, clearance letters, violations, action taken on the violations and court matters including the Orders of the Hon'ble Court as also the approved CZMPs of the respective State Government or Union Territory.

9. Enforcement of the CRZ Notification:

(i) For the purpose of implementation and enforcement of the provisions this notification and compliance with conditions stipulated there under, the powers either original or delegated are available under Environment (Protection) Act, 1986 with the MoEF&CC, State Government or the Union territory Administration, NCZMA and SCZMAs;

(ii) The composition, tenure and mandate of NCZMA and State Government or the Union territory CZMAs have already been notified by MoEF&CC in terms of Orders of Hon'ble Supreme Court in Writ Petition 664 of 1993;

(iii) The State Government or the Union territory CZMAs shall primarily be responsible for enforcing and monitoring of this notification and to assist in this task, the State Government and the Union territory shall constitute district level Committees under the Chairmanship of the District Magistrate concerned comprising at least three representatives of local traditional coastal communities including from fisherfolk. The State Government may consider further delegation of the enforcement of this notification to the level of respective District Magistrates.

(iv) The dwelling units of the traditional coastal communities including fisher folk, tribals as were permissible under the provisions of the CRZ notification, 2011, but which have not obtained formal approval from concerned authorities under the aforesaid notification shall be considered by the respective Union territory CZMAs and the dwelling units shall be regularized subject to the following condition, namely:-

(a) These are not used for any commercial activity.
(b) These are not sold or transferred to non-traditional coastal community.

10. Areas requiring special consideration:

10.1 Critically Vulnerable Coastal Areas (CVCAs):

(i) For all the CVCAs enlisted in para 3.3 of this notification, Integrated Management Plans (IMPs) shall be prepared, which shall, inter alia, keep in view the conservation and management of mangroves, needs of local communities such as, dispensaries, schools, public rain shelter, community toilets, bridges, roads, jetties, water supply, drainage, sewerage and the impact of sea level rise and other natural disasters. The IMPs will be prepared in line with the guidelines for preparation of Coastal Zone Management Plans;

(ii) Till such time the IMPs are approved and notified, construction of dispensaries, schools, public rain/cyclone shelters, community toilets, bridges, roads, jetties, water supply, drainage, sewerage which are required for traditional inhabitants shall be permitted on a case to case basis, by the CZMA with due regards to the views of coastal communities including fisher folk.

10.2 CRZ for inland Backwater islands and islands along the mainland coast:

(i) All the inland islands in the coastal backwaters and islands along the mainland coast shall also be covered under this CRZ Notification.

(ii) In view of the unique coastal systems of backwater and backwater islands along with space limitations in such coastal stretches, CRZ of 20 mts. from the HTL on the landward side shall uniformly apply to such islands and activities shall be regulated as under:

(a) Existing dwelling units of local communities may be repaired or reconstructed within 20 mts from the HTL of these islands. However, no new construction shall be permitted.

(b) Foreshore facilities such as fishing jetty, fish drying yards, net mending yard, fishing processing by traditional methods, boat building yards, ice plant, boat repairs and the like, may be taken up in CRZ limits subject to due environmental safeguards.

(iii) Integrated Island Management Plans (IIMPs), as applicable to smaller islands in Lakshadweep and Andaman & Nicobar, as per Island Protection Zone Notification, shall be formulated by respective States/UTs for all such islands and submitted to MoEF&CC for approval at the earliest. Until and unless the IIMPs are framed, provisions of this Notification shall not come in force and the CZMPs as per provisions of CRZ Notification 2011 shall continue to be followed.

10.3 CRZ areas falling within municipal limits of the Greater Mumbai:

(i) In order to protect and preserve the 'green lung' of the Greater Mumbai area, all open spaces, parks, gardens, playgrounds indicated in development plans within CRZ-II shall be categorized as No Development Zone. A Floor Space Index up to 15% shall be allowed only for construction of civic amenities, stadium and gymnasium meant for recreational or sports related activities and the residential or commercial use of such open spaces shall not be permissible.

(ii) Construction of sewage treatment plants in CRZ-I area for the purpose of treating the sewage from the municipal area shall be taken only by the municipal authorities in exceptional circumstances, where no alternate site is available to set up such facilities, subject to recommendations of the CZMA and approval by the Central Government and in case the construction of such plant is inevitable in a mangrove area, a minimum three times the mangrove area affected/destroyed /cut during the construction process shall be taken up for compensatory plantation of mangroves.

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Annexure-I

CONSERVATION, PROTECTION AND MANAGEMENT FRAMEWORK FOR ESAs

The coastal and marine Ecologically Sensitive Areas (ESAs) and the geo-morphological features play a vital role in maintaining the functions of the coast. Mangroves, beaches, coral reefs etc., aid in controlling coastal erosion, shoreline change, saltwater intrusion and also serve as natural defence against coastal hazards such as storm surges, cyclones and tsunamis. The ESAs maintain the biological integrity of the coast by providing direct and indirect ecosystem services to the coastal livelihood. In addition, several invaluable archaeological and heritage sites are also located along the coast. Hence conservation and protection of the above areas/ features/ sites become necessary.

1. General measures

(i) All ESAs shall be identified and boundary delineated by NCSCM using satellite data.

(ii) The State/UT Governments through the authorized agencies shall prepare CZMP as per the guidelines contained in the Notification highlighting the conservation and protection of the ESAs.

(iii) Those activities permissible under this notification shall be included in the CZMPs

Specific conditions shall be adopted for the conservation, protection and management of each of the ESAs as under:-

1.1 Mangroves:

(i) Mangroves declared as forest under Forest Conservation Act, 1980:

Notwithstanding anything contained in this notification, such mangroves declared by the concerned State Governments/UT Administrations/Central Government as forest land under the F(C) Act, 1980 shall attract the provisions of the F(C) Act, 1980 only.

(ii) Mangroves not declared under Forest Conservation Act, 1980.

(a) Mangroves in Government land shall be protected based on a detailed plan to be prepared by the concerned State/UT Governments. In case the mangrove area is more than 1000 sq mt, a buffer of 50m along the periphery of mangrove area shall be provided. This buffer zone of 50m may be utilized for public facilities for developing parks, research facilities related to mangrove biodiversity, facilities for conservation and the like.

(b) Mangroves in private land will not require a buffer zone.

1.2 Corals and coral reefs and associated biodiversity:

(i) Destruction of coral and coral reefs and the surroundings is a prohibited activity.
(ii) All coral and coral reefs shall be protected except for those small quantities required for research purposes.
(iii) Coral and coral reefs transplantation activities shall be through recognized research institutions wherever required for regeneration after obtaining necessary approvals under Wildlife (Protection) Act 1972.
(iv) The dead and/or destroyed coral areas shall be taken up for rejuvenation and rehabilitation. The conservation and protection of corals and coral reefs shall be taken up as follows:

(a) Active and live coral and coral reefs identified and delineated shall be declared and notified as ESA under E (P) Act 1986.
(b) It shall be ensured that no activities that are detrimental to the health of corals, coral reefs and its associated biodiversity such as mining, effluent and sewage discharge, dredging, ballast water discharge, ship washings, fishing other than traditional non-destructive fisheries, construction activities and the like are taken up in and around the coral areas.

1.3 The National Parks, marine parks, Sanctuaries, reserve forests, wildlife habitats and other protected areas declared under the provisions of Wild Life (Protection) Act, 1972 (53 of 1972), the F(C)Act 1980 (69 of 1980) or E(P)Act 1986 (29 of 1986); including Biosphere Reserves would be conserved and protected as follows:

(i) Conservation and protection of the above listed areas shall be as per the provisions of the respective Acts/notifications/guidelines.
(iii) Efforts shall be made to increase the forest area in the coastal region in order to prevent loss of life and property from increased storms, tides and floods.
(iv) The concerned State Governments/UTs shall provide for adequate funds for such measures to undertake shelter belt plantation or bio-shields with planting material suitable to the location.

1.4. Salt marshes:

The conservation and protection of salt marshes shall be as follows:

(i) The salt marsh areas shall be conserved and protected and efforts shall be made to promote the endemic biodiversity in the salt marshes.
(ii) Only those activities required for overhead conveying/transmission of cables and underground laying of transmission line cables and so on, shall be permissible.
(iii) Traditional fishing is permissible in salt marshes.
(iv) Temporary tourism facilities around the salt marsh areas could be considered subject to adhering to strict norms laid down in the guidelines.
(v) Certain salt marshes which have less biodiversity, identified by MCSCM and demarcated in CZMP can be considered for salt pan activities.

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1.5 Turtle nesting grounds shall be protected and conserved as follows:

(i) Turtle nesting grounds identified by the concerned States/UTs shall be protected as per Wildlife (Protection) Act of 1972.
(ii) No activities shall be permitted in and around the turtle nesting ground including those causing light and sound pollution except for those required for conservation and protection of these sites.
(iii) Strict management plans for protecting the turtle nesting grounds shall be undertaken and implemented by the concerned State/UT Authorities.

1.6 Horse shoe crabs habitats shall be protected and conserved as follows:

(i) The habitat identified shall be taken up for conservation and protection.
(ii) No activities shall be taken up in and around these habitats which affect the horse shoe crab ecosystem.

1.7 Sea grass beds shall be protected and conserved as follows:

(i) Identified sea grass beds shall be conserved and protected.
(ii) No developmental activities that have adverse effect on the sea grass bed shall be undertaken.
(iii) Efforts shall be made to propagate sea grass beds along the coastal waters where ever possible by States/UTs as it acts as a carbon sink.

1.8 Nesting grounds of birds shall be protected and conserved as follows:

(i) The nesting ground of birds including their local migratory route shall be protected. No developmental activities which have adverse impact on the nesting grounds and the migratory routes shall be undertaken including construction of wind mills, transmission lines and the like in the locality.
(ii) Efforts shall be made to increase the forest cover and mangrove cover including enriching the biodiversity of salt marsh and other coastal water bodies so as to provide for suitable habitat for the avifauna.

1.9 Geo-morphologically Important Zones shall be protected and managed as follows:

(i) **Sand dunes** identified shall be conserved and protected as follows:
(a) Sand dunes identified shall be notified under E(P)Act 1986;
(b) No developmental activities be permissible except for providing eco-friendly temporary tourism facilities on stilts such as walkways, tents and the like;
(c) Mining of sand from sand dunes is a prohibited activity except for the removal of rare earth minerals with proper replenishment using the tailings or other suitable sand.
(d) No activities on the sand dunes shall be taken up that would lead to erosion/destruction of sand dunes;

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(e) Afforestation, if any, on the sand dunes shall be done only with native flora.
(f) The States/UTs shall prepare management plans for the demarcated sand dunes.

(ii) **Sandy beaches:**
(a) Mining of beach sand is prohibited except for the removal of rare earth minerals with proper replenishment using the tailings or other suitable sand.
(b) When the permissible developmental activities are taken up on the beaches if loss of beach in the neighbourhood is predicted, necessary beach nourishment to compensate for the losses shall be undertaken by the project authorities and its long term maintenance shall be ensured by them.
(c) The States/UTs shall prepare management plans for the demarcated beaches.

(iii) **Biologically active Mudflats:**

a) Biologically active mudflats will be identified by NCSCM in association with State Govt./UT Administration.
b) The States/UTs shall prepare management plans for such demarcated biologically active mudflats.

1.10 Areas or structures of archaeological importance and heritage value sites:

(i) State Archaeological agencies shall be responsible for conservation and protection of all archaeological structures and heritage sites identified by Archaeological Survey of India, as per the provisions of the respective Acts/notifications/guidelines.
(ii) No activities that are detrimental to the identified areas or structures of archaeological and heritage value shall be permitted.
(iii) It shall be ensured that these structures or areas are preserved and activities undertaken without changing the façade/plinth of such structures. Such structures could be considered for use in accordance with the relevant norms after undertaking careful designing of the interiors without changing the exterior architectural design of the structure.

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Annexure-II

List of petroleum and chemical products permitted for storage in CRZ, except CRZ-I A

(i) Crude oil;
(ii) Liquefied Petroleum Gas;
(iii) Motor spirit;
(iv) Kerosene;
(v) Aviation fuel;
(vi) High speed diesel;
(vii) Lubricating oil;
(viii) Butane;
(ix) Propane;
(x) Compressed Natural Gas;
(xi) Naphtha;
(xii) Furnace oil;
(xiii) Low Sulphur Heavy Stock;
(xiv) Liquefied Natural Gas;
(xv) Fertilizers and raw materials for manufacture of fertilizers
(xvi) Acetic acid
(xvii) Mono ethylene glycol

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Annexure-III

Guidelines for development of beach resorts/hotels in the designated CRZ Areas

1. CRZ-II

Construction of beach resorts/hotels in designated areas of CRZ-II for occupation of tourist or visitors shall be subject to the following conditions, namely:-

(i) Construction shall be permitted only to the landward side of an existing road or existing authorized fixed structures.

(ii) Live fencing and barbed wire fencing with vegetative cover may be allowed around private properties subject to the condition that such fencing shall in no way hamper public access to the beach;

(iii) No flattening of sand dunes shall be carried out;

(iv) No permanent structures for sports facilities shall be permitted except construction of goal posts, net posts and lamp posts;

(v) Construction of basement may be allowed subject to the condition that no objection certification is obtained from the State Ground Water Authority to the effect that such construction will not adversely affect fee flow of groundwater in that area;

(vi) The State Ground Water Authority shall take into consideration the guidelines issued by Central Government before granting such no objection certificate;

(vii The quality of treated effluents, solid wastes, emissions and noise levels and the like, from the project area must conform to the standards laid down by the competent authorities including the Central or State Pollution Control Board and under the Environment (Protection) Act, 1986;

(viii) Necessary arrangements for the treatment of the effluents and solid wastes must be made and it must be ensured that the untreated effluents and solid wastes are not discharged into the water or on the beach; and no effluent or solid waste shall be discharged on the beach;

(ix) If the project involves diversion of forestland for non-forest purposes, clearance as required under the Forest (Conservation) Act, 1980 shall be obtained and the requirements of other Central and State laws as applicable to the project shall be met with; and approval of the State or Union territory Tourism Department shall be obtained.

2. CRZ-III

Construction of beach resorts/hotels in designated areas of CRZ- III for occupation of tourists or visitors shall be subject to the following conditions, namely:-

(i) Live fencing and barbed wire fencing with vegetative cover may be allowed around private properties subject to the condition that such fencing shall in no way hamper public access to the beach;

(ii) No flattening of sand dunes shall be carried out;

(iii) No permanent structures for sports facilities shall be permitted except construction of goal posts, net posts and lamp posts;

(iv) Construction of basement may be allowed subject to the condition that no objection certification is obtained from the State Ground Water Authority to the effect that such construction will not adversely affect fee flow of groundwater in that area;

(v) The State Ground Water Authority shall take into consideration the guidelines issued by Central Government before granting such no objection certificate;

(vi) Though no construction is allowed in the no development zone for the purposes of calculation of Floor Space Index, the area of entire plot including the portion which falls within the no development zone shall be taken into account;

(vii) The total covered area on all floors shall not exceed 33 per cent of the plot size i.e., the Floor Space Index shall not exceed 0.33 and the open area shall be suitably landscaped with appropriate vegetal cover;

(viii) The construction shall be consistent with the surrounding landscape and local architectural style;

(ix) The overall height of construction up to the highest ridge of the roof, shall not exceed 9 metres and the construction shall not be more than two floors (ground floor plus one upper floor);

(x) Groundwater shall not be tapped within 200metre of the High Tide Line; within the 200metre 500metre zone it can be tapped only with the concurrence of the Central or State Ground Water Board;

(xi) Extraction of sand, leveling or digging of sandy stretches, except for structural foundation of building or swimming pool, shall not be permitted within 500 metres of the High Tide Line;

(xii) The quality of treated effluents, solid wastes, emissions and noise levels and the like, from the project area must conform to the standards laid down by the

competent authorities including the Central or State Pollution Control Board and under the Environment (Protection) Act, 1986;

(xiii) Necessary arrangements for the treatment of the effluents and solid wastes must be made and it must be ensured that the untreated effluents and solid wastes are not discharged into the water or on the beach; and no effluent or solid waste shall be discharged on the beach;

(xiv) To allow public access to the beach, at least a gap of 20 metres width shall be provided between any two hotels or beach resorts; and in no case shall gaps be less than 500 metres apart; and

(xv) If the project involves diversion of forestland for non-forest purposes, clearance as required under the Forest (Conservation) Act, 1980 shall be obtained and the requirements of other Central and State laws as applicable to the project shall be met with; and approval of the State or Union territory Tourism Department shall be obtained.

Note: Construction of beach resorts or hotels shall not be permitted in Ecologically sensitive areas (such as marine parks, mangroves, coral reefs, breeding and spawning grounds of fish, wildlife habitats and such other area as may be notified by the Central or State Government Union territories).

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ANNEXURE -IV

GUIDELINES FOR PREPARATION OF COASTAL ZONE MANAGEMENT PLANS

1. Demarcation of High Tide Line and Low Tide Line

Demarcation of High Tide Line (HTL) and Low Tide Line (LTL) as carried out by NCSCM for the entire coastline of the country, has been made available to the Coastal States / Union Territories and only such demarcation of HTL and LTL shall be applicable for all purposes under this Notification.

2. A 'Hazard line' has been demarcated by the Survey of India (SOI) taking into account the extent of the flooding on the land area due to water level fluctuations, sea level rise and shoreline changes(erosion/accretion) occurring over a period of time. The hazard line mapped by SOI has been shared with the coastal States/UTs through NCSCM. The hazard line shall be used as a tool for disaster management plan for the coastal environment, including planning of adaptive and mitigation measures. With a view to reduce the vulnerability of the coastal communities and ensuring sustainable livelihood, while drawing the CZMPs, the land use planning for the area between the Hazard line and HTL shall take into account such impacts of climate change and shoreline changes.

3. Preparation of CZM Maps

(i) Base Maps of 1:25,000 scale shall be acquired from the Survey of India (SOI) and wherever 1:25,000 maps are not available, 1:50,000 maps shall be enlarged to 1:25,000 for the purpose of base map preparation and these maps will be of the standard specification given below:

Unit	: 7.5 minutes X 7.5minutes
Numbering	: Survey of India Sheet Numbering System
Horizontal Datum	: Everest or WGS 84
Vertical Datum	: Mean Sea Level (MSL)
Topography	: Topography in the SOI maps will be updated using latest satellite imageries or aerial photographs

(ii) Coastal Zone Management (CZM) Maps of scale 1:25,000 shall be got prepared by any of the agencies identified by the MoEF&CC vide its Office order number J-17011/8/92-IA-III dated 14th March 2014 using the demarcation of the High Tide Line or LTL, as carried out by NCSCM.

(iii) Various regulatory lines viz. at a distance of 20 mtrs., 50 mts., 200 mts. and 500 mts. from HTL respectively, as applicable in various CRZ categories, and the Hazard line shall be demarcated and transferred to the CZM Maps

(iv) HTL, LTL and CRZ boundaries, as applicable, shall also be demarcated in the CZM maps along the banks of tidal influenced inland water bodies.

(v) Classification of different coastal zones shall be done as per the CRZ notification and Standard national or international colour codes shall be used.

3. Local level CZM Maps

(i) Local level CZM Maps are for the use of local bodies and other agencies to facilitate implementation of the Coastal Zone Management Plans

(ii) Cadastral (village) maps in 1:3960 or the nearest scale, as available with revenue authorities shall be used as the base maps.

(iii) HTL, LTL, other CRZ regulatory lines and the Hazard line shall be demarcated in the cadastral maps and classifications shall be transferred into local level CZM maps.

4. Classification of CRZ areas

(i) The CZM Maps shall clearly demarcate the land use plan of the area and map out the Ecologically Sensitive Areas (ESAs) or the CRZ-IA areas as per mapping made available by NCSCM to coastal State / UTs. All such ESAs shall be appropriately demarcated with colour codes.

(ii) Buffer zone along mangrove areas of more than 1000sq mts. shall be stipulated with a different colour distinguishing from the mangrove area. The buffer zone shall also be classified as CRZ-I area.

(iii) In the CRZ areas, the fishing villages, common properties of the fishermen communities, fishing jetties, ice plants, fish drying platforms or areas infrastructure facilities of fishing and local communities such as dispensaries, roads, schools, and the like, shall be indicated on the cadastral scale maps. States shall prepare detailed plans for long term housing needs of coastal fisher communities in view of expansion and other needs, provisions of basic services including sanitation, safety, and disaster preparedness.

(iv) The water areas of CRZ-IV shall be demarcated and clearly demarcated if the water body is sea, lagoon, backwater, creek, bay, and estuary and for such classification of the water bodies the terminology used by Naval Hydrographic Office shall be relied upon.

(v) The fishing Zones in the water bodies and the fish breeding areas shall be clearly marked.

(vi) In CVCAs, the land use maps shall be superimposed on the Coastal Zone Management Plan clearly demarcating the CRZ-I, II, III, IV.

(vii) The existing authorized developments on the seaward side shall be clearly demarcated.

(viii) The features like cyclone shelters, rain shelters, helipads and other infrastructure including road network may be clearly indicated on the CZM Maps for the purpose of rescue and relief operations during cyclones, storms, tsunami and the like.

(ix) Construction of buildings or other activities shall be permitted under the CZMPs provided adequate arrangements are made for proper management and disposal of solid and liquid wastes in accordance with the environmental standards, rules and statutes etc. Under no circumstances, untreated effluents shall be disposed off in the coastal waters.

5. Public consultations on the CZMP.

(i) The draft CZMPs prepared shall be given wide publicity and suggestions and objections received in accordance with the Environment (Protection) Act, 1986. Public hearing on the draft CZMPs shall be held at district level by the concerned CZMAs.

(ii) Based on the suggestions and objections received the CZMPs shall be revised and approval of MoEF&CC shall be obtained.

(iii) The approved CZMP shall be put up on the website of MoEF&CC, concerned website of the State, Union Territory CZMA and hard copy made available in the Panchayat Office, District Collector Office and the like.

6. Revision of Coastal Zone Management Plans

(i) Whenever there is a doubt the concerned State or Union territory Coastal Zone Management Authority shall refer the matter to the National Centre for Sustainable Coastal Management who shall verify the CZMP based on latest satellite imagery and ground truthing.

(ii) If required the rectified map would be submitted to MoEF&CC for consideration.

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ANNEXURE-V

PROJECT INFORMATION DETAILS

1. PROJECT DETAILS

A. Project Name
B. Survey No./ Village/ Co-ordinates
C. District
D. State
E. Whether the proposal is for (Select relevant field)
   (i) Fresh Clearance under CRZ
   (ii) Amendment to an already issued CRZ clearance
   (iii) Extension of validity of an already issued CRZ clearance
F. Name of the Applicant
G. Address of the Applicant
H. Contact details (Telephone nos. and e-mail address)
I. Cost of the project (Rs in crores)

2. BENEFITS OF THE PROJECT

A. Details of Project Benefits
B. Employment Likely to be Generated (Yes/No)
   If Yes
   (i) Total Manpower Requirement
   (ii) Permanent Employment (Numbers)
   (iii) Temporary Employment (Numbers)
   (iv) Temporary Employment- During Construction (Numbers)
   (v) Temporary Employment- During Operation (Numbers)

3. DESCRIPTION OF THE PROJECT UNDER CONSIDERATION (Select the Category of the project):

A. Resort / Buildings / civic amenities
   (i) Total area/Built-up area (in sqm.)
   (ii) Height of structure
   (iii) FSI ratio
   (iv) Name of concerned town planning authority/ Panchayat etc.
   (v) Details of provision of car parking area

B. Coastal Roads / Roads on Stilt
   (i) Area of land reclamation
   (ii) Estimated quantity of muck/earth for reclamation
   (iii) Traffic carrying capacity

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(iv) Dimensions of road

C. Pipelines from thermal power blow down

(i) Length of pipeline
(ii) Length traversing CRZ area
(iii) Depth of excavation
(iv) Width of excavation
(v) Length of pipeline from seashore to deep sea
(vi) Depth of outfall point from surface of sea water
(vii) Temperature of effluent above ambient at disposal point

D. Marine Disposal of Treated Effluent through pipelines

(i) Location of intake/ outfall
(ii) Depth of outfall point
(iii) Length of pipeline
(iv) Length traversing CRZ area
(v) Depth of excavation
(vi) Width of excavation
(vii) Length of pipeline from shore to deep sea/creek
(viii) Depth of outfall point from surface of water
(ix) Depth of water at disposal point
(x) BOD, COD, TSS, oil & grease, heavy metals in the effluent

E. Facility for storage of goods/chemicals

(i) Name of chemical
(ii) End use of the chemical
(iii) No. of tanks for storage
(iv) Capacity of tanks

F. Offshore structures

(i) Exploration or development
(ii) Depth of sea bed
(iii) No. of rigs
(iv) No. of platform
(v) Details of group gathering stations

G. Desalination Plant

(i) Capacity of desalination
(ii) Total brine generation
(iii) Temperature of effluent above ambient at disposal point
(iv) Ambient salinity
(v) Disposal point

H. Mining of rare earth/atomic minerals

(i) Capacity of mining
(ii) Type of mineral to be extracted
(iii) End use of the mineral

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I. **Sewage Treatment Plants**
   (i) Capacity
   (ii) Total area of construction
   (iii) Compliance of effluent parameters as laid down by cpcb/spcb/other authorised agency
   (iv) Whether discharge is in sea water/creek?
   If yes
   - Distance of marine outfall point from shore/from the tidal river bank
   - Depth of outfall point from sea water/river water surface
   - Depth of seabed/riverbed at outfall point

J. **Lighthouse**
   (i) Total ground area of foundation/platform
   (ii) Height of the structure

K. **Wind Mills**
   (i) Capacity (MW)
   (ii) Height of the windmill
   (iii) Diameter of the windmill
   (iv) Length of blade
   (v) Speed of rotation
   (vi) Transmission lines (overhead or underground)

L. **Others**
   (i) Please specify with salient features
   (ii) Upload relevant Documents (upload PDF only)

4. **PROJECT LOCATION AS PER CRZ CLASSIFICATION** (If project site falls in different/multiple CRZ categories the same may also be elaborated)

5. **CLAUSE OF CRZ NOTIFICATION UNDER WHICH PROJECT IS A PERMISSIBLE /REGULATED ACTIVITY**

6. **MANDATORY FIELDS FOR PROJECT ASSESSMENT**

A. **CRZ map in 1:4000 scale indicating HTL, LTL demarcation and distance of the nearest project boundary** (in meters) **from HTL to be stated**
(i) Upload Map (kml file)

B. **Project layout superimposed on CRZ Map 1:4000 scale with classification of project location including other notified ESAs prepared**
(i) Upload Map (kml file)

C. **CRZ map 1:25000 scale covering 7 km radius around Project site**
(i) Upload Map (kml file)



7. **PROJECT LOCATED IN** (Select Type)
   (i) Non eroding Coast
   (ii) Low and Medium eroding coast
   (iii) High eroding Coast

8. **DETAILS OF FOREST/ MANGROVES LAND INVOLVED (YES/NO)**
   IF YES
   (i) Detail of area diverted
   (ii) Forest clearance to be submitted (Upload document)
   (iii) No. of trees to be cut under the project
   (iv) Compensatory afforestation plan to be submitted (Upload document)

9. **DISTANCE OF PROPOSED PROJECT FROM ESA/MARINE PARK/ WILD LIFE SANCTUARY**

   (i) Within 10 km radius from the project site (Yes/No)
   If YES
   - Permission from NBWL to be submitted (Upload document)

10. **NOC OR CONSENT TO ESTABLISH FROM STATE/UT POLLUTION CONTROL BOARDS OBTAINED (YES/NO)**
    If YES
    (i) Copy of NOC to be provided (Upload document)
    (ii) Conditions imposed to be stated (Upload document)

11. **EIA studies (relevant fields to be filled)**
    A. **Terrestrial studies:**
    (i) Summary Details of EIA (Terrestrial) Studies
    (ii) Upload Recommendation made in EIAs (Upload document)
    (iii) State period of Study

    B. **Marine Studies**
    (i) Summary Details of EIA (Marine) Studies
    (ii) Upload Recommendation made in EIAs (Upload document)
    (iii) State period of Study

12. **DISASTER MANAGEMENT PLAN / NATIONAL OIL SPILL DISASTER CONTINGENCY PLAN (If applicable)**

13. **PROJECT INVOLVING DISCHARGE OF LIQUID EFFLUENTS:**
    (i) Capacity of STP
    (ii) Quantity of effluent generated
    (iii) Quantity of effluent treated
    (iv) Method of treatment & disposal

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14. PROJECT INVOLVING DISCHARGE OF SOLID WASTE:

(i) Type of solid waste
(ii) Quantity of solid waste generated
(iii) Method of disposal
(iv) Mode of transport

15. WATER REQUIREMENT (KLD)

(i) Quantity of water required
(ii) Source of water
(iii) If Ground water (Upload a copy of approval from CGWA or authorised body)
(iv) If other Source (Upload a copy of permission from competent authority)
(v) Mode of transport
(vi) Commitment of water supply (Upload document)

16. DETAILS OF WATER TREATMENT AND RECYCLING (If any) (Multiple Entries Allowed)

Type/ Source	Quantity of Waste Water Generated (Kilos Litre per Day)	Treatment Capacity (Kilos Litre per Day)	Treatment Method	Mode of Disposal	Quantity of Discharged Water (Kilos Litre per Day)	Quantity of Treatment Water used in Recycling/Reuse (Kilo Litre per Day)

17. DETAILS OF RAINWATER HARVESTING

(i) No. of Storage tanks
(ii) Total capacity of tanks
(iii) No. of Recharge Pits
(iv) Capacity of pits

18. ENERGY REQUIREMENT AND SOURCES

(i) Total Power Requirements (kW.h)
(ii) Source
(iii) Upload Copy of Agreement (upload pdf only)
(iv) Stand By Arrangement (Details)

19. ENERGY EFFICIENCY/SAVING MEASURES

(i) Source/Mode
(ii) Details of savings

20. RECOMMENDATION OF STATE COASTAL ZONE MANAGEMENT AUTHORITY

(i) Upload Copy of CZMA recommendations (Upload pdf only)
(ii) Compliance status of the Conditions Imposed

21. WHETHER PROPOSAL ATTRACTS EIA NOTIFICATION, 2006. (Yes/No)
If YES,
(i) the category thereof
(ii) Status of proposal for EC (as applicable)

22. SOCIAL AND ENVIRONMENTAL ISSUES AND MITIGATIONS MEASURES SUGGESTED INCLUDING BUT NOT LIMITED TO R&R, WATER, AIR, HAZARDOUS WASTES, ECOLOGICAL ASPECTS, ETC.(Brief Details to be Provided)

23. DETAILS OF COURT CASES Whether there is any Court Cases pending against the project and/or land in which the project is proposed to be set up? **(Yes/No)**

If Yes,
Pending or Disposed (Select relevant)

(i) Name of the Court (Supreme Court, High Court, NGT)
(ii) Case No.
(iii) Case Details
(iv) Orders/Directions of the court, if any and its relevance with the proposed project (Upload document)

24. ADDITIONAL INFORMATION, If any

UNDERTAKING: It is certified that the information given above are true to the best of my knowledge and belief and nothing contravening the provisions of CRZ Notification, 2011 has been concealed therefore.

****

NOTARY SUBHASH KRISHNA KANEKAR SALCETE TALUKA MARGAO-GOA Regn. No 344/14 Exp. Dt: 28/02/2024 GOVT. OF GOA (INDIA)

Hindustantimes

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ANNEXURE A-7

Draft CRZ notification published despite 68% objections from public

The draft rules were released by the Ministry of Environment, Forests and Climate Change (MoEFCC) on April 18, 2018.

Updated: Jan 29, 2019 00:50:50

By Badri Chatterjee

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SUBHASH KRISHNA KANEKAR
SALCETE TALUKA
MARGAO-GOA
REGD. NO 344/14
EXPIRY: 28/02/2024
GOVT. OF INDIA

Citizens from coastal areas, such as fishermen, local institutions and industries submitted made maximum submissions (664), with most of them (362) demanding the notification be scrapped. (HT File)

Of the 1,965 responses to the draft of the new coastal regulation zone (CRZ) notification that was published on January 18, 1,338 (68%) were objections, according to the Right to Information (RTI) reply obtained by a Delhi-based think tank, Centre of Policy Research (CPR).

The draft rules were released by the Ministry of Environment, Forests and Climate Change (MoEFCC) on April 18, 2018.The draft was open for public comments till June 17, 2018. Citing the RTI reply, CPR said only 470 submissions (23%) were in favour of the new laws, while a small percentage suggested changes or sought clarifications. "The ministry received 471 submissions, with multiple representations and signatures. If the number of representations is factored in, the number of comments touches 1,965," read the analysis by researchers from the CPR-Namati Environmental Justice Program.

"If any draft policy gets more than 50% objections, the draft has to be scrapped and prepared again. However, there is still a chance to appeal against it to the ministry or courts, if all documents highlighting specific objections are collated," said a senior state official.

The new norms are based on the recommendations of Dr Shailesh Nayak-led committee, which includes all coastal states and various other stakeholders.





"The notification has been developed keeping in mind protection of ecologically sensitive areas, safeguarding aquatic system and marine life, plastic waste disposal, and simultaneously allowing ecotourism and development of coastal zones. Every stakeholder

was brought on board before developing the document, which was reviewed by the union council of ministers," said a senior official from MoEFCC from the committee that drafted the notification.

"While existing open spaces and green cover in coastal areas will be protected, the latest provision helps issue clearances for redevelopment activities in areas such as bays and creeks, which was stalled as per the previous notification," said Anil Diggikar, principal secretary, state environment department.

Citizens from coastal areas, such as fishermen, local institutions and industries submitted made maximum submissions (664), with most of them (362) demanding the notification be scrapped.



Seven submissions were from Sindhudurg and Malvan in Maharashtra, seeking a clarification on critically vulnerable area protection, which was mentioned in CRZ 2011 notification, but not in the draft
rules.

Submissions from 10 government agencies from Maharashtra, including the state urban development department, Mumbai Metropolitan Region Development Authority (MMRDA) and mining bodies, sought further reduction of NDZ, and removal of buffer around mangroves on private lands. Six submissions from political parties along the west coast requested the conversion of rural areas (CRZ-III) to urban spaces (CRZ-II) and removal of NDZ.

"Inviting suggestions and objections was tokenism and not a serious attempt to engage with citizens," said Stalin D, director, Vanashakti.

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"With the new notification, the government has assumed that every inch of the coastline can be commercially used, built over or reclaimed, irrespective of ecological fragility or livelihood dependence," said Kanchi Kohli, legal researcher at CPR.

"At a time when climate change and human-induced disasters are a reality, the notification allows exploitation of coastal lands and marine areas up to 12 nautical miles. In cities like Mumbai, this notification was issued to accommodate the demands of real estate sector."

First Published: Jan 29, 2019 00:50:00

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INDIA'S INTENDED NATIONALLY DETERMINED CONTRIBUTION:

WORKING TOWARDS CLIMATE JUSTICE

ॐ द्यौः शान्तिरन्तरिक्षं शान्तिः
पृथिवी शान्तिरापः शान्तिरोषधयः शान्तिः ।

"Om dyauh śāntir antariksam śāntih prithvi śāntih āpah śāntih osadhayah śāntih"

-- Yajur Veda 36.17

{{Unto Heaven be Peace, Unto the Sky and the Earth be Peace, Peace be unto the Water, Unto the Herbs and Trees be Peace}}

INTRODUCTION

India has a long history and tradition of harmonious co-existence between man and nature. Human beings here have regarded fauna and flora as part of their family. This is part of our heritage and manifest in our lifestyle and traditional practices. We represent a culture that calls our planet Mother Earth. As our ancient text says; "Keep pure! For the Earth is our mother! And we are her children!" The ancient Indian practice of Yoga, for example, is a system that is aimed at balancing contentment and worldly desires, that helps pursue a path of moderation and a sustainable lifestyle. Environmental sustainability, which involves both intra-generational and inter-generational equity, has been the approach of Indians for very long. Much before the climate change debate began, Mahatma Gandhi, regarded as the father of our nation had said that we should act as *'trustees'* and use natural resources wisely as it is our moral responsibility to ensure that we bequeath to the future generations a healthy planet.

The desire to improve one's lot has been the primary driving force behind human progress. While a few fortunate fellow beings have moved far ahead in this journey of progress, there are many in the world who have been left behind. Nations that are now striving to fulfill this 'right to grow' of their teeming millions cannot be made to feel guilty of their development agenda as they attempt to fulfill this legitimate aspiration. Just because economic development of many countries in the past has come at the cost of environment, it should not be presumed that a reconciliation of the two is not possible.

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It is possible for people to live in harmony with nature by harnessing its potential for the benefit of mankind without undue exploitation leading to irretrievable damage and consequences that block the progress of others. There is a need to evolve a set of precepts, a kind of commandments, especially for the youth of the world, that help in developing a unified global perspective to economic growth so that the disparity in the thinking of the 'developed' and 'developing' countries could be bridged. The removal of such barriers of thought and the creation of a regime where facilitative technology transfer replaces an exploitative market driven mechanism could pave the way for a common understanding of universal progress. If climate change is a calamity that mankind must adapt to while taking mitigation action withal, it should not be used as a commercial opportunity. It is time that a mechanism is set up which will turn technology and innovation into an effective instrument for global public good, not just private returns.

The challenge of climate change calls for extraordinary vision, leadership, compassion and wisdom. Human ingenuity and intellect will also play an important role in addressing this challenge. The cumulative accumulation of greenhouse gases (GHGs) historically since industrial revolution has resulted in the current problem of global warming. This is further compounded by the tepid and inadequate response of the developed countries even after the adoption of the United Nations Framework Convention on Climate Change (UNFCCC) and delineation of obligations and responsibilities. As a result, an 'emission' ambition gap has been created calling for enhanced global actions to address it. India, even though not a part of the problem, has been an active and constructive participant in the search for solutions. Even now, when the per capita emissions of many developed countries vary between 7 to15 metric tonnes, the per capita emissions in India were only about 1.56 metric tonnes in 2010. This is because Indians believe in nature friendly lifestyle and practices rather than its exploitation. By enhancing their efforts in keeping with historical responsibility, the developed and resource rich countries could reduce the burden of their action from being borne by developing countries that carry the additional responsibility of finding resources to meet their development needs and strive to improve their Human Development Index (HDI).

With the responsibility of ensuring a reasonable HDI for the country and the economic progress of its vast population, India has attempted to follow a path 'cleaner' than the one followed by many countries in the past. Today these countries may be in the forefront of

development, even providing a model of growth to other developing countries. However, if India compares the emission intensity of its GDP (Gross Domestic Product) in PPP (Purchasing Power Parity) terms at present with those countries at a similar level of development, it is seen that their emissions then were far more than India's at present. This is as much on account of India being open and innovative in embracing new technology and a cleaner way of doing things, as it is from the inherent principles of sustainability ingrained in its thought process.

If the world indeed is concerned about its new investments to be climate friendly, it must consider the opportunity provided by a country like India where economic growth could be achieved with minimum levels of emissions by employing new technologies and finance for achieving low carbon growth. Developed countries can certainly bring down their emission intensity by moderating their consumption, and substantially utilize their investments by employing them for development activities in countries housing a vast majority of people barely living at subsistence level. The ratio of emission avoided per dollar invested and economic growth attained would be relatively more favourable in case of investments made in India.

Mahatma Gandhi had once said, "One must care about the world one will not see". Indeed, humanity has progressed when it has collectively risen to its obligation to the world and responsibility to the future.

2015 Agreement

India is committed to engaging actively in multilateral negotiations under the UNFCCC in a positive, creative and forward-looking manner. Our objective is to establish an effective, cooperative and equitable global architecture based on climate justice and the principles of Equity and Common But Differentiated Responsibilities and Respective Capabilities, under the UNFCCC. Such an approach should be anchored in the vision inspired by Mahatma Gandhi's famous exhortation; *"Earth has enough resources to meet people's needs, but will never have enough to satisfy people's greed"*. We must promote sustainable production processes and also sustainable lifestyles across the globe. Habit and attitude are as much a part of the solution as Technology and Finance. It must be understood that poverty is a big

polluter; so is the extravagant way of life and a profligate pattern of consumerism a grave threat to environment.

As we put together the new global compact for enhanced actions, it is critical to ensure that it is comprehensive, balanced, equitable, and pragmatic. It should address all the elements including Adaptation, Mitigation, Finance, Technology Transfer, Capacity Building and Transparency of Action and Support. At the same time, the genuine requirements of developing countries like India for an equitable carbon and development space to achieve sustainable development and eradication of poverty needs to be safeguarded. Achievement of these goals requires adherence to the principles and provisions of the UNFCCC. As the Prime Minister of India, while addressing the United Nations on 25th September 2015, has said; "We all believe that international partnership must be at the centre of our efforts, whether it is development or combating climate change. And, the principle of common but differentiated responsibilities is the bedrock of our collective enterprise. When we speak only of climate change, there is a perception of our desire to secure the comforts of our lifestyle. When we speak of climate justice, we demonstrate our sensitivity and resolve to secure the future of the poor from the perils of natural disasters".

India's contribution takes into account its commitment to conservation of nature as well as the imperatives of meeting the competing demand of resources for addressing the challenges of poverty eradication, food security and nutrition, universal access to education and health, gender equality and women empowerment, water and sanitation, energy, employment, sustainable urbanisation and new human settlements and the means of implementation for enhanced action for achieving among others, the sustainable development goals for its 1.2 billion people.

I. NATIONAL CIRCUMSTANCES

Climate change is a major challenge for developing countries like India that face large scale climate variability and are exposed to enhanced risks from climate change. Few countries in the world are as vulnerable to the effects of climate change as India is with its vast population that is dependent on the growth of its agrarian economy, its expansive coastal areas and the Himalayan region and islands. It also entails tradeoffs with economic growth and social

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development in the shortrun that needs to be factored in the policy matrix, where eradication of poverty is one of the foremost priorities.

India accounts for 2.4% of the world surface area, but supports around 17.5% of the world population. It houses the largest proportion of global poor (30%), around 24% of the global population without access to electricity (304 million), about 30% of the global population relying on solid biomass for cooking and 92 million without access to safe drinking water. The average annual energy consumption in India in 2011 was only 0.6 tonnes of oil equivalent (toe) per capita as compared to global average of 1.88 toe per capita. **It may also be noted that no country in the world has been able to achieve a Human Development Index of 0.9 or more without an annual energy availability of at least 4 toe per capita.** With a HDI of 0.586 and global rank of 135, India has a lot to do to provide a dignified life to its population and meet their rightful aspirations.

India is a developing country with a per capita GDP (nominal) of around USD 1408 per annum. However, this doesn't reflect the wide disparities amongst its people and regions. Around 363 million people (30% of the population) live in poverty, about 1.77 million people are houseless and 4.9% of the population (aged 15 years and above) are unemployed. The per capita electricity consumption stands low at 917 kWh, which is barely one third of the world's average consumption.

A recent national socio-economic census indicates that economic and social deprivations are much higher in terms of availability of proper houses, access to education, lifeline availability of energy, and stable sources of income. This is more so in rural India where 48% of the households lack basic socio economic services and were categorized as deprived. India also has the largest cattle and buffalo population in the world of about 300 million, which faces multiple challenges including diseases, inadequate supply of fodder etc. as a result of changing climate.

Given the development agenda in a democratic polity, the infrastructure deficit represented by different indicators, the pressures of urbanization and industrialization and the imperative of sustainable growth, India faces a formidable and complex challenge in working for economic progress towards a secure future for its citizens.

The following projected key macro indicators are a reflection of India's future needs as the economy grows in the coming years:

Indicator	India in 2014	India in 2030
Population (billion)[a]	1.2	1.5
Urban population (million)[b]	377 (2011)	609
GDP at 2011-12 prices (in trillion)[c]	INR 106.44 (USD 1.69)	INR 397.35 (USD 6.31)
Per capita GDP in USD (nominal)[c]	1408	4205
Electricity demand (TWh)[c]	776(2012)	2499

Source: a: Population Foundation of India; b: UN World Urbanization Prospects, 2014; c: Government of India.

Almost all the macroeconomic models predict that anticipated needs in the future will be large. Rapid urbanization in the country will be one of the most dominant trends in the coming years. It is expected that about 40% of the population in 2030 would be urban as against 30% currently. As population expands and incomes grow, this shift will likely be realized alongside demographic changes that will exponentially increase the demand for urban amenities like housing, energy, transport, water, waste disposal. It is estimated that more than half of India of 2030 is yet to be built. In a way, India's development process is doubly challenging. It not only has to complete the current unfinished development agenda, it has to strategise for future pressures that may increase the magnitude of this development gap. India realises that economic growth and development have to be guided by the key concerns of sustainability, because none of us have the luxury, any longer, of ignoring the economic as well as the environmental threat that a fast-deteriorating ecosystem poses to our fragile planet. India believes that development and environment are not adversaries but can go hand in hand, if environmental sensibilities can be imbibed. Equitable, inclusive and sustainable development would be the key to a new model of growth that India is committed to pursue, which can be fostered and facilitated by a collaborative approach among the Developing and the Developed countries.

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II. POLICY FRAMEWORK

India's environment policy is anchored in the Constitution of India, Article 48-A of the Constitution states that ***"The State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country".***

The Indian development process is guided by the aspiration of making India prosperous and progress on the path of "*Development without Destruction*".

The broad policy framework on environment and climate change is laid down by the **National Environment Policy (NEP)** 2006, which promotes sustainable development along with respect for ecological constraints and the imperatives of social justice. The current development paradigm reiterates the focus on sustainable growth and aims to exploit the co-benefits of addressing climate change along with promoting economic growth. The **National Action Plan on Climate Change (NAPCC)** provides a sharper focus on required interventions. Currently, NAPCC is implemented through eight National Missions, outlining priorities for mitigation and adaptation to combat climate change. The broad policy initiatives of the government are supplemented by actions of the State Governments, Non-governmental Organizations (NGOs), initiatives of the private sector and other stakeholders. 32 States and Union Territories have put in place the **State Action Plan on Climate Change (SAPCC)** attempting to mainstream climate change concerns in their planning process.

Many other national strategies and policies supplement the above efforts. The **Energy Conservation Act** has been enacted to encourage efficient use of energy and its conservation. The **National Policy for Farmers** focuses on sustainable development of agriculture. The **National Electricity Policy (NEP)** underscores the focus on universalizing access to electricity and promoting renewable sources of energy, as does the **Integrated Energy Policy (IEP).**

Policies to promote actions that address climate concerns also include fiscal instruments like coal cess, cuts in subsidies, increase in taxes on petrol and diesel, market mechanisms including Perform Achieve and Trade (PAT), Renewable Energy Certificates (REC) and a regulatory regime of Renewable Purchase Obligation (RPO). The institutional arrangement for offtake of renewable power will be further strengthened.

III. INDIA'S PROGRESS IN COMBATING CLIMATE CHANGE

In recognition of the growing problem of Climate Change, India declared a voluntary goal of reducing the emissions intensity of its GDP by 20–25%, over 2005 levels, by 2020, despite having no binding mitigation obligations as per the Convention. A slew of policy measures were launched to achieve this goal. ***As a result, the emission intensity of our GDP has decreased by 12% between 2005 and 2010.*** **It is a matter of satisfaction that United Nations Environment Programme (UNEP) in its Emission Gap Report 2014 has recognized India as one of the countries on course to achieving its voluntary goal.**

India has a definite plan of action for clean energy, energy efficiency in various sectors of industries, steps to achieve lower emission intensity in the automobile and transport sector, a major thrust to non-fossil based electricity generation and a building sector based on energy conservation.

India's on-going mitigation and adaptation strategies and actions are detailed in the following sections, along with the expected direction of activities in the near future.

1. MITIGATION STRATEGIES

1.1 CLEAN AND EFFICIENT ENERGY SYSTEM

Energy is a vital input for production and growth. Considering universal energy access and energy security as one of the fundamental development goals for the country, Government of India (GoI) has undertaken a two pronged approach to cater to the energy demand of its citizens while ensuring minimum growth in carbon emissions. On the generation side, the Government is promoting greater use of renewables in the energy mix mainly through solar and wind power and shifting towards supercritical technologies for coal based power plants. On the demand side, efforts are being made to efficiently use energy through various innovative policy measures under the overall ambit of Energy Conservation Act.

The energy intensity of the economy has decreased from 18.16 goe (grams of oil equivalent) per Rupee of GDP in 2005 to 15.02 goe per Rupee GDP in 2012, a decline of over 2.5% per

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1.1.1 Promotion of Clean Energy

India is running one of the largest renewable capacity expansion programs in the world. Between 2002 and 2015, the share of renewable grid capacity has increased over 6 times, from 2% (3.9 GW) to around 13% (36 GW). This momentum of a tenfold increase in the previous decade is to be significantly scaled up with the aim to achieve 175 GW renewable energy capacity in the next few years. India has also decided to anchor a global solar alliance, InSPA (International Agency for Solar Policy & Application), of all countries located between the Tropic of Cancer and the Tropic of Capricorn.

1) **Wind energy** has been the predominant contributor to the renewable energy growth in India accounting for 23.76 GW (65.2%) of the renewable installed capacity, making India the 5th largest wind power producer in the world. With a potential of more than 100 GW, the aim is to achieve a target of 60 GW of wind power installed capacity by 2022.
2) **Solar power** in India is poised to grow significantly with Solar Mission as a major initiative of the Government of India. Solar power installed capacity has increased from only 3.7 MW in 2005 to about 4060 MW in 2015, with a CAGR of more than 100% over the decade. The ambitious solar expansion programme seeks to enhance the capacity to 100 GW by 2022, which is expected to be scaled up further thereafter. A scheme for development of 25 *Solar Parks*, *Ultra Mega Solar Power Projects*, canal top solar projects and one hundred thousand solar pumps for farmers is at different stages of implementation. Government of India is also promoting solarization of all the 55,000 petrol pumps across the country out of which about 3,135 petrol pumps have already been solarized.
3) **Biomass energy** constitutes about 18% of total primary energy use in the country and more than 70% of the country's population depends on it. However, it is currently used in an inefficient manner with high levels of indoor pollution. A number of programmes have been initiated for promotion of cleaner and more efficient use, including biomass based electricity generation. It is envisaged to increase biomass installed capacity to 10 GW by 2022 from current capacity of 4.4 GW.
4) **Hydropower** contributes about 46.1 GW to current portfolio of installed capacity, of which 4.1 GW is small hydro (upto 25 MW) and 41.99 GW is large hydro (more than 25 MW). Special programmes to promote small and mini hydel projects, new and efficient

designs of water mills have been introduced for electrification of remote villages. With a vast potential of more than 100 GW, a number of policy initiatives and actions are being undertaken to aggressively pursue development of country's vast hydro potential.

5) India is promoting **Nuclear Power** as a safe, environmentally benign and economically viable source to meet the increasing electricity needs of the country. With a 2.2% share in current installed capacity, total installed capacity of nuclear power in operation is 5780 MW. Additionally six reactors with an installed capacity of 4300 MW are at different stages of commissioning and construction. Efforts are being made to achieve 63 GW installed capacity by the year 2032, if supply of fuel is ensured.
6) **Clean Coal policies**: Coal based power as of now accounts for about 60.8% (167.2 GW) of India's installed capacity. In order to secure reliable, adequate and affordable supply of electricity, coal will continue to dominate power generation in future. Government of India has already taken several initiatives to improve the efficiency of coal based power plants and to reduce its carbon footprint. All new, large coal-based generating stations have been mandated to use the highly efficient supercritical technology. Renovation and Modernisation (R&M) and Life Extension (LE) of existing old power stations is being undertaken in a phased manner. **About 144 old thermal stations have been assigned mandatory targets for improving energy efficiency**. Coal beneficiation has been made mandatory. Introduction of ultra-supercritical technology, as and when commercially available is part of future policy. **Besides, stringent emission standards being contemplated for thermal plants would significantly reduce emissions**.
7) **National Smart Grid Mission** has been launched to bring efficiency in power supply network and facilitate reduction in losses and outages. **Green Energy Corridor** projects worth INR (Indian National Rupee) 380 billion (USD 6 billion) are also being rolled out to ensure evacuation of renewable energy.

The Government's goal of *Electricity for All* is sought to be achieved by the above programs that would require huge investments, infusion of new technology, availability of nuclear fuel and international support.

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1.1.2 Enhancing Energy Efficiency

With the goal of reducing energy intensity of the Indian economy, Ministry of Power through Bureau of Energy Efficiency (BEE) has initiated a number of energy efficiency initiatives. The **National Mission for Enhanced Energy Efficiency (NMEEE)** aims to strengthen the market for energy efficiency by creating a conducive regulatory and policy regime. It seeks to upscale the efforts to unlock the market for energy efficiency and help achieve total avoided capacity addition of 19,598 MW and fuel savings of around 23 million tonnes per year at its full implementation stage. The programmes under this mission have resulted in an avoided generation capacity addition of about 10,000 MW between 2005 and 2012 with government targeting to save 10% of current energy consumption by the year 2018-19. Demand Side Management programmes have been launched to replace existing low-efficiency appliances:

1) During the last decade, there has been rapid transformation of **efficient lighting in India**. The sales of Compact fluorescent lamps (CFLs) have risen to about 37% of the total lighting requirements in 2014 from 7.8% in 2005. India has also launched an ambitious plan to replace all incandescent lamps with Light-emitting diode (LED) bulbs in the next few years leading to energy savings of upto 100 billion kilowatt hours (kWh) annually.
2) **Standards and Labeling Programme** launched by the Government of India enables consumers to make informed decision by providing information about the energy consumption of an appliance. Currently, 21 equipment and appliances are labeled. The programme has contributed to an increase of 25% to 30% in the energy efficiency of an average refrigerator or air-conditioner in 2014 compared to those sold in 2007. **Super-Efficient Fan** (that uses half as much energy as the average fan) programme has been launched. Further, two sets of **Corporate Average Fuel Consumption standards** for cars have been notified, with one coming into force in 2017 and the second set in 2022.
3) **Partial Risk Guarantee Fund for Energy Efficiency (PRGFEE),** a risk sharing mechanism to provide financial institutions with a partial coverage of risk involved in extending loans for energy efficiency projects, and **Venture Capital Fund for Energy Efficiency (VCFEE),** a trust fund to provide "last mile" equity capital to energy efficiency companies, have been established.
4) The **Energy Conservation Building Code (ECBC)** sets minimum energy standards for new commercial buildings. Eight states have already adopted and notified the ECBC, and

over 300 new commercial buildings have become compliant. The Code would be made more stringent to promote construction of even more (Near-Zero) energy-efficient buildings. "**Design Guidelines for Energy Efficient Multi-storey Residential buildings**" have also been launched.

5) In order to both recognize energy-efficient buildings, as well as to stimulate their large scale replication, India has developed its own building- energy rating system **GRIHA (Green Rating for Integrated Habitat Assessment),** based on 34 criteria like site planning, conservation and efficient utilization of resources etc. A number of buildings including Commonwealth Games Village have been rated using GRIHA system. Indira Paryavaran Bhawan, the headquarters of Central Government's Ministry of Environment, Forest & Climate Change is a model building of Government of India and has received LEED India Platinum and a 5 Star GRIHA rating. It is a 'Net Zero Energy' building with 100% onsite power generation.

1.2 ENHANCING ENERGY EFFICIENCY IN INDUSTRIES

Infrastructure sectors, viz. electricity, coal and cement have seen a growth rate of 4.5% in the year 2013-14. The recent initiatives like **Make in India**, **Digital India**, creating **National Industrial Corridors**, streamlining environment and forest approvals, labour reforms and undertaking other measures for the ease of doing business have also fuelled the spurt in their growth rates. Amidst all this, policies to enable industries reduce their energy consumption play a critical role as an instrument for sustainable environment through various interventions like:

1) **Perform, Achieve and Trade (PAT),** as a market based energy efficiency trading mechanism, at present covers 478 plants (designated consumers) in eight energy-intensive industrial sectors accounting for one-third of total energy consumption in the country. The mandated decrease in the specific energy consumption under PAT programme has led to a decline of 4 to 5% in their specific energy consumption in 2015 as compared to that in 2012. Energy Saving Certificates (ESCerts) are issued to consumers who over-achieve the target. The scheme is to be widened and deepened to include additional sectors like railways, electricity distribution and refineries in the next cycle and would cover more than half the commercial energy consumed in India.

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2) **Zero Effect, Zero Defect (ZED):** The **Make in India campaign** with ZED is a policy initiative to rate Medium & Small Industries on quality control and certification for energy efficiency, enhanced resources efficiency, pollution control, use of renewable energy, waste management etc. using ZED Maturity Assessment Model. **The scheme launched in 2015, envisages coverage of about 1 million medium and small enterprises**.

1.3 DEVELOPING CLIMATE RESILIENT URBAN CENTERS

Government of India in recent times has launched a number of schemes for transformation and rejuvenation of urban areas including **Smart Cities Mission**, **Atal Mission for Rejuvenation and Urban Transformation (AMRUT)** and **National Heritage City Development and Augmentation Yojana (HRIDAY)**.

1) Under the **Smart Cities Mission,** 100 **smart cities** are planned with the objective to develop new generation cities, which will provide core infrastructure and a decent quality of life to its citizens by building a clean and sustainable environment. Smart solutions like recycling and reuse of waste, use of renewables, protection of sensitive natural environment will be incorporated to make these cities climate resilient.
2) **Atal Mission for Rejuvenation and Urban Transformation (AMRUT)**, a new urban renewal mission has been launched by Government of India for 500 cities with focus on ensuring basic infrastructure services such as water supply, sewerage, storm water drains, transport and development of green spaces and parks by adopting climate resilient and energy efficient policies and regulations.

1.4 PROMOTING WASTE TO WEALTH CONVERSION

India recognizes the dual benefits that can arise from efficient waste disposal leading to enhanced environmental benefits along with conversion to energy. Incentives are being granted to cities to take up waste to energy conversion projects.

1) The **Waste to Energy** capacity is sought to be enhanced. Government is also encouraging conversion of waste to compost by linking it with sale of fertilizers and providing market development assistance.

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2) Government has invested significantly in **Solid Waste Management (SWM)** projects over the years and has provided INR 25 billion (USD 397 million) as grant in aid to states and Urban Local Bodies specifically for SWM through public-private partnerships.
3) Similarly, initiatives on waste water management would cover an additional population of 41 million and enhance recycling and reuse of treated water. There are about 816 Sewage Treatment Plants (522 operational and rest at different stages of construction and planning) having a combined capacity of 23,277 million of liters per day across 28 States and Union Territories.
4) Government of India has recently launched a one-of-its kind **'Swachh Bharat Mission' (Clean India Mission)** with the objective of making the country clean and litter free with scientific solid waste management in about 4041 towns covering a population of 306 million. It aims to construct 10.4 million individual household toilets and 0.5 million Community and Public Toilets.

1.5 SAFE, SMART AND SUSTAINABLE GREEN TRANSPORTATION NETWORK

In the endeavor towards a low carbon economy, India is focusing on low carbon infrastructure and public transport systems like **Dedicated Freight Corridors** and energy efficient railways to reduce their environmental impact.

1) Indian Railways handles 3 million tonnes of freight and 23 million passengers daily and is the world's third largest network. The endeavor is to increase the share of Railways in total land transportation from 36% to 45 %, thereby decreasing the load on less efficient diesel operated road traffic.
2) **Dedicated Freight Corridors (DFCs)** have been introduced across the country. In the first phase, two corridors viz. 1520 km Mumbai-Delhi (*Western Dedicated Freight Corridor*) and 1856 km Ludhiana-Dankuni (*Eastern Dedicated Freight Corridor*) are being constructed. The project is expected to reduce emissions by about 457 million ton CO_2 over a 30 year period. With a number of energy efficiency measures undertaken, Indian Railways has achieved 19.7% improvement in Specific Fuel Consumption for Freight Service Locomotives and 21.2% improvement for Coaching Service Locomotives during the last 10 years. Indian Railways is also installing solar power on its land and roof tops of coaches.

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3) Recognizing its fuel efficiency, environmental friendliness and cost effectiveness, the Government is promoting growth of Coastal Shipping and Inland Water Transport. To enhance the inland waterways transport, Government has announced the implementation of **Jal Marg Vikas** for capacity augmentation of National Water Way -1. It is also proposed to establish integrated Waterways transportation grid with a view to connecting all existing and proposed National waterways with road, rail and ports connectivity. Another initiative in this direction is the **Sagarmala Project** with the objective to augment port-led development and promote efficient transportation of goods. **Bharatmala Project** which envisions constructing about 5,000 km of road network all along the coastal areas will further provide connectivity to these ports.
4) **The vision of Urban Transport policies is to focus on moving 'people' rather than 'vehicles', in which Mass Rapid Transit System (MRTS) would play an important role.**
5) **Around 236 km of metro rail have been made operational in the country. Further, about 550 km are under construction and 600 km under consideration for different cities across the country including Ahmedabad, Pune, and Lucknow. Delhi Metro, which has become India's first MRTS project to earn carbon credits, has the potential to reduce about 0.57 million tonnes of CO_2e annually**. Delhi Metro has also initiated installation of 9 solar power generation facilities and plans to increase their number.
6) The mass-transit and urban transport projects initiated under the National Urban Renewal Mission also have positive climate change impacts in the long-run. About 39 urban transport and mass rapid transport projects have been approved and about 19 projects have been completed so far.
7) **Solar powered toll plazas** have been envisaged as a mandatory requirement for toll collection across the country.
8) India has recently formulated **Green Highways (Plantation & Maintenance)** Policy to develop 140,000 km long "tree-line" with plantation along both sides of national highways. 1% of total civil cost of projects is to be set aside to implement the policy.
9) With a view to facilitating international commuting by highways, Government of India has approved signing of the **Bangladesh, Bhutan, India and Nepal (BBIN) Motor**

Vehicle Agreement to promote safe, economical efficient and environmentally sound road transport in the sub-region and support regional integration.

10) **Faster Adoption and Manufacturing of Hybrid & Electric Vehicles** in India (FAME India) is a scheme formulated as part of the **National Electric Mobility Mission Plan 2020** (NEMMP) to promote faster adoption and manufacturing of hybrid and electric vehicles in the country by providing incentives.

11) Under the **Vehicle Fuel Efficiency Program,** Government of India in 2014 finalized country's first passenger vehicle fuel-efficiency standards. They will take effect beginning in April 2016, and set the efficiency targets for new cars. The standards will keep 50 million tons of CO_2 out of the atmosphere. **India aims to improve fuel standards by switching from Bharat Stage IV (BS IV) fuels to Bharat Stage V (BS V)/ Bharat Stage VI (BS VI) across the country in the near future.**

12) **National Policy on Biofuels** has adopted an aspirational target of 20% blending of biofuels, both for bio-diesel and bio-ethanol. The government also launched the **National Bio-diesel Mission** identifying *Jatropha curcas* as the most suitable tree-borne oilseed for bio-diesel production. With the intention of further promoting biofuels, India has begun consultations on allowing 5% blending of biofuels in diesel that would be consumed by bulk users such as the railways and defence establishments.

1.6 PLANNED AFFORESTATION

India is one of the few countries where forest and tree cover has increased in recent years transforming country's forests into a net sink owing to national policies aimed at conservation and sustainable management of forests. As per the latest assessment, forests and tree cover has increased from 23.4% in 2005 to 24% of the geographical area in2013. Government of India's long term goal is to bring 33% of its geographical area under forest cover eventually.

1) With its focus on sustainable forest management, afforestation and regulating diversion of forest land for non-forest purpose, India has been successful in improving carbon stock in its forest by about 5%, from 6,621.5 million tons in 2005 to 6,941 million tonnes in 2013. Initiatives like **Green India Mission (GIM)** aim to further increase the forest/tree cover to the extent of 5 million hectares (mha) and improve quality of forest/tree cover on

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another 5 mha of forest/non-forest lands along with providing livelihood support. It is expected to enhance carbon sequestration by about 100 million tonnes CO_2 equivalent annually.

3) These efforts have been further augmented by policies like National Agro-forestry Policy (NAP), REDD-Plus policy, Joint Forest Management; National Afforestation Programme and proposed devolution of about USD 6 billion under Compensatory Afforestation to states.

1.7 ABATEMENT OF POLLUTION

India has recently launched many programmes and schemes to address the problem of pollution:

1) **Continuous Emission Monitoring System (CEMS)** mandates the highly polluting industries to install 24X7 real time monitoring of emission and effluent discharge points.
2) **Common Effluent Treatment Plants (CETPs)** are being set up to treat the effluent emanating from the clusters of compatible small - scale industries.
3) The **Fly Ash Utilisation Policy** makes it mandatory to use only fly ash/ fly ash based products in construction of buildings, roads and reclamation / compaction of land within a radius of 100 km from a coal or lignite based thermal power plant, thus displacing the cement use. It also mandates utilisation of **Fly Ash** for backfilling or stowing of the mines.
4) Standards related to effluent discharge have been modified for over 2000 industries focusing on reducing quantity of waste water generation, conservation of water, promote **Zero Liquid Discharge (ZLD)** and use of treated effluent for irrigation.
5) In 2014, a **National Air Quality Index (AQI)** was launched for Indian cities. AQI is based on six pollutants and is notified every day serving as public information tool to disseminate information on air quality in qualitative terms.
6) Amendment of **Municipal Solid Waste Management (Management and Handling) Rules** is underway which will emphasize on proper segregation of waste at source; enhance waste processing and implementation of scientific landfills. Similarly, Bio-Medical Waste (Management & Handling) Rules, Plastic Waste Management Rules, e-waste (Management) Rules and Hazardous and Other Wastes (Management and

Transboundary Movement) Rules are being amended for a more scientific, technology driven, regulated and participative environment management.

1.8 CITIZENS AND PRIVATE SECTOR CONTRIBUTION TO COMBATING CLIMATE CHANGE

Citizens of India are an integral part of country's strategies to combat climate change. The Constitution of India vide Article 51-A lays down that it as a fundamental duty of every citizen to "***protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures***".

Policies like **Swachh Bharat Mission (Clean India Mission)**, cleaning of our rivers, achieving energy efficiency are all examples of policies which are contingent upon full participations of India's citizens for their successful implementation.

In addition to being involved in Government initiatives related to climate change and resource efficiency, **private sector** has also embarked on a number of voluntary actions. It plays a key role in sustainable development efforts in the country, some of which are enumerated below:

1) Companies Act 2013 directs companies having a certain level of profits, to spend 2% of their annual profit on **Corporate Social Responsibility (CSR)** activities. Estimates indicate that a fair share of the available CSR funding of about INR 220 billion (USD 3.5 billion) annually will be invested in environment initiatives from this window.
2) The Indian industry has also participated in voluntary carbon disclosure programmes whereby they report their carbon management strategy and GHG emissions. Latest Report by **Carbon Disclosure Project, India** indicates a reduction of 165 million metric tonnes of CO_2 equivalent by Indian industries. "**India GHG Programme**" is another voluntary programme to support development of India-specific emission factors and for corporates to measure their carbon footprints.
3) Indian industry has undertaken many initiatives to reduce their water consumption. A study of 100 companies over a 5 year period covering 12 sectors indicate that the Indian companies on an average have been reducing their specific water consumption by 2.8 to 3 % per year. A few companies have achieved 'water positive' status.

4) **Smart Power for Environmentally-sound Economic Development (SPEED)** is a program that aims at electrification of rural areas based on a decentralized renewable energy system.
5) India currently has about 2.68 billion sq. ft. of registered green building space across 3,000 projects (second largest in the world), of which 600 are certified and fully functional.
6) **GreenCo Rating System** is first of its kind in the world which assesses companies on their environmental performance across 10 different parameters to help them develop a roadmap to improve further.
7) **New Ventures India (NVI)** is an initiative to support cleantech entrepreneurs in developing their business plans and access finance and markets.
8) The **Small and medium-sized enterprises (SME) Cluster Programs for Energy Efficiency** covers more than 150 clusters all over the country and has resulted in substantial energy saving, quality improvement and improved competitiveness. Another initiative by SIDBI (Small Industry Development Bank of India) in 500 SMEs spread over 40 industrial clusters is expected to save annually 30,000 tonnes of GHG emissions.

2. ADAPTATION STRATEGIES

The adverse impacts of climate change on the developmental prospects of the country are amplified enormously by the existence of widespread poverty and dependence of a large proportion of the population on climate sensitive sectors for livelihood. Hence for India adaptation is inevitable and an imperative for the development process. It is of immediate importance and requires action now.

Vulnerabilities in India differ among states, among regions and among different groups of people within the same region due to substantial variations in topography, climatic conditions, ecosystems as well as diversity in its social structures, economic conditions and needs of different communities.

A range of actions have been introduced to address it. Out of the eight National Missions on Climate Change five mission focus on adaptation in sectors like agriculture, water,

Himalayan ecosystems, forestry, Capacity building and Knowledge management. Climate plans at the sub national level also focus significantly on adaptation.

Besides these targeted programmes, India has also implemented a series of schemes which strengthen adaptive capacities of the vulnerable communities. India's expenditure on programmes with critical adaptation components has increased from 1.45% of GDP in 2000-01 to 2.82% during 2009-10. Expenditure on human capabilities and livelihoods viz. poverty alleviation, health improvement and disease control and risk management, constitutes more than 80% of the total expenditure on adaptation in India.

India's adaptation policies in some of the crucial sectors are outlined below:

2.1 AGRICULTURE

Agriculture is the source of livelihood for nearly two-thirds of the population in India. It is predominantly rainfed covering about 60% of the country's net sown area and accounts for 40% of the total food production. Droughts and floods are frequent and the sector is already facing high degree of climate variability. The performance of agriculture sector has a direct bearing on food supplies and food security. India is projected to become the most populated country by 2030 and will need to produce an additional 100 million tonnes of food grains to feed the large population. In the agriculture sector, the need for comprehensive risk management and insurance is further enhanced due to these reasons.

Keeping in view the above challenges, Government of India is implementing policies/missions targeting various threats facing agriculture. Some of the important ones are **National Food Security Mission**, **Mission for Integrated Development of Horticulture**, **National Mission for Sustainable Agriculture**, **Paramparagat Krishi Vikas Yojana** to promote organic farming practices, **Pradhan Mantri Krishi Sinchayee Yojana** to promote efficient irrigation practices and **National Mission on Agricultural Extension & Technology**.

1) The **National Mission on Sustainable Agriculture (NMSA)** aims at enhancing food security and protection of resources such as land, water, biodiversity and genetics. The mission focuses on new technologies and practices in cultivation, genotypes of crops that have enhanced CO_2 fixation potential, which are less water consuming and more climate

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resilient. India has developed 580 district level (covering many states) contingency plans based on early warning systems and other weather forecasting systems.

2) Government of India adopted a mega project called the **National Initiative on Climate Resilient Agriculture (NICRA).** Its four main modules include Natural Resource Management, improving crop production, livestock and fisheries and institutional interventions.
3) A Scheme has been launched to provide in mission mode **Soil Health Card** to every farmer. Additionally, **100 mobile soil-testing laboratories** have been setup across the country.
4) **National Agroforestry Policy (NAP)** of India aims at encouraging and expanding tree plantation in complementarity and integrated manner with crops and livestock. It will help protect and stabilize ecosystems, and promote resilient cropping and farming systems to minimize the risk during extreme climatic events. It will also complement achieving the target of increasing forest/ tree cover.

2.2 WATER

India identifies water as the most critical component of life support system. The total catchment area is 252.8 million hectare (mha), covering more than 75% of the total area of the country. The adaptation strategies for the water sector focus on enhancing efficient use of water, ensuring access and tackling the adverse impact of Climate Change. The trans-boundary and regional issues also need to be factored in.

1) The main objective of India's **National Water Mission (NWM)** is "conservation of water, minimizing wastage and ensuring its more equitable distribution both across and within States through integrated water resources development and management". One of the key goals of the mission is to enhance water use efficiency by 20%.
2) **Groundwater** is the major component of the total available water resources. Rapid expansion of groundwater use in India in the last three decades has resulted in a steep decline in the groundwater table in vast areas of the country. **Rainwater harvesting**, which offers a promising solution to replenish and recharge the groundwater is a significant component of Watershed Development Programme, taken up under different schemes of the central and state governments. Several municipal authorities, including

Delhi have amended their existing building bye-laws, making it compulsory for every large house or hotel (200 yards or more in area) to undertake rainwater harvesting.

3) **Neeranchal** is a recent programme by Government to give additional impetus to watershed development in the country.
4) Another important initiative relating to rivers is the **National Mission for Clean Ganga** which seeks to rejuvenate the river along its length of more than 2,500 km through multifarious activities such as pollution inventorization, assessment and surveillance and laying of sewage networks, treatment plants etc.
5) The total flood prone area in the country is about 45.64 million ha. Existing flood management mechanisms involve both Central and State Government.
6) Government of India has also set up the **National River Conservation Directorate** for conservation of rivers, lakes and wetlands in the country and improving the water quality which covers stretches of 40 rivers in 190 towns spread over 20 States.

2.3 HEALTH

Climate change will increase health related stress from extreme weather-related disasters such as wider spread of vector-borne diseases as malaria and dengue and increasing frequency of heat and cold waves.

India is now formulating a '**Health Mission**' under the ambit of NAPCC to evolve strategies for mitigating, containing and managing the adverse impact of Climate Change on health. The mission aims at analysing epidemiological data, identify vulnerable population and regions, build knowledge base and expertise, increase awareness and community participation.

Apart from the overall public heath infrastructure at the national and sub national levels, the Government of India has launched programmes like **Integrated Disease Surveillance Programme (IDSP)**, **National Vector Borne Disease Control Programme (NVBDCP)** to deal with vector borne diseases like malaria, dengue etc. As part of this programme India aims to eliminate malaria by 2030.

2.4 COASTAL REGIONS & ISLANDS

India has a long coastline of 7517 km including island territories, and encompasses total 73 districts in the 9 maritime states and 2 Union Territories. The coastal districts house 14.2% of India's total population. India has been identified as one of the countries which are most vulnerable to the impact of accelerated sea level rise due to global warming:

1) India has demarcated vulnerable areas on the coasts and declared them as **Coastal Regulation Zone (CRZ)** with restrictions imposed on setting up and expansion of industries, operations and processes in these areas.
2) India is also implementing programmes for **Integrated Coastal Zone Management (ICZM)**. The vision of the project is to build national capacity for implementation of comprehensive coastal management through ecological management, conservation and protection of critical habitats, coastal geomorphology and geology of coastal and marine areas, coastal engineering, socio-economic aspects, policy and legal issues and other related fields in the area of coastal governance.
3) Mapping and demarcation of coastal hazard lines for development of emergency response plans is being carried out in all the coastal states and union territories.
4) Another initiative to protect coastal livelihood is '**Mangroves for the Future (MFF)**' coordinated by International Union for Conservation of Nature (IUCN) in India.
5) Similar to Small Island Developing States, the 1,238 Indian islands are vulnerable to loss of coastal wetlands including mangroves and salt water intrusion in fresh water aquifers. With changing climate, islands are highly susceptible to frequent and more intense tropical cyclones and associated storm surge, droughts, tsunamis and volcanic eruptions, which will have adverse impact on economy of these islands and health of their inhabitants.
6) The Government notified the **Island Protection Zone (IPZ)** in 2011 with the objective of ensuring livelihood security to the local communities, conserving and protecting coastal stretches, and promoting development in a sustainable manner. The IPZ focuses on disaster risk reduction through bioshields with local vegetation (mangroves) and other soft protection measures, and the conservation of beaches and sand dunes.

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2.5 DISASTER MANAGEMENT

The Indian subcontinent is among the world's most disaster prone areas. Almost 85% of India's area is vulnerable to one or multiple hazard. 23 States and Union Territories covering 45.64 million hectares of land are subject to floods, and are prone to flood disasters. India's annual average flood damage during the period 1996-2005 was INR 47.45 billion (USD 753.2 Million)

India has been able to establish a holistic disaster risk reduction and response apparatus at national, state and district levels with the aim of reducing existing levels of vulnerability, prevention, and mitigation of disasters and also to provide appropriate response, rehabilitation and reconstruction. Strategies include early warnings and communications, construction and sustainable maintenance of multi-purpose cyclone shelter, improved access and evacuation, enhanced capacity and capability of local communities to respond to disaster and strengthening disaster risk mitigation capacity at central, state and local levels

The link between Adaptation, Disaster Risk Reduction and Loss and Damage is important. It has been witnessed that the occurrence of flash floods, extreme weather events, droughts etc. has increased in frequency and become more unpredictable. The Sendai Framework for Disaster Risk Reduction has laid down a road map for required response. There is an urgent need for finance to undertake activities for early warning system, disaster risk reduction, loss and damage and Capacity building at all levels. The indigenous locally appropriate knowledge and technology may also be used for the purpose.

In order to achieve these goals, India has set up Disaster Relief Funds at all levels and launched the **National Disaster Relief Fund**, which is financed through the levy of a cess.

2.6 PROTECTING BIODIVERSITY & HIMALAYAN ECOSYSTEM

Biodiversity: India, a mega diverse country with only 2.4% of the world's land areas, harbours 7-8% of all recorded species, and 4 out of 34 global biodiversity hotspots. In order to protect the biodiversity from changing climate, India has developed a biogeographic classification for conservation planning, and has mapped biodiversity rich areas in the country. The protected area network has increased from 427 (3.34% of total geographical area) in 1988 to 690 (5.07% of total geographical area) in 2014.

Himalayan Ecosystem: The Himalayas form the most important concentration of snow covered region outside the polar region. It is highly sensitive to global warming. The detailed glacier inventory of Indian Himalayas indicates presence of 9579 glaciers in the Himalayas, some of which form the perennial source of major rivers.

The **National Mission for Sustaining the Himalayan Ecosystem** (NMSHE) addresses important issues concerning Himalayan Glaciers and the associated hydrological consequences, biodiversity and wildlife conservation and protection, traditional knowledge societies and their livelihood and planning for sustaining of the Himalayan Ecosystem. Government has also launched **National Mission on Himalayan Studies** to complement NMSHE with the objective of building a body of scientific and traditional knowledge along with demonstrating replicable solutions to the problems in thematic areas including natural resource management, capacity building, long-term ecological monitoring etc.

2.7 RURAL LIVELIHOODS SECURITY

The rural areas are highly prone to stress and pressures from natural resource exploitation. In this context, schemes for rural development and livelihood programmes are very relevant. The **Mahatma Gandhi National Rural Employment Guarantee Scheme in India (MGNREGS)**, with a budgetary annual allocation of about INR 347 billion (USD 5.5 billion) in 2015-16, aims at enhancing livelihood in the rural areas. A vast majority of works under this programme aim at strengthening natural resource base of the rural economy and are linked to land, soil, and water.

Another important programme of the Government is the **National Rural Livelihoods Mission** which has the objective to cover 70 million rural poor households, across 600,000 villages in the country through self-managed self help groups and federated institutions to support the rural communities in strengthening their livelihood.

2.8 ADAPTATION ACTIONS UNDER STATE ACTION PLANS ON CLIMATE CHANGE

All the 29 states and 7 Union Territories in India are preparing a State level action plan to deal with the challenges of climate change incorporating local needs and priorities. SAPCCs are envisioned to encompass the vision of the NAPCC and aligned with the 8 National

Missions. SAPCCs describe in detail the impact of climate and vulnerability assessment, adaptation, mitigation options and financing and capacity building needs to implement the identified interventions. Key sectors covered by SAPCCs include agriculture, water, habitat, forestry, health and disaster management among others.

2.9 KNOWLEDGE MANAGEMENT & CAPACITY BUILDING

India attaches great significance to knowledge creation and capacity building for climate change.

1. A network of 127 institutions called **"INCCA"** (Indian Network on Climate Change Assessment) has been set up to share knowledge and work in a collaborative manner on climate change issues.
2. The Department of Science & Technology has also initiated creation of **Climate Change Centers** at the state level especially in the Himalayan region. All the state governments have established links with local research institutions to ensure a continuous updating of their SAPCCs.
3. As a move towards competency based system, Government of India has also implemented **National Training Policy**, through which each Ministry and Department earmarks about 2.5% of its salary budget for training. A part of this budget is used for training in climate change and sustainable development issues as well.
4. Government has recently launched "**Skill India**" with the target to provide skill training in various sectors including sustainable development to about 400 million people by 2022.

3. India's Climate Change Finance Instruments

Maximum share of India's current climate finance comes from budgetary sources, as most of the resources for adaptation and mitigation are built into the ongoing sectoral programmes. The availability of funds for such purposes is largely guided by the overall resources and requirement of different sectors.

Nevertheless, India is not relying solely on budgetary resources and is experimenting with a careful mix of market mechanisms together with fiscal instruments and regulatory provisions to mobilize finance for climate change.

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3.1 National Funds

To augment the availability of assured targeted resources, Government of India has set up two dedicated funds at the national level for mobilizing financing for mitigation and adaptation respectively.

1) **Cess on Coal**. India imposed a cess on coal in 2010 @ INR 50 (USD 0.8) per tonne of coal. Recently it has been quadrupled to INR 200 (USD 3.2) per tonne of coal. The coal cess translates into a carbon tax equivalent, using the emission factor for coal, of around USD 2 per tonne. This forms the corpus for the **National Clean Environment Fund,** used for financing clean energy, technologies, and projects related to it. The total collection of INR 170.84 billion (USD 2.7 billion) till 2014-15 is being used for 46 clean energy projects worth INR 165.11 billion (USD 2.6 billion).
2) India has set up a **National Adaptation Fund** with an initial allocation of INR 3,500 million (USD 55.6 million) to combat the adaptation needs in sectors like agriculture, water, forestry etc. in addition to sectoral spending by the respective ministries.

3.2 Other Fiscal Instruments and Incentives for Low Carbon Growth

Some of the other fiscal measures incentivizing green actions in India are as follows:

1) With a series of steps taken recently, India has **cut subsidies and increased taxes on fossil fuels (petrol and diesel)** turning a carbon subsidy regime into one of carbon taxation. Further, in its effort to rationalize and target subsidies, India has launched '*Direct Benefit Transfer Scheme*' for cooking gas, where subsidy will be transferred directly into the bank accounts of the targeted beneficiaries. In fact, over the past one year India has almost cut its petroleum subsidy by about 26%.
2) Recent actions have led to an implicit carbon tax (USD 140 for petrol and USD 64 for diesel) in absolute terms. This is substantially above what is now considered a reasonable initial tax on CO_2 emissions of USD 25- USD 35 per tonne. Estimates suggest that these measures will help India achieve a net reduction of 11 million tonnes of CO_2 emissions in less than a year.
3) **Tax Free Infrastructure Bonds** of INR 50 billion (USD 794 million) are being introduced for funding of renewable energy projects during the year 2015-16.
4) **Finance Commission (FC) Incentive for creation of carbon sink**: Another important initiative has been the 14th FC recommendation on incentives for forestry sector. The

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devolution of funds to states from the federal pool would be based on a formula that attaches 7.5 % weight to the area under forest. According to the estimations based on 14th FC data, this initiative has effectively given afforestation a massive boost by conditioning about USD 6.9 billion of transfers to the states based on their forest cover, which is projected to increase up to USD 12 billion by 2019-20. Implicitly, India is going to transfer to states roughly about USD 174 per hectare of forest per year which compares very favorably with other afforested countries.

4. External Cooperation: A Critical Enabler

Over the years, the carbon intensity of the Indian economy has decreased, in large part, due to the adoption of new and innovative technologies which address climate mitigation and climate adaptation. The development, adoption and dissemination of these technologies has been an ongoing process which has led to, *inter-alia*, increased energy efficiency and an increasing share of renewables in the electricity grid. This has been facilitated by several bilateral and multilateral collaborative efforts both in the public and private sector.

At the same time, climate friendly technologies, adapted and deployed in India are also being utilized in other countries, particularly in developing countries, through bilateral cooperation. This development and transfer of technologies, both into the Indian market and from India into other markets, will continue to sustain future decreases in the carbon intensity of the Indian economy and increases in the share of renewables in the electricity-mix.

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IV INDIA'S INDC

Keeping in view its development agenda, particularly the eradication of poverty coupled with its commitment to following the low carbon path to progress and being sanguine about the unencumbered availability of clean technologies and financial resource from around the world, ***India hereby communicates its Intended Nationally Determined Contribution (INDC) in response to COP decisions 1/CP.19 and 1/CP.20 for the period 2021 to 2030***:

1. To put forward and further propagate a healthy and **sustainable way of living** based on traditions and **values of conservation and moderation**.
2. To adopt a **climate friendly and a cleaner path** than the one followed hitherto by others at corresponding level of economic development.
3. To **reduce the emissions intensity of its GDP** by **33 to 35 percent by 2030** from **2005 level**.
4. To achieve about **40 percent cumulative electric power installed capacity** from **non-fossil fuel based energy resources** by **2030** with the help of transfer of technology and low cost international finance including from Green Climate Fund (GCF).
5. To **create an additional carbon sink of 2.5 to 3 billion tonnes** of CO_2 **equivalent** through additional forest and tree cover by **2030**.
6. To **better adapt** to climate change by enhancing investments in development programmes in sectors vulnerable to climate change, particularly agriculture, water resources, Himalayan region, coastal regions, health and disaster management.
7. To mobilize **domestic and new & additional funds** from developed countries to implement the above mitigation and adaptation actions in view of the resource required and the resource gap.
8. To **build capacities**, create domestic framework and international architecture for quick diffusion of cutting edge climate technology in India and for joint collaborative R&D for such future technologies.

To achieve the above contributions, India is determined to continue with its on-going interventions, enhance the existing policies as detailed in previous sections and launch new initiatives in the following priority areas:

1) Introducing new, more efficient and cleaner technologies in thermal power generation.
2) Promoting renewable energy generation and increasing the share of alternative fuels in overall fuel mix.
3) Reducing emissions from transportation sector.
4) Promoting energy efficiency in the economy, notably in industry, transportation, buildings and appliances.
5) Reducing emissions from waste.
6) Developing climate resilient infrastructure.
7) Full implementation of Green India Mission and other programmes of afforestation.
8) Planning and implementation of actions to enhance climate resilience and reduce vulnerability to climate change.

India has also revisited the National Missions under the NAPCC in the light of new scientific information and technological advances and identified new missions or programs on wind energy, health, waste to energy, and coastal areas. It is also redesigning the National Water Mission and National Mission on Sustainable Agriculture.

It is clarified that India's INDC do not bind it to any sector specific mitigation obligation or action, including in agriculture sector. India's goal is to reduce overall emission intensity and improve energy efficiency of its economy over time and at the same time protecting the vulnerable sectors of economy and segments of our society.

The successful implementation of INDC is contingent upon an ambitious global agreement including additional means of implementation to be provided by developed country parties, technology transfer and capacity building following Article 3.1 and 4.7 of the Convention.

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5. MEANS OF IMPLEMENTATION

5.1 CLIMATE CHANGE FINANCE REQUIREMENT

Finance is a critical enabler of climate change action. However, an overall assessment and quantification of finance requirements for adaptation and mitigation for a country with so much diversity and demand is a difficult task given the rapid pace of changing technologies and innovation. Estimates by various studies vary in projecting precise requirements but converge on the enormity of funds that would be needed.

Preliminary estimates indicate that India would need around USD 206 billion (at 2014-15 prices) between 2015 and 2030 for implementing **adaptation actions** in agriculture, forestry, fisheries infrastructure, water resources and ecosystems. Apart from this there will **be additional investments needed** for strengthening resilience and disaster management. An Asian Development Bank Study on assessing the costs of climate change adaptation in South Asia indicates that approximate adaptation cost for India in **energy sector alone** would roughly be about USD 7.7 billion in 2030s. The report also projects the economic damage and losses in India from climate change to be around 1.8% of its GDP annually by 2050. **Mitigation requirements are even more enormous**. Estimates by NITI Aayog (National Institution for Transforming India) indicate that the mitigation activities for moderate low carbon development would cost around USD 834 billion till 2030 at 2011 prices.

India's climate actions have so far been largely financed from domestic resources. A substantial scaling up of the climate action plans would require greater resources. A detailed and full scale assessment of international climate finance needs will be finalized at a later stage and would depend on the gap between actual cost of implementation of India's plans and what can be made available from domestic sources. While this would evolve over time, a preliminary estimate suggests that at least USD 2.5 trillion (at 2014-15 prices) will be required for meeting India's climate change actions between now and 2030.

5.2 REQUIREMENT FOR TECHNOLOGY TRANSFER & SUPPORT

In the rapidly and ever evolving realm of technology development, it is difficult to project future requirement of technologies. Transfer and grounding of technologies and their knowhow would be key to enhancing adaptation and mitigation measures in developing countries. It also calls for meaningful and adequate financing for the required cutting edge

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technologies. It is in this context that India has advocated global collaboration in Research & Development (R&D), particularly in clean technologies and enabling their transfer, free of Intellectual Property Rights (IPR) costs, to developing countries. IPR costs can also be borne from the GCF through a separate window.

It is also to be appreciated that every country has different requirements of technology and different capabilities of handling technologies depending on trained and skilled manpower, supporting infrastructure, intellectual environment etc. Knowledge creation, eco-system design for innovation and development, and technology deployment would be a continuous requirement in this process.

In its pursuit of low carbon growth, India would be focusing on technologies that need to be moved from lab to field and those that require targeted global research along with those that are still in the realm of imagination. One of the important areas of global collaborative research should be clean coal and fossil fuel, energy management and storage systems for renewable energy. Given the current stage of dependence of many economies on coal, such an effort is an urgent necessity. A preliminary and illustrative list of some of the technologies (which will evolve over time) is at **Annexure A**.

5.3 CAPACITY BUILDING NEEDS

India's efforts will require proper training and upgrading of skills across sectors. While no firm assessments have been made, it is evident that substantial resources will be required to implement capacity building programmes both nationally and across the states to address climate change challenges. It is expected that the international mechanism will support such initiatives including formation of Thematic Knowledge Networks, further expand activities under Global Technology Watch Group, establishing more intensive state centric knowledge and awareness creating activities and training of professionals in different aspects of renewable energy and supporting research and development institutions for pre-competitive research.

Though a firm projection is difficult, rough estimates indicate that around 2.5% of Government's salary budget would be required for capacity building initiatives, while some part of it would need to be financed internationally.

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V. CONSIDERATION ON FAIRNESS AND AMBITION

India's INDC is based on the 1992 convention. In terms of the provision on Article 3.1 and 4.7, this submission by India represents the utmost ambitious action in the current state of development. Both in terms of cumulative global emissions (only 3%) and per capita emission (1.56 tCO_2e in 2010), India's contribution to the problem of climate change is limited but its actions are fair and ambitious.

The recent decisions of the Government represent a quantum jump in our aspirations in climate change actions starting with the manifold scaling up of our renewable energy targets to the programme on Smart Cities, cleaning of rivers and Swachh Bharat Mission (Clean India Mission). The initiatives have demonstrated unparalleled vision and strong political initiatives of the Government. It is expected that developed countries will re-examine their pre 2020 actions in the light of substantial action taken by developing countries like India to ensure that the ambition gap is substantially bridged.

Through this INDC, India has shown its commitment to combat climate change and these actions are indeed important contributions to the global effort. However, our efforts to avoid emissions during our development process are also tied to the availability and level of international financing and technology transfer since India still faces complex developmental challenges. The critical issue for developing nations is the gap between their equitable share of the global carbon space and the actual share of carbon space that will be accessible to them. The transfer of appropriate technologies and provision of adequate finance will have to be a determined contribution of the developed countries, which will further enable the developing countries to accomplish and even enhance their efforts. It is expected that developed countries would recognize that without means of implementation and adequate resources, the global vision is but a vacant dream. Addressing the United Nations Summit for the adoption of Post-2015 Development Agenda in September 2015, the Prime Minister of India, Shri Narendra Modi said; "We should forge a global public partnership to harness technology, innovation and finance to put affordable clean and renewable energy within the reach of all. Equally, we must look for changes in our lifestyles that would make us less dependent on energy and more sustainable in our consumption. It is equally critical to launch a global education programme that prepares our next generation to protect and conserve

Nature. I hope that the Developed World will fulfil its financing commitments for development and climate change, without in any way putting both under the same head".

India's INDC is fair and ambitious considering the fact that India is attempting to work towards low carbon emission pathway while endeavoring to meet all the developmental challenges the country faces today. Through this submission, India intends to reduce the emissions intensity of its GDP by 33 to 35 % by 2030 from 2005 level. This commitment is further echoed in India's actions in climate change adaptation with setting up its own 'National Adaptation Fund'.

The current policy framework also includes a favorable environment for a rapid increase in renewable energy, move towards low carbon sustainable development pathway and adapting to the impacts of climate change. It represents the highest possible efforts as evident from the multiple initiatives of the Government of India.

Accordingly, India's development plans will continue to lay a balanced emphasis on economic development and environment.

India reserves the right to make additional submissions on Intended Nationally Determined Contribution (INDC) as and when required.

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Recent Initiatives of the Government of India

Under the leadership and vision of Hon'ble Prime Minister Shri Narendra Modi, Government of India has taken a number of measures to promote sustainable development and address the threat of climate change at national and sub-national level.

The first step was revisiting the National Missions under the National Action Plan on Climate Change (NAPCC). Government is proposing to set up new missions on Wind Energy, Health, Waste to Energy, Coastal Areas and redesigning the National Water Mission & National Mission on Sustainable Agriculture. Other initiatives include:

MITIGATION STRATEGIES

- Green Generation for Clean & Energy Secure India: more than 5 times increase in Renewable Capacity from 35 GW (upto March 2015) to 175 GW by 2022.
- National Solar Mission scaled up five-fold from 20 GW to 100 GW by 2022. Kochi Airport is the World's first airport to fully run on solar power.
- Solar powered toll plazas envisaged for all toll collection booths across the country.
- National Smart Grid Mission launched for efficient transmission & distribution network.
- Green Energy Corridor projects being rolled out to ensure evacuation from renewable energy plants.
- Nationwide Campaign for Energy Conservation launched with the target to save 10% of current energy consumption by the year 2018-19.
- Launched Smart Cities Mission to develop new generation cities by building a clean and sustainable environment.
- National Heritage City Development and Augmentation Yojana (HRIDAY) launched to bring together urban planning, economic growth and heritage conservation in an inclusive manner.
- Atal Mission for Rejuvenation and Urban Transformation (AMRUT) is a new urban renewal mission for 500 cities across India.
- Launched one-of-its kind 'Swachh Bharat Mission' (Clean India Mission) to make country clean and litter free by 2019.

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- Zero Effect, Zero Defect (ZED) with Make in India campaign to enhance energy& resource efficiency, pollution control, use of renewable energy, waste management etc.
- Formulated Green Highways (Plantation & Maintenance) Policy to develop 140,000 km long "tree-line" along both sides of national highways.
- Faster Adoption and Manufacturing of Hybrid & Electric Vehicles (FAME India) to promote faster adoption and manufacturing of hybrid and electric vehicles.
- Country's first passenger vehicle fuel-efficiency standards finalized.
- Policies to increase production of energy efficient 3 phase locomotives and switchover to 100% of these locos from 2016-17 onwards.
- Policy directive issued to use 5% bio-diesel in traction fuel in diesel locomotives.
- National Air Quality Index launched with One Number, One Color and One Description to give the status of air pollution in a particular city.

ADAPTATION STRATEGIES

- Launched Soil Health Card Scheme. Additionally, 100 mobile soil-testing laboratories setup across the country.
- Paramparagat Krishi Vikas Yojana launched to promote organic farming practices.
- The Pradhan Mantri Krishi Sinchayee Yojana launched to promote efficient irrigation practices.
- Neeranchal is a new programme to give additional impetus to watershed development in the country.
- Launched National Mission for Clean Ganga (Namami Gange) which seeks to rejuvenate the river.
- National Bureau of Water Use Efficiency (NBWUE) proposed for promotion, regulation and control efficient use of water.
- 'Give It Up' Campaign launched to encourage citizens to give up subsidy on cooking gas to meet the needs of the truly needy citizens, thereby promote shift away from inefficient use of biomass in rural areas.

CLIMATE FINANCE POLICIES

- Setting up of INR 3,500 million (USD 55.6 million) National Adaptation Fund.
- Reduction in subsidies on fossil fuels including diesel, kerosene and domestic LPG.
- Coal cess quadrupled from INR 50 to INR 200 per tonne to help finance clean energy projects and Ganga rejuvenation.
- Introduction of Tax Free Infrastructure Bonds for funding of renewable energy projects.

Annexure A

Illustrative list of some of the Technologies (Mitigation perspective)

Clean Coal Technologies (CCT)

- Pulverized Combustion Ultra Super Critical (PC USC)
- Pressurised Circulating Fluidised Bed Combustion, Super Critical, Combine Cycle (PCFBC SC CC)
- Integrated Gasifier Combined Cycle (IGCC)
- Solid Oxide Fuel Cell (SOFC), Integrated Gasifier Fuel Cell (IGFC)
- Underground Coal gasification (UCG)

Nuclear Power

- Pressurized water reactor, Integral pressurized water reactor, Advanced Heavy Water Reactor (AHWR)
- Fast breeder reactor (FBR)
- Accelerated-driven systems in advanced nuclear fuel cycles

Renewable Energy

- Yeast /enzyme based conversion to high quality hydrocarbon fuels
- Conversion of pre-treated biomass to fuels and chemicals
- Gasification technologies like fluidised bed, plasma induced etc. for power generation
- Wind Energy technologies:
    - Development of smaller and efficient turbines
    - Wind turbines for low wind regime
    - Designs of offshore wind power plants
- Solar PV technologies:
    - Based on p-type silicon wafers and n-type silicon wafers
    - Hetero junction with Thin Interfacial (HIT) Module, Back Contact Back Junction (BCBJ) Modules
    - Crystalline silicon photovoltaic cells of > 24 % cell efficiency
    - High efficiency Concentrating PV (CPV)
    - Non-silicon based solar PV technologies
- Composite cylinders for on-board hydrogen storage
- Advanced biomass gasification technologies
- Low temperature Polymer Electrolyte Membrane Fuel Cell (PEMFC) for stationary power generation and for vehicular applications
- Energy storage technologies for bulk storage and Renewable Energy integration, frequency regulation, utility Transmission & Distribution applications and for community scale projects.

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ANNEXURE A-9

Tabulated points of difference between the CRZ Clearance of 2011 and 2019

Sr. No.	Issue	CRZ Notification of 2011	CRZ Notification of 2019	Comments
1	**Reduction of CRZ area for Tidal Influenced Bodies**	Clause 1(ii) prescribes that the CRZ "shall apply to the land area between HTL to 100mts or width of the Creek, whichever is less, on the landward side along the tidal influenced water bodies that are connected to the sea"	Clause 1(ii) prescribes that the CRZ "shall apply to the land area between HTL to 50 meters or width of the creek, whichever is less on the landward side along the tidal influenced water bodies that are connected to the sea "	Reduces the extent of protections granted under the impugned notification around ecologically sensitive tidal influenced bodies , by demarcating a minimal and inadequate periphery of 50metres to be CRZ areas around such bodies.
2	**Reduction of CRZ area for islands**	Clause 8(i)(v)(2)(ii) prescribes a CRZ area spanning 50 metres in width from the High Tide Line on the landward side as the CRZ area;	Clause 10.2(ii) prescribes "In view of the unique coastal systems of backwater islands and islands along the mainland coast, along with space limitations in such coastal stretches, CRZ of 20 meters from the HTL on the landward side shall uniformly apply to such islands"	Reduces the extent of protections granted under the impugned notification around ecologically sensitive islands, by demarcating a minimal and inadequate periphery of 20 metres to be CRZ areas around such bodies



3	**The delineation of CRZ areas as per Hazard Lines has been altered**	Clause 1(iii) provided that, "the land area falling between the hazard line and 500mts from HTL on the landward side, in case of seafront and between the hazard line and 100mts line in case of tidal influenced water body the word 'hazard line' denotes the line demarcated by Ministry of Environment and Forests (hereinafter referred to as the MoEF) through the Survey of India (hereinafter referred to as the SoI) taking into account tides, waves, sea level rise and shoreline changes." This clause has been deleted vide amendment dated 8th July 2018	The Hazard Line does not form part of the body of the 2019 notification at all but instead is now part of the Guidelines for Preparation of Coastal Zone Management Plans at Annexure IV of the Notification. Clause 2 of the Guidelines [**at Page ____of the Application**] reads as follows, *2. **Hazard Line:** A 'Hazard line' has been demarcated by the Survey of India (SOI) taking into account the extent of the flooding on the land area due to water level fluctuations, sea level rise and shoreline changes(erosion or accretion) occurring over a period of time. The hazard line mapped by SOI has been shared with the coastal States or Union territories through NCSCM. The hazard line shall be used as a tool for disaster management plan for the coastal environment, including planning of adaptive and mitigation measures. With a view to reduce the vulnerability of the coastal communities and*	The hazard line has been completely delinked from the CRZ regulatory regime and is now retained merely as a disaster management tool. Protection granted to areas between 500 metres from the HTL to the Hazard Line under the CRZ 2011 Notification has been done away with , thereby opening up these areas to construction and development



			ensuring sustainable livelihood, while drawing the CZMP, the land use planning for the area between the Hazard line and HTL shall take into account such impacts of climate change and shoreline changes."	
4	**Altered definitions of CRZ areas**	CRZ areas categorised under Clause 7 as follows:	CRZ areas are categorised under Clause 2 0 as follows:	
		CRZ-I,– The areas that are ecologically sensitive and the geomorphological features which play a role in the maintaining the integrity of the coast,- Including: a.Mangroves b Corals and coral reefs and associated biodiversity; c.Sand Dunes; d.Mudflats which are biologically active;	CRZ-I A shall constitute the following ecologically sensitive areas (ESAs) and the geo-morphological features which play a role in maintaining the integrity of the coast viz.: (i) Mangroves (in case mangrove area is more than 1000 square meters, a buffer of 50 meters along the mangroves shall be provided and such area shall also constitute CRZ–I A);	Places an overall condition on the recognition of all CRZ areas such that they must first be mapped by the National Centre for Sustainable Coastal Management (NCSCM), Chennai as being CRZ areas.



		e.National parks, marine parks, sanctuaries, reserve forests, wildlife habitats and other protected areas under the provisions of Wild Life (Protection) Act, 1972 (53 of 1972), the Forest (Conservation) Act, 1980 (69 of 1980) or Environment (Protection) Act, 1986 (29 of 1986); including Biosphere Reserves; f.Salt Marshes; g.Turtle nesting grounds; h.Horse shoe crabs habitats; i.Sea grass beds; j.Nesting grounds of birds; k.Areas or structures of archaeological importance and heritage sites. bThe area between Low Tide Line and High Tide Line;	(ii) Corals and coral reefs; (iii) Sand dunes; (iv) Biologically active mudflats; (v) National parks, marine parks, sanctuaries, reserve forests, wildlife habitats and other protected areas under the provisions of Wild Life (Protection) Act, 1972 (53 of 1972), Forest (Conservation) Act, 1980 (69 of 1980) or Environment (Protection) Act, 1986 (29 Of 1986), including Biosphere Reserves; (vi) Salt marshes; (vii) Turtle nesting grounds; (viii) Horse shoe crabs' habitats; (ix) Sea grass beds; (x) Nesting grounds of birds;	

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			(xi) Areas or structures of archaeological importance and heritage sites. A detailed environment management plan shall be formulated by the states and Union territories for such ecologically sensitive areas in respective territories, as mapped out by the National Centre for Sustainable Coastal Management (NCSCM), Chennai based on guidelines as contained in **Annexure-I** to this notification and integrated with the CZMP.	
		(ii)CRZ-II,- The areas that have been developed upto or close to the shoreline. *Explanation.*- For the purposes of the expression "developed area" is referred to as that area	**2.2 CRZ-II:** CRZ-II shall constitute the developed land areas up to or close to the shoreline, within the existing municipal limits or in other existing legally designated urban areas which are	Definition of CRZ II area has been expanded to be contingent upon the density of 'plots' without clarifying what constitutes a plot

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		within the existing municipal limits or in other existing legally designated urban areas which are substantially built-up and has been provided with drainage and approach roads and other infrastructural facilities, such as water supply and sewerage mains;	substantially built-up with a ratio of built-up plots to that of total plots being more than 50 per cent and have been provided with drainage and approach roads and other infrastructural facilities, such as water supply, sewerage mains, etc.	



		(iii)CRZ III Areas- Areas that are relatively undisturbed and those do not belong to either CRZ-I or II which include coastal zone in the rural areas (developed and undeveloped) and also areas within municipal limits or in other legally designated urban areas, which are not substantially built up. Clause 8(i)(III)(A) provides that, 'Area upto 200 mts from HTL on the landward side in case of seafront and 100mts along tidal influenced water bodies or width of the creek whichever is less is to be earmarked as "No Development Zone (NDZ)",-	**2.3 CRZ-III:** Land areas that are relatively undisturbed (viz. rural areas, etc.) and those which do not fall under CRZ-II, shall constitute a CRZ–III, and CRZ-III shall be further classified into following categories: **2.3.1 CRZ-III A:** Such densely populated CRZ-III areas, where the population density is more than 2161 per square kilometre as per 2011 census base, shall be designated as CRZ–III A and in CRZ-III A, area up to 50 meters from the HTL on the landward side shall be earmarked as the 'No Development Zone (NDZ)', provided the CZMP as per this notification, framed with due consultative process, have been approved, failing which, a NDZ of 200 meters shall continue to	No rational basis for defining CRZ III areas to be those, where where the population density is more than 2161 per square kilometre as per 2011 census base. Instead provision in the 2011 notification which requires areas that are "not substantially built up" has been removed, but no reason for the prescription of population density is evident from the 2019 notification The No-Development Zone in the CRZ-III A, is reduced by 150 metres, as it previously was 200 metres from the HTL on the landward side which has now been reduced to a maximum of 50 metres

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			apply. **2.3.2 CRZ-III B:** All other CRZ-III areas with population density of less than 2161 per square kilometre, as per 2011 census base, shal be designated as CRZ-III B and in CRZ-III B, the area up to 200 meters from the HTL on the landward side shall be earmarked as the 'No Development Zone (NDZ)'.	

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		(ii)CRZ-IV,- A.the water area from the Low Tide Line to twelve nautical miles on the seaward side; B.shall include the water area of the tidal influenced water body from the mouth of the water body at the sea upto the influence of tide which is measured as five parts per thousand during the driest season of the year.	**2.4 CRZ- IV:** The CRZ- IV shall constitute the water area and shall be further classified as under:- **2.4.1 CRZ- IVA:** The water area and the sea bed area between the Low Tide Line up to twelve nautical miles on the seaward side shall constitute CRZ-IV A. **2.4.2 CRZ- IVB:** CRZ-IV B areas shall include the water area and the bed area between LTL at the bank of the tidal influenced water body to the LTL on the opposite side of the bank, extending from the mouth of the water body at the sea up to the influence of tide, i.e., salinity of five parts per thousand (ppt) during the driest season of the	The sea bed has been included in the definition of CRZ-IV areas, implying that all development activity permitted in CRZ IV areas under other provisions of the new 2019 notification can take place on the sea bed.

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			year.	
5	**Previously prohibited activities in CRZ areas are being permitted**	Clause 3(ix) prohibited ; - [Reclamation for commercial purposes such as shopping and housing complexes, hotels and entertainment activities except for construction of memorials/ monuments and allied facilities, only in CRZ-IV (A) areas, in exceptional cases, by the concerned State Government, on a case to case basis.]	No corresponding provision in CRZ notification of 2019	The blanket restriction Reclamation for commercial purposes such as shopping and housing complexes, hotels and entertainment activities has been removed in the 2019 notification



		Clause 3(xii) prohibits: Dressing or altering the sand dunes, hills, natural features including landscape change for beautification, recreation and other such purpose except utilising the rocks/ hills/ natural features, only in CRZ-IV (A) areas, for development of memorials/ monuments and allied facilities, by the concerned State Government	Clause 4 (ix) Prohibits: Dressing or altering of active sand dunes.	Additional qualification of establishing that a sand dune is "active" in order to be protected from dressing and altering, without establishing what constitutes an active sand dune. The protection granted to hills has been removed completely.
		Clause 3(vi) prohibits: Discharge of untreated waste and effluents from industries, cities or towns and other human settlements. The concerned authorities shall implement schemes for	No corresponding provisions requiring authorities to phase out existing discharge of untreated waste and effluents from industries and human settlements	The 2019 notification does not require authorities to phase out existing discharge of untreated waste and effluents from industries and human settlements, despite the fact that this task has not been completed since 2011.

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		phasing out existing discharge of this nature, if any, within a time period not exceeding two years from the date of issue of this notification.		
		Clause 3(v) prohibits: Setting up and expansion of units or mechanism for disposal of wastes and effluents except facilities required for,- (a) discharging treated effluents into the water course with approval under the Water (Prevention and Control of Pollution) Act, 1974 (6 of 1974); (b) storm water drains and ancillary structures for pumping;	No corresponding provision	The setting up and expansion of units or mechanism for disposal of wastes and effluents, a hitherto prohibited activity, has been allowed in the CRZ Notification of 2019. Specifically, the act of establishing treatment plants for sewage and waste in CRZ areas has been allowed in CRZ areas.



		(c) treatment of waste and effluents arising from hotels, beach resorts and human settlements located in CRZ areas other than CRZ-I and disposal of treated wastes and effluents;		
		Clause 3(xi) prohibits the:- "Drawl of groundwater and construction related thereto, within 200mts of HTL", with certain exceptions		
6	**Unrestricted development allowed under the category of "strategy, "defence", "security" and "public**	Defence projects were not permitted liberally under the CRZ Notification of 2011	Clause 5.1.1 (iii) allows Construction of roads and roads on stilts, by way of reclamation in CRZ-I areas, shall be permitted only in exceptional cases for defence, strategic purposes and public utilities, subject tc a detailed marine or terrestrial or both environment impact	Express permission granted to projects within CRZ areas, both 1-B for all defence, strategic and public utility projects

	utility"		assessment, to be recommended by the Coastal Zone Management Authority and approved by the Ministry of Environment, Forest and Climate Change; and in case construction of such roads passes through mangrove areas or is likely to damage the mangroves, a minimum three times the mangrove area affected or destroyed or cut during the construction process shall be taken up for compensatory plantation of mangroves. Clause 5.1.2 (xi) permits projects classified as strategic, defence related projects and projects of the Department of Atomic Energy, Government of India in CRZ-IB areas	
7	**Enhancement of industrial**	Annexure I - Guidelines for preparation of Coastal Zone	Clause 5.1.1 (ii) allows, In the mangrove buffer, only such	Construction and Development activities permitted in buffer

	development permissible within CRZ areas	Management Plans - Clause II (4) stipulates that the 50m buffer zones around mangrove areas are to be classified as CRZ-I areas	activities shall be permitted like laying of pipelines, transmission lines, conveyance systems or mechanisms and construction of road on stilts, etc. that are required for public utilities.	zones arcund Mangroves, which were hitherto protected from development
		Clause 8(i)III permits, inter alia, the follcwing activities in CRZ-III areas: Vi. facilities for generating power by non-conventional energy sources; * **Also allowed in CRZ II areas** xi.[Mining of Atomic Minerals notified under Part-B of the First Schedule of Mining and Minerals (Development) Act, 1957 occuring as such or in association with one or other minerals.]	Clause 5.1.2 permits, inter alia, the following activities in CRZ-IB areas (iii) Power by non-conventional energy sources and associated facilities. (iv) Transfer of hazardous substances from ships to Ports, terminals and refineries and vice versa. (xii) Manual mining of atomic mineral(s) notified under Part-B of the First Schedule to the Mining and Minerals (Development and Regulation) Act, 1957)(67 of 1957) occurring as such or in association with	The transfer of hazardous substances from ships to Ports, terminals and refineries and vice versa has been permitted in CRZ -III areas.

			one or other minerals in the intertidal zone by such agencies as authorised by the Department of Atomic Energy, Government of India as per mining plan approved by the Atomic Mineral Directorate for Exploration and Research	
			Clause 5.1.2 -xv. permits, Pipelines, conveying systems including transmission lines in CRZ-IB Areas	
			Clause 5.1.2 -xiv. permits, in CRZ-IB areas foreshore requiring facilities for transport of raw materials, facilities for intake of cooling water, intake water for desalination plants, etc, and outfall for discharge of treated wastewater or cooling water from thermal power plants in conformity with the	



			environmental standards notified by Ministry of Environment, Forest and Climate Change and relevant directions of Central Pollution Control Board (CPCB) or State Pollution Control Board (SPCB) or Pollution Control Committee (PCC), as the case may be.	
7	**Allows for a singular agency to determine CRZ areas**		Clause 2.1.1(b) and Annexure I- Conservation, Protection and Management Framework for Ecologically Sensitive Areas - provides that all CRZ I A will be determined as per the mapping of the NCSCM Clause 1.4 (v) of Annexure I - authorises the NCSCM to demarcate certain salt marshes which have less biodiversity in Coastal Zone Management Plan can be considered for salt pan	The MoEFCC had previously approved of 7 agencies to map the HTL as per the CRZ Notification of 2011

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			activities. Clause 1.9(iv)(a) of Annexure I states that biologically active mudflats are to be identified by the NCSCM Clause 8(1)(e) and Annexure IV- The Guidelines for the Preparation of Coastal Zone Management Plans;	
8	**Decentralised method of granting clearances authorises local authorities to permit development in CRZ areas without**	Clause 4 provides for the projects that can be approved by the MoEFCC, the State Environmental Impact Assessment Authority as per the need prior recommendation from the CZMA. Local Authorities cannot grant clearances for any projects	Clause 7(iii)(v) and (vi) provides that, permissible and regulated activities as per this notification, which fall purely in CRZ–II and CRZ-III areas, the CRZ clearance shall be considered by the concerned Coastal Zone	Local Authorities can grant clearances for projects in CRZ - II and CRZ-III areas

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	scientific assessment		Management Authority In case of building or construction projects with built-up area less than the threshold limit stipulated for attracting the provisions of the EIA Notification, 2006 these shall be approved by the concerned local State or Union territory Planning Authorities in accordance with this notification, after obtaining recommendations of the concerned Coastal Zone Management Authority. (vi) Only for self-dwelling units up to a total built up area of 300 square meters, approval shall be accorded by the concerned local Authority, without the requirement of recommendations of concerned Coastal Zone Management Authority and such authorities shall, however, examine the proposal from the perspective of	

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			the Coastal Regulation Zone notification before according approval.	
9	**Removes special provisions for particularly eco-sensitive regions within India**	Clause 8(b)(v) Denotes special provisions for "areas requiring special consideration". Sub-Clause 3 requires: 1. the Government of Goa shall notify the fishing villages wherein all foreshore facilities required for fishing and fishery allied activities 2. purely temporary and seasonal structures customarily put up between the months of September to May; 3. the eco sensitive low lying areas which are influenced by tidal	No provision for protection of eco-sensitive lands in Goa, such as khazans	Special protections granted to eco-sensitive zones, particularly within the State of Goa have been removed completely.

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		action known as khazan lands shall be mapped; 4. the mangroves along such as khazan land shall be protected and a management plan for the khazan land prepared and no developmental activities shall be permitted in the khazan land;		
10	**Allows for the storage of Monoethylene Glycol and Acetic Acid in CRZ areas**	Annexure -II List of petroleum and chemical products permitted for storage in [CRZ except CRZ-I(A)] does not provide for the storage of Monoethylene Glycol and Acetic Acid	Annexure II - List of Petroleum and Chemical Products permitted for storage in CRZ except CRZ-IA Permits for the storage of two new chemical products, namely Monoethylene Glycol and Acetic Acid in CRZ areas	Two new chemical products, namely Monoethylene Glycol and Acetic Acid can be stored in CRZ areas
11	**Allows for the expansion of**	Clause 3(iii) prohibits setting up and expansion of fish	Clause 5.1.2 - permits the	Expansion of fish processing units have been permitted to

	fish processing units in CRZ 1	processing units including warehousing except hatchery and natural fish drying in permitted areas:	expansion of existing fish processing units in CRZ -IB areas follows: (vii) Existing fish processing units may utilise 25% additional plinth area for modernisation purposes (only for additional equipment and pollution control measures) subject to the following:- (a) Floor Space Index of such reconstruction not exceeding the permissible Floor Space Index as per prevalent town and country planning regulations; (b) additional plinth area is constructed only to the landward side. (c) approval of the concerned State Pollution Control Board or Pollution Control Committee.	match current rules for FSI and FAR.



12	**Waste Treatment Plants permitted in CRZ I areas**	Clause 3 (v) prohibits setting up and expansion of units or mechanism for disposal of wastes and effluents except facilities required for,- a. discharging treated effluents into the water course with approval under the Water (Prevention and Control of Pollution) Act, 1974 (6 of 1974); b. storm water drains and ancillary structures for pumping; c.treatment of waste and effluents arising from hotels, beach resorts and human settlements located in CRZ areas other than CRZ-I and	Clause 5.1.2 (ix) permits "Treatment facilities for waste and effluents and conveyance of treated effluents" in CRZ IB areas	The treatment of waste and effluents is now permitted in CRZ areas, whereas previously it was only the discharge of such treated discharge and effluents that was permitted.

		disposal of treated wastes and effluents;		
13	**Allows Commercial Salt production instead of only traditional manual methods permitted earlier**	Clause 8(ii)(d) allows salt harvesting by solar evaporation of seawater in areas between LTL and HTL which are not ecologically sensitive	No corresponding provision	No restriction of salt harvesting in CRZ areas to only be through solar evaporation
14	**Liberalises commercial construction that was previously prohibited in CRZ areas**	Clause 8 (i)(II)(ii) and (iii) stipulates that within CRZ-II area: buildings permitted on the landward side of the existing and proposed roads or existing authorised structures shall be subject to the existing local town and country planning	Clause 5.2 (iii) and (iv) Provides that buildings permitted in CRZ II areas. "shall be subject to the local town and country planning regulations as applicable from time to time, and the norms for the Floor Space Index (FSI) or Floor Area Ratio (FAR) prevailing as on the date of this Notification, and in the event that there is a need for	Development in CRZ areas were restricted to regulation for FSI and FAR as per the permitted levels in 1991, but would now have been relaxed to meet the permitted ratios for FSI and FAR

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		regulations as modified from time to time, except the Floor Space Index or Floor Area Ratio, which shall be as per 1991 level: Provided that no permission for construction of buildings shall be given on landward side of any new roads which are constructed on the seaward side of an existing road: Provided further that the construction in CRZ-II area of Goa, Kerala and Mumbai shall be governed by the provisions of Clause V of paragraph 8 reconstruction of authorized building to be permitted subject with the existing Floor Space Index or Floor Area Ratio	amendment of the FSI after the date of publication of this notification in the official Gazette, the Urban Local Body or State Government or Union territory Administration shall approach the Ministry of Environment, Forest and Climate Change through the concerned State Coastal Zone Management Authority (SCZMA) or Union Territory Coastal Zone Management Authority, as the case may be and the SCZMA shall forward the proposal to the National Coastal Zone Management Authority (NCZMA) with its views in the matter, and the NCZMA shall thereafter examine various aspects like availability of public amenities, environmental protection measures, etc., and take a suitable decision on the proposal" Similarly, reconstruction of	

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		Norms and without change in present use;	buildings authorised in CRZ II areas have also been permitted as per the norms for the Floor Space Index (FSI) or Floor Area Ratio (FAR) prevailing as on the date of this Notification.	
15	**Allows for the dissolution of CZMAs through non-appointment**	Regulation 4.2(iv) was amended to allow: [In case CZMAs are not in operation due to their reconstitution or any other reasons, then it shall be the responsibility of the Department of Environment in the State Government or Union Territory Administrations, who are the custodian of the Coastal Zone Management Plans of respective States or Union Territories to provide comments and recommend the proposals in terms of the	Regulation 8(iv) provides as follows In case the Coastal Zone Management Authorities are not in operation due to their reconstitution or any other reasons, then it shall be responsibility of the Department of Environment in the State Government or Union territory Administration, who are the custodian of the CZMP of respective States or Union territories, to provide comments and recommend the proposa s in terms of the provisions of the said notification.	The hazard line has been completely delinked from the CRZ regulatory regime and is now retained merely as a disaster management tool. Protection granted to areas between 500 metres from the HTL to the Hazard Line under the CRZ 2011 Notification has been done away with , thereby opening up these areas to construction and development



		provisions of the said notification to the Ministry of Environment, Forest and Climate Change.		
16	**Validity of CRZ clearances were increased to 7 years**	Regulation 4.2(v) was amended to read as follows: [The clearance accorded to the projects under this notification shall be valid for a period of seven years from the date of issue of such clearance: Provided that the construction activities shall commence within a period of five years from the date of the issue of clearance and the construction be completed and the operations be commenced within seven years from the date of issue of such a	Regulation 8(v) provides as follows: The clearance accorded to the projects under this notification shall be valid for a period of seven years, provided that the construction activities are completed and the operations commence within seven years from the date of issue of such clearance. The validity may be further extended for a maximum period of three years, provided an application is made to the concerned authority by the applicant within the validity period, along with recommendation for extension of validity of the clearance by the	CRZ Clearances are now valid for 7 years

		clearance: Provided further that the period of validity may be extended for a maximum period of three years in case an application is made to the concerned authority by the applicant within the validity period, along with recommendation for extension of validity of the clearance by the concerned State/ Union Territory Coastal Zone Management Authority.][1] The amendment was made vide notification dated 6th March 2018	concerned State or Union territory Coastal Zone Management Authority.	



[1]

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ANNEXURE A-10

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MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

NOTIFICATION

New Delhi, the 2nd July, 2018

S.O. 3197(E).—Whereas by notification of the Government of India in the erstwhile Ministry of Environment and Forests number S.O.19 (E), dated the 6th January, 2011 (hereinafter referred to as the Coastal Regulation Zone Notification, 2011), the Central Government declared certain coastal stretches as Coastal Regulation Zone and restrictions were imposed on the setting up and expansion of industries, operations and processes in the said Zone;

And whereas, representations have been received from the Defence organisations for providing an enabling provision under the Coastal Regulation Zone Notification, 2011 for location of facilities in certain areas which are of strategic requirement and has national importance;

And whereas, representations have also been received from various coastal States and Union territories, besides other stakeholders, regarding certain provisions in the Coastal Regulation Zone Notification, 2011 related to management and conservation of marine and coastal ecosystems, development in coastal areas, eco-tourism, livelihood options and sustainable development of coastal communities, etc;

And whereas, various State Governments and Union territories and stakeholders have requested the Ministry of Environment, Forest and Climate Change to address the concerns related to Coastal Environment and sustainable development with respect to the Coastal Regulation Zone Notification, 2011;

And whereas, the Ministry of Environment, Forest and Climate Change had constituted a committee under the chairmanship of Dr. Shailesh Nayak to examine various issues and concerns of coastal States and Union territories and various stakeholders, relating to the Coastal Regulation Zone Notification 2011 and to recommend appropriate changes in the said notification;

And whereas, the report submitted by Dr Shailesh Nayak Committee has been examined in the Ministry and consultations have been held with various stakeholders in this regard;

And whereas, the Central Government, having regard to the provision of sub-rule (4) of rule 5 of the Environment (Protection) Rules, 1986, is of the opinion that it is in public interest to dispense with the requirement of notice under clause (a) of sub-rule (3) of rule 5 of the said rules for amending the Coastal Regulation Zone Notification, 2011.

Now, therefore, in exercise of the powers conferred by sub-section (1) and clause (v) of sub-section (2) of section 3 of the Environment (Protection) Act, (29 of 1986) read with clause (d) of sub-rule (4) of rule 5 of the Environment (Protection) Rules, 1986, the Central Government hereby makes the following further amendments in the Coastal Regulation Zone Notification, 2011, namely: —

(a) in the opening paragraph, sub-paragraph (iii) shall be deleted and sub-paragraphs (iv) and (v) shall be renumbered as (iii) and (iv);

(b) in paragraph 5, for sub-paragraphs (iii), (iv) and (v), the following sub-paragraphs shall be substituted, namely:-

"(iii) A 'Hazard line' shall be demarcated by the Survey of India, taking into account the extent of the flooding on the land area due to water level fluctuations, sea level rise and shoreline changes (erosion/accretion) occurring over a period of time, and shared with the coastal States and Union Territories through the National Centre for Sustainable Coastal Management, Chennai;

(iv) The Hazard line shall be used as a tool for disaster management plan for the coastal environment, including planning of adaptive and mitigation measures;

(v) With a view to reduce the vulnerability of the coastal communities and ensuring sustainable livelihood, while drawing the Coastal Zone Management Plans (CZMPs), the land use planning for the area between the Hazard line and HTL shall take into account such impacts of climate change and shoreline changes;";

(c) in paragraph 8. Under the heading "I. CRZ-I", in clause (i), after sub-clause (f), the following clause shall be inserted, namely:-

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"(g) projects relating to Defence organisations which are of strategic requirement and national importance and cannot be located elsewhere, subject to strict environmental safeguards.".

[F. No. 19-27/2015-IA-III (Pt.)]

RITESH KUMAR SINGH, Jt. Secy.

Note : The principal notification was published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (ii), *vide* number S.O. 19(E), dated the 6th January, 2011 and subsequently amended as follows :—

1. S.O. 2557 (E), dated the 22nd August, 2013;
2. S.O. 1244 (E), dated the 30th April, 2014;
3. S.O. 3085 (E), dated the 28th November, 2014;
4. S.O. 383 (E), dated the 4th February, 2015;
5. S.O. 556 (E), dated the 17th February, 2015;
6. S.O. 938 (E), dated the 31st March, 2015;
7. S. O. 1599 (E), dated the 16th June, 2015;
8. S. O. 3552 (E) dated the 30th December, 2015;
9. S. O. 1212 (E), dated the 22nd March, 2016;
10. S.O. 4162(E), dated 23rd December, 2016;
11. S.O. 621(E), dated 23rd February, 2017;
12. S.O. 1393 (E), dated 3rd May, 2017; and
13. S.O. 2444 (E), dated 31st July, 2017.
14. G.S.R. 1227(E), dated 6th October, 2017
15. S.O. 1002 (E), dated 06th March, 2018.

RAKESH SUKUL

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and Published by the Controller of Publications, Delhi-110054.

ANNEXURE A-11

EXAMPLES OF FLAWS IN CZMP 2011 FOR GOA

Sl No	Location	Description of the flaws in CZMP 2011
1	Varca, Salcete	Large sand dunes are not shown in Varca such as the sand dune measuring over **1,75,000 sq m** in sy nos 157, 160, 162, 164, 165, 174 & 175, Varca village. These sand dunes are demarcated within settlement zones in RP 2021 by TCP Department.
2	Siridao and Goa Velha, Tiswadi	Mangroves and water bodies in an area over **4,50,000 sq m** in sy nos 12 to 26 of Siridao village are not demarcated. Water bodies measuring 26,000 sq m approximately in sy nos 178, 179 and 181 of Goa Velha village are not shown.
3	Cavelossim, Salcete	Sand dunes are not shown in sy nos 134, 135, 137, 139, 142, 146 & 133, Cavelossim village. Mangroves in sy nos 141, 144, 147 & 148, Cavelossim village are not demarcated. These sand dunes and mangrove areas are entirely shown as settlement zones in RP 2021 by TCP Department. Khazan lands are also adjusted in sy no 147 (part), Cavelossim village to exclude a construction being carried out presently after cutting of 26 mangrove clumps. A road which does not exist is also shown in sy no 134 (part), Cavelossim village to assist a hotel project.
4	Shiroda, Ponda	Khazans measuring over **3,50,000 sq m** bearing sy nos 80, 81, 83, 89-95, 106-108, 131, 133, 135 and other adjoining lands, Shiroda village are not demarcated
5	Cacora and Odar, Quepem	Salt marshes and coconut plantations within CRZ measuring over **8,00,000 sq m** bearing sy nos 456 to 515, Cacora village and adjoining lands of Odar village are not demarcated

6	Morombi O Grande, Tiswadi	Khazan lands are not shown where illegal destruction of the khazans has taken place in sy no 275/1 of Morombi O Grande village. Mangroves are also not shown fully.
7	All across Goa	Fish breeding areas are not shown, fishing areas and registered fishing nets are not demarcated, fishing villages are not demarcated, structures, paths and other rights of local communities are not shown.



EXAMPLES OF FLAWS IN CZMP 2011 FOR GOA

CZMP 2011, GOOGLE AND RP 2021 IMAGES

i. VARCA, SALCETE

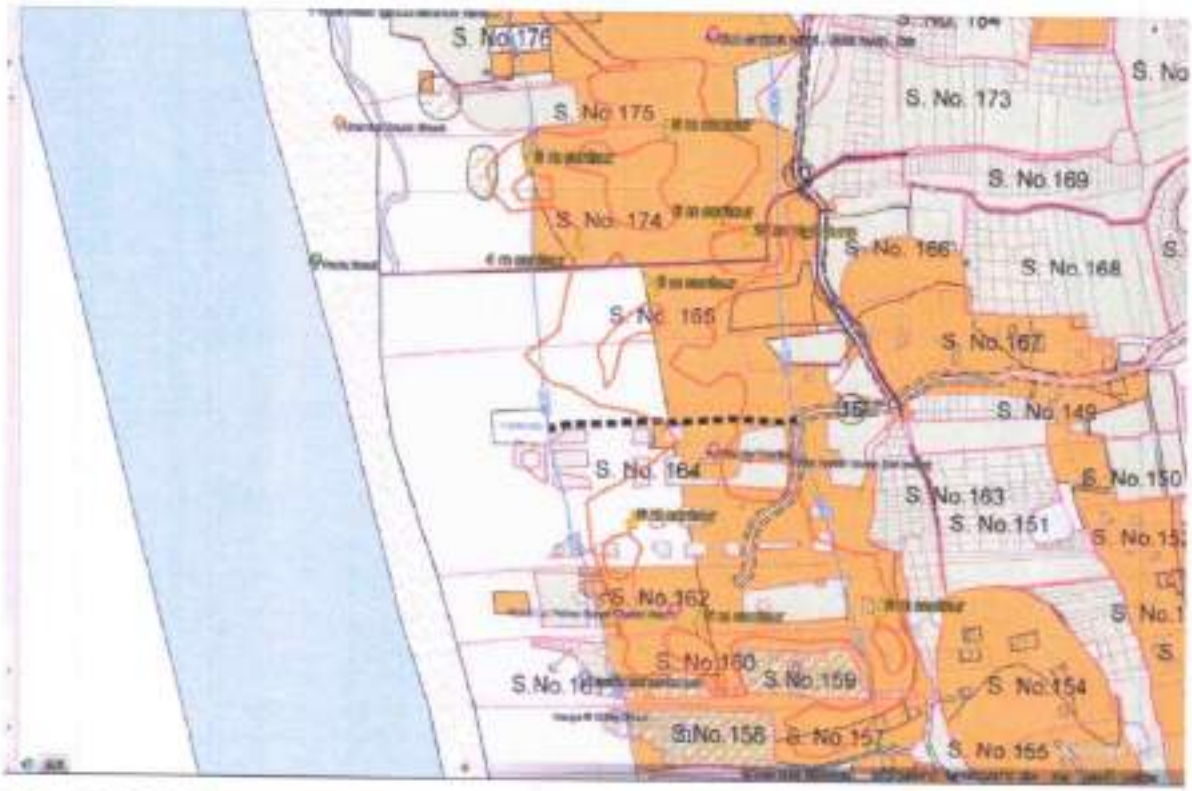


Large sand dunes are missed in CZMP 2011 such as a sand dune larger than 1,75,000 sq m in sy nos 157, 160, 162, 164, 165, 174 & 175, Varca village. The CZMP 2011 above is marked with 4 m & 6 m dune contours & a 12 m dune peak.



The marked up google earth image shows that the area of the sand dune not demarcated is over 1,75,000 sq m.

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The RP 2021 image marked up to show the sand dunes not demarcated on CZMP 2011 reveals that the sand dune is included by TCP Department within settlement zones, making construction on this and other similar sand dunes imminent.

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2. SIRIDAO & GOA VELHA, TISWADI



Mangroves and water bodies spread across an area over 4,50,000 sq m in sy nos 12 to 26 of Siridao village are not demarcated. Water bodies measuring about 26,000 sq m in sy nos 178, 179 and 181 of Goa Velha village are not shown.



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3. CAVELOSSIM, SALCETE



The CZMP 2011 fails to demarcate the CRZ areas in the village of Cavelossim. As an example, images of the ward of Tamborim are included here, which reveal the gross failure to demarcate sand dunes and mangroves in this ward.



The google images on this page show the growth of a large number of mangroves in the fields to the east of the ward (centre-right of the images), but these are not demarcated on the CZMP 2011.



The image below is marked with 1 m contours, which reveals the undulating nature of the lands, which can only mean large sand dunes. The yellow, red and white contours demarcate areas within the sand dunes over 4 m (up to 10 m) above MSL., which reveals large sand dunes. The blue and green contours are of the low-lying flood-preventing areas that also need to be protected.

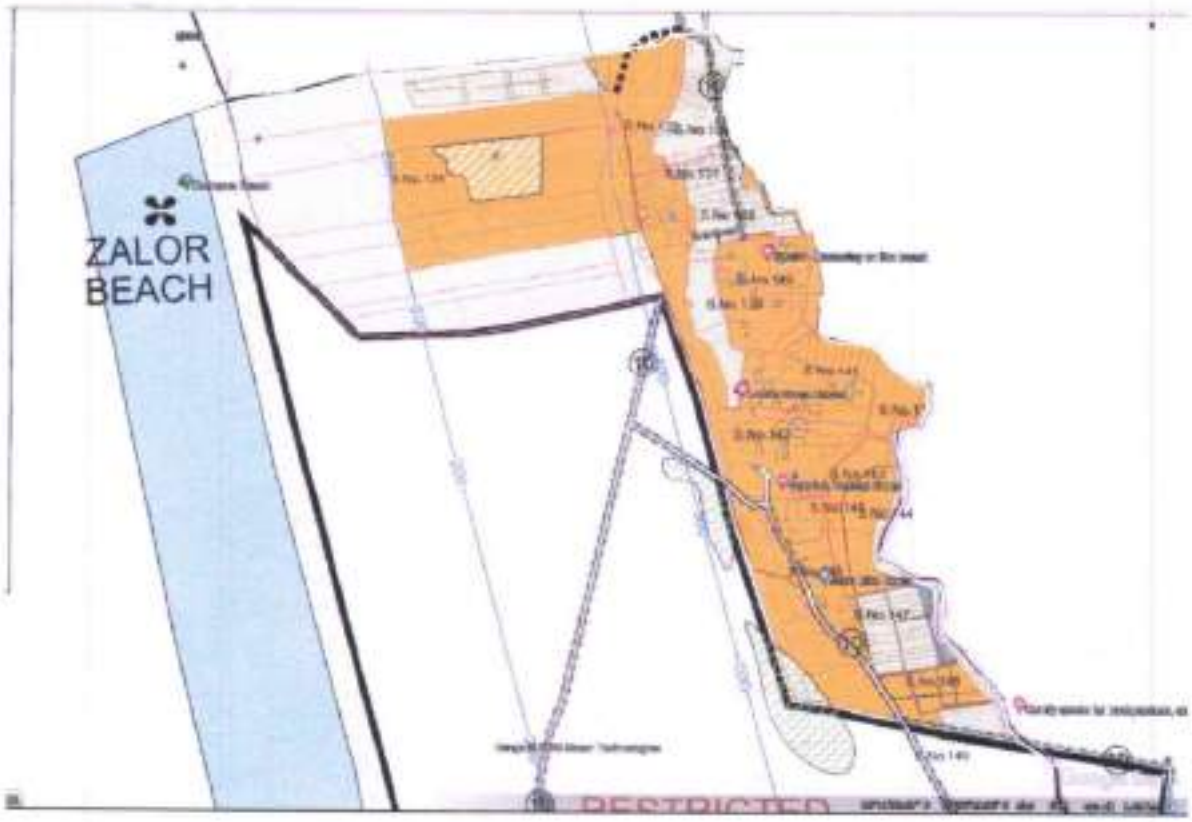




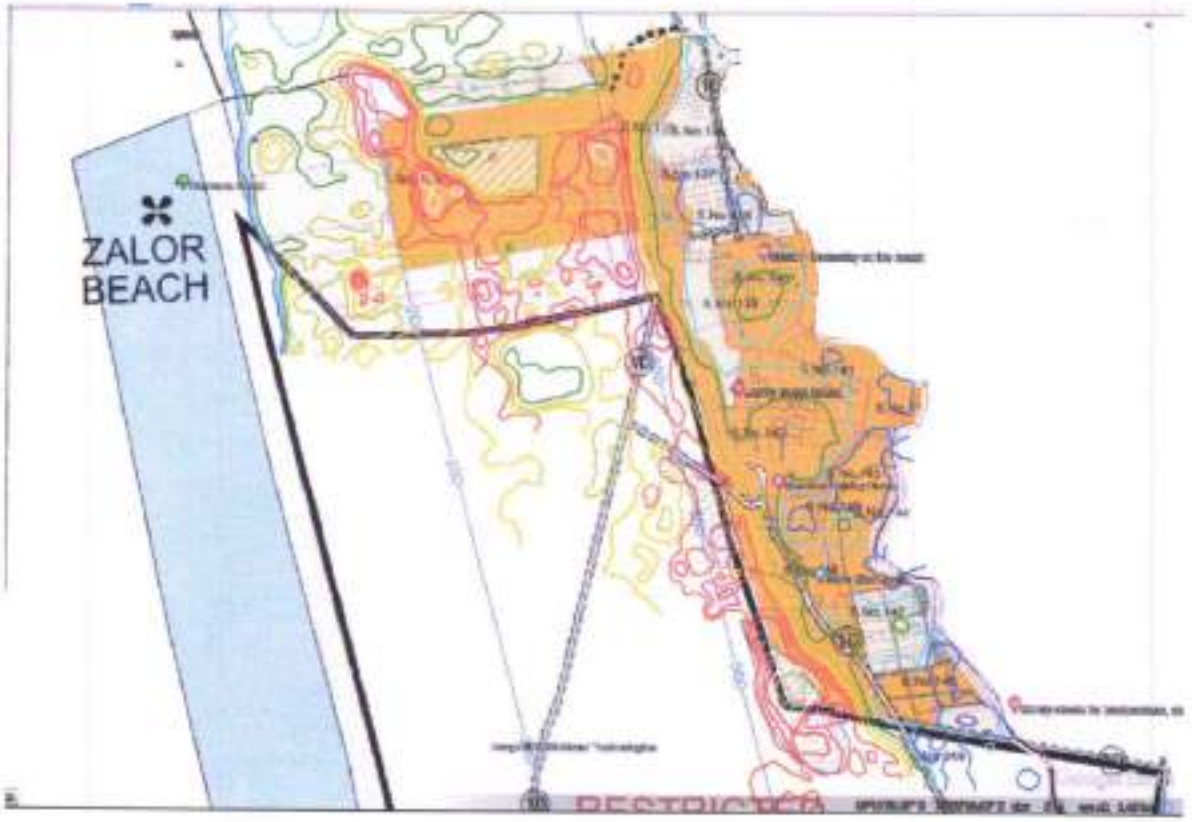
The CZMP 2011 fails to demarcate substantial parts of the sand dunes, as is obvious from the contours (yellow, red and white contours are within sand dunes) superimposed below. Some sand dunes are seen beyond 500 m from HTL.



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The RP 2011 demarcates most of the sand dunes and mangroves as settlement zone, making the destruction of these CRZ-I areas imminent.





4. SHIRODA, PONDA

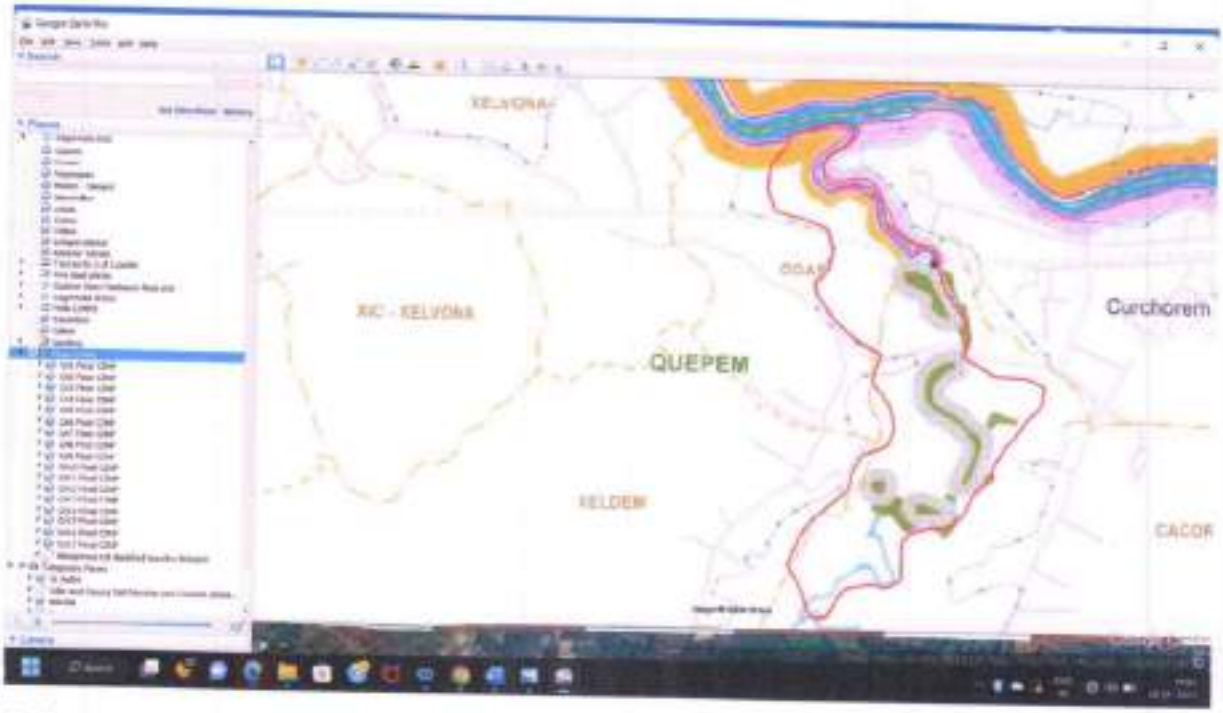


In Shiroda village, khazans measuring over 3,50,000 sq m in sy nos 80, 81, 83, 89-95, 106-108, 131, 133, 135 and other adjoining lands are not demarcated

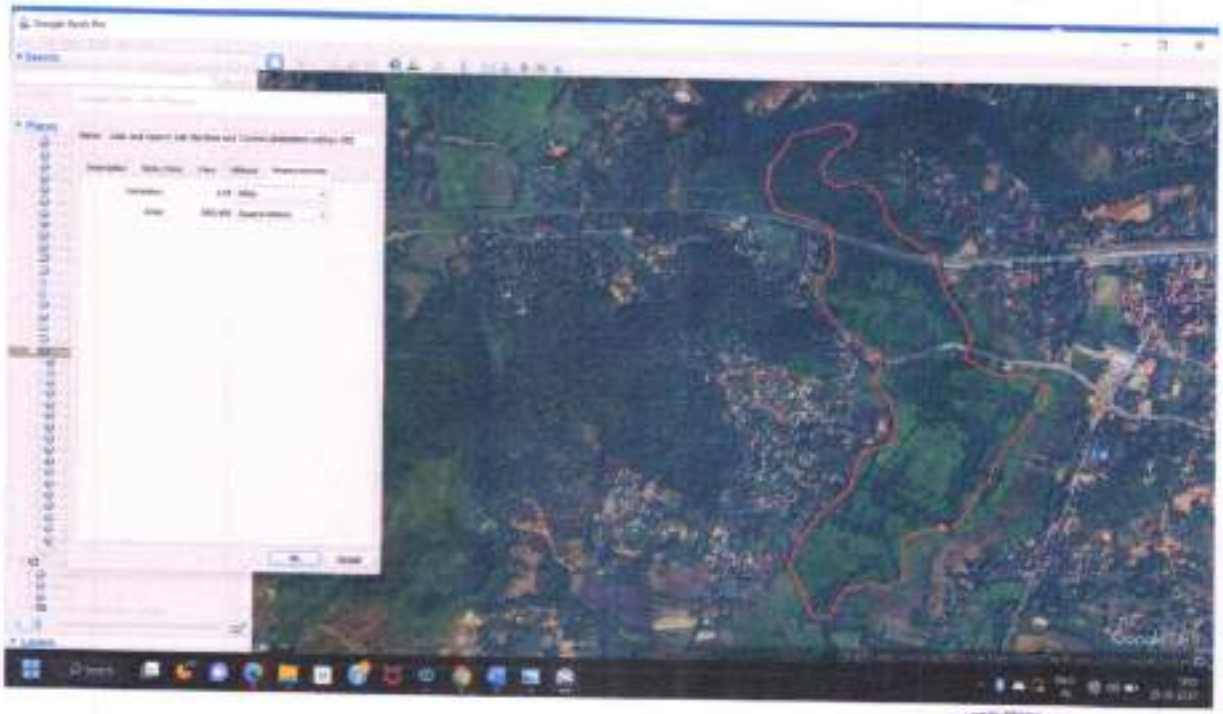


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5. CACORA & ODAR, QUEPEM



Salt marshes and coconut plantations within CRZ measuring spread over 8,00,000 sq m bearing sy nos 456 to 515, Cacora village and adjoining lands of Odar village are not demarcated



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1. MOROMBI O GRANDE, TISWADI



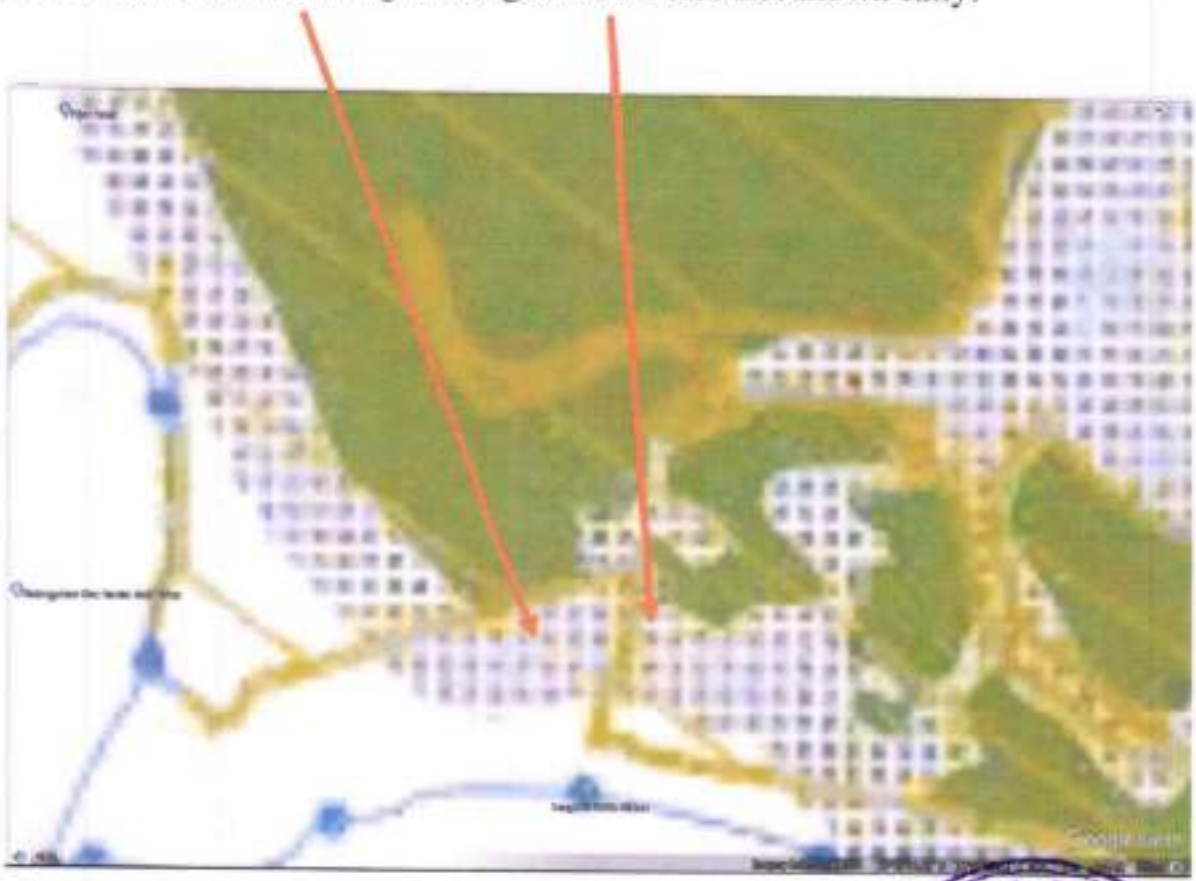
Ingress of salt water in khazan fields in sy 275/1, Morombi O Grande village



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Khazan lands are not shown where khazans are illegally destroyed in sy no 275/1, Morombi O Grande village. Mangroves are also not shown fully.



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The RP 2021 image above shows that the illegally destroyed khazan lands are mischievously demarcated by TCP Department within settlement zone.

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State Action Plan on Climate Change
for
The State of Goa
for
Period of 2020-2030

Prepared in 2019-2020

Suggested citation: Goa State Action Plan on Climate Change, 2020, by Goa State Biodiversity Board prepared through NABARD Consultancy Services (NABCONS)

Disclaimer: While all the due care has been taken in ensuring awareness and representative consultations with public, institutions, departments and other stakeholders, primary and secondary relevant research, compiling, editing and reviewing this report, the accuracy of the data included is specific for SAPCC purpose to act at policy level, while using for any other specific purpose shall require necessary validation.



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EXECUTIVE SUMMARY

Goa is a coastal state with a significant rise in land elevation from sea to 1022 m. It is one of the smallest states in the country and has a coast length of about 105km. It has very high biodiversity both on land and in the marine system. Tourism is one of the most important sectors of the Goa economy. Other important sectors are mining, fishing, and agriculture.

Climate change scenario

Goa's mean annual temperature has increased by over 1°C since the beginning of the 20th century till date (1901-2018), much of it during 1990-2018 period. The mean annual rainfall in Goa has increased by 68% over the period 1901-2015. With increasing rainfall the inter-annual rainfall variability in the state has also increased especially since 1970s. While mean annual rainfall in the state has increased, moderate to light rainfall days (IMD category I) in Goa have declined over 1901-2015 period, whereas very heavy and exceptionally heavy rainfall events (IMD category III) in the state have increased by a dramatic more than 100%.

Mean annual temperatures (model ensemble) in Goa may increase by around 2°C in 2030s compared to 1901-1950 period, and further to by around 4°C by 2080s under high emission scenarios. Goa will start experiencing heat waves (>40C) beyond the 2040s, as maximum temperature increases by about 5°C towards the century end under high emission scenarios. Minimum temperatures are expected to rise even more by up to 8°C by the century end under the high emission scenarios. The mean annual rainfall in Goa is projected to slightly decline under high emission scenarios, which under low emission scenarios is projected to slightly increase.

The flood vulnerability analysis from the state reveals that 14.73% of the land is under 15meter elevation, much of it in the coastal zones, and are severely vulnerable to flooding both from extreme rainfall events and sea-level rise. In terms of vulnerability from floods and sea-level rise the Taluks Salcete, Tiswadi, and Bardez most vulnerable.

Vulnerability to Climate Change: In the context of Goa, communities living in low lying areas, informal settlements like slum population, people with disabilities and those whose livelihood dependents mainly on khazan lands and low lying ecosystems including riparian ecosystems are in particular the immediate and most vulnerable groups. Also, four coastal taluks of Bardez, Tiswadi, Mormugao, and Salcete, house about 80% of the population and are hubs of economic activity.

It is the moderate and light rainfall events that nourish life-forms and ecosystems, whereas very heavy and exceptionally heavy rainfall events create devastation and chaos to life-forms and ecosystems. Increasing frequency of very heavy and exceptionally heavy rainfall events in Goa is one of the key impacts of climate change witnessed in the state.



Mitigation Strategy

The state of Goa does not produce power, it purchases power from NTPC power plants except for some renewable energy, based power plants like solar power plants. Thus, the direct GHG contribution of the state to national GHG inventory is not significant. Thus, the transportation sector becomes the most important sector in GHG management. Mitigation strategy has been developed for the transportation sector, demand-side energy management, agriculture, and waste sector. Priority sectors include Transport, Energy - Power sector including renewable energy, Water, Agriculture – Forest - Fisheries and allied, Environment and Waste Management Sectors.

Mitigation in the Transportation Sector

The transportation sector is the major source of emissions in Goa and has the maximum possibility for mitigation as well. Due to the large tourist population, which depends on taxis/motorbikes etc for transportation, their lies an opportunity to relook at the transportation sector from a different lens and identify options for mitigation which will also lead to decongestion and reduced pollution.

Some of the mitigation measures proposed are:

1. Development of a holistic policy for low emission sustainable transport system
2. Electric mobility policy should be developed by the state
3. Provisions should be made for non-motorized transportation in urban areas to decongest and reduce GHG emissions
4. The Goa State Subsidy for replacement of old Passenger Buses Scheme, 2001
5. Identify Alternate mode of fuel transportation in the mining area
6. Explore the possibility of using CNG instead of petrol and diesel
7. Solar power vessels for inland waterways
8. Convert existing vessels to CNG vessels (explore possibility)
9. Make adequate parking space for vehicles
10. Provide interconnected public and non-motorized system for point to point connectivity

Mitigation in the Energy Sector

The energy sector in the context of Goa primarily represents the opportunity to reduce demand-side energy consumption and explore new opportunities for renewable energy generation. Some of the mitigation measures which are underway or proposed are as provided below:

1. Power sale agreement has been executed with SECI to meet the additional 50MV wind power
2. Power is also bought from Saligao Solid Waste Treatment Plant for promoting the generation of renewable energy
3. Demand Side Management (DSM) measure, all types of conventional Street light fixtures are being replaced by high-quality efficient smart LED light fixtures under the Street Lighting National Programme (SLNP) of Government of India through Energy Efficiency Services Ltd (EESL), a joint venture of PSUs of Ministry of Power, Government of India on ESCO model.
4. Under the Deendayal Upadhyaya Grameen Jyoti Yojana (DDUGJY) installation of digital meter

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5. Jyotirmay scheme - distribution of 3 LED bulbs of 9W each to domestic households. 8.2 lakh bulbs have been distributed under the scheme
6. Goa has executed a Bipartite MoU with the Ministry of Power, Government of India and joined the "UDAY" scheme.
7. Goa Solar policy
8. Goa Wind Policy
9. Goa must explore the possibility of tidal energy and further enhance mini-hydro potential
10. Mandating periodic Energy audit to improve energy consumption and operational efficiency of all government establishments
11. Industrial energy efficiency should be promoted through BEE's programs
12. Incentivization of energy efficiency for commercial and domestic users
13. Programs to develop awareness on saving of energy
14. Training and skill development for renewable energy implementation, maintenance and energy auditors, etc.
15. Present target is 150 MW by 2022 and 300 MW of solar to be set up by 2030
16. 25 MW of renewable energy to be set up by 2030

Mitigation in the Agriculture Sector

Agriculture and allied sectors contribute to GHG emissions due to the use of machinery, water, fertilizers, etc. Inadequate, utilization of resources increases emissions. Methane is one of the main GHG's emitted in agriculture and cattle rearing activities.

Some of the mitigation measures ongoing and proposed are as under:

1. Focus initiatives to increase vermicomposting at the community level
2. Incentivize replacement of agricultural pumps with energy-efficient pumps and solar pumps
3. Sensitize farmers on optimal utilization of water to reduce pump usage and reduce water wastage
4. Incentivize optimal utilization of water pumps
5. Promoting organic manure
6. Optimal utilization of fertilizers and pesticides
7. Assist in utilization of cattle and animal waste as manure and for biogas generation
8. Promoting Biomass residue from agriculture to be used for power generation where it does not have an alternate use

Mitigation in the Environment and Waste Management Sector

Integrated coastal zone management with various interventions including restoration of bunds and sluice gates, initiatives for erosion control measures – coasts and rivers, Biodiversity conservation initiatives, Wetland conservation and restoration, bold initiatives such as ban on single use plastic, mechanism for effective system for extended manufacturers responsibility in waste sector are some of the measures in environment sector.

The first major initiative is the collection of all the plastic waste across the National Highways and the second major initiative is setting up of Solid Waste Treatment Facility one each in North Goa and South Goa.

Few important items in Goa's waste management strategy should include:

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1. Waste minimization in the tourism sector by providing alternate and bio-degradable options for tourist
2. Incentivising disposal of plastic waste by providing ride coupons or other tourist coupons in exchange for disposal or deposition of plastic waste at designated areas

Sectoral Adaptation Strategy

Water Sector

Though Goa is situated in high precipitation zones, it has one of the lowest per capita freshwater availability. The draft state water policy 2015 presents various challenges faced by the state in the utilization of the water resources. The rivers are prone to tidal variations up to 40 km inland and seasonal variation in the availability of water. Given these the key adaptation strategies for water sectors are:

1. Adaptation of water-related infrastructure
2. Development of infrastructure to reduce the impact on water availability and enhance water security
3. Developing systems for appropriate planning of water to ensure water supply to all
4. Maintenance of water resources to avoid flooding and to keep related infrastructure functional during peak events and disasters
5. Knowledge management and capacity building (Forecasting and database building)
6. Awareness Raising

Tourism Sector

Tourism is one of the most important economic sectors of the state. It receives tourists, three to four times the total population of the state.

Adaptation strategies proposed for the tourism sector are:

1. Promoting community-based agritourism
2. Inland tourism development in a climate-friendly manner
3. Tourism infrastructure climate vulnerability assessment
4. Climate proofing and disaster management for critical tourism infrastructure
5. Develop design standards for new tourist infrastructure and guide modification of existing vulnerable infrastructure
6. Enhance/modify and restructure the insurance for off-coast or water-related tourism activities and infrastructure like boats and ships which are vulnerable to climate change
7. Incentivize the use of eco-friendly, recycle/reuse in the tourism sector by facility providers
8. Single-use plastic to be banned with credible alternates in tourism activity
9. Provide extensive infrastructure and encourage the use of non-motorized transport by tourist - Develop a climate-friendly tourist mobility plan
10. Green Skill and capacity development amongst the tourist service providers
11. Environmental Clearance for large tourism projects/hotels in Goa could include climate mitigation and adaptation plan and climate disaster preparedness plan
12. RE-consider the coastal development plan or zone for new construction based on the climate predictions on sea-level rise, flooding, and erosion
13. Reducing hotspot vulnerability

Mining Sector

Mining in Goa is primarily focused on the sand and iron ore. Sand mining is directly influenced by the growth of the construction sector, does increase the sensitivity of the coastal system to coastal hazards.

Adaptation strategies for mining sector:

1. A comprehensive study of Hydro Geology of underground water to be carried out
2. Independent mining audits to ensure compliance with EIA/clearances and other parameters
3. Explore and provide treated water for mines or alternate sources
4. Resource efficiency and circular economy concept need to be incorporated into the construction sector to reduce pressure on the sand as a resource.

Agriculture and allied sector

Goa has only one agro-climatic zone i.e. West Coast Plains & Ghat Region and the state primarily depends on rain-fed agriculture. The agriculture sector is facing challenges like the decline in interest towards agriculture, Erosion of soil and deterioration of soil quality, very high labour wages, EROSION OF LOCAL GERMPLASM and introduction of GMO seeds and khazan lands.

Adaptation strategies for agriculture sector are:

- Maximizing the agricultural land utilization by including fallow land for agriculture
- Climate Research in Agriculture by the development of regional knowledge, development of climate risk indicators, acceptable coping ranges of the sector and specific crops, which are critical to improving climate risk management
- Increase overall investments in agricultural research and development.
- Technological innovation, research in agriculture will be promoted.
- Increasing farmer income through credible, certified organic farming and market connections
- Encourage education in agriculture and educate farmers
- Fisheries management to include integrating fisheries and aquaculture management into coastal zone management, to increase the coping ability of small communities to sea-level rise. Breeding fishes which can withstand higher temperatures.
- Livestock management by breeding temperature tolerant species, and providing temperature resistant livestock shelter.

The ICAR Goa would be the primary research organization which will work in conjunction with and State agriculture department. Similarly, Fisheries board, animal husbandry, and associated bodies would work together on the other aspects.

Forest and biodiversity

Goa is the smallest state with just 3702 sq. km. of geographical area is having a good forest cover with 1,225.12 sq. km of recorded Government Forest which is over 33% of the total geographical area of the State. Out of this 62% is designated as 7 Protected Areas, 6 biodiversity-rich and ecologically sensitive Western Ghats and one in Mangrove forest at Chorao island.

There is no further potential to increase the forest cover of the state, however, there is a possibility to increase the green cover and increase the quality of the forest by increasing the carbon content.

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States first biodiversity heritage site has been registered at Purvatali Rai located in Bicholim Taluka, Dedicated project on biodiversity and livelihood is initiated for 7 years duration, integrated approach for dealing with climate change for developing climate resilient models and various other initiatives are taken through biodiversity management committees constituted at local body level. Participatory process of chronicling of biodiversity and associated traditional knowledge is the scientific process adopted to understand inventory of biodiversity, ground level situation, issues associated, priority conservation focus areas with respect to biodiversity are part of initiatives of Goa State Biodiversity Board. Revival of traditional systems including proposed seed bank are initiatives proposed.

Identification and notification of wetlands in the State of Goa by Goa State Wetland Authority is a significant step towards water security, biodiversity conservation, climate resiliency and also responsible sustainable initiative.

The strategies for Goa are:

1. Enhance the forest quality
2. Restore and increase the coastal defence mechanism
3. Prepare a strategy to prevent and control forest fires
4. Afforestation and Plantation outside the forest
5. Support private forest owners in the sustainable management of their forests and derive economic benefit
6. Water and Soil conservation
7. Capacity building of field staff
8. Promote Ecotourism

Human Health

Goa has 13 government hospitals with 3000 beds and 29 community/primary health centres and 30 dispensaries. It has about 2756 beds in private hospitals [ ]. The changing climate has increased the occurrence of diseases like dengue and introduced new diseases like Kyasanur Forest Disease (KFD).

Adaptation strategies:

1. Prepare an action plan to reduce the climate change related health impacts
2. Develop an IT enabled system to inform the public on possible and actual disease outbreak
3. Study and map new and emerging diseases in the state concerning climate change
4. Prepare a heatwave action plan
5. Develop a system to predict disease outbreak
6. Assess the adequacy and resilience of health infrastructure to climate change
7. Strengthen the health infrastructure based on the assessment
8. Enhancing the knowledge skills of health workers

Habitat

62% of Goa's population lives in cities. About 80% of the state population lives in four coastal talukas of Bardez, Tiswadi, Mormugao, and Salcete. To be able to effectively meet the requirements of the growing population and economic activity in these talukas it is essential to not only prepare effective land use plan but also to provide and maintain:

- Water and Sanitation Services
- Transportation services

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- Solid waste management
- Energy demand
- Health services and health management

Adaptation strategy is as below:

1. Climate based infrastructure vulnerability assessment of critical services
2. Development of a plan for the resilience of vulnerable structure associated with critical services
3. Redesigning the regional land use planning maps of most vulnerable areas after considering climatic factors
4. Identifying measures like creating flood control gates etc. for controlling flooding events due to various aspects like the upward flow of water into the rivers
5. Development of climate-based disaster management plan
6. Implementation of the solid waste management plan
7. Enhancing internal waterways for transportation
8. Strategy to relocated/compensate and identify new means or alternate skill for the owners of khazan lands as the probability of submergence due to climate change increases
9. Identify and explore natural mechanisms like increased mangroves or sea walls etc. to guard against sea level rises.

Financial and Institutional Arrangement for Implementing the Mitigation and Adaptation strategies

The total budget required for implementing the SAPCC in Goa has been projected to be INR ₹ Rs 465.00 Crores for ten years, which works out to be ₹ 46.5 Per Annum and amounts to approximately 0.22% of Annual Budget and 0.050 % of Gross State Domestic Production (GSDP) of Goa State. The same may get revised or updated over the years, based on any additions or modifications to the SAPCC. One of the steps for mainstreaming climate change is to factor the above-identified amount annually into the state budget. A state nodal agency on climate change will be formed for the which will serve as the climate change secretariat for the State of Goa. The nodal agency shall be allocated budget or financial assistance from the state for carrying out its activities. Each of the concerned departments will appoint a nodal officer on climate change to interact and deal with the climate change secretariat.

People's participation is an essential part of the SAPCC. SAPCC provides a plan for including people from all sections of the society. The M&E framework consists of:

1. Qualitative and quantitative indicators of adaptation
2. Indicators are attempted to be as ambiguous as possible
3. Monitoring, reporting and communication process for departments and the policymakers

[1] Goa at a glance 2017-18



1. Introduction

1.1. Background

Climate change and its impacts are no longer a subject of the future. Its impacts are being evidenced globally. Extreme events causing severe impact have been evidenced in the last decade at several places. The UN High Commission on Refugees (UNHCR) has estimated that since 2009, one person every second has been displaced by a disaster as a result of climate change.

Climate change threat varies from country to country and region to region in large countries like India. India has a very diverse climate from continental to coastal, from extremes of heat to extremes of cold, from extreme aridity and negligible rainfall to excessive humidity and torrential rainfall. Nearly two-thirds of the countries annual precipitation is received through the southwest monsoon in the months of June to September in most parts of the country. Many parts of India are vulnerable to floods during the monsoons which cause significant loss of life and damage to livelihood systems, property, infrastructure, and public utilities. As per the second BUR of India, flood risk has increased significantly over India during the recent decades. India's exposure to natural hazards can be gauged from the fact that it experienced 431 major natural disasters during the period 1980-2010. The flood events of recent years in the states of Uttarakhand, Jammu & Kashmir and Kerala are examples of such disasters.

To respond to the threat of climate change in a systematic manner the government of India announced the National Action Plan on Climate Change (NAPCC) in the year 2008. NAPCC has eight missions –

- National Solar Mission
- National Mission for Enhanced Energy Efficiency
- National Mission for Sustainable Habitats
- National Water Mission
- National Mission for Sustaining the Himalayan Eco System.
- National Mission for Green India
- National Mission for Sustainable Agriculture
- National Mission for Strategic Knowledge for Climate Change

Due to large diversity in the country and the existing political and administrative structure, it is essential for the States and Union Territories, as well to understand, identify and develop state-specific responses to climate change. Hence, MoEFCC has encouraged states and UTs to develop their state action plan on climate change (SAPCC) consistent with the NAPCC.

India is a signatory to the Kyoto Protocol and is committed to the Paris Agreement on climate change. Under the Paris Agreement India has officially submitted its nationally determined contribution (NDCs) on 2nd October 2015.

As per the Paris Agreement, all signatories will attempt to limit global mean temperature within 2degree Celsius and work towards to limit 1.5degree Celsius. India has submitted its Nationally Determined Contributions (NDC) goals for post-2020 with eight different goals including three major quantifiable goals related to emission reduction, renewable energy, and forestry. The following targets form the core of India's NDC:

1. To put forward and further propagate a healthy and sustainable way of living based on traditions and values of conservation and moderation.
2. To adopt a climate-friendly and cleaner path than the one followed hitherto by others at a corresponding level of economic development.
3. To reduce the emissions intensity of its GDP by 33 to 35 percent by 2030 from 2005 level. 4. To achieve about 40 percent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030 with the help of the transfer of technology and low-cost international finance including from Green Climate Fund (GCF).
4. To create an additional carbon sink of 2.5 to 3 billion tonnes of CO2 equivalent through additional forest and tree cover by 2030.
5. To better adapt to climate change by enhancing investments in development programs in sectors vulnerable to climate change, particularly agriculture, water resources, Himalayan region, coastal regions, health, and disaster management.
6. To mobilize domestic and new and additional funds from developed countries to implement the above mitigation and adaptation actions given the resource required and the resource gap.
7. To build capacities, create a domestic framework and international architecture for quick diffusion of cutting-edge climate technology in India and joint collaborative R&D for such future technologies.

To meet the NDC's in addition to the adaptation measures, SAPCCs need to be revised and strengthened further considering the evolving context of climate science, policies, and actions.

1.2. Need for State-level action

Goa is a coastal state with a significant rise in land elevation from sea to 1022 m. It is one of the smallest states in the country and has a coast length of about 104km. It has very high biodiversity both on land and in the marine system. Tourism is one of the most important sectors of the Goa economy. Other important sectors are mining and industries, fishing, and agriculture. All the key economic sectors in Goa's economy have the potential to get significantly impacted by climate change.

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The second national inventory under the BUR report for 2014 has been submitted by India. According to the report, India emitted 2607.49 million tonnes CO2e (excluding LULUCF) and 2306.3 million tonnes CO2e (including LULUCF) in 2014. Out of the total emissions, the energy sector accounted for 73%, IPPU 8%, agriculture 16% and waste sector 3%. Land Use, Land Use Change, and Forestry sector offset about 12% of India's total emissions. GOI has taken various direct and indirect measures to reduce its emissions.

The direct contribution to India's GHG emissions is low as the state does not generate electricity and is relatively small in size and population. However, the state does have the potential to implement demand-side management measures in electricity and contribute to countries' overall effort to meet the NDC.

Goa is exposed to several climate risks like loss of land due to erosion, loss of life, livelihood, the outbreak of disease, damage to buildings, drainage, and other infrastructure. It is also exposed to sea-level rise, storms, high-speed wind, altered runoff, changed wave pattern and sea temperature in addition to the other threats like rainfall and temperature profile changes. The characteristic of states other natural and geographical features like rivers, khazan lands, soil type, and moisture and flora and fauna will result in unique or varied results in different climate scenarios.

The Canacona flash flood is one such event experienced by the state of Goa on 2nd of October, 2009. It was found that these flash floods were directly related to about 271 mm of rain that fell in a short span of 7 hours, resulting in flooding of Talpona and Galjibag Rivers. Due to continuous rainfall in the monsoon season, the soil on slopes was saturated. As a result, on steep slopes with altitude above 300 m, the cascading water led to mudslides. At altitudes of about 50 m or more, agricultural and horticultural areas were submerged and cattle were washed away. At lower altitudes (about 50 m or less), where the topography is flatter, accumulation of water submerged buildings, and as the water made its way towards the sea, the flow destroyed houses and commercial establishments, particularly those that were weak (mud houses, for example). There are no records to suggest the precedence of such a rainfall scenario in the past.

It is interesting to note that the flooding on 2 October 2009 was unprecedented in recorded history, but the total daily precipitation on that day is not. Hence, it implies that similar rainfall can have different risk profiles depending upon the month in which it occurs.

Thus, the state-specific action plan on climate change is necessary to understand and pave the way forward on climate change in the state of Goa. The present plan envisages wide coverage including priority sectors and his based on inclusive approach of planning based on extensive process of consultations.

2. Goa State Profile

2.1. Location, geography and size

The State of Goa, located between 140 53' 57''N and 150 47' 59'' N Latitudes and 730 40' 54''and 74053'11'' E Longitudes. It covers an area of 3702 sq. km. and accounts for about one percent of the total geographical area of the country. Goa was elevated to the status of the 25th State of India Union on 30th May 1987. The boundaries of the State are well defined in the north by Terekhol River which separates it from the state of Maharashtra. Western Ghats are protecting the State in the east and is bordered with the state of Karnataka and in the west, it is surrounded by the Arabian Sea.

The State consists of 2 administrative districts i.e. North Goa and South Goa, which are further divided into 12 talukas viz. Pedne, Bardez, Bicholim, Sattari, Tiswadi, Ponda, Mormugaon, Salcette, Sanguem, Dharbandoda, Quepem, and Canacona.

After attaining statehood the number of towns in the state increased from 15 to 70 and the number of villages has decreased from 407 to 334[1]. The state has 14 municipalities, 320 inhabited villages. The above is indicative of increasing urbanization in Goa and decreasing rural population. Generally speaking, the rural areas of Goa exhibit semi-urban characteristic.



Figure 1: Map of Goa

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2.2. Socio-Demographic profile

The State of Goa supports a human population of 14.59 Lakhs (Census 2011) which is about 0.12% of India's population. The average population density has increased in the last 20 years from 272 persons per sq. km to 394 persons per sq. km. The population density of Goa is higher than the national population density of 382 persons per sq. km. While the population density of Goa has increased the decennial population growth rate has reduced significantly from 26% in 1987-88 to 8.23% as per the Census 2011. The decadal growth rate of the population of the State for the decade 1991-2001 was 15.21%. Thus, indicating the overall population pressure will decrease further in the coming decades.

Table 1: Year wise Population and Decadal Growth 1900-2011

Year	Total Population	Decadal variation	Decadal growth (%)
1900	4,75,513	-9289	-1.9
1910	4,86,752	11,239	2.36
1921	4,96,494	-17,258	-3.55
1931	5,05,281	35,787	7.62
1940	5,40,925	35,644	7.05
1950	5,47,448	6,523	4.21
1960	5,89,997	42,549	7.77
1971	7,95,120	2,05,123	34.77
1981	10,07,749	2,12,629	26.74
1991	11,69,793	1,62,044	16.08
2001	13,47,668	1,77,875	15.21
2011	14,58,545	1,10,877	8.23

More than 62% of the population reside in urban areas and about 38% in rural areas. The sex ratio stands at 973 females per thousand males as against the National sex ratio of 943. As per the 2011 Census, 11,65,487 persons in the State are reported to be literate which constitutes 88.70 % of the total population. The State's workforce is about 577548, which constitutes 39.58% of the total population in the State.

Table 2: Demographic Profile of the State[1]

Item	Value	Unit
Total population	14.59	lakhs
Male	7.39	lakhs
Female	7.2	lakhs
Sex ratio (females per "000" males)	973	
Population Density	394	person per sq.km
Average household size	4.24	persons per household
Decennial growth of population	8.23	%
Urban Population	9.07	lakhs
Rural Population	5.52	lakhs
Overall Literacy Rate	88.7	%

[1] All information is as per the Census of 2011

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Overall urban Literacy	89.95	%
Overall Rural Literacy	86.65	%
Urban Women	85.56	%
Rural Women	81.63	%

2.3. Geophysical profile

The State of Goa has a hilly terrain especially on its eastern side, where lies the southern end of the Sahyadri ranges. These mountains, after skirting a considerable portion of the north-eastern and south-eastern boundaries, branch off westward across the State with many spurs and ridges. The terrain is interspersed by several rivers flowing westwards, which provide a network of internal waterways. The important rivers are Mandovi (Originates and is known as Mhadeyi in most areas along the course), Zuari, Terekhol, Chapora, Sal, Betul, Talpona, Galjibag, Cumbarjua, Valvanti, Mapusa, Sinquerim, Khandepar and Kushavati. The rivers are navigable for a total length of 256 Kms. The coast is full of creeks and estuaries formed by these rivers which provide a good shelter for fishing crafts. The 105 km long coastal line of Goa is endowed with some of the loveliest beaches in the world which have earned the frame of bearing idyllic beauty spots.

The land elevation ranges from sea level to 1022 meters. The highest point is the Wagheri hills in Sattari taluka. The natural vegetation of Goa consists of dense forest and dry deciduous to moist deciduous type. Moderately sloping lands with laterite outcrops are covered by grass and shrubs. The habitat of the flora is of semi-evergreen type. Evergreen forests are seen only on high hills. The vegetation consists of trees, shrubs, herbs climbers, sedges and grasses. The coastal tracts are namely covered by palms and mangroves. Goa receives rains from the southwest monsoons. The average annual rainfall of the State, as recorded is 2776.9 mm. The rainy season is spread over four months from June to September. Occasional thundershowers are experienced in May and October. Goa experiences a warm and humid tropical climate. The summer temperature ranges from 24°C to 36°C. In winter, the mercury hovers between 21°C to 30°C. Due to the Global Warming effect, the picture seems to be slightly changing.

Goa receives rains from the South West monsoons. The average annual rainfall of the State, as recorded is 2776.9 mm. Rainy season is spread over four months from June to September. Occasional thunder showers are experienced in May and October. Goa experiences warm and humid tropical climate. The summer temperature ranges from 24°C to 36°C. In winter, the mercury hovers between 21°C to 30°C. Due to Global Warming effect, the picture seems to be slightly changing.

Figure 2:Geographical Zones of Goa

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2.4. Economic Development of the State

The GSDP at constant (2011-12) prices for the year 2016-17 is estimated at more than INR 51,692 crore as against INR 44717 crore in the year 2015-16 (Provisional Estimates) thereby reflecting a growth of 15.60% as against 11.47% in 2015-16[3]. About 40% of the total population in Goa forms its workforce [4]. Per capita income increased from INR 3,19,827 in 2014-15 to INR 4,25,749 in 2016-17. Goa has one of the highest per capita Net state domestic product (NSDP) in the country.

The population of the State primarily depends on agriculture for livelihood. As per the economic survey 2017-18, the growth rate over the previous year under Primary Sector was negative during the period 2013-14 with -43.83 percent due to impact on the mining sector. Thereafter, in 2014-15 to 2015-16, the growth rate under the primary sector improved at 0.03 percent and 15.88 respectively. This was mainly due to the resumption in mining and quarrying activity wherein the growth rate improved from -5.35 percent in 2014-15 to 1130.60 percent in 201516. The growth rate under Secondary sector registered negative growth during the year 2013-14 reflecting -20.10 percent and thereafter improved to 56.65 percent during 2014-15 and 13.77 percent during 2015-16. The positive growth in the secondary sector continued during 2016-17 and stood at 18.36 percent. Similarly, the growth rate under the Tertiary Sector which was 3.24 percent in 2013-14, went up to 9.63 percent in 2014-15 and 7.34 percent in 2015-16. This was mainly because of the improvement in transport and financial services.

Table 3: Sector wise Percentage composition of GSDP at Current Prices (Percent)

Sector	2012-13	2013-14	2014-15	2015-16(P)	2016-17(Q)
Primary	12.54	9.86	7.29	8.20	9.26
Secondary	49.06	44.06	53.79	53.97	55.18

Tertiary	35.40	46.08	38.92	37.83	35.56
Total	100.00	100.00	100.00	100.00	100.00

2.5. Sectoral profile of State[2]

Primary Sector

Goa's primary sector mainly comprises of agriculture, forestry and fishing and mining and quarrying. For NSDP (at current price), under the sub-sector of the primary sector, Forestry and Logging has recorded the highest growth rate of 29.23 percent, followed by, Fishing and Aquaculture, Livestock and Crops with growth rates of 26.74%, 19.88%, and 13.75% respectively. The sub-sector of Mining and Quarrying have also recorded positive growth rates of 204.09% in 2016-17 as against the growth rate of 715.43% in 2015-16(P).

Secondary Sector

The sub-sectors of the Secondary sector, "Electricity, Gas & Water Supply & other Utility Services" recorded a growth of 31.47 percent followed by the sub-sector manufacturing with 23.13 percent and construction with 11.18 percent.

Tertiary Sector

Under the sub-sectors of the tertiary sector, Transport by means other than Railways recorded the highest growth of 33.44 percent followed by the sub-sectors Transport, Storage, Communication and Services related to Broadcasting (26.87 percent), Other services (16.92 percent) & Public Administration (12.50 percent).

2.6. State specific development issues

Khazan land: Some of the coastal land in Goa has been reclaimed from the inundation of the tidal waters by constructing embankments. These lands are known as Khazan lands and cover an area of about 18,500 hectares. These lands in Goa are made of saline alluvial soils. They are used for the cultivation of paddy and form an important part of Goa's agricultural profile. Khazan lands are vulnerable as any sea-level rise or intrusion of salinity upstream can harm the quality of groundwater and soil quality. During 2017-18, up to 31/12/2017 under the State Sector, about 750 ha of Khazan paddy land have been protected and about 1.94 km of long bunds are repaired. The state has incurred an expenditure of INR 75.64 lakh on account of this work.

Drifting Occupations: Tourism has become a major industry in Goa and attracts domestic and foreign tourists from all over the globe. It, directly and indirectly, employs about one-third of the state's population. Due to alternate. As Goa has a high literacy rate and alternate options of income are available, the state is witnessing a drift from agriculture. Eventually, leading to agriculture being a secondary source of income, instead of the primary source. It poses a unique challenge for the state where due to economic prosperity the inherent knowledge on agriculture and agrobiodiversity of the state is likely to be lost.

[2] Economic Survey of Goa 17-18

Potential Threat to Biodiversity and Agriculture due to changing trends: Genetically modified organisms and crops (GMOC) are also a cause of concern for the State as the impact of the introduction and mainstreaming of these are yet to completely understood. Most of the agriculture and allied activities in the State are at subsistence level and completely synchronized with the natural system. The introduction of GMOC may threaten the age-old system and might shift the balance from self-sustaining to industry dependant, intensive input-based agriculture.

Power Dependency: Goa does not produce any power and is dependent on NTPC plants in other states for supply of power whereas demand for power due to increased urbanization, industrialization, a boom in construction activity, commercialization, consumerism is constantly increasing. It is a serious issue that plagues the State of Goa.

Illegal and Non-compliance in Mining Sector: In all, 38 Mining Leases are in operation during the current year (till December 2017) which have reported production of Iron ore to the tune of 6.08 million Tons. Due to rampant illegal mining, several sectors in the State like water, biodiversity, and environment were getting impacted. Rash and careless driving in and around the mining area increases accidents. To curb the impacts a ban was imposed on mining activities during the year 2013-14, which has been lifted in subsequent years with the more stringent implementation of laws. However, the problem continues to concern the development of the state.

- Effective implementation of CRZ rules for new development in areas sensitive to subsidence. Effective ICZMP plan and its execution by GCZMA and Dept. of Environment.
- Bund restoration, khazan land rejuvenation, riverine ecosystem restoration etc.

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3. Process of Development of SAPCC

3.1. Guiding Principle in development of SAPCC

Common guidelines and principles have been developed by the Ministry of Environment, Forest and Climate Change (MoEFCC) to be followed by all States and Union Territories in India. This SAPCCC of the State of Goa is also based on these fundamental guidelines and principles of MoEFCC as mentioned below:

a) SAPCCs should be a policy document of the States/UTs outlining the major initiatives and strategies reflecting the commitments and proposed actions in the state to tackle the vulnerabilities and impacts of climate change across the socio-economic sectors. It should reflect the policy directions and strategies of the state for climate actions.

b) It should envisage inclusive, sustainable and climate-resilient low carbon development pathways, with a focus on climate change adaptation and mitigation within the key sectors in the States/UTs and should protect the poor and vulnerable sections of society from adverse effects of climate change.

c) It should take into account recent scientific assessments and projections on global warming; vulnerability; and impacts. Climate models and high-resolution downscaled projections must be considered while assessing the vulnerability and preparing sectoral adaptation plans.

d) It should synergize with the goals of NDCs under the Paris Agreement, though the targets under NDCs are national targets. It should also contribute towards achieving other development goals including Sustainable Development Goals (SDGs). SAPCC should also complement prevalent national development and policy initiatives inter alia National Forest Policy, Biodiversity Goals, National E-Mobility Programme, Swatch Bharat Mission to reap greater developmental co-benefits.

e) It should highlight the links with national missions related to climate change. It should bring out climate actions of the state government from their own sources, over and above the Government of India schemes.

f) The SAPCC should also be built on the evolving socio-economic development context and priorities of the state.

g) SAPCCs should integrate and mainstream climate change concerns in the different sectors and policies/programs of the States in alignment and consistent with the existing schemes and programs within the states/UTs.

h) It can strengthen existing climate action measures as well as launch new initiatives in their priority sectors.

i) The period of the implementation of SAPCCs should start with the implementation cycle of NDCs i.e. 2021-2030 and beyond.

j) Financial resources required for the implementation of the action plan primarily to be leveraged from the existing budget of the State Governments and convergence with the relevant schemes and programs. The SAPCC should also bring out the likely funding from State's own resources over and above from the ongoing schemes and programs of Govt. of India.

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k) It should set out the institutional mechanism for implementation including stakeholder engagement ensuring inclusiveness along with the mechanism for capacity building and monitoring and evaluation with clear indicators for reporting.

3.2. Process of development

SAPCC has been developed in line with MoEFCC guidelines through a structured multi-stakeholder consultative approach. The state of Goa has formed a State Level Steering Committee group, which is responsible for the development of SAPCC. Identification of key departments, research organization and other stakeholders especially from the State of Goa and to engage and receive their feedback and inputs for the SAPCC is the responsibility of the State Level Steering Committee group.

Figure 3: Key Activities in development of SAPCC as defined by MoEFCC



The State Governing Council

The State Governing Council shall be the decision-making authority in terms of the implementation of SAPCC.

Sr. No.		Designation
1.	Hon. Chief Minister	Chairperson
2.	Hon. Minister for Environment and Climate Change	Vice-Chairperson
3.	Chief Secretary	Member *(Ex-Officio)*
4.	Secretary, Department of Environment	Member *(Ex-Officio)*
5.	Secretary, Department of Science and Technology	Member *(Ex-Officio)*
6.	Secretary, Goa Energy Development Agency	Member *(Ex-Officio)*
7.	Secretary, Department of Power	Member *(Ex-Officio)*
8.	Secretary, Water Resource Department	Member *(Ex-Officio)*
9.	Secretary, Department of Agriculture	Member *(Ex-Officio)*
10.	Secretary, Department of Transport	Member *(Ex-Officio)*
11.	Secretary, Department of Forest	Member *(Ex-Officio)*
12.	Secretary, Department of Health	Member *(Ex-Officio)*
13.	Member Secretary, Goa State Biodiversity Board	Nodal Officer for Secretariat

Simultaneously, the Steering Committee for the SAPCC has also been formulated at the State level to ensure appropriateness and coherence of the SAPCC with the state's vision and guidance. The State Steering Committee for SAPCC is headed by Chief Secretary.

Table 4: State Steering Committee for SAPCC

State Steering Committee Members	**Department/Organization/ Designation**
Chief Secretary	Chairperson *(Ex-Officio)*
Secretary (Environment)	Member *(Ex-Officio)*
Chief Secretary (Forest)	Member *(Ex-Officio)*
Secretary (Agriculture)	Member *(Ex-Officio)*
Secretary (Health)	Member *(Ex-Officio)*
Secretary (Renewable Energy Source)	Member *(Ex-Officio)*
Chief Secretary (Transport)	Member *(Ex-Officio)*
Secretary (Disaster Management)	Member *(Ex-Officio)*
Under Secretary (Finance)	Member *(Ex-Officio)*
Director, Department of Agriculture	Member *(Ex-Officio)*
Director, Department of Fisheries	Member *(Ex-Officio)*
Director, Department of Animal Husbandry and Veterinary Services	Member *(Ex-Officio)*
Director, Directorate of Health	Member *(Ex-Officio)*
Director, Directorate of Transport	Member *(Ex-Officio)*

Director, Department of Science and Technology	Member *(Ex-Officio)*
Chief Engineer, Water Resources Department	Member *(Ex-Officio)*
Principal Chief Conservator of Forests, Forest Department	Member *(Ex-Officio)*
Member Secretary, Goa State Pollution Control Board	Member *(Ex-Officio)*
Member Secretary, Disaster Management Cell	Member *(Ex-Officio)*
Member Secretary, Goa Energy Development Agency	Member *(Ex-Officio)*
Dean, Marine Science Department, Goa University	Member *(Ex-Officio)*
General Manager, NABARD or his/ her nominee	Member *(Ex-Officio)*
The Member Secretary, Goa State Biodiversity Board	Nodal Officer
Director, Department of Environment	Convenor *(Ex-Officio)*

To develop the SAPCC following activities were carried out:

a) Extensive stakeholder consultation
b) Data collection from departments
c) Secondary data collection through desk review and research
d) Climatic modelling for future projections
e) Data analysis using appropriate tools for vulnerability assessment

3.3. Stakeholder Consultation Process

Climate change in an interdepartmental topic and requires understanding, coordination, and implementation by various departments and stakeholders in the state. Two key types of consultations were conducted for the development of SAPCC:

1. Individual-level consultation with concerned departments, institutes, and organizations
2. Group stakeholder consultations at various locations with stakeholders from all sections of the society i.e. institutes, NGOs, local community representatives, etc.

Stakeholder feedback through structured feedback form during the consultation. Additionally, an email ID was created to receive feedback from stakeholders over 10 days during the consultation period.

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Figure 4: Stakeholder consultation process adopted

The **objective** of departmental stakeholder consultations was to understand from the departments their activities, policies, budget, resources, and plans for the state. These consultations also provided an understanding of the gaps in understanding climate change, actions that were aligned to climate change and the constraints that could be faced due to climate change and in the implementation of climate adaptation and mitigation strategies and interventions for the state.

Stakeholders consulted during the stakeholder consultation process and the public stakeholder consultation are provided below:

Table 5: Stakeholder Consultation for Development of SAPCC

Stakeholder consultation date and venue	**Stakeholder types consulted**
21/03/2017; Crown Hotel, Panaji	Members of State Level Steering Committee
28/11/2017; Hotel Orion, Panaji	Members of State Level Steering Committee and core committee members
05/11/2019; Goa International Centre, Dona Paula	Biodiversity Management Committees of North Goa
06/11/2019; Goa International Centre, Dona Paula	Biodiversity Management Committees of South Goa
07/11/2019; Goa International Centre, Dona Paula	Experts from various fields Scientists from NIO, officers from various departments, researchers from Goa University, etc
Questionnaire for climate change was circulated and inputs were compiled accordingly	General Public
Finalized SAPCC to be further presented for approvals and necessary modifications	

3.4. Key stakeholder feedback

Feedback received through group-level stakeholder consultations has been summarized below to reflect the stakeholder understanding of climate change, impacts experienced and their views on the response measures needed for climate proofing the State of Goa.

a) Awareness on Climate Change

Overall understanding and awareness on climate change issues were high amongst the stakeholder groups. Stakeholders have described it as a very important topic for mankind. According to the stakeholders, climate change affects every human being along with the flora and fauna on a very. The impact of climate change is significant and will continue to increase. They have emphasized the need to start preparing and planning on tackling the issue immediately to avoid a major disaster. They have emphasized on the need to develop strategies and implement at the local level to conserve the existing biodiversity. Information on weather-related warnings is received through the internet and news. Stakeholders described temperature rise, variation in rainfall, the intrusion of the sea as some of the observed climate change phenomena in Goa.

b) Impacts of Climate change experienced by stakeholders

i. Changes in ecosystem observed due to pollution and climate change

a. Some of the examples of these changes expressed by stakeholders are the disappearance of some of the bird species like sparrow and parrot, quality of fish harvested from the capture fisheries, invasive fish species leading to biodiversity erosion, decrease in shellfish at the coast and decrease in insects.

ii. Changes due to change in rainfall patterns and other non-climatic stressors

a. Some of the changes cited by stakeholders are drying up of water bodies (like wells and lakes) during summer leading to agricultural loss, over usage of groundwater to serve commercial utilities.

iii. Altered monsoon pattern or sequence has been observed

iv. Health issues due to change in the ecosystem and climate change

a. There has been an increase in vector-borne diseases and various allergies like cold, bronchitis, asthma, bird flu, swine flu, etc. An example expressed during stakeholder consultation was a reduction in the breeding of frogs, which has led to an increase in mosquitoes. This further increases diseases like Malaria, Filaria, Dengue and many more.

v. Changes due to temperature and other stressors

a. Some of the examples are eutrophication of water bodies, occurrences of harmful algal species from some of the estuarine systems of Goa suggesting water quality deterioration, unusual shortage of water or good quality of water over the years

vi. Impact of Land use change

vii. Land-use change has been expressed as a concern that leads to the destruction of forest and mangroves on a large scale and it also impacts agricultural land

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viii. Rainfall quantum and intensity has changed

a) A daily commuter is impacted by flooding causing inconvenience in daily activity, overflow of sewers due to the high intensity of rains. Infrastructure most impacted due to weather events are road infrastructure, public health, power availability, food type and quality, internet and telephone connectivity. A specific example of waterlogging of roads near the creek area of Jorda, cultivated fields were cited.

Sea level rise and associated problems of bund breaching and need for restoration of khazan lands

It was expressed that sea level rise has been experienced in some areas which has led to soil erosion, impacted access to sea beaches, disappearance of sea shells and fishes. Flooding of Khazan lands was specifically expressed as a concern while water level in creeks like those at Tarda was also reported to have increased.

Specific observation and concern

The **TENANTS ASSOCIATION OF CAMARCASANACHO BUNDH** ward no. 8 of Camarkazana, Acoi, Bilou and Peddem has a huge stretch of river which connects to the Arabian sea through the river Mandovi. This ward lies at the lowest point in the whole of the Mapusa City/Aldona Constituency and therefore finds itself to be vulnerable and susceptible to the ongoing climate change and the increase of the sea level.

b) Response for Climate Proofing Goa

Community involvement: Generally, the stakeholders have expressed a need to involve every citizen in the implementation of climate change response by increasing the awareness level of citizens on climate change. While the stakeholders also expressed the need for government to take overall responsibility on developing and executing strategies to combat climate change, considering the local experiences and practices.

A strong need was expressed to create awareness amongst the citizens on the impacts and actions needed from every individual by introducing the topic in school and college syllabus.

It was also emphasized that creation of a Task Force for Climate Change to monitor the effects of climate change involving the local communities should be considered by the government. Such communities can assist to oversee that the laws/activities identified for combating climate change are enforced in the State of Goa. It would help the Government of Goa and People of the State to be better prepared. Citizen mascots can also create awareness amongst communities on climate change action. Youth mascots were also recommended.

One of the measures suggested was regular meeting by concerned departments with the people affected due to climate change and to involve citizens in climate change activity to increase citizen sensitivity and generate positive attitude towards biodiversity and climate friendly practices

c) Other proposals

i. Reduction of pollution and decreasing deforestation and increasing the forest cover through afforestation, improving mangrove management, protection of trees through base mapping
ii. The *Manos* or the embankments along the Border of our Rivers require immediate repaired, and strengthening to withstand the rising Sea levels.
iii. Timely dredging of rivers to be undertaken
iv. To reduce pollution and GHG emissions garbage burning should be stopped, buses older than 15 years should be banned, availing public transport should be encouraged
v. Barriers to avoid water logging of agriculture fields
vi. Revival of community resource systems, enhancing resource management and reducing consumption was also emphasised
vii. Do not link rivers to de-risk
viii. Enhancing in ground water protection
ix. Imposition of heavy fines on violators
x. Illegal mining to be stopped and development activities in eco-sensitive zones as well should be stopped including cutting of hills and land filling with debris
xi. Planting more trees
xii. Protection of water resources through harvesting water, preventing excessive supply of water through tankers
xiii. Using products that generate less heat
xiv. Local bodies to have plan of action – develop models which will enable hands-on learning in our State itself was expressed.



4. Climate Change in Goa: Observations and Projections

Due to the build-up of greenhouse gases (GHGs) in the atmosphere, global temperatures are rising. The atmospheric CO2 concentration has increased from 285 ppm during pre-industrial times (mid 1700s) to ~410 ppm in 2019. In response to this GHG build-up, the global mean temperatures have already risen by about 1°C compared to pre-industrial times (Met Office, 2015). Indian sub-continent is also experiencing rapid warming particularly since 1980s. As per IMD (2019) analysis, the annual mean temperature during 1901-2018 period showed an increasing trend of 0.6°C/100 years. As per IMD (2019) assessment significant increasing trend was seen in maximum temperature (1.0°C/100 years), and relatively lower increasing trend (0.2°C/100 years) in the minimum temperature over India.

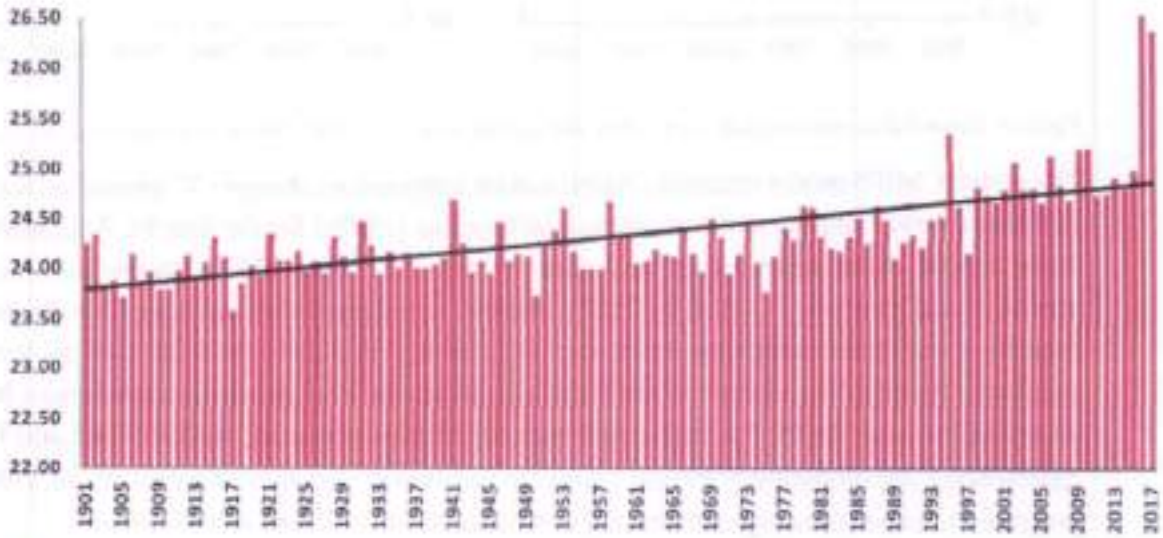


*Figure 5: **Observed temperature change (in Deg C) in India (Source: IMD, 2019)***

As GHG build-up is project to further rise in the 21st century, future temperatures are expected to rise even further. It is agreed by the scientific community that global temperatures should be capped below 1.5 – 2°C, which creates the dangerous threshold for climate change. The Paris Agreement aims to limit warming below these levels. At all India level Chaturvedi et al 2012 project that "under the *business as usual* (between RCP6 and RCP8.5) scenario, mean warming in India is likely to be in the range of 1.7 to 2°C by 2030s and 3.3 to 4.8°C by 2080s relative to pre-industrial times", further it was project that "all India precipitation under the *business as usual* scenario is projected to increase from 4% to 5% by 2030s and from 6% to 14% towards the end of the century (2080s) compared to the 1961-1990 baseline".

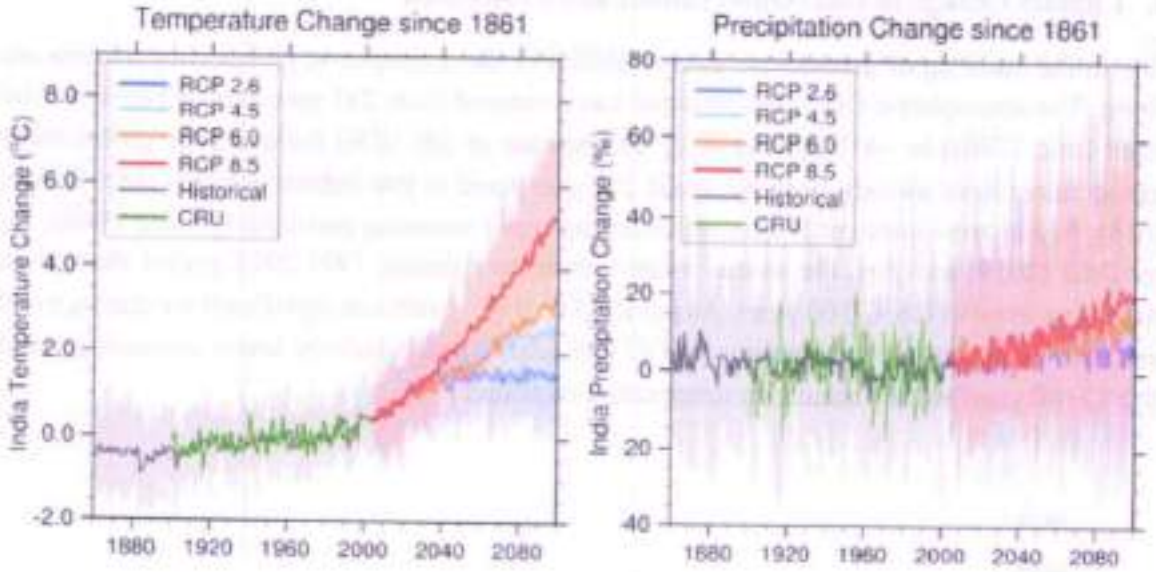


Figure 6. National level projections for temperature and rainfall in the 21st century (based on Chaturvedi et al 2012)

The global CMIP5 model ensemble-based annual temperature change (°C) projected for 2030s, 2060s and 2080s relative to the pre-industrial baseline (1880s) for the four RCP scenarios. All-India annual mean temperature increases by 1.7–2.02°C by 2030s under different RCP scenarios and by about 2–4.8°C by 2080s, relative to the pre-industrial base. The above figure projects a consistent warming trend over the country in short-, mid- as well as long-term scenarios. As expected in each of the three time slices RCP2.6 generally experiences the least warming, whereas RCP8.5 is associated with the highest warming, with RCP4.5 and RCP6.0 representing the moderate warming scenarios. Generally, the northern part of the country is projected to experience higher warming compared to the southern counterpart.

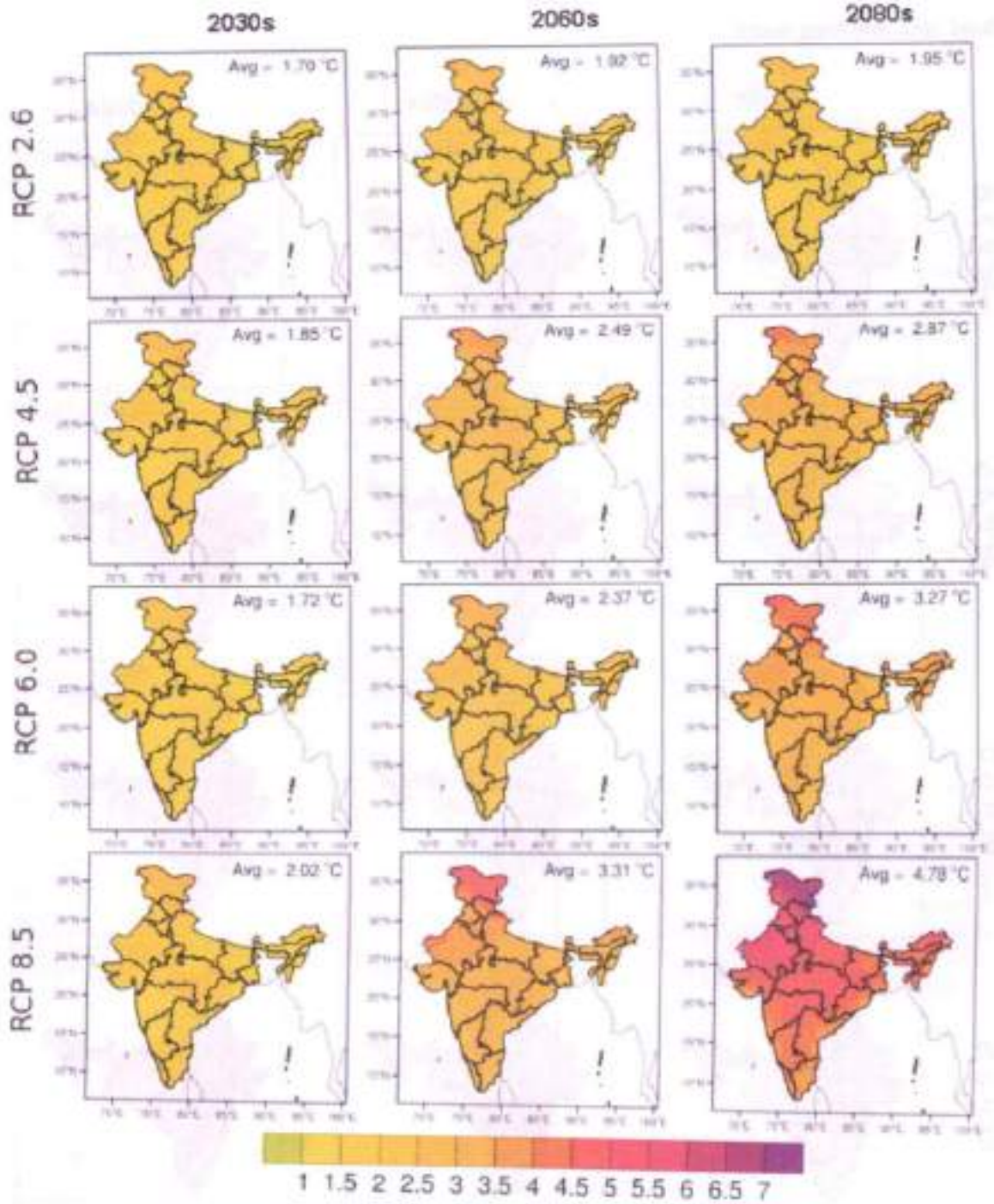


Figure 7: CMIP5 model ensemble mean temperature change (°C) projected for 2030s (2021-2050), 2060s (2046-2075) and 2080s (2070-2099) relative to the pre-industrial period (1880s i.e over 1861-1900)

Figure 7 shows the CMIP5 model ensemble-based annual precipitation change (%) projected by 2030s, 2060s and 2080s respectively, compared to the pre-industrial base- line (1880s) for the four RCP scenarios. All-India annual precipitation increases by 1.2–2.4% by 2030s under different RCP scenarios and by 3.5–11.3% by 2080s, relative to the pre-industrial base. Precipitation is projected to increase almost all over India except for a few regions in short-term projections (2030s). As noted in the temperature trends in each of the three time slices, RCP2.6 experiences the least increase in precipitation, whereas RCP8.5 experiences the highest precipitation increase, and the precipitation changes are larger for each subsequent period (i.e.

short, mid and long term)

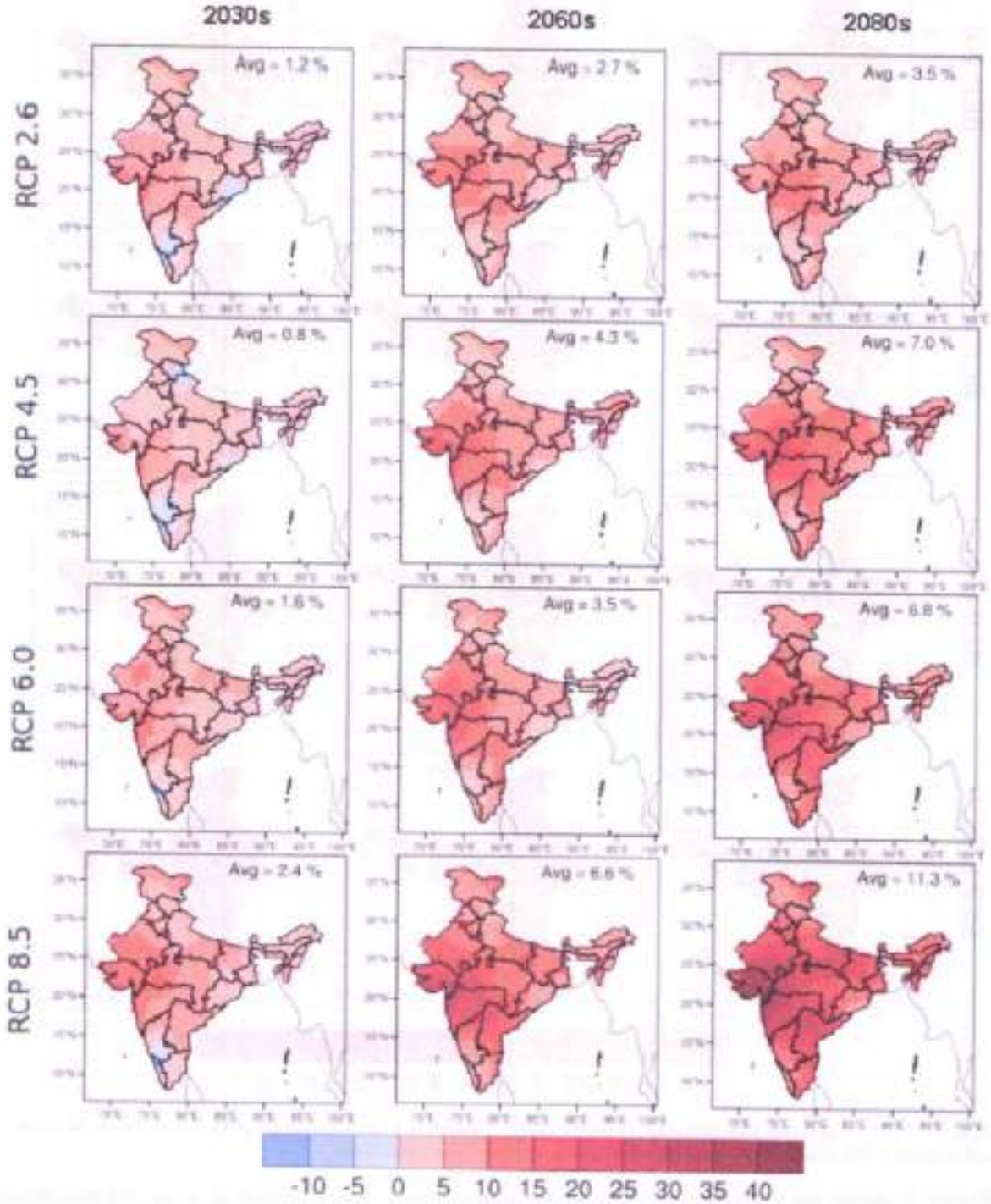


Figure 8: CMIP5 model ensemble mean precipitation change (%) projected for 2030s (2021-2050), 2060s (2046-2075) and 2080s (2070-2099) relative to the pre-industrial period (1850s i.e over 1861-1900) (Source: Chaturvedi et al 2012)

For Goa, state climate change projections are not available. Thus, climate projects and past climate analysis has been carried out for the SAPCC. Following is achieved by this analysis and presented in this chapter:

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1. Updated long-term climate profile for the Goa state based on the 1951-2014 period as per revised IMD methodology
2. It investigates as to what extent changes in mean and extreme climate occurred in the State of Goa during the period of 1901-2015
3. Investigates climate projections in Goa in the 21st century based on high resolution regional climate models.
4. Assesses the relative vulnerability of different parts of Goa to inundation and floods

Methodology

For the purpose of all analysis carried out in this chapter, including the analysis of climate profile, observed climate change trends as well as climate change projections, are carried out using this map.



Figure 9: Taluk Map of Goa for climate modelling

Observed gridded climatology data for temperature and rainfall is obtained from India Meteorological Department, Government of India (Pai et al 2014) and the Climate Research Unit (CRU) of East Anglia, UK (Harris et al 2014). IMD provides gridded temperature data at a resolution of 1°X1°, which roughly translates into 100 Km in length and 100 Km in width, meaning a single pixel in the IMD covers an area of about 10,000 Sq. Km. Goa state on the other hand is 105 Km in Length and 65 Km in width, and has an area of 3,702 Km^2, which means any given IMD pixel will atleast have 63% of its area outside the Goa state and most probably much of it may lie in the neighbouring ocean which will have a sharp temperature gradient. Hence, it is decided that the coarse IMD observed temperature dataset may not be appropriate for assessing the observed climate change in Goa's landmass. This analysis uses observed temperature dataset as provided by the Climate Research Unit (CRU) of East Anglia,

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UK (Harris et al 2014) for the analysis of temperature profile in the state as well as assessing the changes in temperature in the state over the period 1901-2018. CRU dataset (Harris et al 2014) is available at a spatial resolution of 0.5°X0.5°, and for a time period of 1901-2018. Gridded rainfall data from IMD is available at a much finer spatial resolution i.e. 0.25°X0.25° (Pai et al 2014). This high resolution observed rainfall dataset (1901-2015) is used for the analysis of rainfall profile of the state as well as for assessing the changes in observed rainfall in the state over the period 1901-2015.

In order to project climate in the 21st century, the scientific community has developed a set of new emission scenarios termed as Representative Concentration Pathways (RCPs) (http://www.iiasa.ac.at/web-apps/tnt/RcpDb/dsd?Action=htmlpage&page=welcome). There are four RCP scenarios: RCP 2.6, RCP 4.5, RCP 6.0 and RCP 8.5 – these scenarios are formulated such that they represent the full range of stabilization, mitigation and baseline emission scenarios available in the literature. The naming convention reflects socio-economic pathways that reach a specific radiative forcing by the year 2100. For example, RCP 8.5 leads to a radiative forcing of 8.5 Wm^{-2} by 2100. While four RCP scenarios are available, we have used the RCP scenarios of RCP4.5 and RCP8.5. These are briefly described in table below.

Table 6: Description of RCP scenarios

RCPs	Description	Developed by
RCP 4.5	It is a stabilization scenario where total radiative forcing is stabilized before 2100 by employing a range of technologies and strategies for reducing greenhouse gas emissions.	MiniCAM modeling team at the Pacific Northwest National Laboratory's Joint Global Change Research Institute (JGCRI) (Wise et al., 2009)
RCP 8.5	The RCP 8.5 is characterized by increasing greenhouse gas emissions over time representative for scenarios in the literature leading to high greenhouse gas concentration levels.	MESSAGE modeling team and the IIASA Integrated Assessment Framework at the International Institute for Applied Systems Analysis (IIASA), Austria; (Riahi et al., 2007)

Climate projections for the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) are made using these newly developed representative concentration pathways (RCPs) under the Coupled Model Inter-comparison Project 5 (CMIP5). More than 50 CMIP5 model outputs are now available from different climate modelling groups. Since CMIP5 models outputs are available at coarse resolution, in order to facilitate local and regional adaptation planning Co-Ordinate Regional Downscaling Experiment (CORDEX) was carried out. In India Indian Institute of Tropical Meteorology, Pune hosted these experiments and have since provided multiple dynamically downscaled high resolution climate model projections for the South Asian domain, including India. It is desirable that CORDEX South Asia model

projections are used for State Action Plan on Climate Change (SAPCC). The cordex south asia models presented in the table below have been downloaded and evaluated for these projections.

Table 7: Evaluated CORDEX South Asia models for this report

Model Name	CORDEX SA RCM	Contributing CMIP5 Modeling Center	Model Resolution (in Km)
ACCESS1-0	CCAM	CSIRO, Australia	50*50 Km
CCSM4	CCAM	National Center for Atmospheric Research (NCAR), USA	50*50 Km
CNRM-CM5	CCAM	Centre National de Recherches Me´te´orologiques (CNRM), France	50*50 Km
MPI-ESM-LR	REMO2009	MPI-M, Germany	50*50 Km
GFDL-CM3	CCAM	National Oceanic and Atmospheric Administration (NOAA)	50*50 Km
MPI-ESM-LR	CCAM	Max Planck Institute for Meteorology (MPI-M), Germany	50*50 Km
NorESM1-M	CCAM	Norwegian Climate Centre (NCC), Norway	50*50 Km
LMDZ4(IPSL)	RegCM4-11	CCCR, IITM, India (Not a CMIP5 contribution	35*35 Km
EC-EARTH	RCA4	Irish Centre for High-End Computing (ICHEC), European Consortium (EC)	50*50 Km

However, since the regional climate projections data from most of the models is incomplete/ truncated, the following CORDEX south asia models for which full time-series till 2100 is

available for at least the two climate scenarios of RCP 4.5 and RCP8.5: Access 1.0, CCSM4 and MPI-ESM-LR.

Spatial Downscaling: Goa is a small state, hence even the dynamically downscaled climate projections at 0.5X0.5 resolution are not adequate for the analysis of the spatial variability in climate. Hence, spatial downscaling techniques are employed to improve the climate projection datasets. Temperature component of the climate model projections which are available at a spatial resolution of 50*50 Km, is downscaled to very high resolution using the elevation adjusted bias correction method (Gerlitz et al 2014). Whereas, rainfall projections (available at 50*50 Km resolution) are downscaled using the high resolution gridded observed rainfall datasets as provided by IMD to 0.25°*0.25° resolution. Downscaling method as well as results of this analysis are described in *Vignesh et al (in preparation)*.

In order to analyse the flood and inundation risk and vulnerability in Goa under current climate as well as under future climate, high-resolution digital representation of orography based on SRTM Digital Elevation Model (DEM), published by the CGIAR-Consortium for Spatial Information (http:// srtm.csi.cgiar.org), with a cell size (spatial resolution) of 90 m, is used (Farr et al.2007, Reuter et al. 2007).

Temperature Profile in Goa:

Below shows the mean annual temperature map of Goa over the long-term period of 1951-2014. Methodology and data source for this figure is described in Venkateswaran and Chaturvedi (in Preparation). Mean temperature in Goa is found to be 26.70C, which is higher than the national average annual temperature is about 23.3C (Chaturvedi et al 2012). While spatial temperature variability is not high in goa, hilly areas in the eastern parts of the state are generally cooler than the coastal areas in the west.

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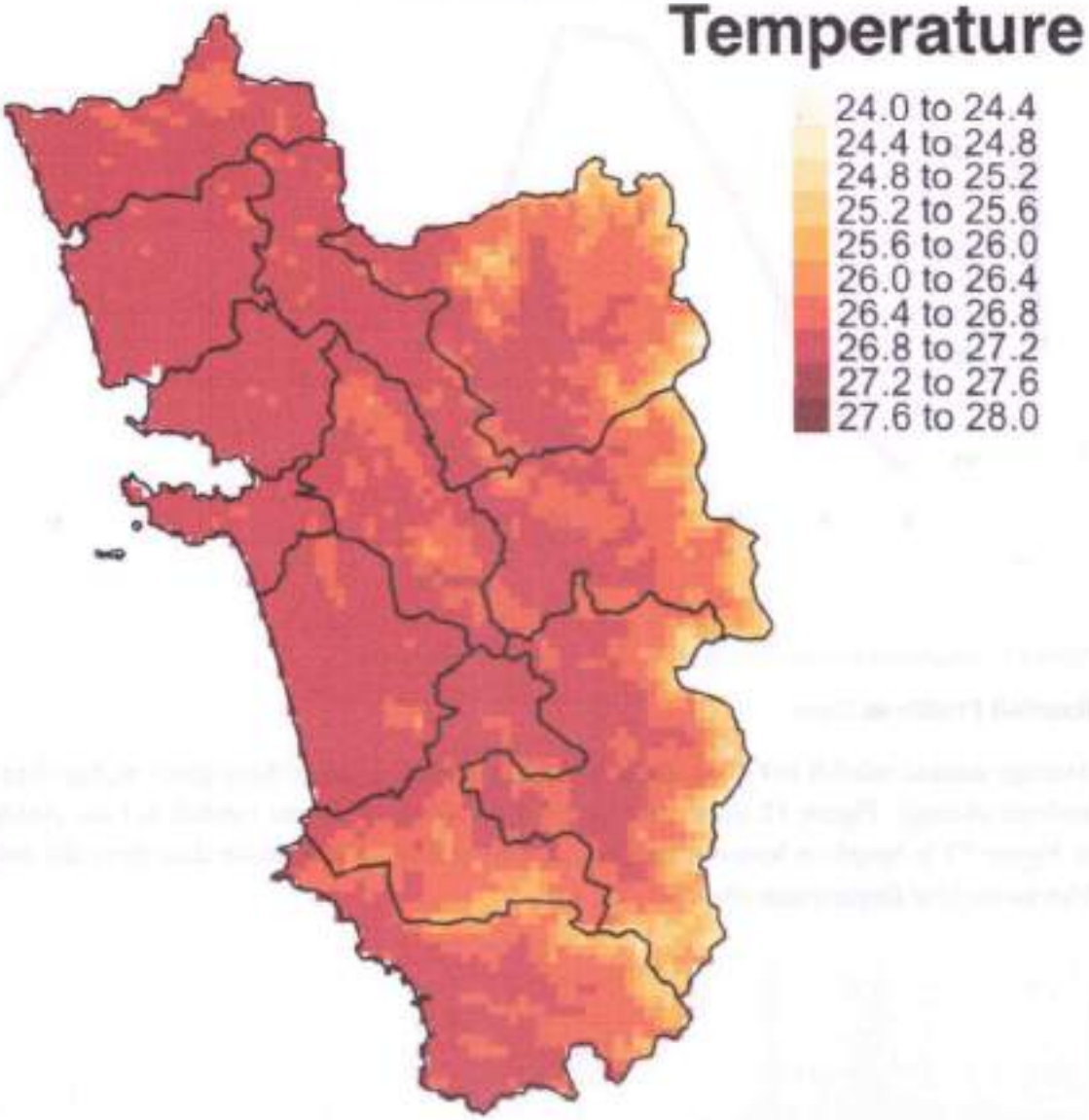


Figure 10: Long period average (1951-2014) spatial distribution of mean temperature (deg C) in Goa

Goa experiences a hot summer (April- June) followed by pleasant monsoon (June-September) season, temperatures temporarily rise again in the month of October, following pleasant winter months (November to March). Figure 11 shows the seasonal and monthly mean monthly temperature profile in the Goa based on the long-period mean temperature average over the period 1951-2014.

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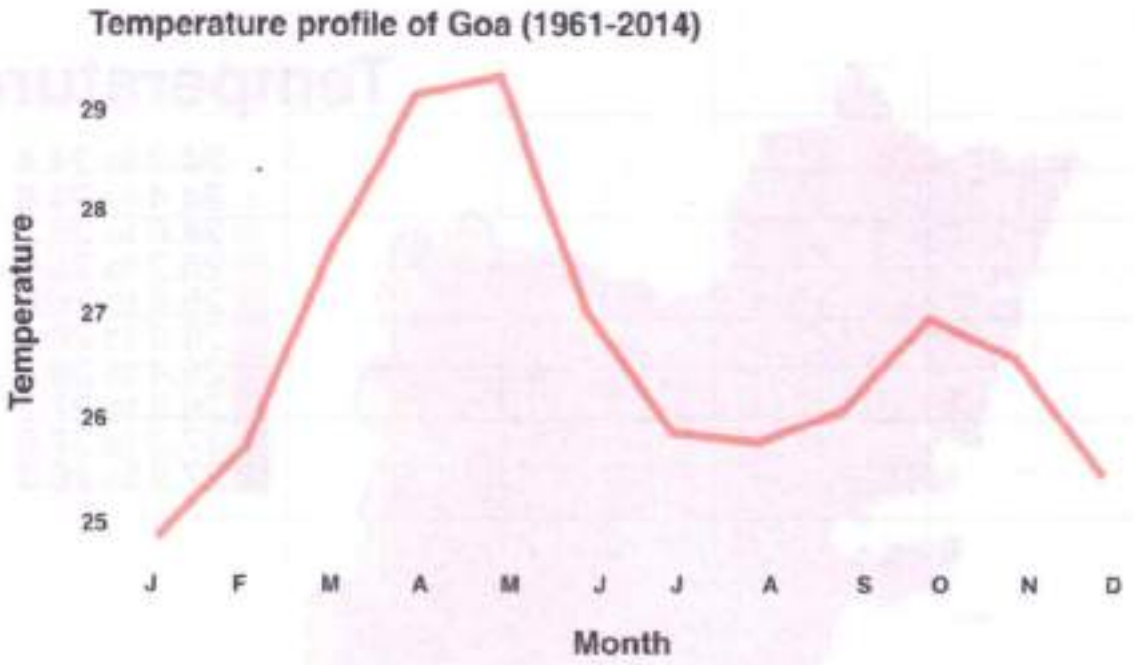


Figure 11: Long-period average (1951-2014) annual temperature profile in Goa

Rainfall Profile in Goa:

Average annual rainfall in Goa is about 3000 mm, which is about three times higher than the national average. Figure 12 shows the spatial distribution of annual rainfall in Goa. Analysis in Figure 13 is based on long-period (1951-2014) gridded precipitation data from the Indian Meteorological Department (Pai et al. 2014).

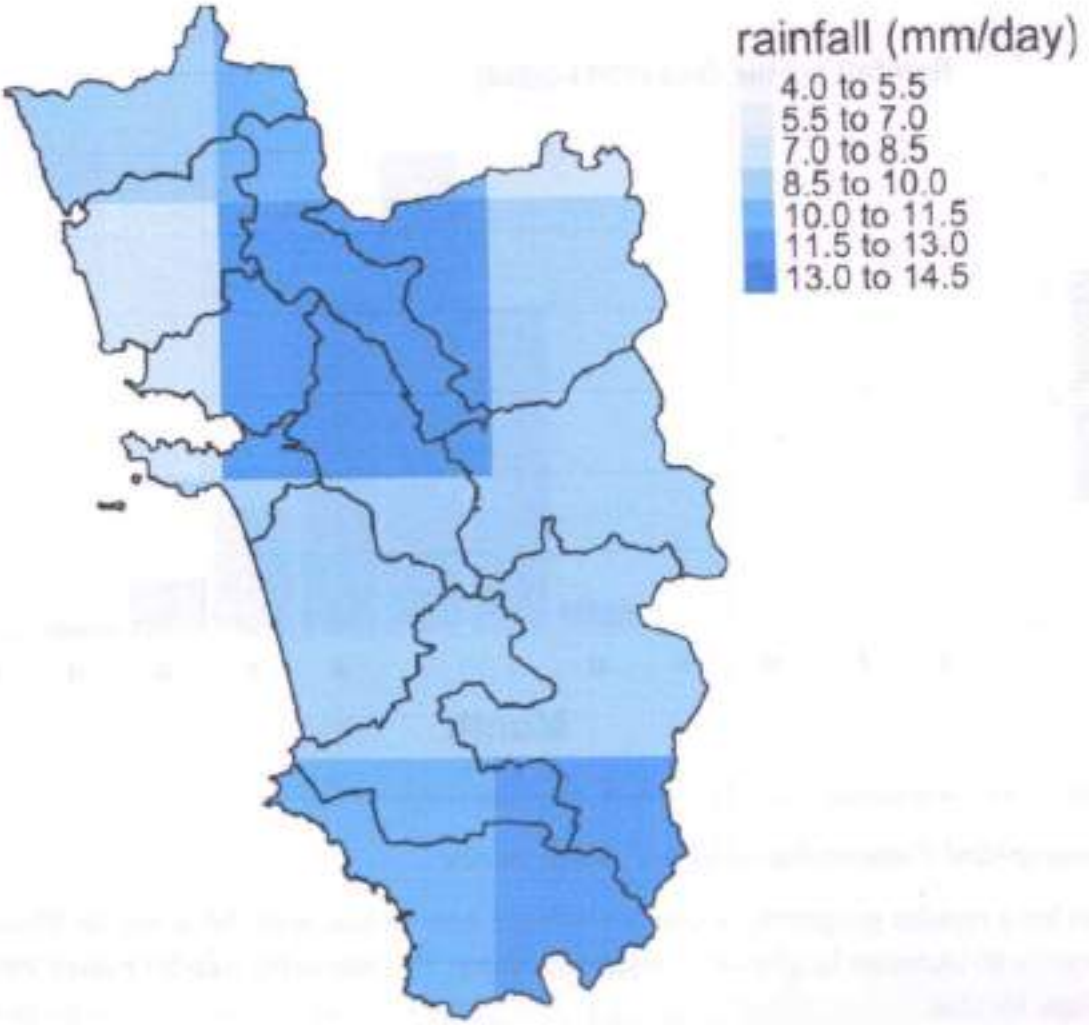


Figure 12 Long period average (1951-2014) spatial distribution of annual rainfall in Goa

Figure 13 shows the mean monthly rainfall profile in the state in monsoon, pre-monsoon and post monsoon months. Figure 13 shows that much of the rainfall in Goa takes place in the monsoon months, whereas winters are usually dry.

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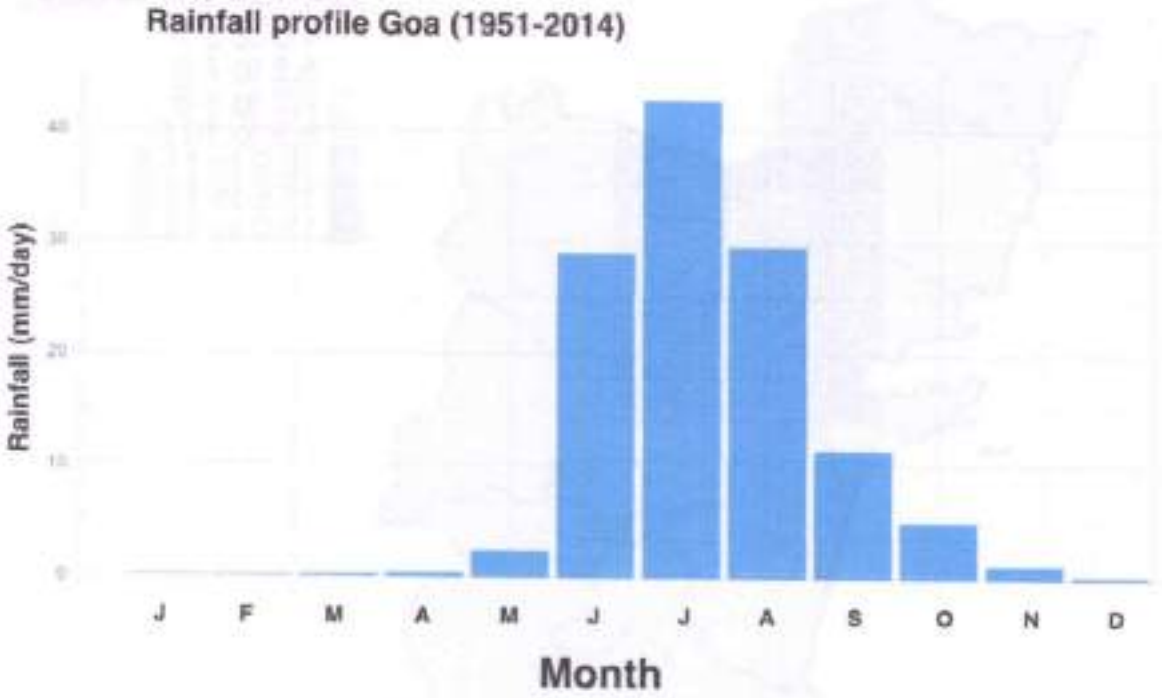


Figure 13: Long-period average (1951-2014) annual Rainfall profile in Goa

Geographical Features that influence climate in Goa

Goa has a peculiar geographic orientation with the Arabian Sea on the West and the Western Ghats (with increased height) on its eastern boundary. This makes the weather pattern very unique for Goa.

Observed Climate Change in Goa

Due to the build up of greenhouse gases in atmosphere, global temperatures are rising. It has been estimated that a warming of 2°C or even 1.5°C compared to the pre-industrial times is the threshold for dangerous climate change (IPCC, 2018). The global mean temperatures have already risen by about 1°C compared to pre-industrial times (Met Office, 2015). Indian sub-continent is also particularly warming since 1980s. As per IMD (2019) analysis, the annual mean temperature during 1901-2018 showed an increasing trend of 0.6°C/100 years. Climate change and its impact in Goa is not fully explored, however Kamat, 2013 and Kaur et al 2017 have explored some of the aspects of the observed climate change in Goa. The objective of this section is to investigate as to what extent changes in mean and extreme climate have occurred in the State of Goa during the period of 1901-2015.

Mean temperature trend in Goa is shown in Figure 14. It suggests that Goa is witnessing higher levels of temperature increase compared to the national average (IMD, 2013) as the mean temperature in Goa has increased by about 1°C over the period 1901-2018. Figure 3.10 also shows that much of the warming in Goa has been witnessed after 1970s.

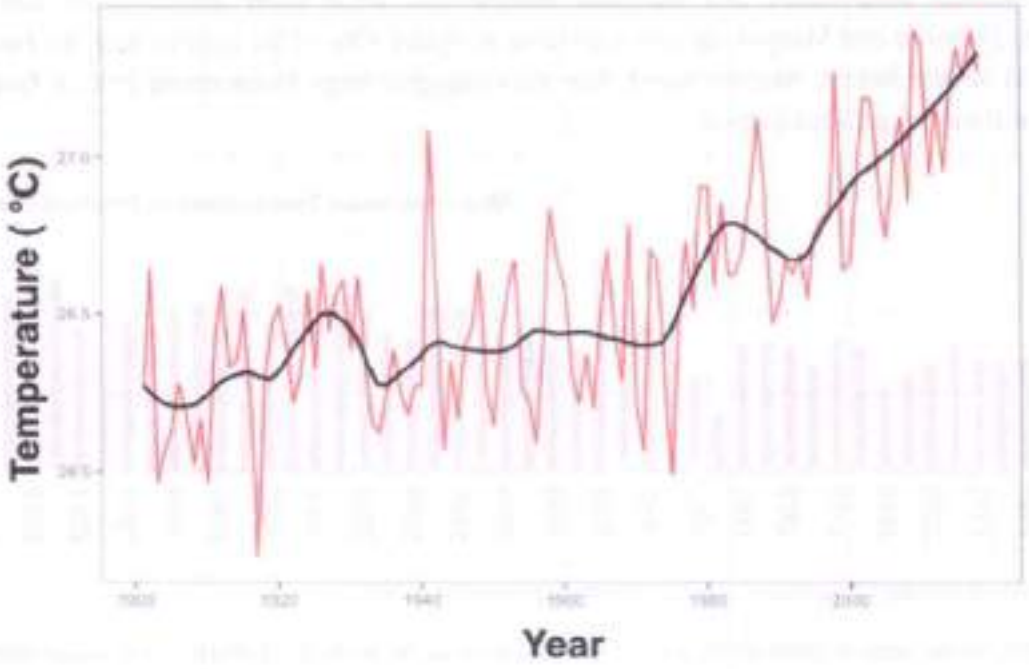


Figure 14: Observed changes in mean annual temperature in Goa (1901-2018)

Mean temperature change could be represented in terms of temperature anomalies as well. Change in mean temperature anomaly in Goa compared to the period 1960-1990 as shown in figure. It reiterates the conclusion that the mean temperature anomaly in Goa has increased by 1°C in the last century.

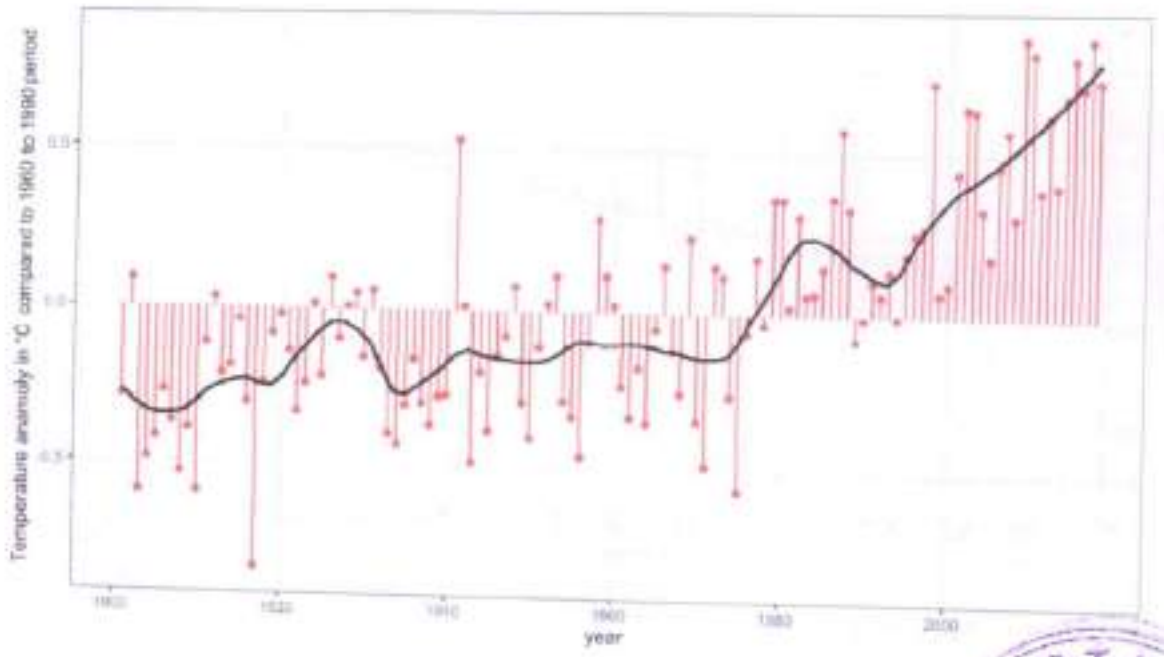


Figure 15: Mean annual temperature anomaly in Goa (1901-2018)

The maximum temperature and minimum temperature trend from station-based data for Panajim, Dabolim and Margoa stations were also analysed. One of the results from the Panjim station is shown below. Station based data also suggests large temperature rise in Goa as analysed from the gridded dataset.



Figure 16:Mean Maximum Temperature trend as available from Panjim station

Similarly, mean annual rainfall trend in Goa has also been plotted. It shows that mean annual rainfall in Goa has increased by about 68% over the last century. Results are supported by mean annual rainfall trend in North Goa as reported by Kaur et al 2017, where mean annual rainfall in North Goa is found to have increased from 3000 mm in 1901 to 5000 mm to 2015 (an increase of 66%).

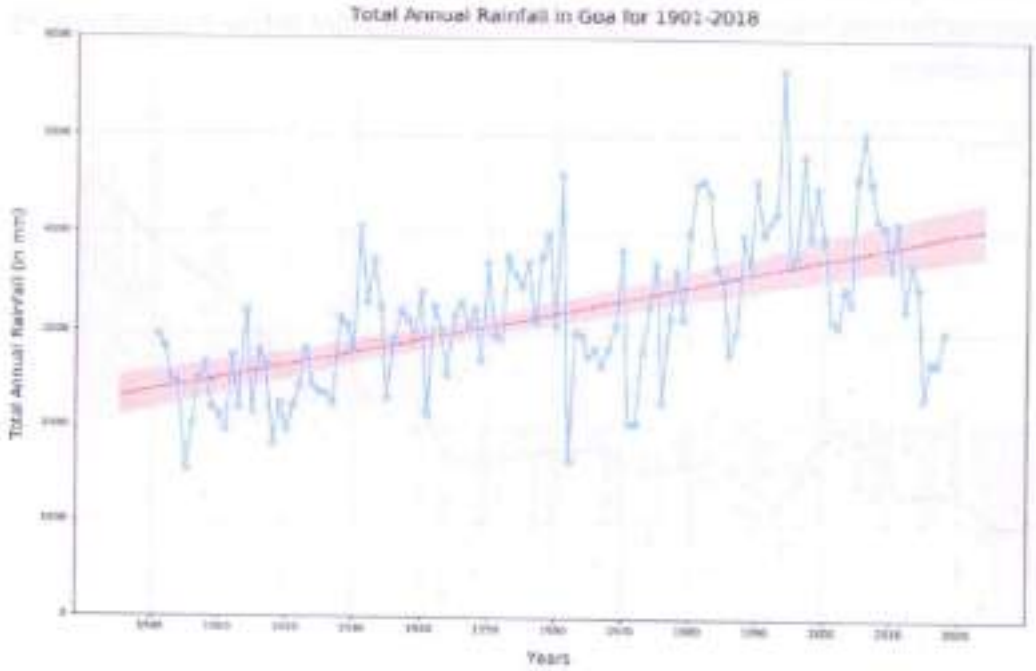


Figure 17: Long-term rainfall trend in Goa (1901-2018)

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The rainfall anomaly (percentage departure from the 1960-1990 mean) for the period 1901-2015 shows that mean annual rainfall in Goa has consistently increased over the last 100 years.

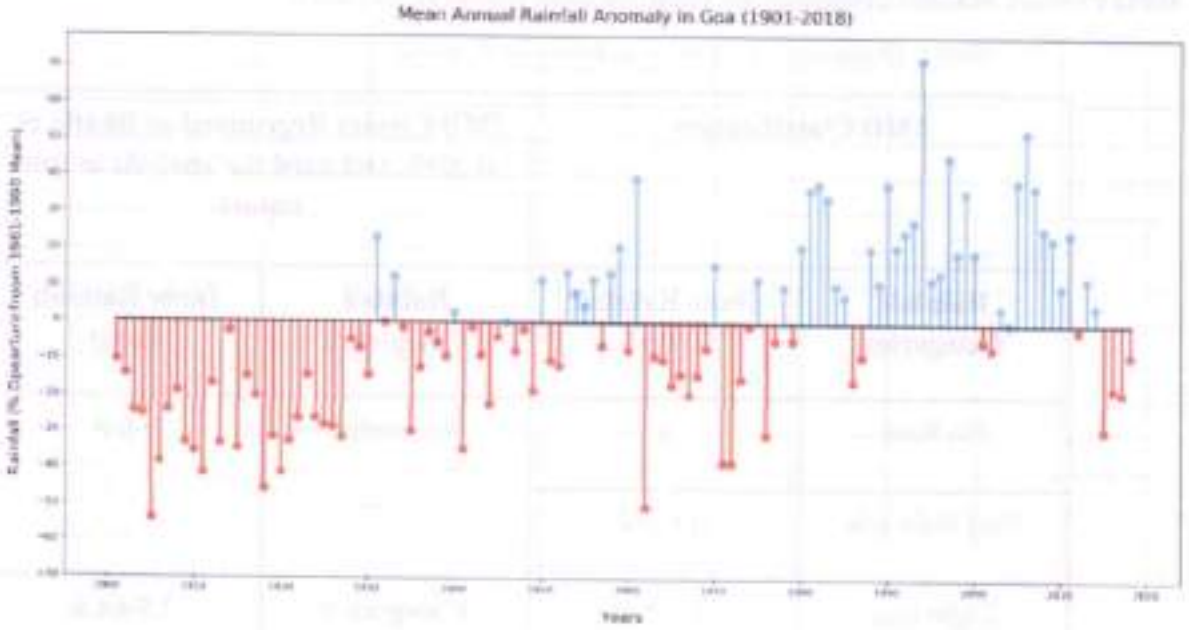


Figure 18: Mean annual rainfall anomaly in Goa (1901-2018)

The annual rainfall trend from station based data for Panajim, Dabolim and Margao stations. One of the results from the Panjim station is shown below. Station based data also suggests rise in rainfall as analysed from the gridded dataset.



Figure 19: Annual rainfall trend from Panjim station

Studies (Goswami et al 2006; Ghosh et al 2012) based on the observed precipitation records of Indian Meteorological Department (IMD) have shown that the occurrences of extreme

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precipitation events and their variability have already gone up in many parts of India. To quantify the observed changes in extreme rainfall events over Goa by using the daily precipitation data from IMD. Rainfall in India is categorized as the following categories and these extreme Rainfall categories are obtained from Bhatla et al., 2016.

Table 8: Classification of rainfall events based on daily rainfall

IMD Classification		**IMD Classes Regrouped as Bhatla et al 2019, and used for analysis in this report**	
Rainfall Categories	**Daily Rainfall (mm)**	**Rainfall Categories**	**Daily Rainfall (mm)**
No Rain	0	No rainfall	0-2.4
Very light rain	0.1-2.4		
Light rain	2.5-7.5	**Category 1**	**2.5-64.4**
Moderate rain	7.6-35.5		
Rather heavy rain	35.6-64.4		
Heavy Rain	64.5-124.4	**Category 2**	**64.5-124.4**
Very Heavy rain	124.5-244.5	**Category 3**	**>124.5**
Exceptionally heavy rain	≥244.6		

Source: Bhatla et al 2016

The frequency of light and moderate rainfall events is declining over the last century, whereas the frequency of extreme rainfall events in increasing in Goa over the last century. No. of rainy days experiencing Category 1, rainfall has declined over the period 1901-2015. Whereas, no. of rainy days experiencing heavy rainfall i.e. category 2, rainfall has increased by about 60%. On the other hand, Category 3 rain fall days, which denotes rainy days with extreme rainfalls (very heavy and exceptionally heavy) have increased by an alarming more than 100%. It is interesting to note that it is the category 1 and 2, rainfall events (moderate to light heavy rainfall) that nourish life-forms and ecosystems, whereas category 3 rainfall events (very heavy and exceptionally heavy) create devastation and chaos to life-forms and ecosystems. Increasing frequency of very heavy and exceptionally heavy rainfall events in Goa is one of the key

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impacts of climate change witnessed in the state. **Goa state is already vulnerable to flooding, increasing heavy rainfall trend makes the state even more vulnerable to this hazard.**

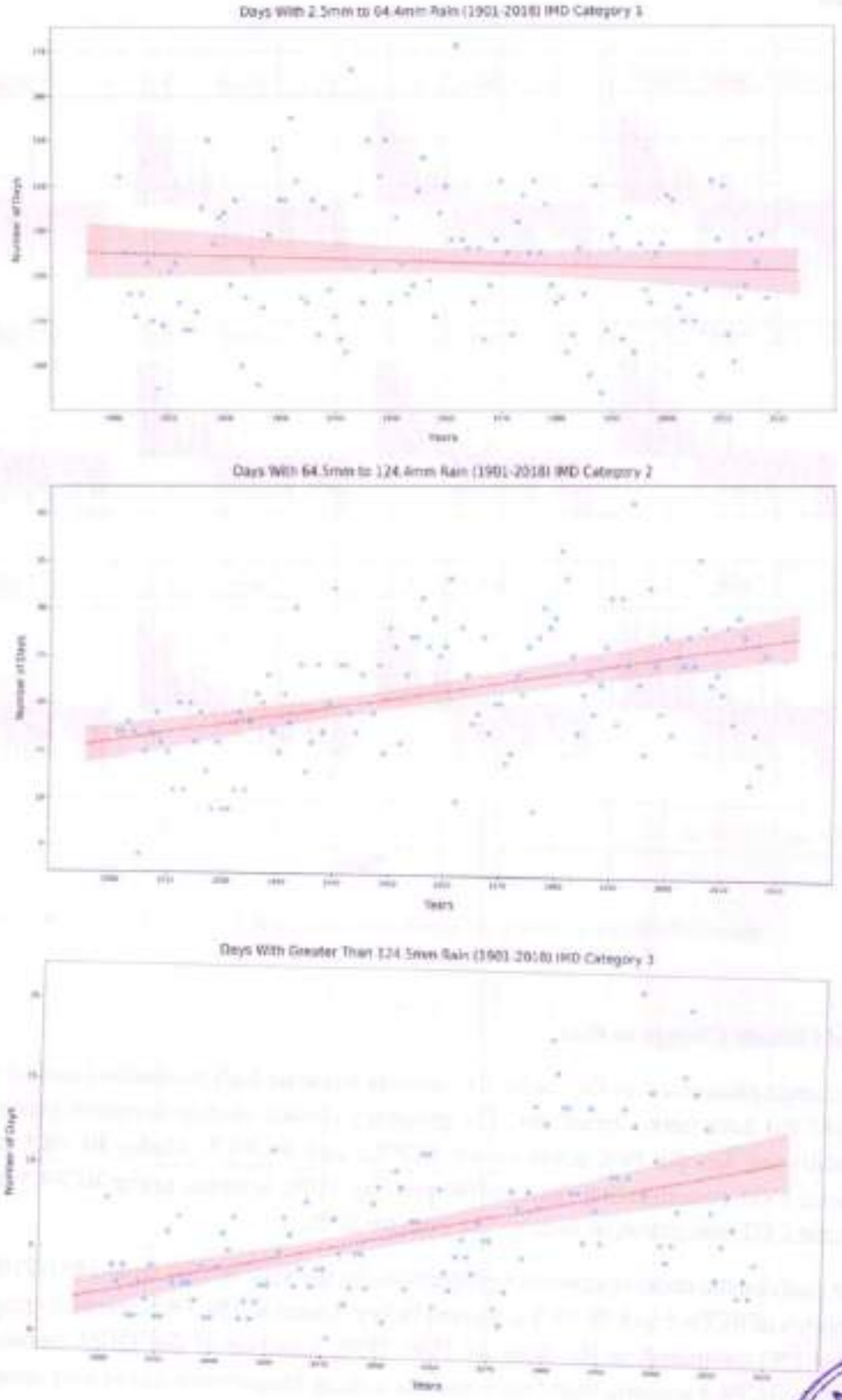


Figure 20: Declining moderate rainfall days and increasing very heavy and exceptionally heavy rainfall days in G

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Goa state is organized in 12 Taluks, Figure below shows how each of the Taluks in the state are facing the impact of climate change in terms of increasing temperature anomalies over the last century.

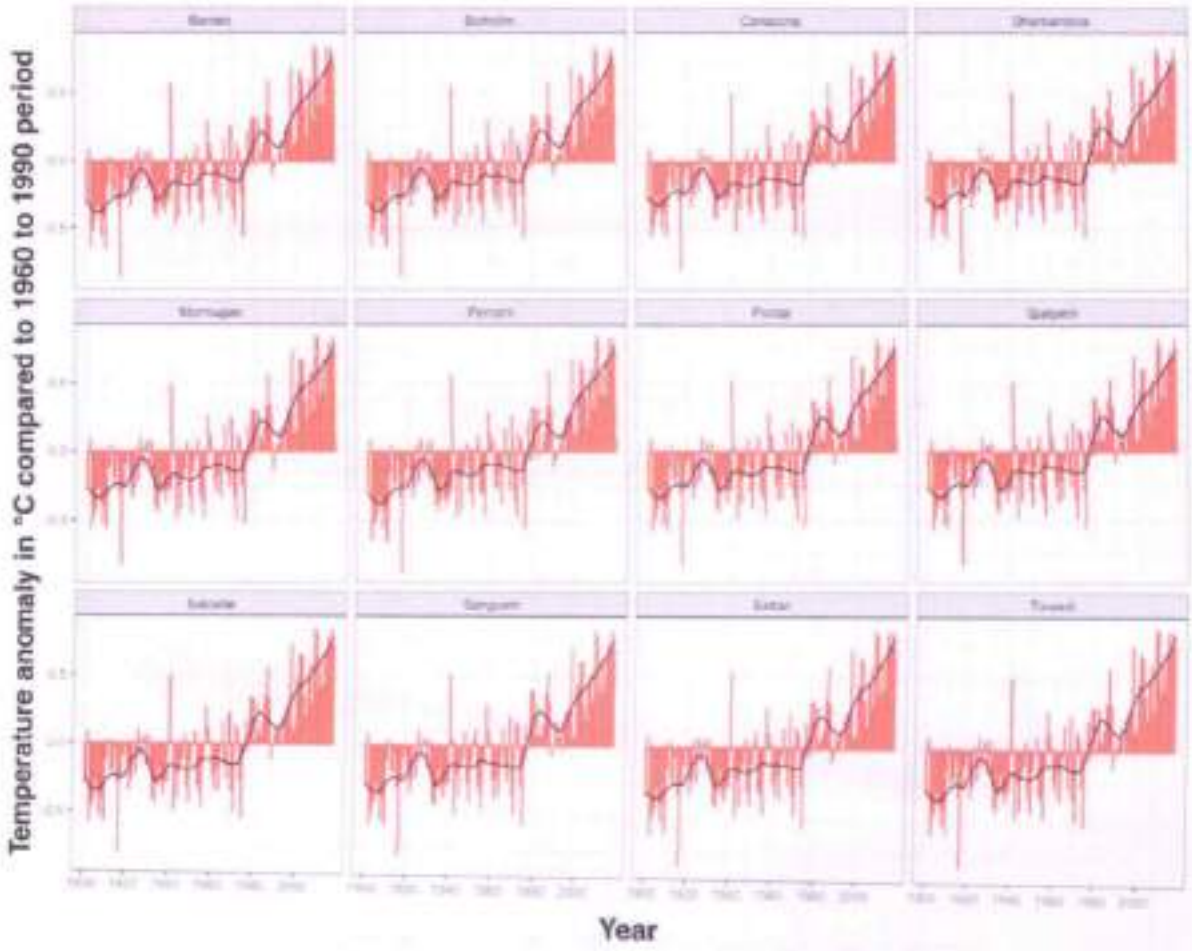


Figure 21: Taluk-wise observed mean annual temperature anomalies (°C) in Goa over 1901-2015

Projected Climate Change in Goa

Climate change projections in Goa in the 21st century based on high resolution regional climate models (RCPs) have been carried out. The projected climate change scenarios (temperature and rainfall) are for the two scenarios of RCP8.5 and RCP4.5. Under RCP8.5 scenario atmospheric CO2 concentration rises to 940 ppm by 2100, whereas under RCP4.5 scenario atmospheric CO2 concentration rises to 538 ppm by 2100.

From the analysis the mean temperature projections for the state of Goa from 1901-2100 under two scenarios of RCP4.5 and RCP8.5 are given below. Under the RCP8.5 scenario temperature rises by 4.5°C compared to the base of 1901-1950, however if the GHG emissions are controlled to RCP4.5 scenario then Goa witnesses a mean temperature rise of only about 2.5°C compared to 1901-1950 base.

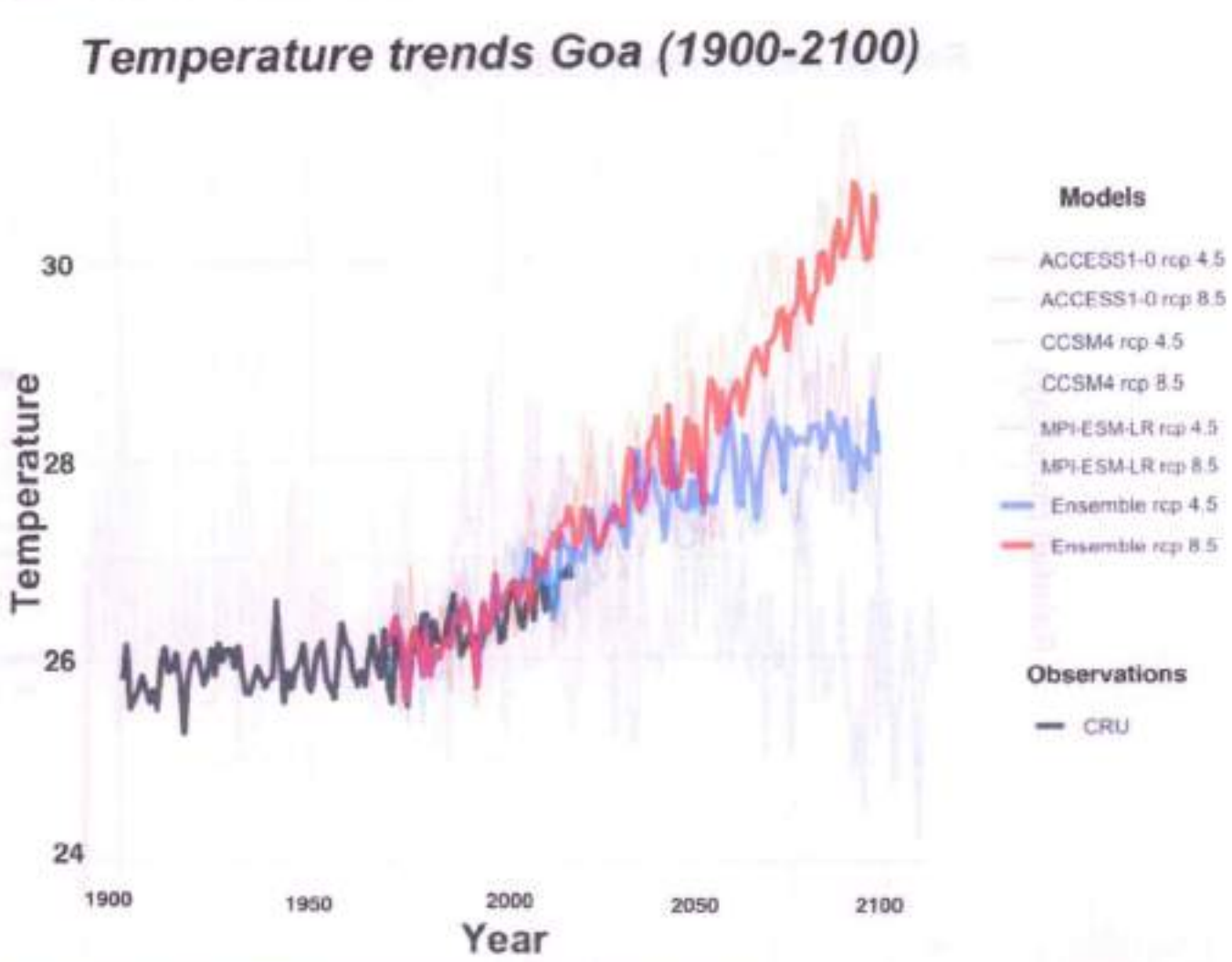


Figure 22: Projected mean temperature trend (deg C) in Goa under different climate change scenarios

The mean annual rainfall projections for the state of Goa from 1901-2100 shows that generally annual rainfall is projected to decrease in Goa in the 21st century, however the variability in rainfall projections for Goa state are very high.

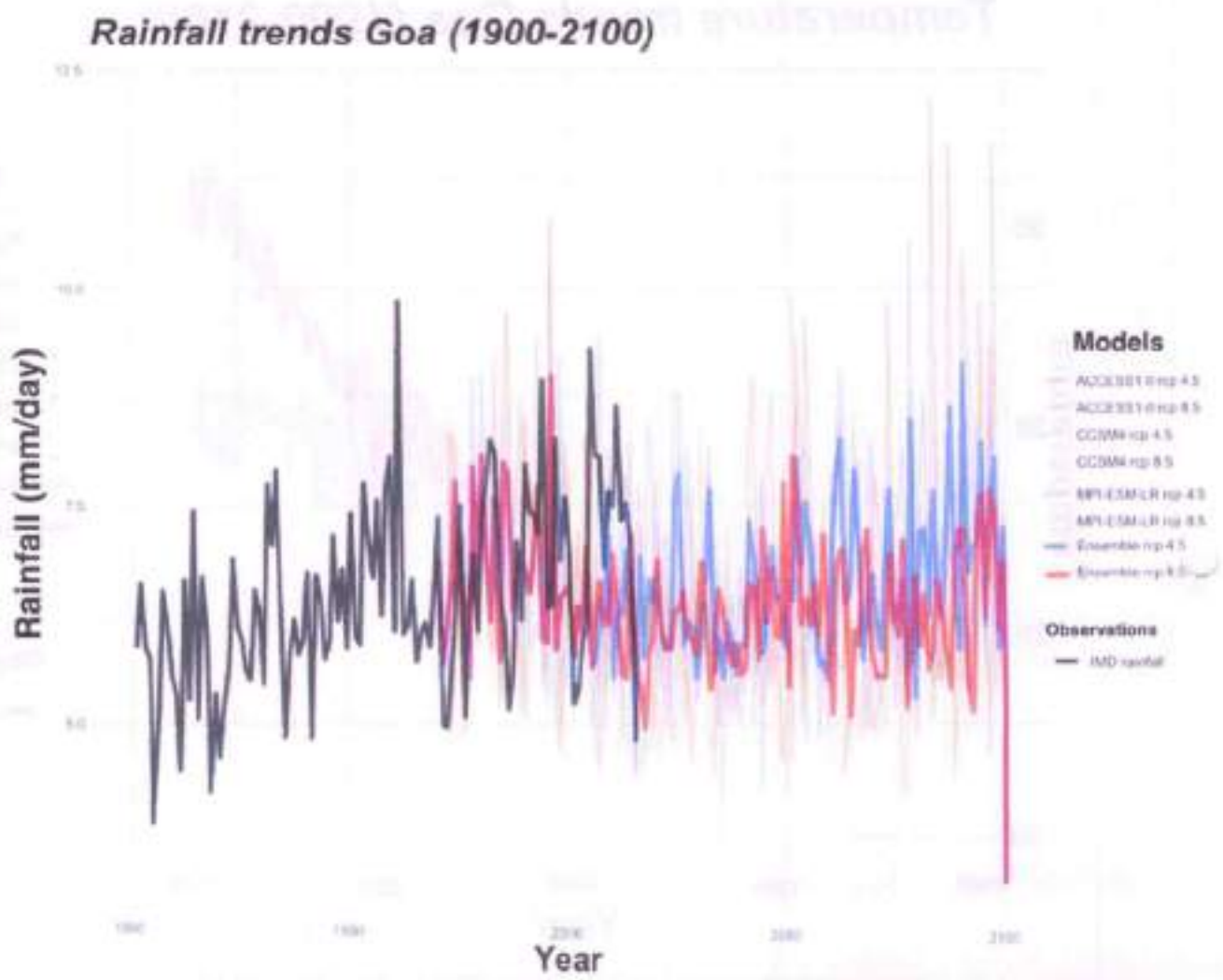


Figure 23: ***Projected rainfall trend (mm/day) in Goa under different climate change scenarios***

Krishnan et al (2013) based on simulations from the 20-km ultra high-resolution model projected reduced rainfall over the Western Ghats in the 21st century. It is argued that a stabilization (weakening) of the summer monsoon Hadley-type circulation in response to global warming can potentially lead to a weakened large-scale monsoon flow thereby resulting in weaker vertical velocities and reduced orographic precipitation over the narrow Western Ghat mountains by the end of the twenty-first century. The findings of this modelling are aligned to the same.

It should, however be noted that precipitation projections in the 21st century are less reliable compared to temperature projections. Chaturvedi et al 2012 based on their analysis find that all India precipitation projections have larger uncertainties as evident from the large spread of the precipitation change projections in the 21st century. Further Taylor diagram analysis suggests higher confidence for the temperature projections and relatively low confidence for the precipitation projections from 21 CMIP5 models (See figure 3.20).

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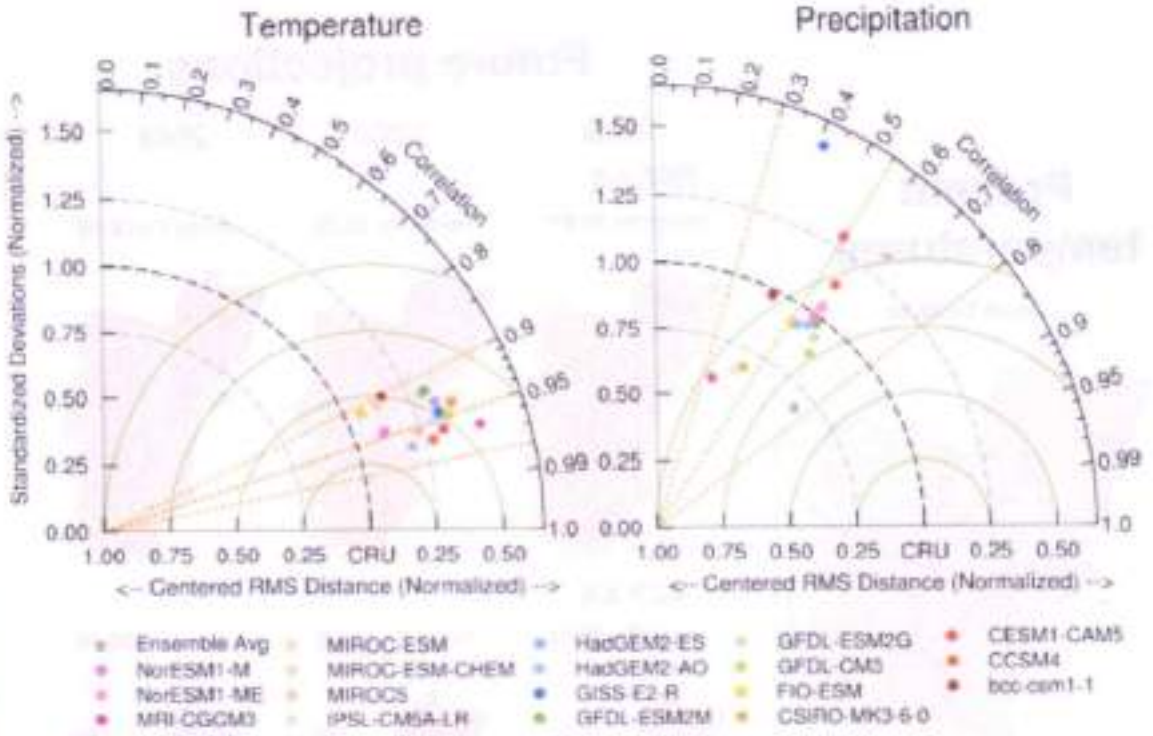


Figure 24: Predictability of temperature variable in the 21st century is high whereas the predictability of precipitation variable is lesser

These findings are also supported by the earlier findings involving the CMIP3 model experiments both at global scales (Solomon et al 2007), as well at all India level precipitation projections (Krishnakumar et al 2010).

Following three time-slices has been used for climate change projections: 2021-2050 (Short-term); 2046-2075 (Mid-term); and 2071-2100 (Long-term).

Figure below shows the future mean annual temperature projections in the short term, medium term and long-term. As per Figure 3.21, mean annual temperature in Goa increases to 28.3°C by 2035, and to 30.3°C, compared to the present annual temperatures (1985-2015) of 26.80°C.

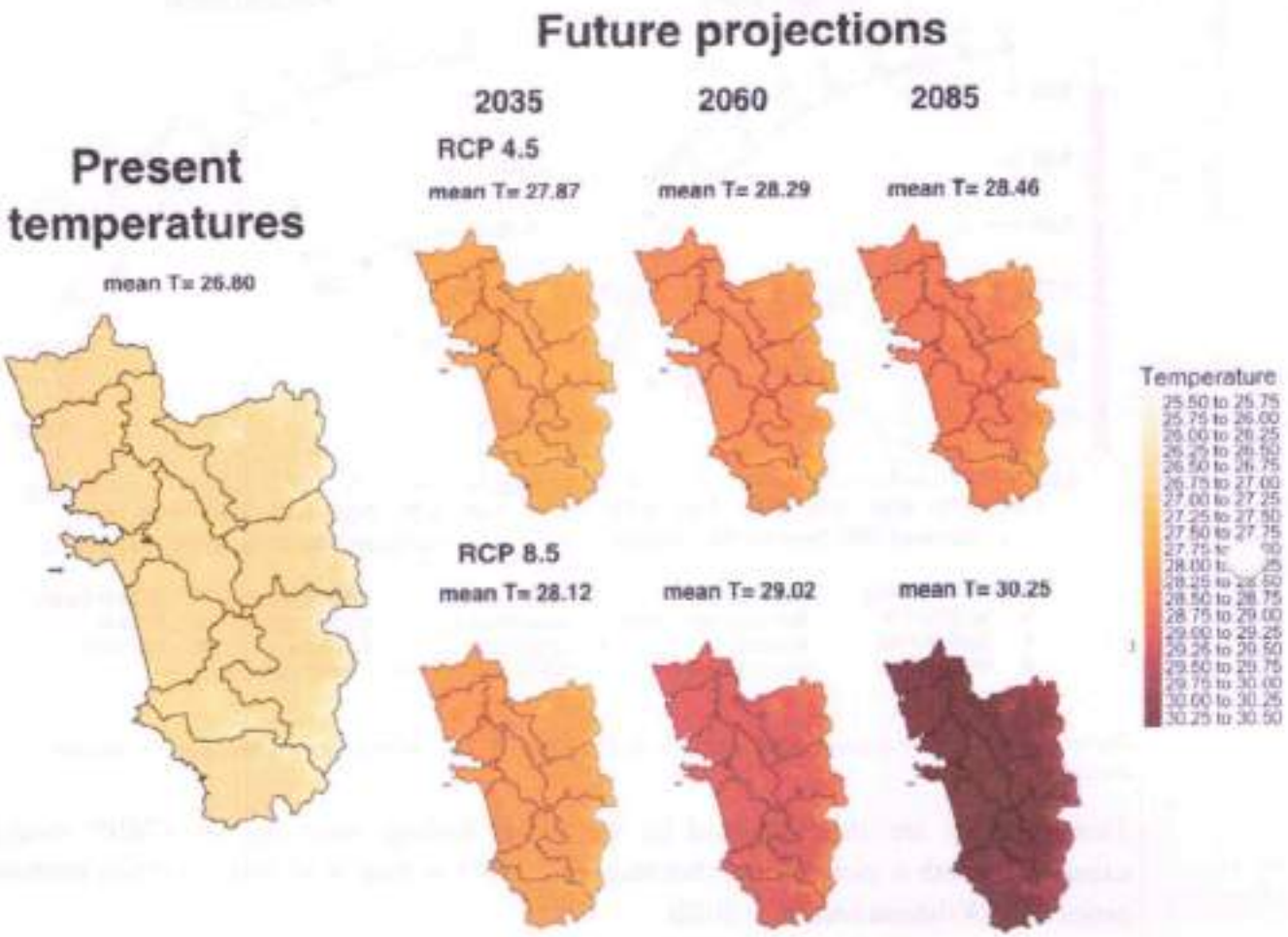


Figure 25: CORDEX model ensemble based mean temperature change (°C) projected for Goa for the year 2030s (2021–2050), 2060s (2046–2075) and 2080s (2070–2099) relative to the Present temperatures (1985-2015)

Figure below shows the future mean annual rainfall projections in the short term, medium term and long-term. Annual mean rainfall in Goa decreases under high emission scenarios but

remains largely stable under moderate emissions scenario.

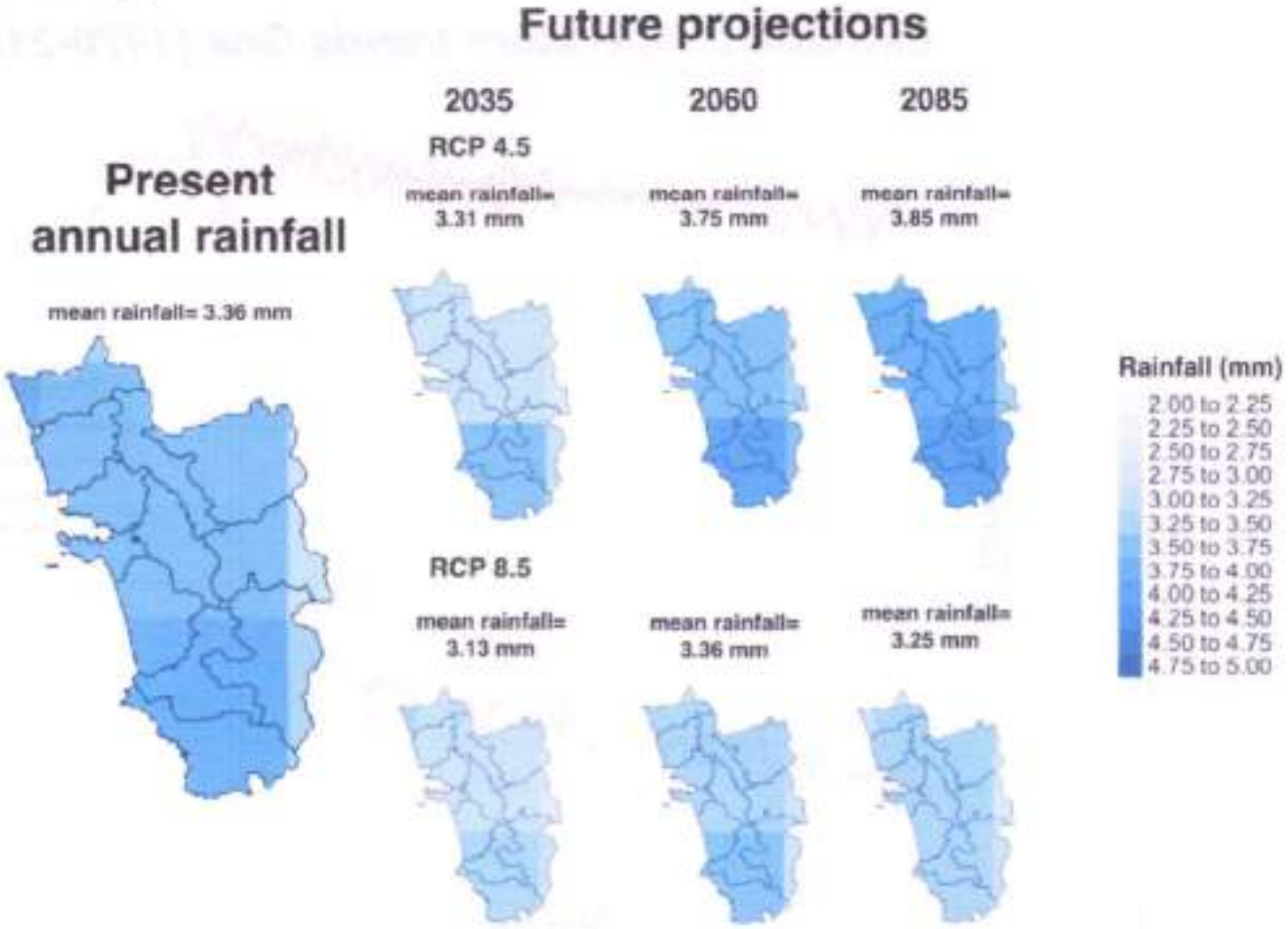


Figure 26: CORDEX model ensemble based mean daily rainfall change (mm) projected for Goa for the year 2030s (2021–2050), 2060s (2046–2075) and 2080s (2070–2099) relative to the Present temperatures (1985-2015)

Projection of Extreme Temperature

Extreme temperatures are projected to increase under climate change scenarios. For Goa, it is projected that by the year 2040, maximum temperatures of 40°C or more will become commonplace, minimum temperatures in Goa are also expected to increase by 3-7°C.



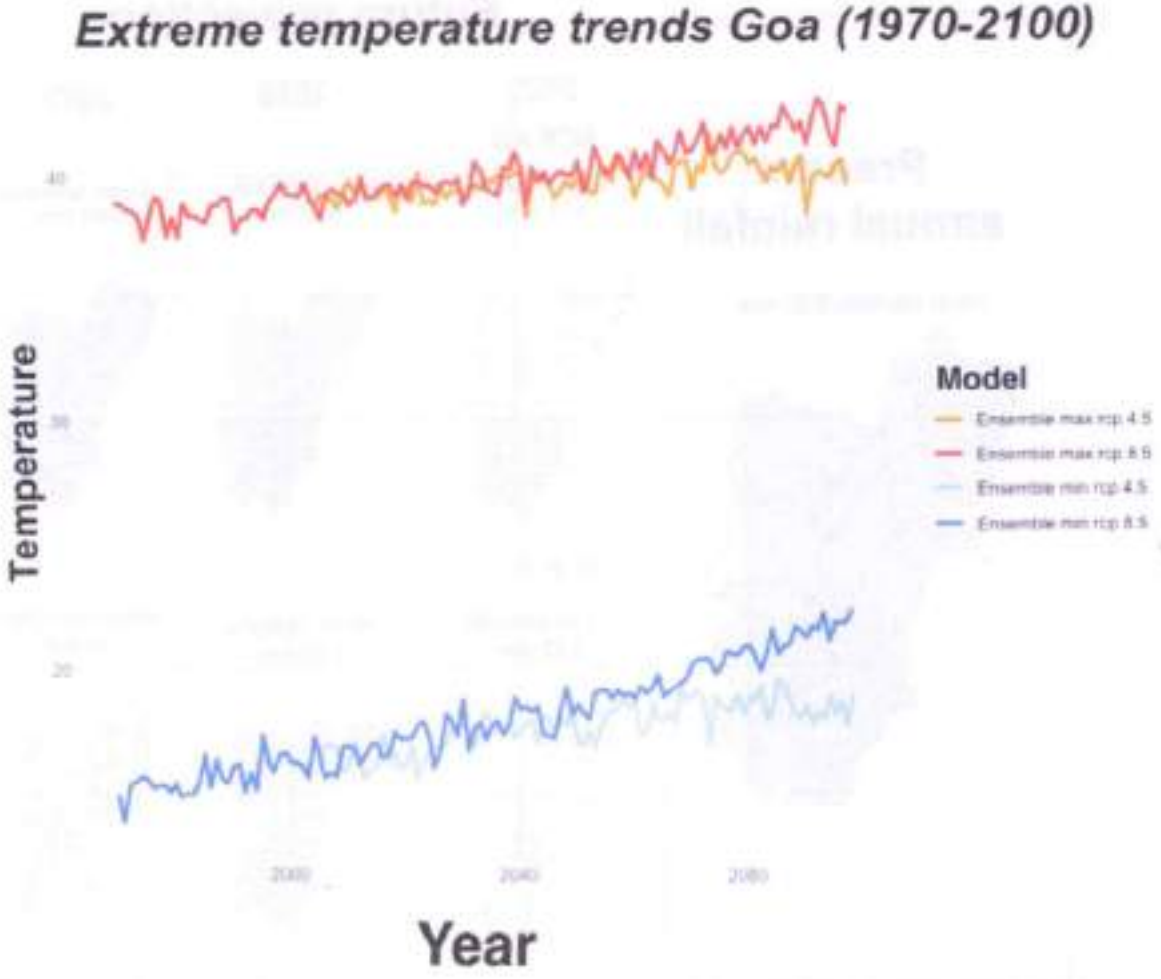


Figure 27: Projected trend in minimum temperature and maximum temperature in Goa in the 21st century

Projection of Extreme Rainfall

IPCC special report on weather extremes (IPCC, 2012) project likely increase in the frequency of heavy precipitation in the 21st century over many areas of the globe. We quantify the expected future change in extreme rainfall events over India by using the daily precipitation data from the multiple model ensemble of the CORDEX models. Very heavy rainfall events

will increase in Goa in the 21st century, under both RCP4.5 and RCP8.5 scenarios.

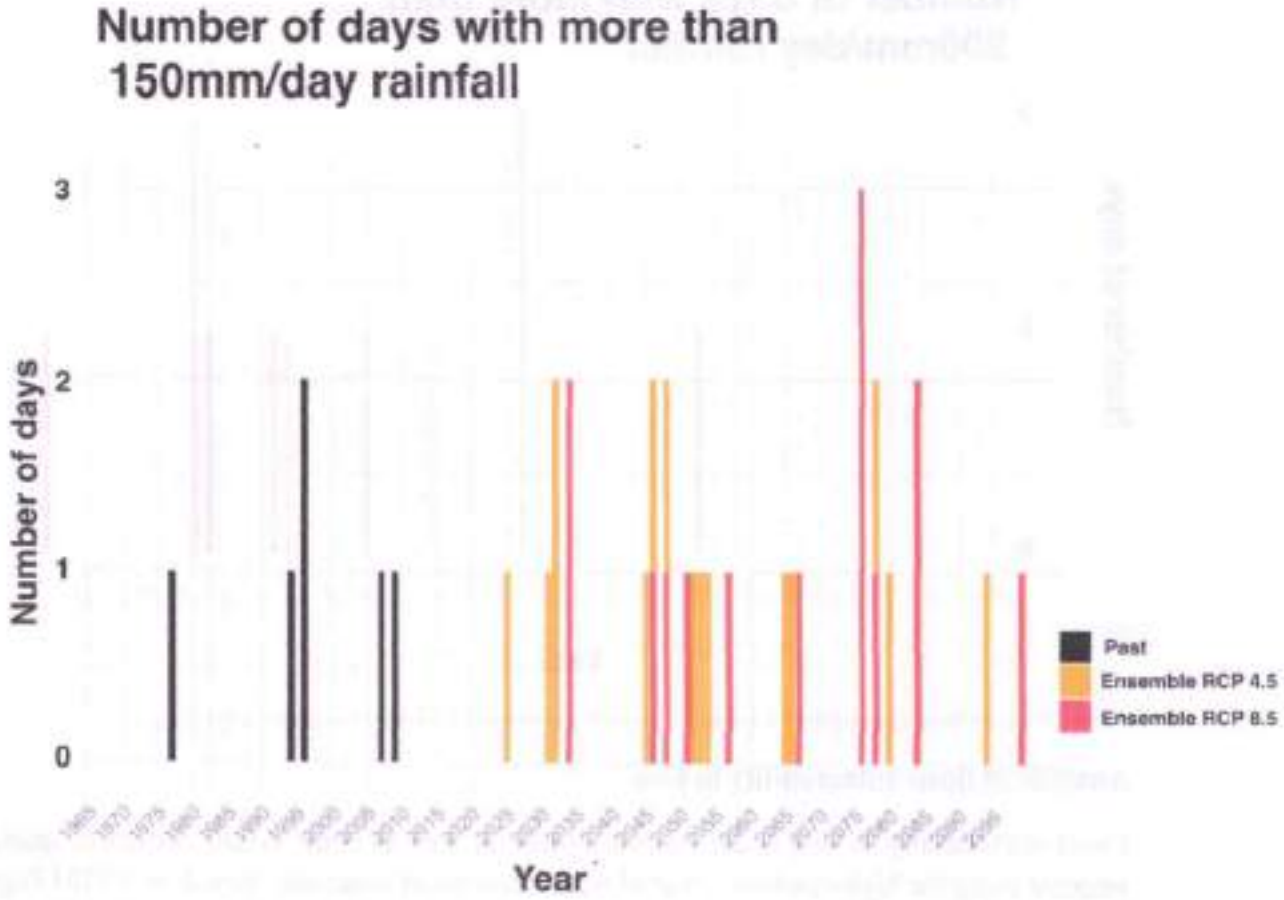


Figure 28: Rising frequency of very heavy extreme rainfall events in climate change scenarios

Similarly, exceptionally (rare) very heavy extreme rainfall events which are rare and exceptional in today's climate will become commonplace in climate change scenarios of RCP4.5 and RCP8.5 (see Figure 3.25).

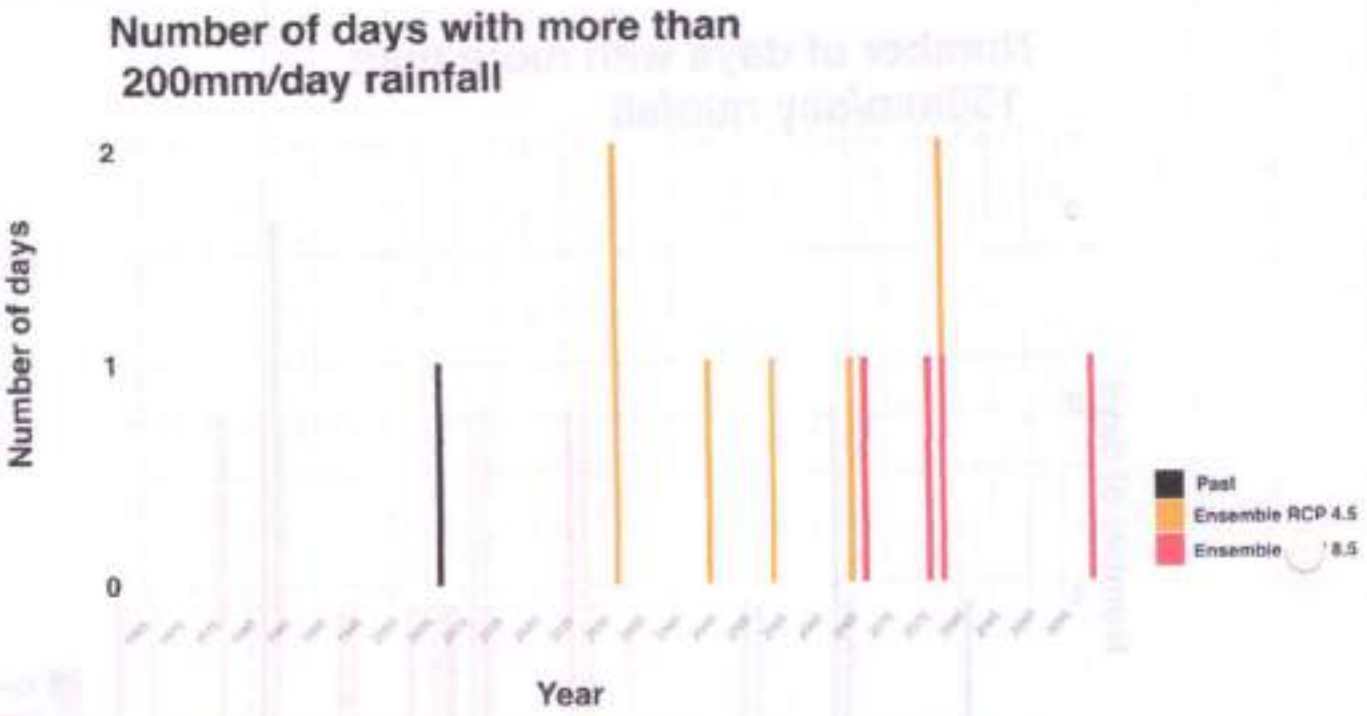


Figure 29: Abundance of exceptionally (rare) very heavy extreme rainfall events in climate change scenarios

Analysis of flood vulnerability in Goa

Flood vulnerability in Goa under current climate as well as under future climate is spatially mapped using the high-resolution digital representation of orography based on SRTM Digital Elevation Model (DEM), published by the CGIAR-Consortium for Spatial Information (http://srtm.csi.cgiar.org), with a cell size (spatial resolution) of 90 m, is used (Farr et al.2007, Reuter et al. 2007). On the basis of elevation, Goa is categorized in multiple elevation zones, elevation zone of 0-5 meter is considered to be most vulnerable to flooding from multiple hazards including sea level rise, and extreme precipitation events. The taluks of Salcete, Tiswadi, and Bardez most vulnerable to flooding related hazards.

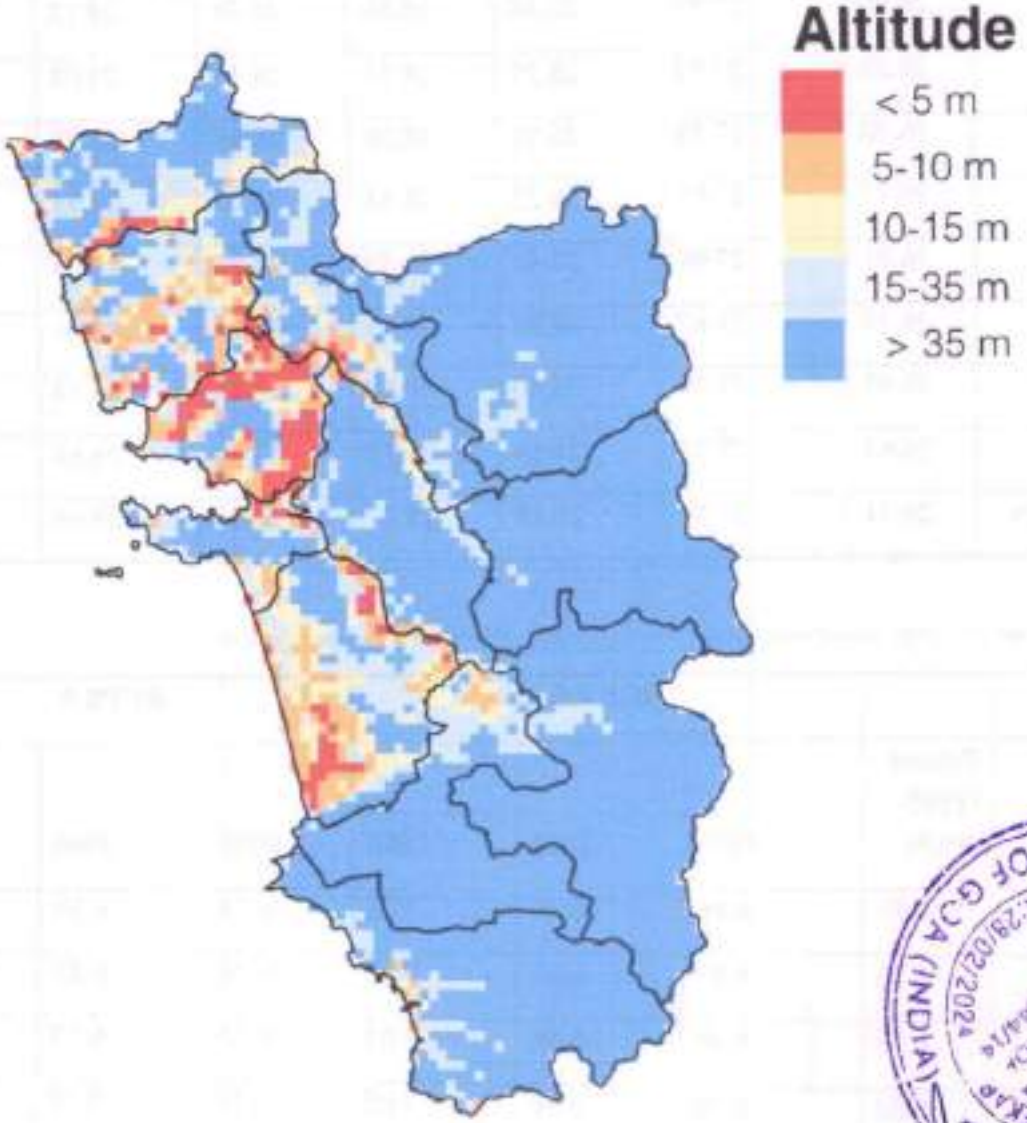


Figure 30: ***Flood vulnerability map of Goa***

Taluk-wise climate change projections for Goa are provided in table below.

Table 9: Taluk wise projection of mean temperature (°C) under different climate change scenarios

		RCP 4.5			RCP8.5		
Taluk	Present (1985-2015)	2035	2060	2085	2035	2060	2085
Bicholim	26.90	27.97	28.38	28.56	28.21	29.12	30.34
Bardez	26.93	27.99	28.41	28.59	28.23	29.14	30.37

Tiswadi	26.94	28.01	28.42	28.60	28.25	29.16	30.38
Pernem	26.90	27.97	28.38	28.56	28.21	29.12	30.34
Ponda	26.86	27.94	28.35	28.53	28.18	29.08	30.31
Sattari	26.70	27.78	28.18	28.36	28.03	28.93	30.15
Canacona	26.77	27.85	28.25	28.43	28.09	28.99	30.22
Salcette	26.93	27.99	28.41	28.59	28.23	29.14	30.37
Quepem	26.79	27.87	28.27	28.45	28.11	29.01	30.24
Mormugao	26.92	27.99	28.40	28.58	28.23	29.14	30.36
Sanguem	26.67	27.75	28.14	28.32	27.99	28.89	30.12
Dharbandora	26.71	27.79	28.19	28.37	28.03	28.94	30.16

Table 10: Taluk wise projection of mean rainfall (mm/day) under different climate change scenarios

		RCP 4.5			RCP8.5		
Taluk	Present (1985-2015)	2035	2060	2085	2035	2060	2085
Bicholim	6.75	6.46	6.86	7.02	6.25	6.53	6.50
Bardez	6.76	6.47	6.87	7.03	6.26	6.53	6.50
Tiswadi	6.75	6.46	6.86	7.02	6.25	6.53	6.50
Pernem	6.80	6.50	6.90	7.02	6.29	6.52	6.46
Ponda	6.75	6.46	6.86	7.02	6.25	6.53	6.50
Sattari	6.73	6.44	6.84	7.00	6.24	6.51	6.48
Canacona	7.16	6.78	7.27	7.25	6.61	6.77	6.52
Salcette	6.94	6.60	7.05	7.13	6.42	6.64	6.51
Quepem	7.15	6.77	7.26	7.25	6.60	6.77	6.52
Mormugao	6.75	6.46	6.86	7.02	6.25	6.53	6.50
Sanguem	6.93	6.60	7.06	7.12	6.43	6.63	6.45
Dharbandora	6.64	6.37	6.77	6.[illegible]	6.18	6.44	6.38

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5. Climate Vulnerability Assessment

5.1. Vulnerability assessment

The Intergovernmental Panel on Climate Change (IPCC) defines vulnerability as "the propensity or predisposition to be adversely affected" [1], which encompasses the basic components of exposure, sensitivity, and adaptive capacity. Key sector-specific indicators have been utilized to assess the sensitivity and adaptive capacity of the sector.

The coastal areas of the country, face grave risks due to climate change. There is the risk of cyclones and tsunamis, the intensity of which is predicted to rise. Rising sea levels, which could flood land (including agricultural land) and cause damage to coastal infrastructure and other property, pose another threat.

Coastal Vulnerability: UNDP predicts, Goa stands to lose a large percentage of its land area, including many of its famous beaches and tourist infrastructure, which are very significant to states' socio-economic status. A one-metre rise in sea level, it is estimated, will affect 7 percent of Goa's population and cause damage to the tune of Rs 8,100 crore.[3] Because of this, it becomes essential to understand the vulnerability to different parts of the 100km vast coastline of Goa.

The multi-hazard vulnerability assessment of the coastline of Goa carried out by NIO in 2014 provides a reasonable assessment of coastal flooding and inundation for Talukas along the coast. This is accomplished by using seven physical and geologic risk variables characterizing the vulnerability of the coast, including historical shoreline change, rate of relative sea-level change, coastal regional elevation, coastal slope, mean tidal range, significant wave height, and geomorphology using conventional and remotely sensed data, in addition to two socio-economic parameters: population and tourist density data. The results of this composite vulnerability index-based study suggest that [4] the 30 km of the coastline of the talukas of Salcete, Bardez, and Tiswadi has a coastal regional elevation of fewer than 35 m and is at the highest risk due to sea-level rise and flooding. Bardez and Salcete talukas have both experienced erosion rates of more than 0.6 m/year while the erosion rate for Tiswadi was found to be above 0.3 m/year. These are also the most populated talukas and most prominent tourist spots, further increasing the risk of erosion in these taluks.

Table 11: Taluka and District wise Population of the State[5]

Taluka/District wise Household Population

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[3] Climate change adaptation activities in India:
https://www.undp.org/content/dam/india/docs/climate_change_adaptation_activi...

[4] Multi-hazards Coastal Vulnerability Assessment of Goa, India, using Geospatial Techniques, NIO, 2014

[5] Economic Survey 2017-18

State/ District/ Taluka	Number of HH	Total population	% to Total population	Average Family Size
GOA	343611	1458545	100.00	4.24
North Goa				
Pernem	17248	75747	5.19	4.39
Bardez	57147	237440	16.28	4.15
Bicholim	22414	97955	6.72	4.37
Tiswadi	42241	177219	12.15	4.20
Satari	14367	63817	4.37	4.44
Ponda	38349	165830	11.37	4.32
TOTAL	191766	818008	56.08	4.27
South Goa				
Mormugao	35702	154561	10.60	4.33
Salcete	71717	294464	20.19	4.11
Quepem	19119	81193	5.57	4.25
Sanguem	15068	65147	4.46	4.32
Canacona	10239	45172	3.10	4.41
TOTAL	151845	640537	43.92	4.22

**Source: Office of Registrar General and Census Commissioner, India.

Other Physical Vulnerability

The riverine water system of Goa and the creeks and backwaters are vulnerable to high-intensity precipitation scenarios predicted for the state. The brackish water areas have very rich ecosystems and exist along creeks and rivers. Some of them are protected by sluice and gate systems whereas others are at the risk of ingress of saline water due to climate change. Groundwater extraction is not well regulated and intrusion of groundwater is likely to increase Saltwater intrusion into the groundwater system. As the sea level rises this problem will be further exasperated. The high groundwater levels in certain areas pose the challenge of water percolation capacity of the soil. Thus, increasing the vulnerability of these areas like Panaji.

Mangroves are an important part of the marine ecosystem. This is under threat due to rising temperatures. The increased seawater temperature is impacting the fish availability as well.

Economic Vulnerability

Quantification of the economic loss due to climate change has not been ascertained so far for Goa, however, based on the national, international and sectoral developments published the economic activities in Goa are certainly vulnerable to climate change.

South Asia on average could lose nearly 2% of its GDP by 2050, rising to a loss of nearly 9% by 2100 under the BAU scenario (Ahmed and Suphachalasai, 2014).

About 4% of the state lives below the poverty line which is much lower than many other states in India. The majority of its population is urban with a high literacy rate of about 82%. Economic activity in the state is dominated by agriculture and the allied sector, tourism, and mining.

Tourism in general and in Goa specifically, if highly dependent on natural resources. Changes in water availability, biodiversity loss, reduced landscape aesthetic, increased natural hazards, coastal erosion and inundation, damage to infrastructure and the increasing incidence of vector-borne diseases will all impact tourism to a varying degree. The risk of irreversible loss of many marine and coastal ecosystems increases with global warming, especially at 2°C or more.

5.2. Impact and Vulnerability of Vulnerable Group to Climate Change

The IPCC Special Report on Global Warming of 1.5°C emphasized that disadvantaged and vulnerable populations including indigenous peoples and certain local communities are at disproportionately higher risk of suffering adverse consequences with global warming of 1.5°C and beyond.

Coastal regions are directly vulnerable to rising sea levels, local and regional land subsidence, storm surges from severe storms, and changing intensities and frequencies of precipitation events (Hoegh-Guldberg et al., 2018; Koop and van Leeuwen, 2017). In the context of Goa, communities living in low lying areas, informal settlements like slum population, people with disabilities and those whose livelihood dependents mainly on khazan lands are in particular the immediate and most vulnerable groups.

Goa has one of the lowest slum populations in the country of about 2% of which 90% is found in Mormugao. Mormugao houses the only commercial port of Goa and has been identified to be at moderate risk due to climate change in the study carried out by NIO mentioned above in this section. The coping capacity of the slum population is usually the lowest, increasing the vulnerability to climate change. It is also essential to note that10% of Goa's population lives in Mormugao and it has the highest population density in the state as well.

Table 12:Mormugao Statistics

Area smallest	109.13 sq. km	
Population	154561	
Population density	1416	
Population density highest in state		
Percentage of the state population	10.6	%
Literacy rate	85%	

Table 13: Distribution of slum population in Goa (Census 2011)

Distribution of Slum Population in Goa- 2011 Census

Area	No. of Slum Households	Slum Population	% to total slum population
Ponda (MCI)	258	981	3.74
Mormugao (MCI)	4974	23625	90.01
Margao (MCI)	265	1641	6.25
Total	5497	26247	100.00

Source: Registrar General and Census Commissioner, India.

Health impacts due to climate change can have more significant and serious impacts on young children especially those from the vulnerable group. Poor sanitation increases vulnerability to gastro-intestinal illnesses, with future rates of diarrheal diseases among children are expected to rise under many climate change scenarios (Cissé et al, 2018, WHO 2014).

Hence, the most vulnerable population in the state needing immediate attention is concluded to be a slum population of Mormugao, young children below the age of 10 years, women, and families whose livelihood depends on Khazan lands only.

Cultivation in the Khazan Lands

Plains running parallel to the coastline. These plains are flooded annually by brackish water from the Rivers and Creeks and hence, are fertile but saline. Most of these Khazan lands are used for the cultivation of salt-resistant species. Runoff collects in these fields (earlier these fields were also drained by tidal waters). The main crops grown in these fields are rice and vegetables. Most of the cultivation is done using manure and the use of fertilizers is limited. The soil itself is very fertile owing to backwaters and saline resistant varieties of rice are cultivated in Goa.

5.3.Prioritization of sectors for SAPCC

Based on the above assessment, the following sectors and regions in the state have been prioritized in the SAPCC:

5.4. Climate vulnerability and impacts due to diversion of Mhadei River

While in the observed climatology over 1901-2018, mean annual rainfall in the state has increased (Figure 18). However, it has not helped the water security scenario in the state as we find that moderate to light rainfall events that nourish ecosystems have declined, very heavy and exceptionally heavy rainfall events that cause devastation and chaos to life-forms and ecosystems, have increased in the state (Figure 20). Looking forward in future, as per dynamically downscaled regional climate projections from IITM, rainfall in Goa is likely to slightly decline or remain stable (Figure 23). Given that under future climate projection scenarios very heavy and exceptionally heavy rainfall events are likely to increase further (Figure 26), also as losses from evapotranspiration due to warmer climate are projected to increase - water security scenario in the state is likely deteriorate further under climate change scenarios.

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Sr. No.	Sector
1	Transport
2	Power (Energy) & Renewable energy (GEDA)
3	Water
4	Forest sector
5	Agriculture and Allied (AVHS) sector
6	Fisheries sector
7	Environment & Coastal Management
8	Biodiversity & Wetlands
9	Solid Waste Management
10	Sewage Management
11	Tourism
12	Mining
13	Land use land cover
14	Human Health
15	Disaster management
16	Habitat
17	Infrastructure

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6. Sectoral Mitigation Strategies

6.1. GHG Profile of the State

As per India's second Biennial update report, energy sector contributes 73.2% of India's total GHG emission, followed by agriculture, industrial processes and waste contributing to 16%, 7.8% and 3% respectively. GHG emissions in energy are predominated by the emissions from energy industries (60%), followed by manufacturing industries and construction (18%), and transportation (13%).

State of Goa does not produce power, it purchases power from NTPC power plants except for some renewable energy, based power plants like solar power plants. Thus, the direct GHG contribution of the state to national GHG inventory is not significant.

The major GHG emitting sectors in the state are transportation sector, agriculture, waste, construction and mining sector. While the power sector does not result in direct GHG emissions in the state, it does contribute to overall GHG inventory of the country. Hence, it is essential to view the energy sector from the perspective of demand side power consumption and generation of renewable energy to contribute towards counties GHG inventory.

On the other land use and land cover change has the potential to act as both a sink or an emitter depending upon the state level activities.

6.2. Sectoral GHG mitigation strategies

6.2.1. Transportation Sector

Road Transport: Transportation by road in the State is considered to be the dominant medium for both passenger and freight transport. Initiatives are being taken to provide a secure, integrated, proactive and pioneering transport system to reduce traffic congestion, road accidents, vehicle pollution, etc. in the State. About 14 lakh vehicles have been registered in Goa up till FY 18-19. On average, about 78,000 vehicles are being registered every year in the last five years resulting in an increase in vehicle population by approximately 7%.

Year	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Motor Vehicles registered	1009362	1083678	1158241	1238644	1324763	1399833[6]

About 70% percent of vehicles are registered in the category of two-wheelers followed by private cars and jeeps including taxis which form about 22.06 percent of the vehicle population. Goa's traffic profile is dominated by vehicles for tourism-related transport, personal transport, and interstate cargo as Goa's state highways provide an effective route [illegible] connectivity

[6] Source: Goa Economy in Figures

between the southern and western states. 54144.10 MT of cargo traffic has been handled in the State in 2017-18[7].

In some parts of Goa, the demand for public transport is very high. To fulfil the demand the KADAMBA TRANSPORT CORPORATION LIMITED (KTCL) is operating a nonstop shuttle service on various routes like Panaji - Margao, Panaji - Vasco, Margao - Vasco, Panaji - Ponda, PanajiMapusa and Margao-Curchorem.[8]

Table 14: Vehicles by Category[9]

Sr. No.	Type of Motor vehicle	2013-14	2014-15	2015-16	2016-17	2017-18
	1	16	17	18	19	20
	Transport					
1.	Motorcycle for hire	1399	1688	1788	1746	1266
2.	Goods vehicle	1466	1531	1591	1530	1456
3.	Taxis	1122	1067	813	1269	1192
4.	Buses+ Minibuses including KTC	969	299	279	385	259
5.	Autorickshaws	129	102	118	107	54
6.	Fire Tenders	NOT AVAILABLE				2
7.	Ambulance					1
	Total	**5085**	**4687**	**4589**	**5037**	**4230**
	Non-Transport					
1.	Motorcycles+ Scooters	50732	52711	53458	56926	49486
2.	Private cars+ Jeeps	15016	16767	16353	18267	17625
3.	Tractors & Others	144	141	158	168	124
4.	Government vehicles	13	10	5	5	2
	Total	**65905**	**69629**	**69974**	**75366**	**67237**
	Grand Total	**70990**	**74316**	**74563**	**80403**	**71467**

Water Transport: Goa has a network of Inland Waterways, navigable throughout the year. It has a widely spread network of inland waterways comprising of two main rivers Zuari and Mandovi and other small rivers such as Terekhol, Chapora, Mapusa, Sal, etc. [10] These rivers have sufficient draft for navigation and are used for transportation. They serve two types of transportation:

[7] Statistics is up to December 2017
[8] Source: Economic Survey 2017-18
[9] Source: https://www.goatransport.gov.in/Statistic
[10] Source: https://www.goa.gov.in/department/river-navigation/

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- Transportation of passengers and vehicular traffic living in the islands and across the rivers not connected by roads and bridges
- The movement of heavy and bulky mineral ores from interior parts up to the Mormugao Harbour, which is the only major economic port of the State

The River Navigation Department (RND), is mainly engaged in the operation of ferry services in the inland waters of Goa. RND wishes to focus on public transport which is core to its service mission while identifying non-core activities such as fast ferry service across the important towns/cities for public, vehicles and good. Ferry service from Panaji to Vasco has been identified as one of the viable development options for the development of waterways.

River Navigation Department (RND) provides 24 hours ferry transport to the commuters at 20 ferry routes all over Goa with fleet of 39 ferry boats. Everyday about 2.5 lakhs commuters and 18000 vehicles use the ferry service. There is a potential to further utilize the inland water ways.

Initiatives and Schemes to support climate friendly development in transport sector:

Scheme 1: The Goa State Subsidy for replacement of old Passenger Buses Scheme, 2001

Objective: The scheme provides subsidy for replacement of buses older than 15 years with a view to curtail vehicular pollution and to provide an efficient, reliable and comfortable service to the users.

Scope of the Scheme: The scheme covers the owners of buses and mini buses of model older than 15 years covered by valid regular permit and which are in operation for a continuous period of past 3 years.

The scheme also provides for disbursement of subsidy for purchase of new vehicle on replacement of following types of vehicles:

Sr.	Age of the vehicle	Type of vehicle	Seating capacity	Amount of subsidy to be disbursed
1.	Between 10 to 15 years	Bus	49-seater and above	₹6.00 Lakhs
2.	Between 10 to 15 years	Minibus	39-seater and below	₹4.20 Lakhs

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3.	Between 15 to 20 years	Bus	49-seater and above	₹3.90 Lakhs
4.	Between 15 to 20 years	Minibus	39-seater and below	₹3.30 Lakhs
5.	Above 20 up to 25 years	Bus	49-seater and above	₹3.30 Lakhs
6.	Above 20 up to 25 years	Minibus	39-seater and below	₹2.70 Lakhs
7.	Above 25 years	Bus	49-seater and above	₹2.70 Lakhs
8.	Above 25 years	Minibus	39-seater and below	₹2.10 Lakhs

Scheme 2: The Goa State Fuel Subsidy to Private Stage Carriage Operators Scheme, 2014

The objective of this scheme is to provide socio-economic support to entrepreneurs in the trade of operation of stage carriage on intra-state routes. The scheme covers the owners of private buses/minibuses operating on intra-state routes as "stage carriage" as well as those intending to enter the trade for the first time. The scheme provides for disbursement of fuel subsidy of ₹3/- (Rupees three only) per kilometre of operational distance.

Under the Goa State Fuel Subsidy to Private Stage Carriage Operators Scheme, 2014 fuel subsidy to 333 bus operators amounting to ₹ 791.72 lakh was disbursed till December 2017.

KTCL has also undertaken several initiatives which improve the efficiency of its fleet:

- Replacement of overage fleet for better cost control and increase in the load factor.
- Energy conservation measures such as Smoke control, Anti-pilferage device, Purchase of fuel-efficient engine and Modification of bus-body design

GOA ELECTRIC MOBILITY PROMOTION POLICY – 2020 is under finalization and the below given are important projections which are relevant to SAPCC.

This policy envisages to provide manufacturing incentives, demand incentives, upfront incentives, tax incentives and also non fiscal support in addition to innovation. Electric charging stations including solar-powered stations are planned.

Under the National Electric Mobility Mission Plan (NEMMP), Government of India has envisioned 6-7 million electric and Hybrid vehicles on Indian roads by 2020. Towards this goal, the Faster Adoption and Manufacturing of Hybrid and Electric vehicles (FAME) has been launched by Department of Heavy Industries, Government of India. Its target is saving 120 million barrels of oil and 4 million tons of CO_2 as well as lowering of vehicular emissions.

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by 1.3 % by 2020. FAME India scheme has four focus areas–technology development, demand creation, pilot projects and charging infrastructures.

Based on the recent techno-economic developments in EV sector and the vision of Government of India, a need was felt by Government of Goa to formulate a policy for promotion of this sector in Goa. Building on indigenous strengths of tourism and IT industries, Government of Goa envisages to build Goa as a model State in EV.

Despite the unorganized nature of the transport sector, Goa stands on top in the country in terms of per capita vehicles with 625 vehicles for every 1,000 people in the state and is also ranked 15 in the world in terms of vehicle density. According to an estimation by Goa Automobile Dealers Association (GADA), on average, every Goan household has about 2 bikes and one car. With an urbanization rate of 62%, these numbers are only expected to grow. Hence, there is an eminent need to ensure growth of this sector does not further environmental degradation. Adoption of new energy vehicles (NEVs) would also be supported by utility growth in the state.

OBJECTIVES:

1. 30% of annual vehicles registered in Goa, starting from the year 2025, would be electric.
2. To convert 50% of all ferries to electric by 2025.
3. To create 10,000 direct and indirect jobs in the sector by 2025.
4. To encourage start-ups and investment in the field of electric mobility and associated sectors such as mobility as a service (MaaS), autonomous vehicles, data analytics and information technology.
5. To promote service units which would include Electric Vehicles and battery repair and maintenance stations.
6. To promote R&D, innovation and skill development within the EV sector.

Mitigation Measures: In addition to the above schemes, there is scope and need for the state to take measures to develop a low carbon transportation system for the state of Goa. The Mitigation Measures proposed to be implemented under the SAPCC by this sector are provided below.

Table 15: Mitigation Strategy for Transportation Sector

Sr. No	Intervention		Status	Responsible agency	Barriers and Gap in implementation	Intervention Type
	Intervention	**Type**				
1	Electric mobility policy should be developed by state	Mitigation	proposed	Transport department	Gap: e-charging stations State does not produce electricity	Policy
2	Provisions should be made for non-motorized transportation in urban areas to decongest and reduce GHG emissions	Mitigation	to be modified	Transport department		Activity
3	Development of a wholistic policy for low emission sustainable transport system	Mitigation	proposed	Transport department		Policy
4	The Goa State Subsidy for replacement of old Passenger Buses Scheme, 2001	Mitigation	under progress	Department of Transport		Scheme
5	Identify Alternate mode of fuel transportation in the mining area	Mitigation	proposed			Activity
6	Explore the possibility of using CNG instead of petrol and diesel	Mitigation	proposed	Department of Transport	Barrier- Availability of CNG	Scheme
7	Solar power vessels for inland water ways	Mitigation	proposed	RWN	Cost	Activity
8	Convert existing vessels to CNG vessels	Mitigation	proposed	RWN	Cost	Activity
9	Make adequate parking space for vehicles					
10	Provide interconnected public and non-motorized					

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Sr. No	Intervention	Status	Responsible agency	Barriers and Gap in implementation	Intervention Type
	system for point to point connectivity				

Note 1 : The Concerned Department is expected to carry out GAP analysis and ascertain budgetary provisions and implications for the activities mentioned above and add more activities relevant to climate change within the period of at least three months.

Note 2 : **Approximate financial implications of transport sector expected to be met from climate change plan for ten years are approximately ₹ 75 crores. Detailed plan for expenditure along with gap analysis will be prepared by the department within 6 months.**

6.2.2 Power Sector

Power today has become indispensable for all its users. Goa does not generate its own power and its current energy needs are met by purchasing power from the Central Sector Power Stations of the National Thermal Power Corporation (NTPC) as per the allocation made by the Central Government. Besides this, a small amount of 16 MW of power is generated by Naphtha based power plant operated by Reliance Energy Limited at Sancoale, Mormugoa. This plant supplies power predominantly to private industries and a small amount of power is sold to the state grid. Power is also bought from Saligao Solid Waste Treatment Plant for promoting the generation of renewable energy. **The Key agency in electricity sector in Goa is Goa State Electricity Department.** Electricity department is meeting its renewable power obligation (RPO) as framed by Joint Electric Regulatory Commission from time to time. **For the year 2020-21 Goa proposed to purchase 17% of its Power demand from renewable sources.**

Goa Energy Development Agency (GEDA) is responsible for the promotion and production of renewable energy in the state. Goa Solar policy was developed in 2017. Few significant initiatives proposed are given below.

Goa Energy Development Agency (GEDA)

a. Biogas from municipal solid waste, sewage and cow dung/ animal dung to electricity and compressed biogas.
b. Biomass to energy from aggregation of biomass from garden, tree cuttings, monsoon shrub cutting, coconut shells, leaves etc.
c. Centralized facility for Biomass to ethanol conversion project
d. Wave energy/ tidal energy Project
e. Replacement of electricity based pumps of farmer to solar energy driven pumps

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f. Introduction of CBG buses in local state transport.

The Electricity Department of Goa provides both low tension as well as high tension supply to consumers, besides street lights and high masts in public areas. For its future needs, the Power Grid Corporation of India has commissioned a 400 KV transmission system that will enable Goa to draw power to the extent of 500 MW.

Goa has achieved 100% electrification. Goa's per capita power consumption is about 1100 kWh per year. The share of the industrial sector in Goa's power pie is much larger. In 2017-18 about 60% of the power was consumed for industrial purposes whereas 26% was consumed for domestic and 11% for commercial purposes.

Table 16: Energy Demand in Goa[11]

Year	2013-14	2014-15	2015-16	2016-17	2017-18
Energy consumed for Domestic purposes (MKWh)	912.00	730	1010	880.59	924.14
Energy consumed for Commercial purposes (MKWh)	224.00	409	394	368.45	386.03
Energy consumed for Industrial purposes (MKWh)	1411.00	1839	1796	1986.92	2053.75
Energy consumed for Irrigation purposes (MKWh)	21.00	31	18	29.94	29.94
Energy consumed for other purposes (MKWh)	466.00	105	50	86.26	100.86
Total power consumed (MkWh)	3034	3114	3268	3352.16	3494.72

Table 17a: Mitigation Strategies for Energy Sector- Supply Side Interventions

[11] Source: Goa at a Glance

Sr. No	Intervention	Status	Responsible agency	Barriers and Gap in implementation	Intervention Type	Budget (INR crore)	Source of Finance
1	PPA has been executed with SECI for purchase of 25MW of solar power for a period of 25 years from 2015 onwards	Completed	Electricity Department		Others	*	Existing Department Budget
2	Three Power sale agreement (PSA) of 50 MW wind each have been executed with SECI to meet the additional power requirement	Completed	Electricity Department		Others	*	Existing Department Budget
3	50MW of wind power from above PSA is available from May 2019 other two still awaited	Under progress	Electricity Department		Others	*	Existing Department Budget
4	Power of about 2MkWh is also bought form Saligao Solid Waste Treatment Plant for promoting generation of renewable energy	Completed	Electricity Department		Others	*	Existing Department Budget
5	300 MW of solar to be set up by 2030	proposed	GEDA	Creating enough market-based employment	Activity	Rs 47000/ Kw	Own budget and Central Government Contribution
6	25 MW of renewable energy to be set up by 2030	proposed	GEDA	Creating enough market-based employment	Activity	*	Own budget and Central Government Contribution
7	Electrification in rural set up and in hinterlands to be taken up through off grid non-conventional sources like solar rooftop, biogas, kitchen waste etc.	Proposed	GEDA		Policy/Scheme	*	Existing Department budget
8	Goa Solar policy 2017 (amended in February 2019)	completed	Department of Non-Conventional Energy Sources		Policy	*	

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Sr. No	Intervention	Status	Responsible agency	Barriers and Gap in implementation	Intervention Type	Budget (INR crore)	Source of Finance
9	Goa Wind Policy	proposed	Department of Non-Conventional Energy Sources		Policy	*	
10	Goa must explore the possibility of tidal energy and further enhance mini-hydro potential	proposed	Department of Non-Conventional Energy Sources		Policy	*	
	Note – The financial implications expected for GEDA under climate change is broadly ₹ 25 crores. The detailed plan for expenditure and gap analysis will be prepared within 6 months by the department.						

Table 18b: Mitigation Strategies for Energy Sector- Demand Side Interventions

Sr. No	Intervention	Status	Responsible agency	Barriers and Gap in implementation	Intervention Type	Budget (INR crore)	Source of Finance
1	Demand Side Management (DSM) measure - All types of conventional Street light fixtures (i.e. 1.77 lakh) are being replaced by high quality efficient smart LED light fixtures under the Street Lighting National Programme (SLNP) of Government of India through Energy Efficiency Services Ltd (EESL), a joint venture of PSUs of Ministry of Power, Government of India on ESCO model.	completed	Electricity Department		Others	45 crores	State Government Funds (40%) & Central Govt requested for balance

Sr. No	Intervention	Status	Responsible agency	Barriers and Gap in implementation	Intervention Type	Budget (INR crore)	Source of Finance
2	Under the Deendayal Upadhyaya Grameen Joyti Yojana (DDUGJY) installation of digital meter	Completed	Electricity Department	Already 166000 have been installed but now smart is intended	Scheme	20crores	Own budget and Central Government Contribution
3	Jyotirmay scheme - distribution of 3 LED bulbs of 9W each to domestic households. 8.2 lakh bulbs have been distributed under the scheme	Completed	Electricity Department		Scheme	*	State Government funds
4	Goa has executed a Bipartite MoU with the Ministry of Power, Government of India and joined the "UDAY" scheme. - AT & C losses controlled to 12% improving feeder efficiency. AMR remote metering for HT consumers, substation feeders and Distribution transformers installed. GIS for Asset mapping and SAP system for billing implemented.	under progress	Electricity Department		Scheme	*	Existing department budget
5	Mandating periodic Energy audit to improve energy consumption and operational efficiency of all government establishments	proposed			Others	*	Existing Department Budget
6	Industrial energy efficiency should be promoted through BEE's programs	proposed	State Designated Agency for Electricity Department (SDA)		Others	*	To be funded by BEE and industries
7	Incentivization of energy efficiency for commercial and domestic users	proposed	State Designated Agency for Electricity Department (SDA)	Consumer awareness and willingness	Scheme	*	To be funded by BEE

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Sr. No	Intervention	Status	Responsible agency	Barriers and Gap in implementation	Intervention Type	Budget (INR crore)	Source of Finance
8	Programs to develop awareness on saving of energy	proposed	State Designated Agency for Electricity Department (SDA)		Others	*	To be funded by BEE
9	Training and skill development for renewable energy implementation, maintenance and energy auditors etc.	proposed	GEDA	Creating enough market-based employment	Awareness raising and capacity building	*	Own budget and Central Government Contribution

(* **Detailed cost estimates and gap analysis will be carried out relevant to climate change related activities within six months at departmental level and financial implications of about ₹50 crores will be also detailed out)**

Proposed initiatives & Finance requirements for

- **Smart metering (918 crores required)**
- **Underground cabling (HT and ST) (4500 crores required)**
- **GIS substations for forested areas 22 substations (Rs 484 crores)**
- **Underground networking of LTE in forested areas 500 kms target in ten years (Rs 550 crores)**

Approximate financial implications of transport sector expected to be met from climate change plan for ten years are approximately ₹ 75 crores. Detailed plan for expenditure along with gap analysis will be prepared by the department within 6 months.

6.2.3 Agriculture and Allied Sector

Agriculture sectors contribute to climate change through the use of irrigation equipment and other machinery used. Water flooding based irrigation practices, burning of agricultural waste or uncontrolled decay of waste also contributes to GHG emission. To contain the emissions from this sector below mentioned intervention and strategies are proposed.

Table 19: Mitigation Strategies for Agriculture Sector

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Sr. No	Intervention		Status	Responsible agency	Barriers and Gap in implementation	Intervention Type	Budget	Source of Finance
	Intervention	Type					INR crore	
1	Focus initiatives to increase vermi-composting at community level	Mitigation	proposed	Department of Agriculture		Scheme	*	Others
2	Incentivize replacement of agricultural pumps with energy efficiency pumps and solar pumps	Mitigation	proposed	Department of Agriculture and department of energy		Scheme	*	
3	Sensitize farmers on optimal utilization of water to reduce pump usage and reduce water wastage	Cross Cutting	proposed	Department of Agriculture		Awareness raising and capacity building	*	Existing Department Budget
4	Incentivize optimal utilization of water pumps (this	Cross Cutting	proposed	Department of Agriculture		Scheme	*	Own budget and Central Government Contribution

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Sr. No	Intervention		Status	Responsible agency	Barriers and Gap in implementation	Intervention Type	Budget	Source of Finance
	includes installation at appropriate RM Pand head)							
5	Promoting organic manure	Cross Cutting	under progress	Department of Agriculture		Activity	*	Existing Department Budget
6	Optimal utilization of fertilizers and pesticides	Mitigation	under progress	Department of Agriculture		Activity	*	Existing Department Budget
7	Provide assistance in utilization of cattle and animal waste as manure and for biogas generation	Mitigation	proposed	Department of Agriculture		Activity	*	Own budget and Central Government Contribution
8	Promoting Biomass residue from agriculture to be used for power generation where it does not have an	Mitigation	proposed	Department of Agriculture	Aggregation of farmers and setting up of power plant	Activity	*	Others

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Sr. No	Intervention	Status	Responsible agency	Barriers and Gap in implementation	Intervention Type	Budget	Source of Finance
	alternate use						

(* Detailed cost estimates and gap analysis will be carried out relevant to climate change related activities within six months at departmental level)

Note - Proposed ball park estimates for next ten years for Agricultural sector arrived at through broader consultation is ₹ 50 crores. Details will be worked out by the department within 6 months towards this.

6.2.4 Waste Management Sector

The State of Goa has been proactively working on the issue of solid waste management. To maintain a clean and litter-free environment and to ensure proper Solid Waste Management across the State, various initiatives have been undertaken by the State as follows:

The first major initiative is the collection of all the plastic waste across the National Highways.

Highway waste collected by GWMC

HIGHWAY COLLECTION				
Month	Dry	Wet	Tree	**Total (Tonnes)**
Jan-20	34.62	17.38	1.51	**53.51**
Feb-20	41.47	36.93	1.59	**79.99**
Mar-20	84.69	76.06	0.3	**161.05**
Apr-20	59.86	0	1.28	**61.14**
May-20	67.43	0	0	**67.43**
Total				**423.12**

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The second major initiative is setting up Solid Waste Treatment Facility one each, in North Goa and South Goa. The first such state-of-art facility has been already set up in

Saligao/Calangute in Bardez Taluka in 2016 and the second one, at Cacora, which is likely to be commissioned during the end of this year i.e. 2018.

GWMC has signed an agreement with e-waste PRO Karo Sambhav for collection of all types of e-waste generated. Further, the e-waste condemnation policy for the State is being amended to mandate condemnation only against disposal and not buy-back, which reduces the flow of government e-waste to the informal sector in the State.

Department is in the process of setting up of Common Biomedical Waste Treatment Plant at Kundaim Industrial Estate. The Goa Waste Management Corporation formed by the State Government has been entrusted to look after the management of all types of wastes, collection of dry non-biodegradable waste from Village Panchayats, Municipalities, State & Central Government Institutions, Industrial Estates, and other organizations in the State and its safe disposal.

The collection of segregated waste is the first step. Followed by composting of bio-waste.

A state-of-the-art facility using the latest technology for solid waste management has been commissioned and made operational at Calangute by the Government of Goa, to treat and dispose of the solid waste from coastal villages in North Goa. This modern facility is based on the Mechanical Biological Treatment (MBT) process with proper segregation, recycling, and bio-methanation technology. The functioning of the plant and selection of technology has been made to address all issues of odour, unsightly garbage mounds and leachate generation. Electricity produced in-house from the organic fraction of the waste will be used to power the entire plant operation. The state government is proposing to establish similar SWM management facility at Bainguinim in North Goa and Cacora in South Goa in their action plan for SWM for Goa[12]. The solid waste management cell of the DST is collecting segregated nonbiodegradable waste from the village panchayats and bailing it. Details of other SWM facilities planned by the state is provided as annexure I.

State of Art Waste Management Facility at Saligao

The integrated Solid Waste Management Facility (SWMF) at Saligao is a state of art facility set up in 2016 which is scientifically managing waste as per the SWM rules 2016 and is successfully catering to 25 local bodies along the coastal belt of North Goa. additionally, the plant also caters tobeach cleaning waste and highway cleaning waste. The plant was designed for 100 Tonnes Per Day (TPD) capacity which has been enhanced to 150TPD. The facility was built on existing 20-year-old 73,198tonnes waste dump after remediation of the same.

[12] Carrying Capacity of Beaches of Goa for Providing Shacks & Other Temporary Seasonal Structures in Private Areas

- Facility Treated total of **186008.3Tonnes** Municipal Solid Waste from May 2016 to May-2020.
- **63399Tonnes** of RDF generated which is being disposed for coprocessing to cement factory from the facility.

277925KW (277 MegaWatt) power generated from the facility from Aug 2016 to May-2020.

1) Remediation of existing legacy dumps in Goa

The works contemplated under this contract consist of "Remediation, providing monsoon cover wherever required and safe disposal of the separated fractions from existing old Municipal Solid Waste (MSW) at various locations (11 identified) in Goa" shall be applicable to various MSW dumpsites within the state of Goa. GWMC accordingly floated tender for remediation and issued work order to 3 bidders to carry out remediation of 11 identified legacy waste sites in the State of Goa.

Other than the 11 sites, till date the State has remediated approximately 1,23,000 tonnes of waste from legacy dumps at Saligao, Cacora and Aradi. Besides till date among the 11 identified sites, waste remediation has been commenced at following sites

- Sada (Mormugao Municipal Council) ~1,15,000 m3 waste is remediated
- Sonsodo (Margao Municipal Council) ~1,05000 m3 waste is remediated
- Assagao (Mapusa Municipal Council) ~-32,000 m3 waste is remediated
- Campal Parade Ground (Corporation of the City of Panaji) ~ 6,800 m3waste is remediated

Few important items in Goa's waste management strategy should include:

1. Waste minimization in the tourism sector by providing alternate and bio-degradable options for tourist

2. Incentivising disposal of plastic waste by providing ride coupons or other tourist coupons in exchange for disposal or deposition of plastic waste at designated areas

Approximate financial implications of transport sector expected to be met from climate change plan for ten years are approximately ₹ 25 crores. Detailed plan for expenditure along with gap analysis will be prepared by the department within 6 months.

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7. Chapter 7: Adaptation Strategies

7.1. Water

Water sources

The State receives a copious annual rainfall of about 2500 to 5000 mm from the southwest monsoon. Four of the seven rivers in the state, namely, Mandovi, Zuari, Galijibag, and Talpona occupy about 77.70% of the State's geographical area. Mandovi and Zuari are the two largest rivers. 'Dynamic Ground Water Resource of India, (March 2013 - June 2017) has estimated the net groundwater availability in the State as 14625 ham[13]. The stage of groundwater development is 37%, which falls in the safe category of groundwater exploitation.

Though Goa is situated in high precipitation zones, it has one of the lowest per capita freshwater availability. The draft state water policy 2015 presents various challenges faced by the state in the utilization of the water resources. The rivers are prone to tidal variations up to 40 km inland and seasonal variation in the availability of water.

In the mining zones, water scarcity has been increasing due to the withdrawal of groundwater and the non-replenishment of wells.

Current status of water and associated facilities

The Water Supply in the State of Goa is catered through Regional Water Supply Schemes and Spot Sources. The Public Works Department is looking after the Water Supply Sector including Operation and Maintenance in the entire State of Goa in both Rural and Urban Areas.

The state has a total water treatment capacity of 601 MLD. Rural areas are supplied with water at the rate of 82LPCD and urban areas with 143LPCD. The state intends to achieve 24x7 water supply scenario with 100 LPCD supply in rural areas, and 150 LPCD in urban areas. By 2025, state intends to have installed capacity for water at 711 MLD.

All the Water Treatment Plants are equipped with Water Testing Laboratories for regular water testing. The quality of the drinking water is regularly checked to maintain all service standards and quality is maintained at all levels. The details of the Present Water Supply Schemes are:

Total Installed Capacity is 601.43 MLD

Regional Water Supply Schemes	-	580.22 MLD
Additional Schemes (Pressure Filter)	-	14.42 MLD
Additional Spot Sources	-	6.79 MLD

Details of Water supply schemes are provided as annexure II.The majority of the population depends on traditional septic tank and soak pit system for the disposal of wastewater. As of FY 2016-17, urban areas in the state generate 253 MLD of wastewater out of which 36% is treated through the sewerage treatment plant. In the near future state intends to improve the sewerage facilities in all uncovered areas. It is also proposed that sewerage facilities are provided to the rest of the state in a phased manner in order to achieve total sanitation and zero discharge of

[13] 1 cubic meter is equal to 0.0001-hectare meter (ham)

wastewater into the environment. IN FY17-18, 9% of the government's non-tax revenue came from water supply i.e. INR 126 crore.

The state has assessed its total water requirement by 2051 to be 8030mcm. Total water resources that can be conserved have been identified to be worth 1585mcm. In 2015, Goa's Ground Water Policy was also prepared with the aim to develop & regulate groundwater on a sustainable basis and manage it in a professional manner to prevent its pollution and degradation.

To support the water policy, groundwater policy and strengthen the water and related systems in the state following are the key items undertaken by the state:

Schemes and Initiatives

- 'Nital Goem Nital Baim' has been introduced to help promote the conjunctive use of water and also maintain the groundwater structure in the State.
- Master plans have been prepared for optimal utilization of the water resources of the four river basins of the State
- Scheme for post monsoon water harvesting for groundwater recharge through the construction of a series of bandharas across rivers and nallahs in the sweet water zones.

Projects and Activities

- Replacement of old AC pipeline by 300mm dia D.I water supply pipeline from Zrowado Chapel up to Navelim church in Navelim Constituency at a cost of ` 400.00 lakh
- Providing & laying of conveying main & distribution main and Construction of 800 m3 GLR at Bastora at a cost of`` 156.81 lakh.
- Replacement of old 150mm AC pipeline from 800m3 GLR at Desai Nagar to Upper Harvalem in Sankhali Constituency at a cost of`` 216.99 lakh
- The National Hydrology Project provides additional financial support and also offers an excellent opportunity to introduce new technologies into water resource sector planning & management.
- Online services like Registration of wells and tankers under the Groundwater Regulation Act, 2002
- Act to charge rates for drawl and transportation of groundwater under different uses and register all the drilling companies who drill borewells in the State.

Impact of climate change on water resources in the state:

1. **Seawater intrusion or saltwater ingress** will increase the salinity of groundwater near the coastal areas rendering it unusable. With sea-level rise due to climate change and indiscriminate use of groundwater the problem of saltwater intrusion will be exasperated.

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2. **Increased back flow of water into rivers and drainage channels.** This is an indirect impact. As an example: The formation of beaches on Querem and St. Inez is taking place. This is indicative of the sand deposition trends along the Panaji coastline. The formation of this beach has led to blockage of water flow of the St. Inez creek into the Mandovi River and hence, has increased backflows[14]. In the case of climate phenomena like high-intensity short-duration rainfall, the impact could be an increased impact of floods due to clogged drainage channels.
3. **Increased pollution of water bodies and flooding:** Due to the high-water table the soaking capacity of the soil is generally poor in Goa. With increased precipitation events the runoff will increase and inadequate sewerage network and sanitation facilities have the potential to mix run off with sewerage and other contaminants leading to pollution of water bodies like ponds, lakes, tanks, etc.
4. **Increased risk to water-related structures and infrastructure:** Directly and indirectly climate change and other non-climatic stressors increase the risk of failure of infrastructure. For example, increased peak rainfall incidents in Goa where the water table is high and the soil is saturated can further elevate the changes of the landslide, mudslide, etc. Such sliding events have the potential to impact the water supply pipeline, sewerage network, etc. Some parts of Goa have in the past years experienced the impact of such events.

Impact on Mandovi River due to climate change

In Mandovi River Saline water intrudes up to 46 Kms. in the river Mandovi up to Ganjem. If the sea level increases as apprehended on account of global warming, the saline water will intrude even further into the river. When the sea levels rise rapidly, as they have been doing, even a small increase can have devastating effects on coastal habitats. As seawater reaches further inland, it can cause destructive erosion, flooding of wetlands, inundation of Khazan lands, contamination of aquifers and agricultural soils, and loss of habitat for fish, birds and plants. Ground water aquifers will also get impacted. An area of 509 sq.kms at the lowermost end of the Mandovi basin, i.e. about 32% of the basin area in Goa is subject to tidal effects and the water resources in this area are not fit for harnessing for any consumptive uses. Increased salinity due to sea level rise resulting from global warming is bound to enlarge the tidal zone of the basin and thereby progressively reduce the available utilizable fresh water resources.

[14] Urban Vulnerability Assessment Report, Panaji City, India, GIZ, March 2013

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The climate change scenario is also likely to alter the rainfall and cause water shortage. It is likely to have a general overall reduction in the quantity of available run off in rivers originating in Western Ghats including Mandovi.

Synergy with National Water Mission and SDG

The adaptation measures outlined below have been developed to align with the National Water Mission (NWM) and SDG6.

NWM's main objective is "conservation of water, minimizing wastage and ensuring its more equitable distribution both across and within States through integrated water resources development and management". The five identified goals of the Mission are: (a) developing comprehensive water data base in public domain and assessment of impact of climate change on water resource; (b) promotion of citizen and state action for water conservation, augmentation and preservation; (c) focused attention to vulnerable areas including over-exploited areas; (d) increasing water use efficiency by 20%, and (e) promotion of basin level integrated water resources management (IWRM).

The Sustainable development goal (SDG) number 6 focuses on clean water and sanitation. Its goal is to *Ensure availability and sustainable management of water and sanitation for all.*

The targets for SDG 6 are:

6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all

6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations

6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally

6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity

6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate

6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes

6.a By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water

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harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies

6.b Support and strengthen the participation of local communities in improving water and sanitation management

Hence, the adaptation measures on water for the state of Goa would focus on:

1. **Adaptation of water related infrastructure**

Several activities to upgrade, augment and supplement water supply and sewage treatment are planned in Goa. These proposed activities will increase adaptive capacity. However, Climate vulnerability of infrastructure proposed, infrastructure site and the infrastructure should also be assessed. For example, the probability of water sump or treatment plant getting submerged or flooded due to changing climatic phenomena will cause financial vulnerability and availability of critical resources during disasters as well will be compromised.

To avoid such a scenario, it is proposed that:

- **Implementable guideline for climate-proofing of water-related** infrastructure projects is developed for all types of water projects. These guidelines must be taken into account at the time of development of project DPRs. Examples of water-related projects where these may apply are water supply, sewerage network, wastewater treatment structures, etc.

- **Climate proofing existing key water supply and sewerage management infrastructure** lying in critical zones like low lying areas. Climate risk and vulnerability assessment of such infrastructure, prioritization and development of remedial action plan.

2. **Development of infrastructure to reduce impact on water availability and enhance water security**

Safeguarding groundwater against salinity and pollution is essential for water security. To achieve this:

a. There is a need to develop an integrated salinity control mechanism in coastal areas of Goa which would include measures to reduce the exploitation of groundwater.
b. The majority of the population is still dependent on traditional septic tank and soak pit system for the disposal of wastewater. Appropriate fecal sludge management or alternate management strategies to be developed and implemented.
c. Health hazards such as contamination of groundwater or drinking water due to the lack of adequate soaking capacity of the soil, letting of the wastewater in open drains is growing due to urbanization. It is proposed to cover all the major towns with sewerage network using appropriate technology, to take the goal of total sanitation and clean environment in urban areas. Provide sewerage network in all low-lying unsewered areas, followed by extension of the network to all unsewered areas.

d. It is necessary to enforce various measures to make the residents avail sewerage connections in serviced areas.

3. Developing systems for appropriate planning of water to ensure water supply to all

- Draft water policy should be finalized after including climate resilience aspects.

  There is a need for a system of suitable water pricing to deal with increasing water scarcity in the future due to the adverse effects of climate change. It is also essential to include recycling and reuse component in the water policy.

- Treated wastewater can provide additional water resources to water-stressed regions and help in meeting the water needs of growing India. Therefore, the state needs to invest in wastewater treatment capacity keeping this long-term vision in mind and plan for practical options for the introduction of recycle and reuse potential in the state by 2030. **A complete assessment of existing recycling and reuse potential for treated wastewater and the enablers needed for future capacities to be developed is missing in the policy.**

- Undertake a pilot on wastewater recycling and reuse before scaling it.

- Carry out a water audit to identify the potential for reducing water loss in the current water supply system

- Modernizing and expanding instrumentation and measurement techniques also enhance the ability to reduce water loss. Systematic investment in critical areas.

4. Maintenance of water resources to avoid flooding and to keep related infrastructure functional during peak events and disasters

Major rivers carry away surge water and help in reducing surge velocity to flooding, hence nearness to a major river decreases vulnerability while minor rivers can have the opposite effect likely because of their low water carrying capacity. It is essential to maintain the carrying capacity of rivers by desilting. Due to climate change, it is essential to review and revisit the existing maintenance plan for drains, sewerage networks as well as key water bodies like rivers and lakes.

- Revisit the maintenance plan of water bodies and conduct desilting accordingly
- Revisit the infrastructure maintenance plan and develop a climate-resilient infrastructure maintenanee plan and implement the same

5. Knowledge management and capacity building (Forecasting and data base building)

Interdepartmental interaction: The different departments of the state government, whose work is related to water and climate change should have a common forum that should meet at frequent intervals to take an integral view of knowledge base and policy options. For this

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purpose, the Department of Water Resources should have an effective cell headed by a Chief Engineer level officer. The climate secretariat shall be a part of this activity.

- Where feasible GIS based mapping of the sewer drains for better tracking and management
- Flood forecasting should be envisaged using real-time data acquisition systems and linked to forecasting models. Real-time Data acquisition systems should be provided to make flood level data available to concerned officials.
- The impact of climate change should be analyzed at sub-basin level such as Zuari sub-basin,
- High priority should be assigned to strengthening and creating adequate facilities for studies and research on hydrological, hydro-metrological and geomorphologic aspects related to climate change within the Department of Water Resources, WALMI, Universities, and other institutions

6. Awareness Raising

There is a need to take up massive programs of awareness generation among people at all levels about the adverse effects of climate change and the need to optimize water usage and conserve water.

Table 20: Adaptation Measures for Water Sector

Sr No	Intervention	Status	Responsible agency	Barriers & Gap in Implementation	Intervention Type	Budget (INR crore)	Source of Finance	Time frame
1	Develop Implementable guideline for climate proofing of new water related infrastructure projects	proposed	Climate Secretariat	Gap: Exact information on climatic variables may not be available	Others	0.15	Own budget and Central Government Contribution	6 months
2	Implementation of guideline by including it in project planning and DPR stage	proposed	Water Resource Department, Municipal Administration		Policy	-	Existing Department Budget	1 year

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Sr No	Intervention	Status	Responsible agency	Barriers & Gap in Implementation	Intervention Type	Budget (INR crore)	Source of Finance	Time frame
3	Climate risk and vulnerability assessment of such infrastructure, prioritization and development of remedial action plan.	proposed	Climate Secretariat	Gap: Exact information on climatic variables may not be available	Others	0.2	Own budget and Central Government Contribution	6 months
4	Climate proofing existing key water supply and sewerage management infrastructure	proposed	Water Resource Department, Municipal Administration		Activity	Unknown		2 years
5	develop and implement an integrated salinity control program	to be modified	Multi department Ground water department, Municipal Administration etc		Others		Own budget and Central Government Contribution	3 years
6	faecal sludge management	proposed	Sanitation department		Activity	-	Own budget and Central Government	3 years

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Sr No	Intervention	Status	Responsible agency	Barriers & Gap in Implementation	Intervention Type	Budget (INR crore)	Source of Finance	Time frame
							Contribution	
7	to cover all the major towns with sewerage network	under progress			Activity	-	Own budget and Central Government Contribution	
8	Provide sewerage network in all low-lying unsewered area followed by extension of network to all unsewered areas.	under progress			Activity		Own budget and Central Government Contribution	1-5 years
9	Development of measures to make it mandatory to avail sewerage service	under progress			Activity		Existing Department Budget	1-5 years
10	Draft water policy should be finalized after including climate resilience aspects.	to be modified		Gap_ existing water policy does not include important climate change aspects	Policy	0.1	Existing Department Budget	6 months

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Sr No	Intervention	Status	Responsible agency	Barriers & Gap in Implementation	Intervention Type	Budget (INR crore)	Source of Finance	Time frame
11	A complete assessment of existing recycling and reuse potential for treated waste water and the enablers needed for future capacities to be developed is missing in the policy.	proposed			Policy	0.2	Own budget and Central Government Contribution	6 months
12	Undertake a pilot on wastewater recycling and reuse before scaling it.	proposed			Activity	15-20	NAFCC	3 years
13	Carry out water audit to identify the potential for reducing water loss in current water supply system	proposed			Activity	0.25	Existing Department Budget	1 year and then every three years
14	Modernizing and expanding instrumentation and measurement techniques also enhances the ability to reduce water loss	under progress			Activity	*	Existing Department Budget	continuous
15	Revisit the maintenance	proposed			Activity	*	Existing Depar	1 year

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Sr No	Intervention	Status	Responsible agency	Barriers & Gap in Implementation	Intervention Type	Budget (INR crore)	Source of Finance	Time frame
	plan of water bodies						tment Budget	
16	Implement revised maintenance plan	to be modified			Activity	*	Existing Department Budget	1 year 6 months
17	Revisit infrastructure maintenance plan and develop a climate resilient infrastructure maintenance plan	proposed			Activity	*	Existing Department Budget	1 year
18	Implement of the plan	to be modified			Activity	*	Existing Department Budget	1 year 6 months
19	GIS based mapping of the sewer drains	under progress			Activity	*	Existing Department Budget	
20	Flood forecasting should be envisaged using real time data acquisition systems and linked to	proposed			Activity	*	Multilateral agenc	2 years

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Sr No	Intervention	Status	Responsible agency	Barriers & Gap in Implementation	Intervention Type	Budget (INR crore)	Source of Finance	Time frame
	forecasting models							
21	The impact of climate change should be analysed at sub-basin level such as Zuari sub-basin,	proposed			Activity	*	Others	5 years
22	massive programmes of awareness generation on water conservation	under progress			Activity	*	Own budget and Central Government Contribution	continuous
23	Reducing the NRM below 25%	proposed				*	Departments own budget	5 years by 2025

(* **Detailed cost estimates and gap analysis will be carried out relevant to climate change related activities within six months at departmental level and in few cases these costs are not to be accrued to climate change)**

Proposed ball park estimates for next ten years for energy sector arrived at through broader consultation is about ₹ 50 crores. The detailed financial breakup and gap analysis will be prepared and submitted by the department within six months.

However separate fund demand will be submitted within six months for climate related intervention after gap analysis.

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7.2. Tourism

With a 105 km long coastline, Goa is a well-known tourist destination, primarily for coastal tourism. Four coastal taluks of Bardez, Tiswadi, Mormugao, and Salcete receive a maximum number of tourists. The annual tourist population in these taluks significantly exceeds the local population. Tourism in the rest of the taluks is minimal.

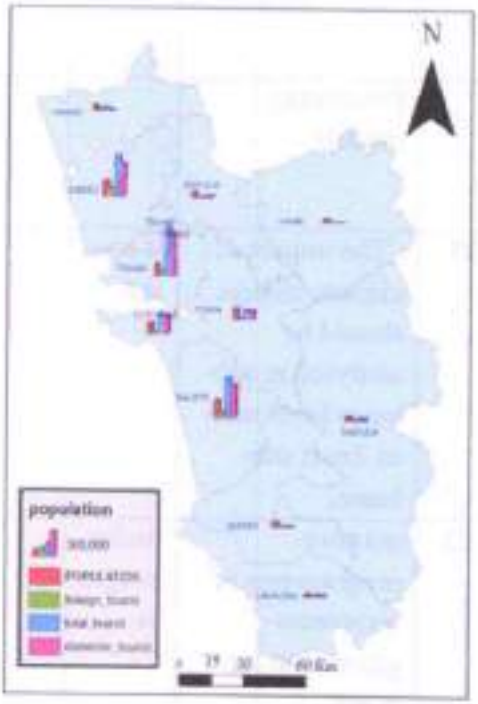


Figure 31: Annual Tourist footfall by Taluk

International tourists, mostly from Europe, arrive in Goa in winter whilst the summer and monsoon seasons see a large number of Indian tourists totalling to about 5,00,000 per annum. It is estimated that the total number of tourists visiting Goa has become nearly equal to the population of Goa.

Tourism is thus, one of the key important activities in Goa contributing to more than one-fourth of the state GDP and one of the largest employments providing industry in the state.

Due to the development of the tourism state has experienced a significant shift in employment activities from traditional fishing and agriculture towards tourism-related employment like water sports, beach shacks, etc. The pressure on infrastructural facilities in the State has also increased significantly due to tourism. While tourism generates revenue for Goa, it is highly dependent on natural resources.

Resource and impact of tourism:

Tourism activities have created an enhanced demand for water in the above-mentioned taluks. Groundwater exploitation has increased as a result of the same. On the other hand, in the absence of 100% coverage with sewerage network and sewerage treatment facility, groundwater and Marine pollution and eutrophication in the coastal waters are observed.

In India, Joevivek et al (2013) noted that sand dunes were destroyed for tourism development and coastal areas with high population density were causing erosion and decreasing the width of beaches. Goa's sand dunes and coasts are also under pressure and experience disturbance due to tourism-related activities.

Ecological disturbances, traffic congestion, and impact on air quality due to heavy traffic movement are some of the other impacts of tourism experienced by Goa.

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Table 11: Sand Dunes along Goa coast within 200m in CRZ Area

Taluk	Panchayat	Area of Sand Dunes within 200m (in Sqm)
Bardez	Anjuna-Calsua	4183
	Calangute	46009
	Candolim	87949
Canacona	Poinguinim	559886
Salcete	Betalbatim	208409
	Colva	196776
	Cana-Benaulim	123149
	Varca	363438
	Cavelossim	613175
Mormugao	Cansaulim, Arossim, Cullim	86217
	Pale-Valsao	31727
Total Sand dune area within 200 m		2320918

http://dsr.nic.in/organisation/environment/plan/factsheets/sp/documents/sp-02.pdf extracted on 2 December 2016

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Regional plan of Goa up till 2021 ha been prepared. According to which Tourism Master Plan should be prepared keeping in mind the potential of the tourism sector and its sustainability and proposals of the tourism master plan including infrastructure shall conform to the eco-tourism policy. The eco-tourism policy promotes hinterland tourism. The state has taken several measures to provide adequate infrastructure for tourism and mandated large hotels to provide solar panels and treat the sewerage before discharge etc.

The carrying capacity of Goa's beaches has also been assessed to provide structured planning.

Impact of climate change

Climate change will impact tourism activities and any infrastructural and system deficiencies will only increase the impact.

1. Warmers temperatures as indicated earlier can cause heat stress leading to the altered tourist season, tourist time at the beach, etc.
2. Increase in sea temperature and acidity level can impact the ecosystem and reduce the attractiveness of sea for tourists engaging in certain water sports/activities like snorkelling or diving
3. Sea level rise will lead to loss of beach, coastal erosion and impact the tourist infrastructure.
4. Increase in high-intensity rainfall events could cause flooding and damage to tourist spots and tourist infrastructure like hotels
5. Changes in the length of and quality could have considerable implications for competitive relationships between destinations and therefore the profitability of tourism enterprises. Studies indicate that a shift of attractive climatic conditions for tourism towards higher latitudes and altitudes is very likely.
6. Changes in water availability, biodiversity loss, reduced landscape aesthetic, altered agricultural production (e.g., food and wine tourism), increased natural hazards, coastal

[15] Carrying Capacity of Beaches of Goa for Providing Shacks & Other Temporary Seasonal Structures in Private Areas http://www.dteegoa.gov.in/Beach%20Carrying%20Capacity%20Report.pdf

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erosion and inundation, damage to infrastructure and the increasing incidence of vector-borne diseases will all impact tourism to varying degrees.

Adaptation Strategies for Tourism

Table 21: Adaptation Strategies for Tourism Sector

Sr. No	Intervention	Status	Responsible agency	Barriers and Gap in implementation	Intervention Type	Budget	Source of Finance
1	Promoting community based agro tourism	proposed	Agriculture department and Tourism Department		Awareness raising and capacity building	*	
2	Inland tourism development in a climate friendly manner	proposed	Tourism department		Activity		
3	Tourism infrastructure climate vulnerability assessment	proposed	Tourism department	Barrier: Few precedence's and established practices	Activity		
4	Climate proofing and disaster management for critical tourism infrastructure	proposed	Tourism department	Barrier: Few precedence's and established practices	Activity		
5	Develop design standards for new tourist infrastructure and provide guidance for modification of existing vulnerable infrastructure	proposed	Multi-department	Barrier: Few precedence's and established practices	Policy		

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Sr. No	Intervention	Status	Responsible agency	Barriers and Gap in implementation	Intervention Type	Budget	Source of Finance
6	Enhance/modify and restructure the insurance for off-coast or water related tourism activities and infrastructure like boats and ships which are vulnerable to climate change	to be modified	Multi-department	Barrier: Few precedence's and established practices	Scheme		
7	Incentivize use of eco-friendly, recycle/reuse in the tourism sector by facility providers	to be modified	Multi-department	Barrier: Few precedence's and established practices	Scheme		
8	Single use plastic to be banned with credible alternates in tourism activity	proposed	Multi-department	Barrier: Credible alternatives, monitoring mechanism, incentives and tourist awareness,	Others		
9	Provide extensive infrastructure and encourage use of non-motorized transport by tourist - Develop a climate friendly	to be modified	Multi-department	Barriers: Inadequate wholistic infrastructure and marketing to promote the same	Scheme		

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Sr. No	Intervention	Status	Responsible agency	Barriers and Gap in implementation	Intervention Type	Budget	Source of Finance
	tourist mobility plan						
10	Green Skill and capacity development amongst the tourist service providers	proposed		Barrier: Willingness and local business models	Awareness raising and capacity building		
11	Environmental Clearance for large tourism projects/hotels in Goa could include climate mitigation and adaptation plan and climate disaster preparedness plan	proposed	SPCB/ any other local clearance body	Gap: No existing standard or precedence	Policy		
12	RE-consider the coastal development plan or zone for new construction based on the climate predications on sea level rise, flooding and erosion	proposed			Policy		
13	Reducing hotspot vulnerability						

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Approximate financial implications of tourism sector expected to be met from climate change plan for ten years are approximately ₹ 5 crores. Detailed plan for expenditure along with gap analysis will be prepared by the department within 6 months. The detailed mechanism for green cess will also be submitted.

7.3. Mining

Mining in Goa is primarily focused on the sand and iron ore. The iron ore mining belt of Goa is mostly concentrated in four talukas namely, Bicholim of North Gia district and Salcete, Sanguem and Quepem of South Goa district. The mining belt of Goa is divided into three regions based on the concentration of the iron ore, namely, Northern, Central, and Southern Zone. Usgao River is the dividing line for the northern and central zone and Sanguem River between the Central and Southern zone. The maximum area under mining is in Sanguem Taluka followed by Bicholim, Sattari, and Quepem. These talukas also have considerable areas under the forest cover and are part of the Western Ghats, rich in biodiversity. Sand mining is another important mining activity in the state. It is primarily fuelled by the construction sector and carried out along the coastal areas.

Along with tourism, mining is an important part of the state's economy and industrial growth. As per Economic survey 2017-18, 38 mining leases were in operation in 2017. However, mining has led to several social and environmental problems in the region. Some of these problems can be attributed to 'illegal' and 'unscientific' mining activities. Iron ore mining is water-intensive leading to drying up of wells in the nearby area, pollution of water bodies and groundwater, biodiversity loss, etc. In some cases, the dust has been attributed to low cashew production.

Impact of Climate Change:

1. Climate change will further exasperate the water scarcity in the mining area for the local population and also for agricultural purposes
2. Mines will as well be impacted by water scarcity
3. Sea level rise and extreme events can cause flooding of mining sites

Adaptation Strategies

Sand mining, which is associated with economic activities and indirectly with number of people, does increase the sensitivity of the coastal system to coastal hazards.[16]

Table 22-Mining related adaptation strategies

[16] [16] Multi-hazards Coastal Vulnerability Assessment of Goa, India, using Geospatial Techniques, NIO, 2014

Sr No	Intervention	Status	Responsible agency	Barriers and Gap in implementation	Intervention Type	Budget	Source of Finance	Time frame
1	A comprehensive study of Hydro Geology of underground water to be carried out	proposed	Ground water department		Activity	0.5	Multilateral agency	1 year
2	Independent mining audits to ensure compliance with EIA/clearances and other parameters	to be modified	Climate Secretariat or other institutes		Activity	0.5	Own budget and Central Government Contribution	6 months
3	Explore and provide treated water for mines or alternate sources	proposed	PWD		Policy		Others	1 year
4	Resource efficiency and circular economy concept needs to be incorporated into the construction sector to reduce pressure on	under progress	PWD		Policy		Existing Department Budget	1 year

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Sr No	Intervention	Status	Responsible agency	Barriers and Gap in implementation	Intervention Type	Budget	Source of Finance	Time frame
	sand as a resource.							

Approximate financial implications of mining sector expected to be met from climate change plan for ten years are approximately ₹ 5 crores. Detailed plan for expenditure along with gap analysis will be prepared by the department within 6 months.

7.4. Agriculture and allied sectors

Agriculture is an important sector in the state. Out of the total state area of 361113 ha. about 131587 ha. is under cultivation. The cultivable agricultural and plantation area had reduced from 3,26,671 ha during 1989-90 to 3, 23,976 ha in 2009 - 10. The area is sown more than once fluctuate between 3 to 6 percent. Conversely, there has been a decrease in the area of cultivable wasteland from 21 to 16 percent. This indicates that there is an awareness to use the irrigation potential for double-crop and greening the State. A large area in Sanguem, Sattari, Canacona, Dharbandoda, and Quepem talukas are under woodland forests and cultivable wastelands. On an average landholding in Goa are small and the average landholding is around 0.84 ha. Like most other coastal States, the people of Goa practice integrated systems of farming, forestry, horticulture, livestock, and off-farm activities.

Goa has only one agro-climatic zone i.e. West Coast Plains & Ghat Region and the state primarily depends on rain-fed agriculture. Paddy, sugarcane, arecanut, coconut are the major crops grown under irrigation. Besides, pulses are taken in rotation. Goa has a very distinct pattern of land use. The sloppy hills are cultivated with cashew interspersed with Kokum; the lower slopes are cultivated with Coconut. Areas with perennial irrigation have multi-storied cropping including Coconut, Arecanut, Black Pepper, Nutmeg, Jackfruit, Pineapple, Breadfruit, etc. The valley along the Nullah & River is cultivated with Paddy in Rabi season. The sandy soil in Coastal areas is planted with Paddy in Rabi season and with legumes and vegetables in the summer season. Khazan lands that are reclaimed by constructing bunds along the tidal rivers and controlling tidal water through an intricate arrangement of sluice gates cover about 18000 ha. These areas are cultivated with paddy only during the rainy season with salt-tolerant varieties and left fallow due to high salinity in dry months.

The State of Goa has around 60.44% of its geographic area under Government forest (2,237.49 sq.km.) One National Park and six Wildlife Sanctuaries constitute the Protected Area network of the State covering 5.33% of its geographical area . There is a substantial area under private forest and a large tract of plantation under cashew, mango, coconut, etc. There are many areas

in Goa which are famous for their Agro Heritage. These include Mayde (Moira) for Banana, Aldona & Khola for Chili, Taleigaon for Bhendi, Kutthali for Brinjal.

The soils of the State are largely acidic in nature having laterite in plains/midlands and in hilly areas while sandy to sandy loam in coastal areas. Brackish water salt pans also exist in the low-lying areas of the coastal regions. About 30 percent of the area of the Goa has shallow soils, 5 percent has moderately deep soils, 46 percent has deep soil and about 7 percent has shallow to very shallow soils.

In the upper reaches of the topography, the soils are coarse and gradually become dense towards the valley regions. The percolation is better up to pediplain areas from hills and gradually decreases in the valley regions. Particularly in the lower areas, i.e. the soil along the river banks and major streams, heavy textured soils are encountered. In some cases, subsoils are affected by acidity. The surface layer of the soil up to a depth of 25 cm. is normally used by the crop plant. About 38 percent has silty clay and gravelly silty clay surfaces soil texture, 26 percent has gravelly clay sand clay texture, and 20 percent sandy loam and loamy sand, 6 percent gravelly sandy clay loam and gravelly clay loam and 5 percent loam and sandy clay loam surface soil texture. The National Bureau of Soil Survey and Land Use Planning [NBSS & LUP], Nagpur has brought out the publication on "Soil Series of Goa" in 2002. In all 32-soil series have been identified in the State. Provided in Annexure III.

Topographically, 13.4% of the area has less than 3% slopes and 5.5% of the area records between 5-25% slopes. Most of the area, which is under rain-fed agriculture, possess 3-5% slope grade.

Agricultural sector plays a vital role in the distribution of regional income and hence, Land utilization, cropping pattern, the extent of inputs and other related factors become very important for proper planning at the micro level so that the share in the State income of particularly the small and the marginal farmers improves.

The government intends to increase the area under organic farming and has set a target of bringing 350 ha under organic farming in the year 2019. It has developed schemes and mechanisms for the same.

Animal Husbandry sector plays is also important for the economy. The State supports around 2.0 lakh livestock population out of which about 72 thousand are cattle, 38 thousand are buffaloes, 59 thousand are sheep and 11 thousand are goats as per the 2010-11 Economic Survey.

Statistics based on 20th Livestock census 2019

Total Livestock Population	**1,32,388**
Buffalo	27,207
Cattle	60,247
Sheep	08

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Goat	9,446
Pig	35,480
Total fowl population	2,03,51
Milk production	1.70 LLPD
Milk required	4 Lakhs LLPD
Deficit	2.30 LLPD
Per day Egg Production	1,09,596
Per day Meat Production	19,758 kgs

There is a huge demand in the State for milk, eggs, and meat and also their products. Milk required is about 4 Lakh Litres Per Day (LLPD). In comparison to this, State is producing 1.40 LLPD milk, thus having a deficit of 2.80 LLPD. In FY16-17 average milk collection was 66,000 liters/day in 2016-17 with 1395 animals and has gone up to 72,000 litres/day till December 2017 with the purchase of 1559 animals by the beneficiaries under Kamdhenu (Sudharit) Scheme. A 10 TPD biogas plant working on the cow dung unit has also been set up. This deficit predicts the huge demand for milk production and milk marketing in the State. The grazing area for cattle is often encroached by mining, industrial and housing activities. This has largely hampered the availability of green fodder and thereby decreased production.

Fisheries: Goa has 104Km. of coast length, 250Kms. of inland waterways and about 100 ha. area covered under inland water tanks provide huge opportunities for fishing activity. The coast is full of creeks and estuaries formed by these rivers which provide a good shelter for fishing crafts. Annual fish landing is about 95000 MT. The export of marine fish products earns a good amount of foreign exchange. As a result, there has been a proliferation of few invasive species of a shrub-like Lantana and fishes like African Catfish and Tilapia. These have established in many pockets including wild habitat and pose danger to native flora and fauna.

Administrative set up: Besides Zonal Agriculture Office at each Taluka level there is Farmer Training Centre at Ella, Old Goa, State Department supported Krishi Vigyan Kendra at Margao and Three-State Agriculture Farms. There is also ICAR set up in Goa through ICAR Research, Complex for Goa at Ella and KVK. As regards Animal Husbandry there is the presence of Veterinary Dispensary at the Panchayat level.

Challenges:

Agriculture and allied sectors face several unique challenges in Goa:

1. **A decline in interest in agriculture:** One of the major problems being faced is the drifting interest from agricultural activities towards jobs in other sectors like tourism and mining. In the year 1960-61, 64 percent of the workforce engaged in agriculture and allied activities, which has declined to 16.6 percent in 2001. While decadal censuses indicate a continuous decline of workforce in the agriculture sector, the agriculture production in the State is showing an increasing trend. However, its contribution to GSDP has declined sharply.

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2. **Erosion of soil and deterioration of soil quality** has been observed in large agricultural areas and varies from light to heavy erosion. These areas are mostly fallow or grazing lands or under bushy vegetation.
3. **Labour wages have more than doubled over the decades, and very few people are available to undertake highly skilled jobs like Coconut/ Arecanut harvesting.**
4. **Loss of Agro heritage sites:** These areas are rapidly developed to accommodate increasing demand for Housing and there by affecting land availability for agriculture.
5. **EROSION OF LOCAL GERMPLASM and introduction of GMO seeds**
6. **Khazan Land** was earlier maintained through regular contribution and surveillance and Tenant Association and is currently under the Soil and Water Conservation Department. The traditional system of maintaining bunds by using local clay is substituted by Cement and boulder. Many times, these bunds are breached intentionally to promote prawn culture which though provides high return but eventually leads to increased salinity. There is also increasing danger to the bund due to heavy traffic of high capacity barges which generate waves and lead to erosion of the bunds. If these bunds are not maintained regularly then there is a danger of losing these precious agricultural ecosystems.
7. **Unavailability of water** during the non-rainy season for irrigation of crop and other agricultural activities
8. **The proliferation of invasive species:** Invasive species of a shrub-like Lantana and fishes like African Catfish and Tilapia is increasing. These have established in many pockets including wild habitat and pose danger to native flora and fauna.
9. **Quality of water:** Turbid or poor-quality water can impact the aquatic food chain

Schemes, Policies and Initiatives

Agriculture and allied sector are a priority for the government of Goa. To overcome the challenges and other issues being faced government has taken several steps in the last decade and assisted to strengthen the sector.

One of the main initiatives of the government has been the development of Vision 2025 for agriculture and allied sectors. This plan envisages doubling of farmer's income by the year 2022 and a substantial increase in the GDP from the agriculture and allied sector.

Some of the other schemes, policies and initiatives are:

- To reverse this order of deterioration of natural resources and support livelihood activities for the inhabitants' watershed management has been taken up as the functional and planning tool for conservation of natural resources and sustainable development by the Government of India through its Common Guidelines for Watershed Development Projects 2008. The State of Goa, through its State Level Nodal Agency for the same, will be formulating State-Level Perspective Plan (SLPP) for Integrated Watershed Management Project (IWMP) in Goa for 15 years period (i.e. 2010-25).
- **Greening the Young mind:** To sustain agriculture in the long term, there is a need to bring youth into farming. To expose school students to vegetable cultivation, a

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comprehensive program of training followed by actual cultivation of vegetables was taken up in 90 schools through the Agriculture Technology Management Agency (ATMA) in both districts

- **Development of e-Krishi Card:** Bringing technology to agriculture and making it simple to access all agricultural schemes.
- **Shetkari Aadhar Nidhi:** The scheme is implemented for grant of compensation to farmers who suffer a loss of crop/produce due to natural causes like unseasonal rains, floods, droughts, landslides, siltation, natural fire/lightning, an epidemic of pests and diseases, damage due to wild animals, etc.
- **Mechanization in Agriculture:** The objective of the scheme is to promote agricultural mechanization to overcome the shortage and high cost of manual labour.
- **Assistance in agricultural inputs like subsidy on setting up of irrigation facility, organic inputs, etc.**
- "**Rashtriya Krishi Vikas Yojana**" (RKVY), a government of India flagship program, is being implemented in the state
- Extension of financial help for growing most of the horticultural crops like cashew, mango, chikoo, pinapple, banana, coconut, and spices.
- **Control of soil erosion**: Soil erosion can be improved by taking up of afforestation, plantation crops, etc. Agronomical measures like the introduction of vegetative hedges, taming of gullies have to be taken immediately in some of the areas.
- **Kamdhenu Scheme (Sudharit)**: The scheme proposes to increase milk production in the state. Under this, it is ensured that the cattle market was brought into the State as "Cattle Melas" wherein farmers could purchase the animals of their choice within the State itself, thus saving on time and money.
- **Crop Production and Input Management Scheme:** Assistance for High Yielding Certified Seeds, Assistance for Fencing Crop demonstration on cereals (Hybrid Rice) Hybrid paddy Mini-kits Contingency Plan Development in Sugarcane Plant Protection Mechanization in Agriculture are some of the measures under this head.
- **Development of Agricultural Extension**: Agriculture and Home Science Demonstration Camps/Courses are being undertaken. Conducting three days Institutional courses, Exhibition and Shows, Best Farmer Support for Higher Education in Agriculture, Conducting Krishi Melas Publicity and Publication of technical literature and Encouragement of Kisan Call Centre
- **Development of Manure Scheme:** Soil Sample Collection and Analysis Assistance for Soil Health Improvement
- **Organic farming: Organic Manure Unit** assistance for construction of Biogas units and Export oriented Certification of Organic Farming
- **Soil and Water Conservations Scheme:** The scheme has the following objectives - Repairs and maintenance of notified ponds protecting Khazan agricultural lands and provide assistance for Protection of embankments Revitalization of the Waterbodies
- **Support price and productivity linked incentive scheme**: Support Price for Paddy Support price to sugarcane Support price to Areca nut productivity linked incentives for oil palm crops

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- **Western Ghat Development Programme**: The scheme is aimed at restoration of the eco-system and upliftment of living of the people of western Ghat.
- Green fodder scheme to ensure fodder to the cattle.
- Legislation such as the Marine Fisheries Regulation Act and the Monsoon Ban must be strictly observed and enforced
- Increasing the **gobar gas plants** – Introducing the same in goushala's and in stray cattle ponds
- Optimizing the use of waste from indigenous and non-indigenous cattle for therapeutic and non-therapeutic uses.
- Minimizing the use of closed paddock system and shifting to open paddock system to reduce methane emissions.
- The Self Help Groups' involved in vermicompost production should be registered by Directorate of Agriculture so that their produce can be sourced under Paramparagat Krishi Vikas Yojana (PKVY) and organic farming.
- 500 organic farming clusters have been formed involving more than 10000 farmers under PKVY.

Impact of Climate Change on Agriculture in Goa

While the above-mentioned measures assist agriculture, climate change continues to pose new threats and disrupt the plan:

- A threat to production levels and quality due to the rise in ambient temperature and changing season patterns:
  Evidence and observations have been made by several stakeholders which suggest a shift in the time frame and duration of ripening of local popular fruits and vegetables. A change in the quality of produce, specifically its taste and smell has been associated with it. Farmer preparedness for harvesting, labour availability are several other factors that would require adjustment to the change.
- Reduction in Availability of Water for irrigation

An increase in high-intensity rainfall scenarios as predicted and a decrease in slow and long spells of rainfall will impact soil runoff and water availability.

- Degrading Soil health:

IPCC's special report suggests that Soil erosion from agricultural fields is estimated to be currently 10 to 20 times (no-tillage) to more than 100 times (conventional tillage) higher than the soil formation rate (medium confidence). Climate change exacerbates land degradation, particularly in low-lying coastal areas, river deltas[17]. Thus, maintaining soil health and increasing focus on this would be essential for Goa's agriculture policy.

- Erratic flood & drought condition cause loss of livestock due to flooding
- The emergence of new pests and pathogens

[17] https://www.ipcc.ch/site/assets/uploads/2019/08/4.-SPM_Approved_Microsite_FINAL.pdf

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- Heavier precipitation events and floods accompanied by seal level rise is having a detrimental impact on the khazan land which are crucial for rice cultivation in the state
- Erratic rains and Long dry periods impact the quality and quantity of produce
- Stress to livestock due to heat

Synergy with National Mission and SDG

Sustaining agricultural productivity depends on quality and availability of natural resources like soil and water. Agricultural growth can be sustained by promoting conservation and sustainable use of these scarce natural resources through appropriate location specific measures. National Mission on Sustainable Agriculture (NMSA) derives its mandate from Sustainable Agriculture Mission which is one of the eight Missions outlined under National Action Plan on Climate Change (NAPCC). NMSA caters to key dimensions of 'Water use efficiency', 'Nutrient Management' and 'Livelihood diversification' through adoption of sustainable development pathway by progressively shifting to environmentally friendly technologies, adoption of energy efficient equipment's, conservation of natural resources, integrated farming, etc. Besides, NMSA aims at promoting location specific improved agronomic practices through **soil health management, enhanced water use efficiency, judicious use of chemicals, crop diversification, progressive adoption of crop-livestock farming systems and integrated approaches like crop-sericulture, agro-forestry, fish farming,** etc.



Several SDG's are partially linked to agriculture. However, SDG 2 i.e. End hunger, achieve food security and improved nutrition and **promote sustainable agriculture**, is in particular most relevant to this SAPCC. The SDG2 targets that the SAPCC interventions are linked to are:

- Target 2.3 - By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment
- Target 2.4 - By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality
- Target 2.5 - By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits





arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed

- Target 2.a -Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries
- Target 2.c - Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility

Adaptation Strategies for Agriculture and Allied Sector

1. **Maximizing the agricultural land:**

- Human Animal conflict: Availability of drinking water and green fodder/wild fruits to the animals in forest to be ensured by Forest Department. Management of Accasia & Eucalytus in phased manner and planting local fruit bearing plants.

- Areas that are fallow and not being currently used should be brought under agriculture by encouraging landholders. Planting of flowering trees along roadside would facilitate promotion of Apiculture. Soap nut, Taman, etc. IFS&IPM:- Effective use of IFS & IPM will reduce use of chemical fertilizers and pesticides resulting in cleaner foods availability and reduced pollution.
- Identification of areas under non-cultivation in the State and encouraging landholders to cultivate them by providing some incentives.

2. **Climate Research in Agriculture**

- Development of regional knowledge bases on climate change impacts and adaptation strategies for a farming systems approach, taking into account information such as crop yield responses to climate, crop quality response, water availability for rain-fed and irrigated crops, and livelihood strategies
- Identify and develop indicators for climate risks, including thresholds and acceptable coping ranges of the sector and specific crops, which are critical to improving climate risk management
- Increase overall investments in agricultural research and development.
- Technological innovation, research in agriculture will be promoted.

The ICAR Goa would be the primary research organization which will work in conjunction with and State agriculture department

3. **Increasing farmer income:**

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The State has already taken various measures to promote agriculture in the State of Goa. Organic farming and market connection are important factors. In addition, it support's existing farmers associations for the same.

4. **Encourage education in agriculture and educate farmers**

- Improve access by farmers, herders, fishers, and foresters to timely weather forecasts and response options, which can enhance decision making and responses to a changing climate.

• Provide training and education programs as well as agricultural advisory services to help implement agricultural practices and technologies that are more resilient to climate change.

- Advisory to farmers through Use of modern technology like Social Media, TV etc to issue advisory to farmers and general public on effects of climate change and ways to mitigate them.

5. **Fisheries management**

- Adopt changes in management philosophy, such as integrating fisheries and aquaculture management into coastal zone management, to increase the coping ability of small communities to sea-level rise.
- Breed fish species that are tolerant to high water temperatures and improve the management of fish stocks, which can be effective measures to reduce climate change impacts on fisheries.

- **Livestock management:**
  Breed livestock that is tolerant to adverse climatic conditions and improves the management of stocking rates and pasture rotation to enhance the climate resilience of livestock production. Modify and construct livestock shelter to reduce climatic stress, especially heat stress on livestock and explore the choice of natural material for the same.

6. **Managing the cropping pattern:**
   - Implement farm management practices, such as crop diversification, changing planting dates, and adjusting the application of nutrients, fertilizers, insecticides, and pesticides, to effectively adapt to alterations in the growing season and irrigation opportunities.
   - Develop adequate systems for weather data collection, analysis, and prediction.

7. **Khazan Lands:**
- Protecting khazan lands, 'Puran sheti' a unique among other types of farming practices in Goa from inundation and other climatic impacts requires the involvement of local farmers association and a structured mechanism for monitoring the same.
- Investment in coastal flood control structures which could be a combination of hard infrastructures like gates, dykes and natural infrastructure like mangroves.

8. **Gene Bank preservation:**

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Goa has several unique varieties of rice and other crops. Documentation of the traditional practices and protection of rice variety and other crops through gene banks is essential

9. Farm Insurance:

Identify and encourage farm insurance measures that cover climate vulnerabilities like loss of crop due to temperature variability or climate-induced pest invasion.

Table 23: Adaptation Strategies for Agriculture and Allied Sector

Sr. No	Intervention	Status	Responsible agency	Barriers & Gap in implementation	Intervention Type	Time frame	Budget	Source of Finance
1	Emergency evacuation plan for livestock during flooding	proposed	Disaster management		Others			
2	Heat stress relieving system in cow sheds	proposed	Department of Animal Husbandry and Veterinary service		Others			
3	Demarcated area for such livestock relief	proposed	Department of Animal Husbandry and Veterinary service	Land availability	Others			
4	Farm insurance and livestock insurance for climate stressors like temperature need to be explored and established	proposed	Department of Animal Husbandry and Veterinary service, Agriculture department	Terms and conditions to define the stressors and availability of ready to use private sector insurance products	Scheme			Insurance
5	Gene Preservation Bank	proposed	Agriculture department	Cost intensive	Activity			Own budget and Multilateral agency
6	Investment in coastal flood control structures which could be combination of hard infrastructure like gates, dykes and natural infrastructure like mangroves	proposed			Activity			Own budget and Multilateral agency

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Sr. No	Intervention	Status	Responsible agency	Barriers & Gap in implementation	Intervention Type	Time frame	Budget	Source of Finance
7	Develop adequate systems for weather data collection, analysis and prediction.	to be modified			Activity			NAFCC
8	Formation of strategy Breed livestock that are tolerant to adverse climatic conditions	to be modified	Animal Husbandry		Scheme			Own budget and Central Government Contribution
9	Integrating fisheries and aquaculture management into coastal zone management, to increase the coping ability of small communities to sea-level rise	to be modified	Fisheries department		Activity			Own budget and Central Government Contribution
10	Encourage breeding fish species that are tolerant to high water temperatures and improve the management of fish stocks	proposed	Fisheries department		Activity			Existing Department Budget
11	Enhance access of all stakeholders of agriculture and allied sector to weather information in a format that is usable for their activity	proposed	Climate secretariat		Activity			Own budget and Central Government Contribution
12	Provide training and education programs as well as agricultural advisory services to help implement agricultural practices and technologies that are more resilient to climate change.	to be modified	Agriculture department		Activity			Existing Department Budget

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Sr. No	Intervention	Status	Responsible agency	Barriers & Gap in implementation	Intervention Type	Time frame	Budget	Source of Finance
13	Provide enablers for credible and certified organic farming	under progress	Agriculture department		Activity			Existing Department Budget
14	Enhancing market connect for farmers	under progress	Agriculture department		Activity			Existing Department Budget
15	Climate Research in Agriculture	proposed	ICAR and Agriculture department		Activity			Own budget and Central Government Contribution
16	Maximizing the agricultural land by utilizing fallow land	proposed	Agriculture department		Activity			Existing Department Budget

Approximate financial implications of agricultural sector expected to be met from climate change plan for ten years are approximately ₹ 50 crores. Detailed plan for expenditure along with gap analysis will be prepared by the department within 6 months.

7.5. Forest

Goa presents an astonishing diversity of endemic species, habitats, and ecosystems. The impact of intensified economic activities on biodiversity in this region is visibly noticeable.

On the other hand, Goa the smallest state, with just 3702 sq. km. geographical area is having a good forest cover with 1,225.12 sq. km of recorded Government Forest which is over 33% of the total geographical area of the State. Out of this 62% is designated as 7 Protected Areas, 6 biodiversity-rich and ecologically sensitive Western Ghats and one in Mangrove forest at Chorao island. The Wildlife Sanctuaries and National Parks cover an area of 75,496 ha. constituting 20.39 % of the geographical area of the State, the highest in the country. As per the "India State of Forest Report 2017" published biennially by Forest Survey of India, Dehradun, the Forest Cover of Goa is 60.21% and the total Forest and Tree Cover of Goa is about 68.94%, which includes forests on private lands, plantations such as cashew., and other tree crops. Its entire hills have been declared as Protected areas.



Forest Cover	2229Sq.km
Total Recorded Forest Area	1225 Sq.km.
Tree Cover	323Sq.km.
Total forest and tree cover	2552 Sq.km.
National Park	
Bhagwan Mahaveer National Park	107 Sq.km
Wildlife Sanctuaries	
1.Mhadei Wildlife Sanctuary, North Goa	208.48 Sq.km
2. Bhagwan Mahaveer Wild Life Sanctuary, North Goa.	133 Sq.km
3. Netravali Wildlife Sanctuary, South Goa.	211.05 Sq.km
4. Cotigao Wildlife Sanctuary, South Goa.	85.65 Sq.km
5. Bondla Wildlife Sanctuary and Zoo, North Goa	8.00 Sq.km
6. Dr. Salim Ali Wild Life Sanctuary, North Goa	1.78 Sq.km

There is no further potential to increase the forest cover of the state, however, there is a possibility to increase the green cover and increase the quality of the forest by increasing the carbon content.

Because of this, about 44 sq. km. forest areas in private lands have been brought under protection as Private Forests and remaining areas are being surveyed which are having natural tree cover. These areas support and nurture a variety of ecosystems of life forms – both floral and faunal, particularly in Western Ghat areas of the State located in Sanguem, Canacona, Sattari, and Dharbandora Talukas.

Marine and coastal ecosystems, including mangroves, seagrass beds, coral reefs, and associated biota. This system is threatened due to pollution and over-exploitation. Climate change will only exasperate the impact.

Schemes, Initiatives and Policies

Forest Department is entrusted with overall conservation, protection, management, and development of forests and wildlife. The Goa's Forest Department through various State and Central funded projects has been protecting and enriching its existing forest areas in a highly scientific manner.

Documentation of biodiversity has been and is being carried out under various activities like PBR, Documentation of Flora and Fauna of each Sacred Groves and labelling of important plant species.

Several social forestry activities are being taken up. In coastal areas plantation of Casuarinas and Protection & Maintenance of Social, Forestry plantation is planned.

The state's first biodiversity heritage site has been registered at Purvatali, Bar located in Bicholim Taluka. Mining is prevalent in this region and registering the site as biodiversity

heritage will protect several medicinal plants and recharging of aquifers. State Biodiversity Board is working towards getting several other sites in state registered as biodiversity heritage sites.

Community Response Network: The Department in collaboration with the IUCN conducted a workshop to develop Community Response Network for Marine Conservation in Goa to train Forest staff, lifeguard/ coast guard to monitor report and document the marine mammals stranding incidences and carcasses in a timely, efficient manner.

To mitigate human-animal conflict, this Department maintains 24 x 7 Rescue Squad/Centre at Campal, Margao, and Cotigao for rescuing wild animals under stress.

Satpal Arboretum consists of 82 plots of different species of trees, shrubs, vines, etc. which are grown for study and research.

Goa Forest development corporation is also carrying out rejuvenation of Cashew Plantations/ estates and conducts the auction for sale of rights for collections of Cashes, nuts and apples, maintenance and development of Rubber Plantations, extraction of the latex, processing it to rubber sheets and selling the same.

Eco-tourism facilities: Forest Department has established eco-tourism complexes at Bondla, Mollem, and Cotigao for visitors and to improve the livelihood of local people. 3,33,657 tourists have visited the National Park and Wildlife Sanctuaries this year. Rs. 37.23 lakhs of revenue have been generated through the sale of Forest produce and Rs. 260.29 lakhs of revenue have been generated through Eco-tourism and allied activities. Plantation and other Conservation related activities have also generated direct employment to the local youths.

Impact of climate change

Forest Fire: Climate change has resulted and will further result in a change in temperature and humidity in Goa. Temperature rise is predicted to be up to 3 to 4 degrees. Ecological systems are vulnerable to these changes. Forest fire is a phenomenon that can get intensified due to climate change. Though enough documented proof is not available on whether forest fire incidents have increased in Goa due to climate change or human activities. The trend depicts the vulnerability of Goa's forests to fires and this can get exasperated due to climate change by 2040.

Table 24: Forest Fire Incidents in Goa from 2014-15 to 2018-19

Year	No. of incidents of forest fires	Area involved in ha.
2014-15	2	11.07
2015-16	24	44
2016-17	92	153.42

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2017-18	47	130.80
2018-19	38	113.29

- **Invasion of alien species** and enhanced spread and colonization of the same can impact the native species.
- Changes in the flowering time and fruit ripening time due to change in temperature. This can lead to alternation incomplete cycle of the plant.
- The shift in forest ecosystem
- Changing rainfall patterns could lead to water availability constraints in certain patches.
- Soil erosion can have drastic impacts

- **Change in Forest Types and Structure**: Climate change will cause shift/ changes in the flowering and fruit ripening time due to change in temperature. This can lead to alternation incomplete cycle of the plant. The functions of forest ecosystem might be adversely affected due to climate change.

- **Extreme weather events including change inrainfall patterns** could lead to flooding and scarcity of water and affect overall water availability in various parts of the state. Soil erosion in heavy rains and landslidescan have adverse impact on agriculture.

State REDD+ Cell as per National REDD+ Strategy is as follows:

Deforestation and forest degradation account for approximately 11 percent of carbon emissions, more than the entire global transportation sector and second only to the energy sector. Reducing emissions from deforestation and forest degradation (REDD+) is a mechanism developed by Parties to the United Nations Framework Convention on Climate Change (UNFCCC). It creates a financial value for the carbon stored in forests by offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development. Developing countries would receive results-based payments for results-based actions. REDD+ goes beyond simply deforestation and forest degradation and includes the role of conservation, sustainable management of forests and enhancement of forest carbon stocks. State REDD+ Cell, headed by Principal Chief Conservator of Forests has been constituted for implementation of National REDD+ Strategy in Goa and has 8 other members.

The terms of reference of the State REDD+ Cell as per National REDD+ Strategy is as follows:

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a) Facilitate the implementation of National REDD+ Strategy in the State

b) Preparation of State REDD+ action plan, sub-national/ State level reference emission level/ reference level. Forest monitoring system and safeguard information system (SIS).

c) To oversee REDD+ Project Proposal preparation and implementation through Community Forestry, Van Panchayats / Village Forest Protection Committees.

d) Development of State REDD+ Learning/ Knowledge sharing platform for exchange and sharing of knowledge.

e) Explore the possibilities of REDD+ financing, development of REDD+ projects and facilitate REDD+ benefit sharing mechanism

f) Arrange technical and institutional supports for implementation of REDD+

g) Monitoring of REDD+ implementation in the state

h) To approve and submit the plans and projects for REDD+ implementation to the NDE-REDD+, Government of India for financial support.

i) To organize training and capacity building seminars and workshops for the officials of the State Forest Department and village level institutions

j) To institutionalize data collection and management, and adherence to safeguards

k) To devise mechanism to absorb lessons from pilots, as an input to the national and international policy processes and development.

Synergy with National Mission and SDG

The Green India mission, which aims to protect, restore and enhance India depleting forest resources through increase forest/tree cover; improve/enhance eco-system services like carbon sequestration and storage (in forests and other ecosystems), hydrological services and biodiversity; along with provisioning services like fuel, fodder, and timber and non-timber forest produces (NTFPs); and increase forest based livelihood income of about 3 million households.

It is an endeavour of the state to increase the green cover wherever possible to achieve objectives of implementing the Green India Mission.



SDG 15 i.e. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss



- By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements.
- By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally.
- By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.
- By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development.
- Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.
- Promote fair and equitable sharing of the benefits arising from the utilisation of genetic resources and promote appropriate access to such resources, as internationally agreed.
- Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products.
- By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species.
- By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts.
- Mobilise and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems.
- Mobilise significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation.
- Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities.

Strategies for climate impact management

Strategies to protect and enhance forest availability generally have cross-cutting impacts i.e. providing both mitigation and adaptation. The strategies for Goa are:

a. Enhance the forest quality
b. Restore and increase the coastal defence mechanism
c. Prepare a strategy to prevent and control forest fires
d. Afforestation and Plantation outside the forest

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e. Support private forest owners in the sustainable management of their forests and derive economic benefit
f. Water and Soil conservation
g. Capacity building of field staff
h. Promote Ecotourism

Action Plan to address Forest related Climate Change:

Action Point 1: Enhancing quality of existing Forests

1. **Conversion of Open Forest into Dense Forests**: Around 357 sq km of recorded forest area falls under open forest which will be converted into dense through Assisted Natural Regeneration (ANR).
2. Out of 1225 sq km recorded forest area, 1173 sq km area is having forest cover. Out of 52 ha remaining, suitable area will be explored for afforestation.
3. Conservation and increase the Mangrove cover wherever possible.
4. Scientific removal of invasive species and conversion into natural forest.
5. Prevention and control of forest fires.

Action Point 2: Afforestation and Plantations outside forests

1. Linear plantations along the National and State Highways, Rural roads, canal & river embankments and railway line.
2. Greening of urban spaces through appropriate afforestation programme like Nagar Van (City Forest), Woodlands, Coastal Greenbelts, offices and residential complexes, Biodiversity Parks etc.
3. High Density Plantations using local forestry species in degraded lands including abandoned mining areas.
4. Encouraging people to undertake mass planting programme through Van Mahotsav and other focused campaigns.
5. Increasing nursery stock for doubling free distribution of saplings.
6. The department is reaching out to other Government departments, institutions offering support in afforestation/greening of their lands, office and residential complexes.
7. Training of local youths as Nature Guides and Community Foresters for promoting forestbased livelihoods and improving stakeholders base for conservation.
8. Restoration/greening of ongoing infrastructure projects on their completion.

Action Point 3: Support to Private Forest owners in sustainable management of their forest and deriving economic benefits

1. There is significant area under Private Forest in the State which requires sustainable management. The department will support private forest owners to conserve and improve their forests through scientific interventions (Working Schemes) for sustainable harvesting of forest products etc. and economic viable programmes such as ecotourism.
2. Exploring modern woodbased industries for creating demand for wood from tree growers including Private Forest owners.

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Action Point 4: Promote Agro Forestry and Business Models

1. Promotion of Agro forestry in farm lands and agricultural fallow lands. Suitable policy will be made in consultation with Agriculture Department and land owners to develop suitable Agro Forestry model on these lands.

Action Point5: Conservation of mangroves and coastal belts:

1. Strengthen marine and coastal ecosystems, including mangroves, seagrass beds, coral reefs, and associated biota. This system is threatened due to pollution and over -exploitation. Climate change will only exasperate the impact.
2. Interlinkages of coastal people's livelihoods with conservation through sustainable ecotourism and aqua-culture etc.

Action Point 6: Addressing other critical issues:

1. Improving effectiveness and efficiency of various processes in implementation of forestry programme.
2. Building capacity of the department at field levels for efficient and timely utilization of large afforestation funds coming through State Plan, CAMPA and financial support from CSS etc..
3. Hiring of part time staff and human resource for increased afforestation targets.
4. Sensitization of Finance and Account Departments for timely release of funds and accounting process.
5. Keeping the procedures simple with in-built flexibility and decentralized approach.
6. Economic viability of afforestation and tree plantation by farmers and land owners, efficient utilization of wood through modern hi-tech wood-based industries for creating demands and fair priced marketing interventions. Incentivise and not penalize the tree grower and Forest owners.
7. Policy support for extensive use of wood in the country which will help more tree plantation in the private land including farmers.

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Table 25: Adaptation Strategies for Forest

Sr.No	Intervention	Status	Responsible agency	Barriers & Gap in implementation	Intervention type	Budget (in Lakh Rupees) (Approx)***	Source of Finance	Time frame
1.	Improvement of quality of forests and their resilience to change climate	Goa has about 30 percent of area under open forests and its density is required to be improved.	Goa Forest Department	Fund allotment and availability of forest land	Afforestation/ Enrichment plantation/ Aided Natural Regeneration of Open Forests and Medium Dense Forest. Action: An area of 50 ha/year will be taken up for ANR/plantation for conversion of open forest into dense forest	1000.00	State Plan, CAMPA* and CSS** funds	10 years
2.	Restore and strengthen coastal defence mechanism by natural means viz restoration and improvement of mangrove vegetation and coastal belt plantation.	Coastal belts are vulnerable due to anthropogenic and factors of climate change		Insufficient Fund allotment and land availability for mangrove plantation	1.Restoration of damaged and degraded mangrove areas is being done under this intervention. 2. Shelter belt/ Coastal belt plantation 3 Nurseries for mangroves and suitable plants 4. Provide suitable incentives/ livelihood support to people in conservation and management of mangroves in plantation, protection activities, ecotourism in backwaters/ creeks and aquaculture, pisciculture etc.	500.00	State Plan and Mangrove Management Action Plan	10 years
3.	Prepare strategy to prevent and control forest fires	Forest Fire is common in summer season from March to June primarily due to anthropogenic factors.		Timely Fund allotment	Multipronged strategy involving both prevention and timely effective control of forest fires: 1. Preparation of State Action Plan on forest fire 2. Creation of effective and efficient task force of forest staff and fire watchers by regular training and capacity building, supported by adequate communication, firefighting equipment. 3. Design and implement appropriate awareness campaigns for pre fire season sensitization of local communities 4. Periodic creation of new firelines clearing of fire lines, removal of dry bamboo, other inflammable materials from forest floors, controlled burning. 5. Strengthening communication network, infrastructure& control room	1000.00	State Plan, CAMPA and CSS for Fire Prevention and Management	10 years
4.	Afforestation and Plantation outside the forest for increase in ToF			Timely availability of funds	Free distribution of quality seedlings and tree plantation by involving different institutions Roadside plantation	1500.00	State Plan, CAMPA and CSS	10 years

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5.	Support private forest owner in sustainable management of their forests and derive economic benefit	People fear of losing the right to use their land in view of identification of their tree bearing lands as private forests, which creates negative attitude towards planting trees		Regulating provisions under the Forest Conservation Act, 1980	Create supportive policy and Legal framework by providing suitable incentives to tree growers under agroforestry programmes and develop market linkages.	25.00	State Plan	5 years
6	Soil and Moisture conservation	Efforts are being made by Forest Department for soil and moisture conservation if forests and protected areas, however these need to be expanded substantially.		Lack of sufficient funds	Adequate soil and water conservation measures for recharge the natural aquafers and retain water for dry period to improve the habitat for wildlife and control man animal conflict. Soil and water conservation measures like pond, check dams, bunds, gabion check dams, waterholes etc. in the watershed	2000.00	State Plan & CSS	10 years
7	Strengthening of infrastructure & Capacity building of field staff	Insufficient infrastructure in forest area in terms of mobility, communication, and accommodation of staff.	Goa Forest Department	Inadequate Fund allotment	1. Construction and repair of new and existing quarters, forest road / track points, protection camps enhanced mobility communication. 2. Organizing training, seminars, workshops for frontline staff on forest and wildlife conservation etc. 3. Create effective linkages /network with adjoining States of Maharashtra and Karnataka.	5000.00	State Plan, CAMPA and CSS schemes	10 years
8	i.Promote Eco-tourism in select forest areas by employing local population	Local people in forest fringe villages have not been adequately involved in protection/ conservation due to lack of incentives	Goa Forest department in collaboration with Tourism Department	Lack of clear policy framework, Fund constraints,non-availability of sufficient local entrepreneurs	Increasing effective people's participation in conservation through multipronged strategy: 1. Preparation of Eco-tourism policy with Forest Department to play facilitative role. 2. Creation of essential infrastructure likeNature Education Centres, Nature Camps etc. 3. Improving Forest roads / trek routes, watch towers & protection camps & enhanced mobility 4. Encouraging local communities to take up ecotourism activities in neighbouring protected areas	1500.00	State Plan, and other CSS schemes	5 years
	ii. Skill development of local population to assist as nature guide and related livelihood activities		Goa Forest Department	Lack of sufficient funds	1.Organizing trainings, seminars, workshops for local people on forest and wildlife conservation 2. Help local communities in obtaining suitable benefits through sustainable use of minor forest produce biodiversity and ecotourism etc. 3. Promotion of ecotourism, organization of nature awareness camps, bird walk, bird festival, publication of brochure, pamphlets, poster, books and films etc. on nature conservation for generating employment to local people	1200.00	State Plan, and Central Government contribution and CSS.	05 years

9	Prepare strategy to control ingress of invasive species and prepare plan for future protection of forest from invasive species	Conversion of areas under invasive and exotic species is urgently required	Goa Forest Department	Lack of funds	Eradication of Eupatorium, replacement of *Acacia auriculiformis, Eucalyptus* spp. by suitable local species	5000.00	State Plan, CAMPA and other CSS schemes	10 years
10	Research on the impact of changing climate pattern on the forest and prepare plan for forest rejuvenation	There is insufficient knowledge and research on impact of climate change on forest types and wildlife	Forest Research & Training Institute, Goa Forest Department	Lack of funds	1. Setting up of 08 field research stations for research on climate change and forestry issues. 2. Setting up of State Forest Research Institute Goa for conducting collaborative research, training etc. on various aspects of forest, biodiversity and climate change related issues.	2000.00	State Plan, and Multilateral agency	5 years
11	Urban Green Enhancement / improvement of quality of life in cities-	Need to increase green cover in and around urban areas & educating people about the value of forest, biodiversity to general public	Goa Forest Department	Lack of funds	Creation of City Forest (Nagar Van) in various urban centres, Gram Upvan in villages, School nursery, Biodiversity park, Avenue Plantation etc. public engagement on greening Creation of Nagar Van, Gram Van by engaging local public	5000.00	State Plan & CAMPA	5 years
12	Protection and improvement of wildlife habitat	Need to enhance measures for conservation of wildlife including marine wildlife	Goa Forest Department	Lack of funds	Measures required to improve wildlife habitat by creation of grasslands, planting suitable fruit bearing trees and creation of waterbodies and adequate protection	5000.00	State Plan, CAMPA and CSS schemes	10 years
13	Promotion of Agro-forestry, increase in Tree Outside Forests (TOF) Appropriate Scheme – Policy implementation Government facilitation (i) Exemption of trees spp for Transit (ii) Green credit scheme (iii) Supply of quality planting material	Emphasis is to help local people earn by planting fast growing agro forestry species	Goa Forest Department	Lack of funds	Multipronged strategy: i Exemption of tree species grown by farmers and other landowners on private land ii. Helping farmers and landowners in obtaining good quality planting materials for agroforestry, building their partnership with Wood Based industries and supporting through various CSS and State plan Schemes iii. Facilitation in marketing of timber through marketing linkages iv. Promotion of modern wood-based industries for meeting national demand of wood products and furniture.	1000.00	State Plan, CAMPA and CSS schemes	5 years
					Total	**31725.00**	31725	

Note:
* CSS:- Centrally Sponsored Schemes
** CAMPA:- Compensatory Afforestation Fund Planning and Management Authority.
*** Budget is based on current schedule of rates

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Approximate financial implications of forest sector expected to be met from climate change plan for ten years are approximately ₹ 25 crores. Detailed plan for expenditure along with gap analysis will be prepared by the department within 6 months.

7.6. Human Health

Human health is of paramount importance in the overall wellbeing and productivity of a state. Goa has 13 government hospitals with 3000 beds and 29 community/primary health centres and 30 dispensaries. It has about 2756 beds in private hospital[18].

Developing countries face substantial vulnerabilities to the current and projected health risks of climate change. The health-related risks are not just dependent on climatic factors but also the exposure of the population to those risks.

The health statistics in the state indicate a rise in several vector-borne diseases is the last five years.

Table 26: Vector Borne Diseases in Goa from 2014 to 2019

Year	Malaria Indigenous cases		Malaria Imported cases	J.E	Dengue	Chikungunya	Filariasis
	PF	Total					
2014	42	824	4624	Nil	168	49	Nil
2015	75	651	3802	1	293	32	Nil
2016	130	742	4060	1	150	49	Nil
2017	75	653	3427	Nil	235	48	Nil
2018	50	377	3485	3	335	77	Nil
2019 till Oct.	46	231	1731	1	467	245	Nil

Table 27: Cases of other diseases

Year	Acute Diarrheal Disease	Acute Respiratory Infection/ Influenza Like Illness	Pneumonia
2009	14862	54779	600

[18] Goa at a glance 2017-18

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2010	11923	54052	763
2011	NA	NA	NA
2012	NA	NA	NA
2013	NA	NA	NA
2014	NA	NA	NA
2015	13068	75752	890
2016	17072	74458	1156
2017	16932	73465	812
2018	27482	120878	2745
2019 (till 27 Nov 19)	24814	121035	2176

Kyasanur Forest Disease (KFD) is a tick-borne disease, which was confined to Karnataka State for more than 50 years. In the year 2015, an outbreak of fever along with vomiting & diarrhoea was reported from Pali Village of Sattari Taluka. On investigation of this outbreak, it was confirmed to be KFD. This was the first incidence of KFD in Goa. Since then KFD is reported every year from December to May. It cannot be confirmed if the disease outbreak in Goa is due to climate change or not, however, it is predicted that such new diseases or increase in cases of a certain type of diseases may increase due to climate change.



Over and above the existing medical infrastructure, Goa has launched Deen Dayal Swasthya Yojana in 2016. It is a universal insurance scheme providing insurance cover to the entire population. Also, under the Goa Mediclaim scheme, financial assistance is provided to every permanent resident of the State availing super specialty treatment that is not available in the Government Hospitals in the State of Goa. The Goa State Illness Assistance Society scheme provides financial assistance to the extent of INR 1.50 lakhs per

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patient below the poverty line for availing super specialty treatment which is not available in the State Government Hospitals[19].

Impact of climate change

The health of human populations is sensitive to shifts in weather patterns and other aspects of climate change. Increased variability in the weather pattern will further impact the ability of the human body to adjust. Based on the climate change projections it is expected that:

1. The temperature in Goa may rise by 4-5 degrees and beyond a decade state may experience heatwave conditions as well which are currently not experienced in the state. This can cause health effects like dehydration, heatstroke, etc. which are known to be occurring in other states during heatwave conditions.
2. Mortality and morbidity rate due to mudslides, flooding, cyclonic events are also likely to rise.
3. Changing weather pattern is likely to increase the window for the occurrence of vector-borne disease
4. It is predicted that climate change can disrupt the health services related infrastructure and its capacity to serve due to severe events and rise in the number of illnesses
5. New diseases can be introduced in the state

Alignment with National Mission and SDG

National action plan on health and climate change has been launched in 2019 under the national health mission to address health issues related to climate change. Goa is already aligning itself for participating in the programme. In addition, Integrated Disease Surveillance Programme has been identified under Environment Health Cell for NPCCHH.

It is also aligned to SDG3 i.e. Ensure healthy lives and promote wellbeing for all at all ages. Under this the strategies are specifically focused towards the target 3.3, i.e. By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases.

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[19] Goa economic survey 2017-18

Adaptation strategies for health

Sr No	Intervention	Status	Responsible agency	Barriers and Gap in implementation	Intervention Type	Source of Finance	Timeframe
1	Prepare an action plan to reduce the climate change related health impacts	proposed	PHE		Others	Own budget and Central Government Contribution	1 year
2	Develop an IT enabled system to inform the public on possible and actual disease outbreak	proposed	PHE		Activity	Existing Department Budget	6 months
3	3 Study and map new and emerging diseases in the state in relation to climate change	proposed	PHE		Activity	Own budget and Central Government Contribution	continuous system
4	Prepare a heat wave action plan	proposed	PHE		Others	Unknown	6-10 years
5	Develop a system to predict disease outbreak	proposed	PHE		Activity	Own budget and Multilateral agency	

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Sr No	Intervention	Status	Responsible agency	Barriers and Gap in implementation	Intervention Type	Source of Finance	Timeframe
6	Assess the adequacy and resilience of health infrastructure to climate change	proposed	PHE		Activity	Existing Department Budget	
7	Strengthen the health infrastructure based on the assessment	proposed	PHE		Activity		
8	Enhancing the knowledge skills of health workers	to be modified	PHE		Activity	Own budget and Central Government Contribution	1 year
9	Managing and dealing with pandemics – IEC and other aspects of management						

Note: The Concerned Department is expected to carry out GAP analysis and ascertain budgetary provisions and implications for the activities mentioned above and add more activities relevant to climate change within the period of atleast three months.

Approximate financial implications of health sector expected to be met from climate change plan for ten years are approximately ₹ 10 crores. Detailed plan for expenditure along with gap analysis will be prepared by the department within 6 months.



7.7. Habitat

It has been predicted that by 2050 more than two-third of the world population will be living in cities. As per 2011 census, about 62% of Goa's population lives in urban areas comprising of 14 municipalities and 56 census towns. The annual tourist population of Goa is 3 to 4 times the state population, consistently putting pressure on the human habitat and natural resources of the state. The percentage of urban population has been increasing in the state. Goa has an average population density of 394 persons per sq.km. which is higher than the national average of 382 persons/sq.km[20].

For effective planning of limited land resources and increasing pressure on the resource - "Regional plan for Goa 2021" was developed by the town and country planning board. The RPG 2021 report, states that by 2021, the population projection for Goa is estimated at 18.07 lakh with nearly 13.11 lakh living in urban areas spread over 72 census towns and 14 cities. Of this population, it is estimated that 12.36 lakh will be staying in four coastal talukas of Bardez, Tiswadi, Mormugao, and Salcete, with the urban areas in these talukas accounting for 80.51 % of the population. These are the most urban talukas of Goa and economic activities including tourism-related development are concentrated in these talukas.

To be able to effectively meet the requirements of a growing population and economic activity in these talukas it is essential to not only prepare effective land use plan but also to provide and maintain:

1. Water and Sanitation Services
2. Transportation services
3. Solid waste management
4. Energy demand
5. Health services and health management

Sanitation Services: Presently the Sewerage coverage is of about 16 % in state of Goa with respect to 28% National Average. The major cities i.e. Panaji, Vasco and Margao (with population more then 50000) area already connected to the sewerage network. Sewerage system in Navelim, colva, Ponda, Mapusa, Calangute Baga , Porvorim are in progress.

The total installed capacity 78.48 MLD at present against which 25 MLD is received at STP. In addition to this, 73.50 MLD cumulative capacity STP's are in progress for completion by FY21. As of FY 2019-20, urban & rural areas combined in the state generate 388 MLD of wastewater out of which 7 % is treated through the sewerage treatment plant.

Septage treatment is more prevalent in Goa. On call service is available for septage management. Collected septage is treated in nearby STPs. Future outlook of the state is to achieve total sanitation and zero discharge of wastewater into the environment.

Most of the sewerage treatment plants are based on SBR technology and maintain the effluent standards as per Goa State pollution control boards guidelines. Details of sewerage and septage management projects is provided as annexure IV.

[20] Socio economic survey 2017-18

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Sewerage at a Glance	
State Sewerage Coverage	- 16%
Sewerage Generation	- 388 MLD
Total installed Capacity in MLD (Designed)	- 78.48 MLD (8 major STP's)
Treatment Done in MLD (present)	- 24.73 MLD
Total Capacity in MLD in progress	- 73.50 MLD (8 major STP's)
DPR's prepared	- Rs. 3078.59 Cr
Additional Coverage of balance areas	- Rs. 1660.00 Cr
Time Frame Required for Sewerage Scheme-Funds)	5-10 Years (As per availability of

Storm Water Drains: All the Village Panchayats are part of the Disaster Management Plan for the State of Goa. They make their Disaster Management Plan and submit the same to the Taluka Mamlatdar. As a precautionary measure and in order to avoid likely constraints to be faced due to climate change, all the Village Panchayats regularly undertakes Works of cleaning drains, repairs and maintenance of these drains.

Creation of Technical Cell and Green Cell: the establishment of independent Technical Cell for Directorate of Panchayats is in process which will help in expediting civil works of Village Panchayats and which will also help monitor construction with sustainable development such as use of solar panels, rain water harvesting etc. For setting up of Solar Panels for each and every Panchayat Ghar the Directorate of Panchayats require funds of Six Crores for the 191 Village Panchayats located across the State of Goa.

Schemes, Initiatives, and Policies

- The city of Panaji has a city sanitation plan
- Regional land use plans up to 2021
- Affordable housing: In RPG 2021 pockets of settlement areas aimed at providing low-cost housing, industrial/migrant workers housing, 20-point program housing, etc. are accordingly designated in the surface utilization plans. These areas shall be taken for development by either the agencies of the government-mandated to take up such schemes, or by the owners of such lands – collectively or individually depending on whether the land is owned by individuals or by communities. This is aimed at addressing the current gap that exists in the supply vs. demand for affordable housing.
- JICA funding for the sewage treatment plant
- As per the Outline plan of major cities solid waste management site has been identified in the cities of Panaji, Vasco-da-Gama, etc.

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- Laying of sewer network for balance and low laying areas is proposed at an expenditure of approximately Rs. 1660Cr.
- Sewerage Act and Policy for Mandatory House Sewer Connections

Impact of climate change

While the state has developed a regional land use plan, climate change can make all plans and infrastructure ineffective if they cannot stand the climatic change impact and exposure.

As per the climate change predictions, provided in an earlier chapter, the taluka's of Bardez, Tiswadi and Salcete are most vulnerable to flooding and sea-level rise (Appendix). Also as indicated earlier the taluka of Marmugao is vulnerable due to high population density and the presence of 90% of Goa's slum population.

Extreme Precipitation Events: Such events are predicted to rise and can render the service infrastructure in these areas unusable during disasters. It can as well affect the infrastructure resulting in financial loss.

Increased temperature: Temperature is predicted to rise significantly and the duration of high and low-temperature days is expected to change. Increasing urbanization and building infrastructure is adding to the need for cooling systems like loss of Khazan lands due to climate change and ingress of water up to 40kn along the rivers has been predicted.

7.7.1 Synergy with National Mission and SDG

The national mission on sustainable habitat, is a mission under the NAPCC which seeks to promote sustainability of habitats through improvements in energy efficiency in buildings, urban planning, improved management of solid and liquid waste including recycling and power generation, modal shift towards public transport and conservation. It also seeks to improve ability of habitats to adapt to climate change by improving resilience of infrastructure, community-based disaster management and measures for improving advance warning systems for extreme weather events.

The mission requires action based on:

(a) development of sustainable habitat standards that lead to robust development strategies while simultaneously address climate change

(b) preparation of city development plans that comprehensively address adaptation and mitigation concerns

(d) capacity building for undertaking activities relevant to the Mission

The sustainable development goal no. 11 (SDG11) call s for sustainable cities and communities. It has below mentioned targets and these targets are partially or fully meet by the adaptation strategies as applicable.







- By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums
- By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons
- By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries
- Strengthen efforts to protect and safeguard the world's cultural and natural heritage
- By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations
- By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management
- By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities
- Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning
- By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels
- Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials

Strategies for adaptation

Since the talukas of Bardez, Tiswadi, Mormugao, and Salcete contain most of the state population, economic activity and are at the highest risk due to climate change, adaptation will be prioritized for these talukas. Hence, these talukas are prioritized for

1. Climate based infrastructure vulnerability assessment of critical services
2. Development of a plan for the resilience of vulnerable structure associated with critical services
3. Redesigning the regional land use planning maps of most vulnerable areas after considering climatic factors
4. Identifying measures like creating flood control gates etc. for controlling flooding events due to various aspects like the upward flow of water into the rivers
5. Development of climate-based disaster management plan
6. Implementation of a solid waste management plan
7. Enhancing internal waterways for transportation

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8. Strategy to relocated/compensate and identify new means or alternate skill for the owners of khazan lands as the probability of submergence due to climate change increases
9. Identify and explore natural mechanisms like increased mangroves or sea walls etc to guard against sea-level rise.

Table 28: Adaptation Strategy for Most Vulnerable

Sr. No	Intervention	Status	Responsible agency	Barriers and Gap in implementation	Intervention Type	Source of Finance
1	Study on Climatic resilience of Marmugao and development of action plan	proposed	Climate change cell/department/secretariat		Others	NAFCC
2	Implementation of climate resilience action plan for Marmugao	proposed			Activity	Own budget and Multilateral agency
3	Climatic resilience plan for Salcete, Tiswadi, and Bardez should be developed	proposed	Climate change cell/department/secretariat		Others	NAFCC
4	Implementation of climate resilience plan for Salcete, Tiswadi and Bardez	proposed			Activity	Own budget and Multilateral agency
5	Gender vulnerability action plan	proposed			Awareness raising and capacity building	
6	Alternate skill development plan for vulnerable population	proposed			Awareness raising and capacity building	
7	Alternate skill development and facilitation as per the plan	proposed			Activity	
8	Development of last Mile Connectivity and Early Dissemination Solution for the State under NCRMP-II	under progress			Activity	

Sr. No	Intervention	Status	Responsible agency	Barriers and Gap in implementation	Intervention Type	Source of Finance
9	Multipurpose Cyclone Shelter (MPCS) & MPCS with fire stations are proposed to be taken in Canacona, Mormugao, Bardez, Pernem and Tiswadi Talukas.	under progress			Activity	

Table 29: Adaptation Strategies for Habitats

Sr. No.	Intervention	Status	Responsible agency	Barriers and Gap in implementation	Intervention Type	Source of Finance	Time frame
1	Climate resilient city sanitation plans are developed or existing plans are strengthened to be climate resilient	to be modified	TCP		Policy	Existing Department Budget	
2	Service level benchmarks should be met in all major towns and cities	under progress	TCP		Others	Existing Department Budget	
3	To carry out the preparedness assessment of low-lying areas in the four taluks to flooding and other climatic stresses which can cause flooding						

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Sr. No.	Intervention	Status	Responsible agency	Barriers and Gap in implementation	Intervention Type	Source of Finance	Time frame
4	Implement measures to make these areas ready for climatic stresses	proposed					
5	Khazan lands protection from climate change	to be modified					1-2 years
6	Sea protection walls or natural pathways to guard against sea level rise must be identified and deployed	proposed		Cost could be prohibitive and effectiveness needs to be assessed	Activity	Multilateral agency	6 to 9 years
7	Making provision at sea and river confluence to back water or tidal water into the rivers	proposed		Cost could be prohibitive and options could be limited	Activity		2-3 years
8	Identifying vulnerable khazan land owners, providing alternate skills and livelihood options for future	proposed	TCP and agriculture department		Scheme	Existing Department Budget	1-2 years
9.	Online Management of Sewerage Infrastructure with implementation of GIS based mapping	underway		GIS based mapping for Panaji, Vasco and Margao sewerage system has been completed. As other areas get covered		Existing department budget	

Sr. No.	Intervention	Status	Responsible agency	Barriers and Gap in implementation	Intervention Type	Source of Finance	Time frame
				this will be applied to them as well.			
10	Introduction of village carrying capacity concept in any developments/development projects in each village	Proposed	Panchayat Raj department		Policy	-	-
11	Material recovery facility at Village level	Proposed	Panchayat Raj department	Only villages with land can implement it	Infrastructure	XXX	XXX
12	Developing climate resilient and low cost housing	Proposed	RDA				

Note: ***Approximate financial implications of transport sector expected to be met from climate change plan for ten years are approximately ₹ 10 crores. Detailed plan for expenditure along with gap analysis will be prepared by the department within 6 months.***

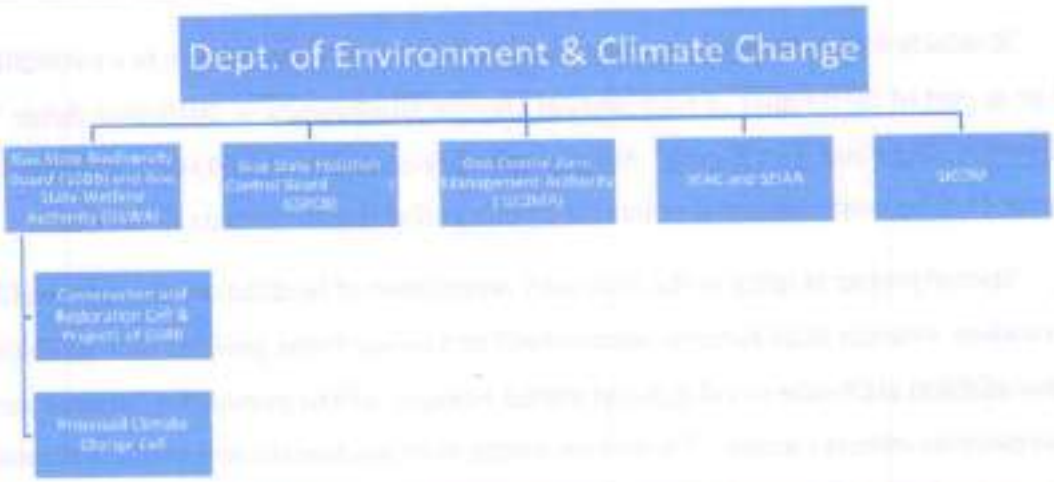
GIS based mapping of the sewer lines of Panaji, Vasco and Margao Sewerage system has already been done. Since Sewerage schemes in Navelim, Colva, Ponda, Mapusa (Part), Calangute, Baga are in progress mapping of same is not done. Once the schemes are completed mapping will be done in due course of time.

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https://tcp.goa.gov.in/wp-content/uploads/2016/gazette/RPG21_Bardez_Tiswadi_Mormugao_Salcete_Notification.pdf

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Department of Environment & Climate Change – Govt. of Goa



Department of Environment & Climate Change – Significant actions initiated and proposed in the context of climate change.

a. Setting up climate change cell under Dept. of Environment to function as secretariat.
b. Mapping of perennial springs and assessment of water quality of perennial springs and ground water,
c. water quality assessment of lakes and ponds and restoration of water quality through interventions
d. GIS mapping of eco sensitive areas, forest, bunds , sluice gates, aquaculture ponds, water and air quality monitoring stations of GSPCB sacred groves (devrai), springs, lakes, ponds, water bodies and creating environment quality data.
e. De-centralized sewage treatment plants at Agonda, Palolem, Morjim and Mandrem
f. Study on *khazan* and it's ecosystem services.
g. Salinity mapping in ground water.
h. Ozone / UV treatment facility to existing STP of PWD/ JICA/SIDCGL
i. Restoration of bunds and sluice gates

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Goa State Biodiversity Board

Unique Initiatives by Goa State Biodiversity Board by involving the network of Biodiversity Management Committees (BMCs0 constituted at ground level in every local body

Goa State Biodiversity Board has always strived to ensure maximum participatory approach at grassroots level and so far, awareness programs on need for biodiversity conservation and mainstreaming biodiversity" have been conducted at all levels throughout the State of Goa.

Highlights of important initiatives worth replicating in other areas

1. Roadside selling farmers were provided platform to sell their produce in air-conditioned mall to as part of celebration of International Day for Biodiversity in 2019 with theme "Our Biodiversity, Our Food, Our Health". Surprisingly they earned over ₹ 60,000/- within half day and over ₹1.5 lac worth recurring orders for further period due to contacts developed.

2. Special project is taken in the State on Conservation of biodiversity through livelihood interventions wherein local farmers, horticultural and minor forest produce will be subjected to value addition at clusters of villages and market linkages will be provided to increase earning of Bioresources owners - locals. This will encourage them to conserve and multiply plantations of various landraces of plants, fisheries and also other shellfish ultimately leading to ecosystem conservation through beneficial mechanism. There is plan to promote GoVan brand wherein locals will be empowered through network of GoVan (also means go back to forests and nature)

3. People's Biodiversity Registers are prepared with participation of villages especially elders and youngsters wherein not only biodiversity is documented but validation is participatory at three levels BMC level, Gramsabha level and State level. Hence village gets honored when they get opportunity to present their village biodiversity registers to eminent intellects at State level. They also become emotional when they themselves learn about their village awhile documenting the vast Bioresources and associated knowledge which was so far confined to certain families or never given importance. Outcome of PBR is used for deriving conservation focus and prioritization of issues at village level. This has created micro level green revolution in villages. Certain examples are – revival of famous and unique watermelon variety of Parra Village (native village of Former Defence Minister of India/ Former CM and Chairperson of Goa State Biodiversity Board Shri. Manoharbhai Parrikar – his surname comes from this village name). This variety was almost extinct and only two women in village had preserved handful of seeds (this emphasizes role and contribution of women in biodiversity conservation). GSBB took initiatives and revived this variety by multiplying seeds. In another initiative archiving of Medicinal plants document/ Book in Urdu from Curti Khandepar BMC area was possible due to PBR exercise.

4. Uniqueness of our PBR process is that technical support groups are not only eminent institutions or ecologically expert companies but also local farmers self help groups with necessary qualification and expertise have ben empanelled with GSBB as technical support groups who guide villages in preparation of PBRs.

5. Our next initiative is green skilling wherein employment opportunities will be created for aspiring youth in practicing traditional occupations such as – revival of traditional Knowledge based techniques, systems and practices such as Bundhs and Sluice gates. Making of watershed structures and walls with use of naturally occurring material including reinforcement by mangrove wood or bamboos.

6. State level Biodiversity Awards are conferred upon the individuals as well as BMC level to encourage the conservation efforts in biodiversity conservation.

7. While signing Access Benefit Sharing (ABS) Agreements, first time agreement is signed without cash but "in-kind type" wherein signatory will conduct awareness and capacity building amongst villagers rather than paying to GSBB.

8. Television series of 20 parts on biodiversity of Goa *'Bhowandi Jaivik Fudarachi'* on Goa Doordarshan Channel featuring unique biodiversity of Goa

9. Periodic public lecture series by eminent personalities in the fields related to biodiversity. Collaborative programs for Youth - Youth Festival – *Yuva Jagruti* and TEDx event wherein over 600 students participate in various competitions at State level.

10. Conservation and Restoration Cell established at GSBB. GSBB has documented and published the book 'Tradable Bio-resources of Goa' and has published book on the prominent Sacred Groves of Goa.

11. Goa State Biodiversity Board notified the Goa State's first Biodiversity Heritage Site – 'Purvatali Rai' of Surla Village, Bicholim Goa.

12. Legal Advisory Group headed by Retd. Justice, involving legal aid cells of law college students for handholding BMCs. Suo moto cognizance of Biodiversity related issues in many matters such as conservation of habitats of rare varieties of the windowpane oysters and other unique local varieties.

13. The Curtorim Biodiversity Management Committee (BMC) & Farmers of Curtorim have launched a 100% locally grown rice under the name "CUDDTARI" - an initiative supported by GSBB. Based on this and such other experiences related to livelihood, a project on achieving conservation through livelihood interventions is taken up by GSBB. This will benefit locals and also lead to biodiversity conservation.

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Network of BMCs is activated from time to time for important activities such as identification and ground truthing of Bunds, khazan land management etc. This is directly related to climate change intervention for low lying areas.

Another example is that even during covid 19 pandemic lock down period, GSBB utilized network of BMCs to identify local homemaker who know tailoring and were involved in stitching over 25000 facemasks which were further supplied to Govt departments. This is example of going beyond mandate during crisis times. MS GSBB is member of State economic advisory to find remedies for dealing with impacts of covid 19 pandemic and revival of economy.

Other initiatives planned are below

- Seed Bank for the State of Goa is planned to be established.
- First in India Sand dune Park will be created through "ICZMP – World Bank".
- Sand mining impact and river Biodiversity Index study and Wetland identification are ongoing through Department of Environment.

Goa State Biodiversity Board (GSBB) – Nodal Agency for Goa State Wetland Authority – (GSWA)) – Goa State Biodiversity Board is an autonomous body of Govt. of Goa, under the umbrella of Dept. of Environment is line Dept.

This board has also created conservation and restoration cell to take up the tasks of preparation

Government of Goa approved 03 ICZMP- Projects to be implemented in the State of Goa:

1. **Establishing and designating coastal sand dune parks in Goa.**
   a. North Goa
      i) Tiswadi Taluka: Miramar
      ii) Pernem Taluka: Mandrem- Morjim Belt
   b. South Goa
      i) Canacona Taluka: Galjibag – Agonda Belt
      ii) Salcete Taluka: Colva- Cavelossim Belt

2. **Erosion/ accretion- Assessment studies to ascertain feasibility of annual replenishment of sand along the estuarine stretches identified for Goan Estuaries.**

3. **Study of critical coastal habitats from the context of biodiversity conservation.**

Inputs for SAPCC

2. **Goa State Pollution Control Board (GSPCB)**

a. Installation of online real time monitoring station at Panaji , Mapusa, Margao, Vasco and Amona, along with noise monitoring station.

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b. Real-time online portable air quality monitoring station with scatter light technology In mining areas

c. Online water quality monitoring station in Mandovi, Zuari, Chapora river and on coast at Palolem, Colva, Calangute and Mandrem beaches.

Goa State Wetland Authority (GSWA)

a. Wetlands shall be Identified and Notified in the State of Goa.

b. Wetland Mitra belonging to the local community will be appointed for the Notified Wetlands in the State of Goa

c. Community and BMC driven Restoration and reclamation of water bodies for future water security will be undertaken by part voluntary labor from the locals.

d. Complete Biodiversity (Flora, Fauna and Microbial level) assessment of available resources of wetland ecosystem will be undertaken in project mode by involving research based organization, institutes and colleges for finding solutions to water crisis and abetment.

e. Community driven conservation and management of Wetlands through livelihood projects will be undertaken, with efficient and wise use of the wetlands ecosystem resources.

f. Revival of traditional practices (introduction of lost indigenous fish species encouraging further fishing, use of Sluice gates to regulate the water contained and its use in traditional practices such as paddy cultivation in low-lying regions, which do not cause any adverse effects to the ecological character of the respective wetlands) will be undertaken

g. Awareness programs for conservation and management of Inland fresh water reservoirs will be undertaken.

h. Use and role of urban wetlands/lakes in the State of Goa for (a) reduction of ambient temperature and avoiding urban heat islands and (b) acting as carbon sink for GHG emission will be carried out as climate change mitigation measure.

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Financial Implications

Sr. No.	Name of the Dept. / Agency / Board / Authority	Intervention	Financial Implications in – Lacs ₹					
			Duration	State Govt	Others - *GMR / World Bank	Central Govt	Gap fund required from Climate Change Sources	Total ₹ lacs
1	Goa State Biodiversity Board	Study of sand mining impact, accretion and river biodiversity index – already initiated and ongoing through State funding	2 years	20%	50% World bank	30%	-----	900.00
2	Goa State Biodiversity Board	Sand Dune Park in Goa for conservation, restoration and understanding of sand dune ecosystem	3 years	20%	50% World bank	30%	--------	310.00
3	Goa State Biodiversity Board	Study of critical coastal habitats	3 years	20%	50% World bank	30%	-----	55.00
4	Goa State Wetland Authority	Wetland Identification & Related technical assistance through NIO	2 years	100%	-----	-----	-----	175.00
5	Goa State Biodiversity Board	Compensatory afforestation for Mopa Airport. State may contribute more over period of next 10 years	5 years for planting 5 lac trees	50 lacs	*100 lacs	---	-----	150.00

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6	Goa State Biodiversity Board & Wetlands	Restoration and Conservation programs specific to climate change in the State for vulnerable areas such as developing sustainable working models for sustainable restoration and management of riparian ecosystems and other areas with interventions such as climate resilient varieties of rice - rice park, erosion control measures, mangrove related interventions, livestock & related interventions, etc. will be made to establish two models in two districts of Goa in collaboration with Dept of Agriculture and voluntary organization	10 years	10 lacs	---	---	**230**	**910.00**

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7	Goa State Biodiversity Board	Creating seed bank for germplasm preservation, propagation and promotion for conservation, livelihood and climate change	3 years	60 lacs	-----	30lacs (Through NABARD or Central Schemes)	**210**	**300.00**
8	Goa State Biodiversity Board	Conservation programs at BMC level in every village based on conservation focus derived from PBRs @₹ 10 lacs per local body for 205 local bodies	10 years	205 lacs	----	----	2050	
9	Goa State Biodiversity Board	Setting up climate change cell under GSBB to function as secretariat.	10 years	10 lacs	-----	100 lacs	10	**110.00**
10	Dept. of Environment	Restoration of bunds, sluice gates and strengthening coastal & riverine protection systems	10 years	1000	-----	-----	3000	4000.00
11	Dept. of Environment	Mapping of perennial springs and assessment of water quality of perennial springs and ground water	10 years					
12	Dept. of Environment	water quality assessment of lakes and ponds and restoration of water quality	10 years	50			150	200.00

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		through interventions						
13	Dept. of Environment	GIS mapping of eco sensitive areas, forest, bunds , sluice gates, aquaculture ponds, water and air quality monitoring stations of GSPCB sacred groves (devrai), springs, lakes, ponds, water bodies and creating environment quality data.	10 years	50			150	200.00
14	Dept. of Environment	De-centralized sewage treatment plants at Agonda, Palolem, Morjim and Mandrem.	10 years	50			375	425.00
15	Dept. of Environment	Study on *khazan* and it's ecosystem services.	10 years	50			150	225.00
16	Dept. of Environment	Salinity mapping in ground water.	10 years	50			150	225.00
17	Dept. of Environment	Ozone / UV treatment facility to existing STP of PWD/ JICA/SIDCGL.	10 years	50			400	450.00
19	Dept. of Environment	Environment conservation related	10 years	50			100	150.00

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		interventions by schemes						
20	Goa State Pollution Control Board (GSPCB)	Installation of online real time monitoring station at Panaji , Mapusa, Margao, bicholim, and Amona, along with noise monitoring station.	10 years	10			50	60.00
21	Goa State Pollution Control Board (GSPCB)	Real-time online portable air quality monitoring station with scatter light technology in mining areas	10 years	25			75	100.00
22	Goa State Pollution Control Board (GSPCB	Online water quality monitoring station in Mandovi, Zuari, Chapora river and on coast at Palolem, Colva, Calangute and Mandrem beaches.	10 years	100			400	500.00
						Total	**7500**	**9445.00**

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8. Climate Disaster Management with special reference to climate migrants and refugees

Disasters are caused due to natural or man-made hazard situations. The impact of a disaster varies from reversible to irreversible and in many cases the impacts lie somewhere in between. As per the Disaster Management Act, 2005, disaster is defined as 'a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or man-made causes, or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of, property or damage to, or degradation of environment, and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected areas'.

Climate change has across the world, enhanced the occurrence of disaster events both in depth and breadth. One of the consequences, of climate change related disasters is migration of people within the country or from another country leading to climate migrant's and refugees. These migrations could be permanent or temporary. IPCC has indicted that the climate change could lead to largest movement of human population leading to migration within and beyond the country borders. According to the Internal Displacement Monitoring Centre reports, 18.8 million new disaster-related internal displacements were recorded in 2017. It has found that most disaster displacements are linked to natural hazards and the impacts of climate change is internal, with those affected remaining within their national borders. However, displacement across borders also occurs, and may be interrelated with situations of conflict or violence.

India has a long, densely populated low-lying coastline, young Himalayan system and vast arid region. Due to the diversity and complimenting factors, internal migration is already experienced in India. Season migration is a common phenomenon experienced in several parts of the country. Labour migration has been permanent in several places. Refugees along the country's borders are more prominent in the border regions of the country, for example: migrants and refugees from neighbouring Bangladesh. Climate change is expected to increase this phenomenon.

Status of migration and refugees in Goa

Currently Goa experiences migration of people from different parts of the country like Telangana, Andhra Pradesh, Orissa, Bihar etc as migrant workers. Migrant workers mostly find place as agricultural labourers and in tourism industry. Goa does not share land border with any of India's neighbouring countries and has not faced any significant refugees so far.

Expected impact of climate change

Climate change as indicated in earlier sections of the report has a likelihood of resulting in:

1. The loss of Khazan lands which may lead to migration of khazan land owners and their families
2. Inundation of several portions of taluks like Salcete, Bardez, and Tiswadi causing people to evacuate these areas

These scenarios may in the longer time frame, lead to permanent migration of population within Goa to areas with higher altitudes. Apart from these, recurrent disasters may create a greater number of temporary or seasonal migrants within Goa as well.

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Women, marginalized population and children are considered to be more vulnerable and have different needs as migrants and refugees. The current disaster management practices often fall short in addressing these needs.

National Cyclone Risk Mitigation Project (NCRMP), a World Bank funded project in India focuses exclusively on ex-ante disaster risk mitigation. It is implemented by the National Disaster Management Authority (NDMA), New Delhi with the support from Ministry of Home Affairs (MHA), GOI focusing on the cyclone prone coastal States and union territories. In the phase II, the States of Gujarat, Maharashtra, Kerala, West Bengal, Karnataka and Goa have been included. Following activities are being taken up under the project:

1. DPR for Development of last Mile Connectivity and Early Dissemination Solution for the State under NCRMP-II.
2. Multipurpose Cyclone Shelter (MPCS) & MPCS with fire stations at Canacona, Mormugao, Bardez, Pernem and Tiswadi Talukas.
3. Awareness on Disaster preparedness programme 2017-18 was conducted by the NDRF team in all the 7 talukas of south Goa.

Issues arising from Migration and refugee

Migration can increase health issues and health cost burden for the state. As an example: 2,72,236 patients were tested for malaria and 543 patients were found to be positive. 267 locals have been affected by malaria and 37 by plasmodium Falciparum. 50.83% cases were reported among migrant population at the construction sites.[21]

Some of the other challenges arising from seasonal migration and refugees are rights and social entitlements, lack of formal residency or residency rights, lack of identity proof, lack of political representation, low-pay work, insecure or hazardous work and extreme vulnerability of women and children.

It could also lead to additional stress on civic infrastructure, stress on limited land resource available with the state, food security issues and further exploitation of the ecologically fragile western ghats.

Women have special needs when staying in shelters and camps. These needs are often missed out in the regular shelters.

UNICEF[22] has identified that migration delays school entry, denies or interrupts schooling, increases the number of children dropping out and leads to child labour.

Adaptation plan to address the challenge

Two level approach and strategy are proposed for managing migration and refugee issue in Goa:

1. **Systematic movement and settlement of migratory population** whose current habitat and/or livelihood is under danger from climate threat despite enacting [illegible]

[21] Socio economic survey 2017-18

[22] Internal migration in India initiative, for better inclusion of internal migrants in India

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adaptation measures (suggested in chapter 7). This should assist in reducing the risk of lives, property and systematic adjustment to alternate livelihood options

2. **Re-settlement of post disaster refugees in a gender sensitive manner**

An action plan on identification of alternate skills and livelihood for vulnerable population has been provided in chapter 7.

The other adaptation measures to be considered for migrants and refugees:

1. Development of gender sensitive post disaster relief policy
2. Development of a coherent legal and policy framework for migrants and refugees
3. Development programmes should be designed keeping in mind the local disaster threats and disaster reduction should be an integral part of the development programmes
4. Develop a minimum social security system for post disaster migrants and refuges
5. Identify and ear mark areas and structures for resettlement of those under threat of subsidence
6. Set up a process for counselling the people who are to be re-located over the years and those who get relocated involuntarily due to disaster.
7. Engage refugee women in a dialogue and in social activities
8. Develop child focused rehabilitation plan

Sr. No	Intervention	Status	Responsible agency	Barriers and Gap in implementation	Intervention Type	Source of Finance	Timeframe
1	Development of gender sensitive post disaster relief policy	proposed	Disaster Management Authority		Policy	Existing Department Budget	1-2 years
2	Development of a coherent legal and policy framework for migrants and refugees	proposed	Disaster Management Authority and Revenue Department		Policy	Existing Department Budget	3-5 years
3	Development programmes should be designed keeping in mind the local disaster threats and disaster reduction should be an integral part of the development programmes	proposed			Others	Own budget and Central Government Contribution	3-5 years

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Sr. No	Intervention	Status	Responsible agency	Barriers and Gap in implementation	Intervention Type	Source of Finance	Timeframe
4	Develop a minimum social security system for post disaster migrants and refuges	proposed			Others	Unknown	1-3 years
5	Identify and ear mark areas and structures for resettlement of those under threat of subsidence	proposed	Revenue department			Existing Department Budget	3-5 years
6	Set up a process for counselling the people who are to be re-located over the years and those who get relocated involuntarily due to disaster.	proposed	Disaster management authority		Activity	Own budget and Multilateral agency	5-7 years
7	Engage refugee women in a dialogue and in social activities	proposed	Child and Women Welfare Department along with Disaster Management authority'		Activity	Own budget and Multilateral agency	
8	Develop child focused rehabilitation plan	proposed	Child and Women Welfare Department along with Disaster Management authority'		Others	Existing Department Budget	1-2 years
9	Formulation and implementation of stricter CRZ rules for new development in areas sensitive to subsidence	proposed	Urban development bodies		Scheme	Existing Department Budget	1-2 years

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Sr. No	Intervention	Status	Responsible agency	Barriers and Gap in implementation	Intervention Type	Source of Finance	Timeframe
10	Sensitization, Awareness and capacity building among various departments on the topic of migrants and refugees as a result of climate change	proposed	Climate change secretariat		Awareness raising and capacity building	Multilateral agency	1-3years

Note: The Concerned Department is expected to carry out GAP analysis and ascertain budgetary provisions and implications for the activities mentioned above and add more activities relevant to climate change within the period of atleast six months. Approximate financial implications of disaster management sector expected to be met from climate change plan for ten years are approximately ₹ 10 crores. Detailed plan for expenditure along with gap analysis will be prepared by the department within 6 months.

9. Financing of Climate Action Plan

In 10 years, from 2006 to 2015, infrastructure and other asset losses in the Asia and Pacific region resulting from floods, earthquakes, and tropical cyclones averaged $73 billion yearly (56% of the global total) and $199 million per day. ADB's disaster risk models indicate an average annual loss over the long-term equivalent to more than 2% of gross domestic product (GDP) for 11 Developing member countries (DMCs), and over 1% of GDP for 21 DMCs[23]. 431 major natural disasters have occurred in India in 30 years period from 1980 to 2010, resulting in a huge loss of human lives, property, and resources. Natural disasters between 1998-2017 have resulted in an absolute financial loss of US$79.5 billion [24]. Similarly, a single extreme weather event in Goa, on 2nd of October 2019, in Canacona taluk resulted in loss of over INR 100 crore[25]. Many of these events and the nature of these natural events are attributed to climate change. It is predicted that the severity and frequency of these climatic events will increase due to climate change and inaction will lead to huge economic losses in the future.

ADB has predicted that inaction in some of the southeast Asian countries could result in a loss equivalent to more than 6% of GDP while adaptation at a cost of just 0.2% of GDP for investment in such things as seawalls and drought- and heat-resistant crops, could avoid damages amounting to 1.9% of GDP, on an annual basis. (Climate Change Operational Framework 2017–2030, Asian Development Bank). Thus, factoring climate action into the future of Goa and climate-proofing Goa and its investments can be expected to contribute towards the State's economic progress as well.

[23] Climate Change Operational Framework 2017–2030, Asian Development Bank

[24] India's second communication to UNFCCC

[25] Report of the Canacona Flash Floods Study Committee constituted by the Government of Goa

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The total budget required for implementing the SAPCC in Goa has been projected to be INR ₹ Rs 465.00 Crores for ten years, which works out to be ₹ 46.5 Per Annum and amounts to approximately 0.22% of Annual Budget and 0.050 % of Gross State Domestic Production (GSDP) of Goa State. The same may get revised or updated over the years, based on any additions or modifications to the SAPCC. One of the steps for mainstreaming climate change is to factor the above-identified amount annually into the state budget.

As per UNFCCC, Climate Finance refers to local, national or transnational financing—drawn from public, private and alternative sources of financing—that seeks to support mitigation and adaptation actions that will address climate change.

In light of the above, climate finance needed for the state should be sourced from a set of best suitable options. It is expected that the state budget would be the key contributor to the climate change budget for the state. Besides, SAPCC will also leverage on national programs, policy, schemes, convergence with national programs and funds, multilateral and bilateral agency funding, market-based mechanisms/instruments and other climate finance options.

Following is an indicative structure to adopted by Goa for financing the measures under SAPCC

- Allocation of dedicated budget for climate-related policy development, awareness and capacity building
- Identified projects which are adaptation based and need additional financial resources which are beyond the capacity of the state to absorb and are below INR 25 crore in value or require co-finance which is within INR 25 crore and pilot in nature can apply for NAFCC funding
- Projects which are large, replicable and essential for climate mitigation or adaptation but beyond states ability to finance in totality and do not have converge with any other scheme or certain components do not have any source of funding can attempt multi-lateral development agencies or other climate funds like GCF funding
- For other activities which are essential and regular with a possibility of a return, can be undertaken through concepts like the revolving fund, green bonds, etc.

9.1. State internal finance

The total budget required for implementing the SAPCC in Goa has been projected to be INR ₹ Rs 465.00 Crores for ten years, which works out to be ₹ 46.5 Per Annum and amounts to approximately 0.22% of Annual Budget which is ₹21056.35 (estimated for 2020) and 0.050 % of Gross State Domestic Production (GSDP) of Goa State which is ₹92260.53 (as per CMs budget speech). The total expenditure of the state is estimated at Rs.39640.53 crore. On the expenditure side, Social Services account for Rs. 4732.61crore i.e. 40.33% of the estimated total expenditure, followed by Economic Services at Rs.3475.38crore or (29.61%) and General Services at Rs.3528.05crore (30.06%). It has a

revenue surplus of INR 455 crore. Grant-in-aid &contribution from central government is Rs 1249.68 crore.

State departments are carrying out activities that directly or indirectly contribute towards SAPCC i.e. climate mitigation and/ or adaptation. For example, switching to LED lights in Panaji, and utilizing power generated at Saligao solid waste treatment plant. However, in the absence of any mechanism to account for expense under climate change, **the expenditure on climate change is currently unaccounted.**

Hence, there is a need to establish a mechanism to identify states' current expenses on items that contribute towards climate change and the source of current finance.

To further enhance the funding of the state on climate change, there is a need to identify own resources, market, and insurance option which can further contribute to the climate change budget of the state.

Own Resource	Market and Insurance
❑Own resources at district, town or taluk level ❑Convergency of state schemes ❑Incorporation of essential climate elements in the existing programs, schemes, projects, state policies etc will result in utilization of existing committed finance towards climate mitigation and /or adaptation ❑Setting up of annual dedicated budget for climate change	• Climate Risk insurance specifically for farm sector • Public Private Partnership • Issuance of Green Bonds (for example : Ahmedabad Municipal Corporation) • Catastrophe Bonds • Incentives for Green Initiatives and Activities by citizens, tourist and business • Establishing Revolving fund • Channelizing Corporate Social Responsibility funds

In addition, existing corporate sector in Goa spends on CSR activities. This CSR expenditure by corporate sector can be further aligned to meet the state governments requirements.

Sector as per CSR fund distribution	Interventions/actions to be incorporated
Education	• School level education programmes on climate resilient measures like maintaining agricultural spaces, promoting green buildings, importance of regulating plastic and inorganic material, etc. • FGDs, outreach programmes in schools, madrasas to develop awareness
Healthcare	• Mobilization and streamlining of rag pickers on health and hygiene issues
Skills Development	• Skill development of urban poor to work with non-biodegradable waste recycling methods – Inorganic waste to planter bags and handicrafts • Waste collection and segregation from areas with low accessibility
Environment	• Funds towards improving rate of plantation as part of Haritha Haram • Promotion of vertical gardening and farming • Restoration of water bodies and wetlands
WASH	• Installation and maintenance of dry toilets in public schools and informal settlements • Awareness building and outreach on good sanitation practices • Provision of safe drinking water in informal settlements in the vicinity of the corporate entity
Livelihood	• Organizing workshops, training modules or exposure visits on greener and cleaner technologies for concerned government staff
Women Empowerment	• Funding women SHGs to scale their operations particularly in sanitation, construction of semi-pucca houses, etc.
Others	• Designing effective communication plan for disaster response • Periodic cleaning of drains in areas prone to water logging

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9.2. Revolving funds (Rf) or Circular funds for climate change

Revolving Funds (RF) or Circular Funds for climate change are pool capital funds using federal, provincial or municipal funds which can then be loaned out to finance infrastructure or other climate change projects at low-interest rates. Money is repaid into the fund which can be loaned out again. These funds are flexible in design and can use a multitude of options in terms of the collection of funds. Usually, these funds are well suited for mitigation activities like renewable energy projects but can also be utilized to tackle climate adaptation activities like water security. The differences and similarities in the design of Rfs speak volumes on the strength of the concept as a whole. The differences allow for elbow room to tailor-build the mechanism according to the country/state/municipality, while the similarities lend ideas to economies on how to maximize its utility.

A revolving fund is proposed for the State of Goa to support the application of initiative between all levels of government. A consensus needs to be reached for the efforts to fructify. The private sector can also be included in this model and a market-based system can be developed. All activities under this must also satisfy social requirements and environmental safeguards.

The next step is to develop a complete guideline for enacting the fund in the State of Goa for utilization or complementing activities which do not find regular budget in the state. The operational mechanism for this fund can be through an SPV under the state secretariat on climate change.

9.3. Green tax on tourism

Tourism is the major industrial sector in Goa. Every year, tourists visiting Goa are almost four to five times population of Goa. Eco-tax or Green tax to combat climate change is proposed to assist in mitigation and adaptation activates of the areas which are most frequently visited by the tourist. Such taxation models are under implementation in countries like Spain. The system can be developed based on the tourist's standard of accommodation.

As a next step, the institutional structure would need to be established to develop a functional model for taxation and its appropriate utilization. **Appropriate mechanism, time frame and other modalities will be worked out by tourism department.**

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10. Implementation of SAPCC and Institutional Mechanism for Implementation

Implementation could involve multiple stakeholders through their projects but as decided and approved by the State level steering committee for climate change for National adaptation fund for climate change (SLSC for NAFCC), initially two model projects could be developed in Goa in two districts wherein maximum convergence of climate change related interventions could be exemplified. The project concept note in this regard has been approved. The institutional framework has been proposed as given below.

10.1. Institutional Framework for Implementation of SAPCC

An appropriate institutional framework with clearly identified roles and responsibilities is essential for the effective implementation of SAPCC. A state nodal agency on climate change will be formed in the Dept. of Environment and Climate Change for the which will serve as the climate change secretariat for the State of Goa. Secretariat will be headed by a senior government officer and will comprise of resources with a background in climate change and understanding of Goa's local context. It will be supported by experts in climate change, from within and/or outside the state. Other staff as needed for the effective functioning of the secretariat shall be identified.

The secretariat will hold the responsibility of:

1. Knowledge management - developing, managing, and updating information on climate change from state, national and global perspective, dissemination of such information to the concerned department, institute, etc on time.

2. Awareness-raising and capacity building – It will be responsible for conducting awareness programs for public and otherwise and also carrying out capacity building activities for departments and all concerned with the delivery of SAPCC. Facilitating green skill development pertaining to climate change.

3. Assisting in climate finance – Any project/ activity or intervention planned under SAPCC or proposed otherwise to be implemented partially or fully through climate finance options other than the state or department internal funds will be coordinated by the secretariat. For example, Procedure for obtaining NAFCC Funds for state projects.

4. Monitoring of SAPCC- Department can consult the secretariat on matters related to the implementation of SAPCC while secretariat will also carry out periodic monitoring on the implementation of SAPCC and utilize appropriate tools to record, produce and update the SLSC on the implementation of SAPCC. All the data / information and reporting by concerned departments, agencies and concerned stakeholders should be periodically furnished to the secretariat.

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The nodal agency shall be allocated budget or financial assistance from the state for carrying out its activities. Each of the concerned departments will appoint a nodal officer on climate change to interact and deal with the climate change secretariat.

The nodal agency will be guided by the State Level Steering Committee headed by the State's Minister for Environment & Climate Change, Chief Secretary & Environment Secretary & other members. The SLSC will not only guide but also provided approvals as necessary. State departments will also form a part of the SLSC.

The State Governing Council, headed by Honourable Chief Minister will be the overall guiding body along with Chief Secretary, Environment Minister for strategic climate change issues in the state. It will constitute of Honourable Chief Minister, Hon. Minister for Environment & Climate Change, Chief Secretary, key experts, and nodal officer of the secretariat and others may be included as necessary.



Figure 32: Institutional Mechanism for Implementation of SAPCC

10.2. Knowledge Management

Climate change is a dynamic subject, and the knowledge about climate change and its region-specific topics are currently scattered, limited and unorganized often making it difficult for departments to effectively utilize and integrate climate change in policy development and routine actions. Thus, their a need to systematically organize, synthesize, regularly update and provide information about climate change in the context of Goa to all stakeholders. At the same time, various institutes in the state are involved in climate change-related data gathering and analysis.

In this context, it is proposed that the secretariat on climate change undertakes the responsibility of collaborating with various agencies and institutes, collation of knowledge/data products available with them and to further continues to develop meaningful outcomes for the state.

Thus, under the National Mission for Strategic Knowledge on Climate Change, it is proposed that a climate change hub is created at the Secretariat. Following activities are proposed to be undertaken by the hub in a collaborative:

1. Creation of knowledge management portal
2. Formulation of integrated databases to assist the policymakers take informed decisions while formulating policies.
3. A collaborative project to continuously provide climate change trends and model projects for Goa. For this purpose, the secretariat may collaborate with state and national level institutes like BITs Pilani Goa and NIO, Goa, IITM Pune and any other institutes of organizations found related.
4. Develop Sectoral climate impact assessments
5. Develop and periodically update sectoral climatic vulnerability and hydrometeorological hazard risk for all sectors. In some time, the vulnerability of sectors may change and hence, re-prioritization might be needed. Such a project will help in developing the required knowledge
6. Develop a system to update and record the government's progress on climate change through policies, programs, etc.
7. Develop and provide guidelines to be included in the pre-implementation stage (i.e. feasibility, DPR, etc) for all infrastructure to climate-proof, and minimize climate impact
8. Develop knowledge material and conduct capacity building for all concerned departments and institutes
9. Develop various tools and models for dissemination of climate knowledge among all stakeholders
10. Conduct skill development programs to provide the state with resources trained to handle activities and infrastructure like STP, vermicomposting units, etc.

10.3. Capacity Building, Awareness Raising and People's Participation

Climate change impacts all and it is a must that people understand and appreciate the realistic impacts of climate change that they can expect to experience. It is also important for people to understand their role in minimizing climate change and how to prepare and respond to climate change through adaptation measures. Hence, people's participation is one of the key pillars of the effective implementation of SAPCC.

To enhance understanding of climate change, awareness programs are essential whereas capacity building is relevant for appropriate action at all levels. During stakeholder consultation at Goa, community involvement was emphasized with specific reference to youth and school children.

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Based on the above following activities are proposed:

1. **Including climate change as a mandatory part of school education**

Standardized modules will be created for generating awareness among school children on climate change with specific reference to the local context. Selected teachers from all schools would be provided with training on climate change. Schools will be provided with the audio-video course module which the trained teachers can use for further educating children

2. **Involving the youth in climate action**

Middle and higher secondary school children will be provided with opportunities to participate in community action on climate change through the school. Youth from college will be educated on climate change in the local context, future career opportunities related to climate action, skills needed and courses for skill development. A program will be developed and implemented to identify youth mascots for further spreading awareness on climate change in the state through various mediums.

3. **A community-level task force (CLTF)**

The community-level task force will be developed at an appropriate level through a structured program to not only create awareness but to also act as disaster averting and the first line of action during climate disasters. CLTF will also assist in gathering land documenting local/indigenous knowledge related to climate change indicators, and actions available to address climate change. The same will be appropriately vetted and included in the knowledge management system.

4. **Capacity building at the departmental level**

Every government employee needs to understand the local context of climate change, the expectation from them in implementing climate change initiatives and enhancing their ability to contribute to the same. A structured program with appropriate tools and implementation mechanisms will be developed by the Secretariat.

5. **Women leaders in climate flight**

Globally, women and children have been identified to be amongst the most vulnerable to climate change. Hence, it is essential to ensure that women and women-specific issues arising out of climate change are addressed appropriately. It is proposed that women SHG's and other women leaders will be identified to ensure that women are well informed on the local context of climate change, their issues are addressed or solution is identified. It is suggested that an appropriate program is developed for women.

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11. Monitoring and Evaluation of SAPCC

Implementation of SAPCC would require the state government to channelize a significant amount of investment. Hence, it is essential to measure the effectiveness, efficacy, and efficiency of SAPCC during the implementation phase. A robust monitoring and evaluation system will ensure that the progress of implementation is appropriately measured and captured, provide accountability for implementation and also to draw lessons for the future from the measures being implemented. As measures to contain and adapt to climate change are multi-dimensional and may have constantly changing climatic parameters, a robust M &E system will provide a way forward to strengthen the SAPCC periodically.

Developing monitoring and evaluation indicators for climate change adaptation activities is challenging as it is often independent of other factors like human development, other changes in the environment.[26]

In view of the above the M&E framework consists of:

1. Qualitative and quantitative indicators of adaptation
2. Indicators are attempted to be as ambiguous as possible
3. Monitoring, reporting and communication process for departments and the policymakers

11.1.1. M&E framework

SAPCC implementation is proposed to be reviewed and review and progress report to be submitted by the state nodal agency to the SLSC, annually before state budget preparation each year, to

a. Ascertain the financial resources spent on CC under projects/interventions, by various departments and concerned organizations
b. Provide progress on ground level implementation based on indicators
c. Provide a plan for next year, with any changes or deviations from the SAPCC
d. Provide a plan for expenditure on CC and additional financial resources needed from the state budget

As SAPCC implementation involves multiple stakeholders from different sectors and administrative groups, requiring interdepartmental coordination, in some cases, it is proposed that a **working group** is formed to facilitate transparency, coordination, communication, and learning. The working group must focus strongly on the MRE process.

[26] UNFCCC synthesis report on monitoring and evaluating adaptation: http://unfccc.int/resource/docs/2010/sbsta/eng/05.pdf

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Climate change secretariat and nodal climate change representatives from each department can be part of the working group. The working group will be chaired by the climate change secretariat. The working group will meet at least every quarter to discuss the progress on the interventions presented in the SAPCC, challenges being faced during implementation and way forward. Working groups quarterly report will be presented to the SLSC members. Apart from a working group, other modes of wider stakeholder engagement will also be explored to enhance the M&E process. Data on certain M&E parameters will be provided by the concerned departments to the secretariat periodically which maybe once a quarter.

Systematic reporting by nodal agency and meeting of State Steering Committee on Climate Change to review the progress shall be undertaken at least twice a year.

As a next step, it is proposed that a state-level climate change performance index is developed for the inter-departmental progress and performance mapping on climate change.

11.1.2. Review and Updating of SAPCC

The SAPCC has been developed for a time frame of 10 years starting from 2021. However, climate change being a dynamic subject, with shifting baselines, the results generated by reports of M&E may suggest to the decision-makers a necessity to revise significant aspects of the SAPCC mid-way. To facilitate the assessment of such need, it is proposed that the SAPCC is reviewed in a period of 3 years from the start date of approval. For this to happen, findings need to be documented and analyzed systematically and communicated to a range of decision-makers, at the right time and in an appropriate way.

If the annual M&E reports do not suggest any need for revision in the first 3 years, it must be assessed once again midway during implementation. However if there is availability of critical data or information (eg. High resolution data from satellites etc.) which could lead to significant change on the SAPCC at policy level then SLSC for NAFCC may take appropriate decision to update SAPCC.

11.1.3. M&E indicators

Indicators play a critical role in M&E systems. To develop effective indicators, it is essential to have a pragmatic approach. It is also essential that they are an effective representation of progress on climate change mitigation and adaptation. The indicators proposed in this SAPCC for M&E have been consulted with the departments and agreed upon by them. Quantitative indicators are more favourable towards policy and decision making, hence, the indicators in this SAPCC are skewed towards the same.

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Table 30: Indicative Sectoral Indicators for M&E

Transportation Sector	**Monitoring Frequency**
Percent reduction in road closures due to landslides or flooding	
Percent reduction in flooding where drainage capacity has been increased	
Improved decision making and sector planning based on climate change considerations	
Transport sector planning documents include adaptation strategies	
Length of road constructed to withstand climate change impacts	
Area of mangrove planted to protect coastal roads	
Percentage increase in population carried through public transport	
Percentage increase in number of bus stops	
Percentage increase in length of path provided for non-motorized transport	
Percentage increase in the distance traversed in km by the public transportation system	
Agriculture Sector	
Agriculture sector planning documents include adaptation strategies	
Number of hectares where climate-resilient cropping practices are introduced	
Number of hectares/communities where rainfall capture and adaptive irrigation management are introduced	
Area of mangrove planted to protect coastal agricultural land	
Number of agricultural officers, extension workers, and farmer cooperatives in target districts trained in climate change impacts on agricultural production and potential community-based adaptation options	
Agricultural land use planning in flood- and drought-prone areas analysed and alternative land use plans developed based on climate risk scenarios	
Improved decision making and sector planning based on climate change considerations	
Percentage of khazan lands protected	
Percentage of population depending on khazan lands provided with alternate livelihood options	

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Percentage of non-efficient agricultural pumps replaced with energy efficient and solar pumps	
Energy Sector	
Percentage reduction in transmission and distribution loss	
MWh of solar power plants installed	
MWh of power through other alternate sources of power	
Percentage reduction in increase in power consumption	

Indicative Budget Estimations for Implementation of Climate Change Related Programs in The State of Goa

Sr. No.	Sector	Budgetary Plan for Next Ten Years (In Crores ₹)
1	Transport	75.00
2	Power (Energy) (50 Cr) & Renewable energy (GEDA - 25 Cr)	75.00
3	Water - WRD	50.00
4	Agriculture and Allied (AVHS) sector	50.00
5	Environment & Coastal Management - Bund restoration , erosion control and other initiatives for climate resiliency	50.00
6	Forest Sector	25.00
7	Fisheries sector	25.00
8	Biodiversity & Wetlands	25.00
9	Solid Waste Management	25.00
10	Sewage Management	15.00
11	Human Health	10.00
12	Disaster management, Climate migrants & refugees	10.00
13	Habitat	10.00
14	Tourism	5.00
15	Mining	5.00

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16	Land use land cover	5.00
17	Infrastructure	5.00
	Rupees ₹ Four Hundred Sixty Five Crores Only for Ten Years	**465.00**
	Total SAPCC financial projections of ₹ Rs465/- Crores for ten years works out to be ₹ 46.5 Crores Per Annum and amounts to approx 0.22% of Annual Budget and 0.050 % of Gross State Domestic Production (GSDP) of Goa State.	

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Annexure I:

Acknowledgement to Individuals for SAPCC

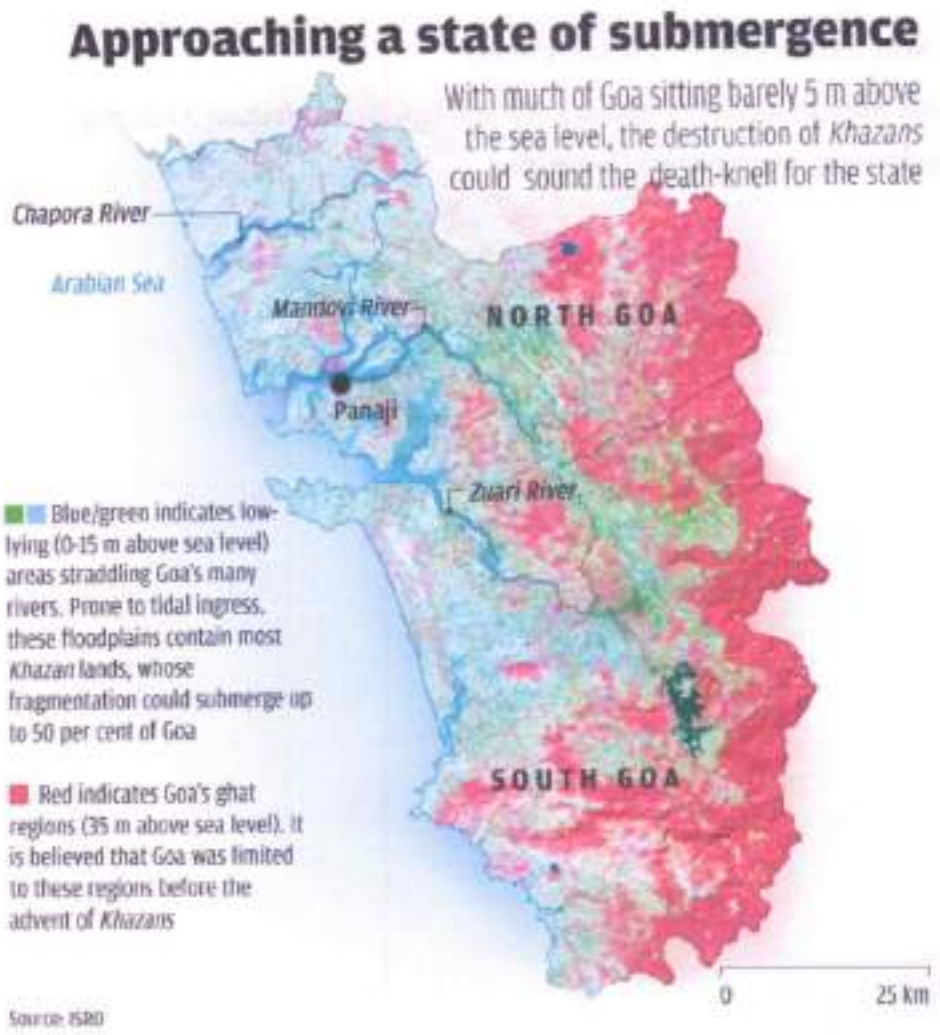
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Appendix I: Submergence of Goa



Abbreviations:

SAPCC – State Action Plan for Climate Change

GSBB – Goa State Biodiversity Board, GSWA – Goa State Wetland Authority

BMC – Biodiversity Management Committee

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ANNEXURE A-13

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Report of the
Comptroller and Auditor General of India
on
Conservation of Coastal Ecosystems

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SUBHASH KRISHNA KANEKAR
SALCETE TALUKA
MARGAO-GOA
EXP. DT. 28/02/2023
GOVT OF GOA (INDIA)

Union Government
Ministry of Environment, Forest & Climate Change
Report No. 4 of 2022
(Performance Audit)

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NOTARY
SUBHASH KRISHNA KANEKAR
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GOVT. OF GOA (INDIA)

Preface

This Report for the year ended March 2020 has been prepared for submission to the President of India under Article 151 of the Constitution of India.

This Report of the Comptroller and Auditor General of India contains the observations of Performance Audit on Conservation of Coastal Ecosystems for the period 2015-20.

The instances mentioned in this Report are those which came to notice in the course of test audit for the period 2015-20 as well as those which came to notice in earlier years but could not be reported in previous Audit Reports; matters relating to the period subsequent to 2019-20 have also been included, wherever necessary.

The audit has been conducted in conformity with the Auditing Standards issued by the Comptroller and Auditor General of India.



Executive Summary

Introduction and Background

The coastal zone is an interface between the land and the sea which comprises of coastal land, intertidal area, coastal ecosystems including rivers, estuaries, marshes, wetlands and beaches. India has a coastline of about 7516 kms of which the mainland accounts for about 5422 kms, Lakshadweep coasts extend to 132 kms and Andaman & Nicobar Islands have a coastline of about 1962 kms. The coastal zone is endowed with a very wide range of natural resources. Beside the coastal waters, the other major ecosystems found in the coastal environment are Mangroves; Coral reefs; Sea Grass; Mud Flats; Estuaries/backwaters; Lagoons; Sand Dunes etc. The coastline supports a huge human population, which is dependent on the rich coastal and marine resources. However, increasing human population, urbanisation and accelerated developmental activities has put huge pressure on the fragile coastal ecosystems of India.

Ministry of Environment, Forest and Climate Change (MoEF&CC) and Ministry of Earth Sciences (MoES) are the two nodal Ministries which deal primarily in the coastal and ocean areas. The Environment (Protection) Act,1986 authorises the central government to protect and improve environmental quality, control and reduce pollution from all sources, and prohibit or restrict the setting and/or operation of any industrial facility on environmental grounds. The Government has issued notifications under Section 3 and 5 of Environment Protection Act 1986 to regulate the activities in coastal space so as to protect the coastal environment from various anthropogenic activities. Coastal Regulation Zone Notification (CRZ) 2019 which was superseded by its earlier versions in 1991 and 2011 implemented by MoEF&CC aims to classify the coastal area into different zones and manage the activities in an integrated manner. Pre-audit studies conducted to understand the risks in coastal zone management revealed that there were large scale CRZ violation in the coastal stretches. Incidence of illegal construction activities (reducing coastal space), effluent discharges from local bodies, industries and aquaculture farms have been recorded from various data sources. It was imperative to assess the implementation of Coastal Zone Regulation Notification 2011 by the coastal states as well as the centre in order to evaluate on the efforts of the Government of India towards protection and conservation of coastal environment.

Also, Given the significance of Sustainable Development Goals and the commitments of the country towards achieving them, we have attempted to evaluate the efforts viz. planning, implementation and delivery mechanism towards attaining the targets under SDG 14- Life Below Water.

Accordingly, we decided to take up a Performance Audit on 'Conservation of Coastal Ecosystems' with the following objectives:

1. To examine if institutional mechanism exists at Centre as well as State to regulate the activities in CRZ areas as per the provisions of CRZ notification 2019

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2. To examine if CRZ clearances granted by the Government is as per due procedure, to conserve coastal ecology
3. Whether post clearance monitoring as well as enforcement of CRZ notifications safeguarded coastal ecosystems
4. To examine if the project development objectives under Integrated Coastal Zone Management Programme (ICZMP) were successful.
5. To evaluate the measures taken up by the Government towards achieving the targets under SDG-14.

Key Audit Findings

Chapter 2: Institutional Framework

MoEF&CC has not notified NCZMA as a permanent body with recommended members. NCZMA is reconstituted every few years and in the absence of defined membership, it was functioning as an ad-hoc body, devoid of permanent members. Further, the composition of NCZMA has not been uniform over these years, indicating a lack of continuity of approach towards coastal conservation issues.

(Para 2.1 a)

Instances were observed where Expert Appraisal Committees (EAC) granted clearances, though domain experts were not present during the project deliberations. Also, cases were noted where the members of EAC were less than half of the total strength during the deliberations as there was no fixed quorum for EAC members.

(Para 2.1 b)

SCZMA was not reconstituted in the state of Karnataka and there was delayed reconstitution in the states of Goa, Odisha and West Bengal. SCZMAs held meetings without fulfilling the quorum requirements and lacked representation from relevant stakeholder bodies. SCZMAs in the states of Andhra Pradesh, Karnataka, Goa, Tamil Nadu, Odisha and West Bengal did not have sufficient manpower to perform their mandate.

(Para 2.1 c & d)

DLCs of Tamil Nadu lacked participation from local traditional communities. In Andhra Pradesh, DLCs were not established in all the nine coastal districts as on March 2021. In Goa, DLCs were formed in 2017 after delay of six years of promulgation of the CRZ notification. DLCs are yet to be reconstituted in two coastal districts of Karnataka as on March 2021.

(Para 2.1 e)

Absence of any active and functional website to disseminate the information related to NCZMA such as the agenda notes, minutes of the meetings was against the mandated responsibilities of the institution.

(Para 2.3)

Chapter 3: Project Clearances under CRZ Notifications

Projects were approved despite inadequacies in the EIA Reports which included non-accreditation of the consultant involved with the preparation of the EIA Report, usage of outdated baseline data, non- evaluation of environmental impacts of the project, non-addressal of disasters which the project area was prone to.

(Para 3.1)

Activities forming a part of the mitigation plans like mangrove conservation/ replantation, biodiversity conservation plan, rain water harvesting plan failed to be included in the Environment Management Plan as the same was left to the project proponent (PP) to be carried out.

(Para 3.2)

Projects were approved where MoEF&CC failed to make independent efforts to verify the veracity of the information given by private consultants and merely relied on the information submitted by the Project Proponent with respect to potential ecological risks due to the project activities.

(Para 3.4)

Instances were observed where the SCZMA usurped the powers of clearance granting authorities and granted clearance to the projects. Further, there were cases of project approvals where the SCZMAs recommended the projects without the submission of mandatory documents.

(Para 3.7)

Modification of CRZ notifications for approval of specific projects defeated the efforts to conserve the coastal ecosystems.

(Para 3.8)

Cases were observed where projects were approved without undergoing the multistage process of EIA as major infrastructure projects are not comprehensively covered under the EIA Notification 2006.

(Para 3.9)

Chapter 4: Post clearance monitoring and enforcement of CRZ Notifications

Instances were observed where the Project Proponent failed to comply with conditions mentioned in the Clearance and did not submit the mandatory half yearly compliance reports to the Regional Offices of MoEF&CC. There were cases where the projects commenced without obtaining any CTE or CTO from the concerned State Pollution Control Board.

(Para 4.1)



The enforcement of CRZ provisions by SCZMAs and DLCs were reviewed and instances were observed where SCZMAs failed to take action against CRZ violations and the DLCs too failed to identify violations and report the same to SCZMAs.

(Para 4.2)

Chapter 5: Conservation of Coastal Ecosystems

Despite serious reduction and degradation of the live coral cover in the Gulf of Mannar Islands, no viable strategy to mitigate the propagation of the invasive species had been devised by the Department of Forest, Tamil Nadu. Issues such as absence of a monitoring system for coral reefs, and non- preparation of management plans for turtle nesting sites in Goa were observed. Instances were observed where prohibited activities like infrastructure development in areas of coastal sand dunes were observed in Goa. Gaps in the efforts to conserve mangroves in Goa and Gujarat were noticed. Instances were observed where the sewage treatment plants were either altogether absent or were functioning without any monitoring leading to discharge of harmful effluents into coastal waters.

(Para 5.1 and 5.2)

Chapter 6: Integrated Coastal Zone Management Project

Although the entire work of mapping of Hazard Line was completed in August 2018, the ground demarcation of the Hazard Line was yet to be done by MoEF&CC. The Integrated Management Plans (IMPs) for Critically Vulnerable Coastal Areas (CVCAs) were yet to be prepared by the coastal states.

(Para 6.1)

In the marine field stations at Mandvi and Jamnagar in Gujarat, it was observed that out of 40 instruments installed under the project at these two places, 33 instruments were operated only for checking and calibration and were never used for the intended purpose i.e., to study the physiochemical parameters of soil and water of the intertidal area of the Gulf of Kutch.

(Para 6.2)

Insufficient capacity building measures at Odisha State Pollution Control Board (OSPCB) were noticed as Against the targets set for the collection and analysis of samples there was a huge shortfall ranging from 33% to 59%. Further, the Centre was working at 55 % of the required manpower and this resulted in non- operation of the equipment procured for the analysis of the samples.

(Para 6.3.2)

We observed that even after the incurring an expenditure of ₹ 6.23 crore, the objective of effective sea patrolling in Gahirmatha Sanctuary remained unachieved. A research laboratory at Dangmal, Kendrapara District, Odisha constructed in 2016 could not be made functional till date. We observed idling of infrastructure created under the activity relating

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Hygienic drying of fish at Gopalpur in Odisha where the solar dryers could not be made functional enough to provide livelihood support to the community, the expenditure of ₹6.72 crore on creation of facilities under the ICZMP.

(Para 6.3.3 and 6.3.4)

Chapter 7: Sustainable Development Goals

Audit examined the stakeholder map and found that a few significant stakeholder organisations like the Indian Coast Guard and Ministry of Ports, Shipping and Waterways were not included in the map. We observed that the indicators do not holistically address the SGD target and do not conform to global indicators, as the indicator essentially measured only the output of the programmes developed for management of mangrove ecosystems. The list of activities planned to achieve the target should have also formed the sub-indicators and biodiversity, fisheries indices etc., should have ideally formed the output indicators for the target. We observed that the State Indicator frameworks were not prepared by the states of Maharashtra and Kerala. It was observed that with the exception of Gujarat, all other coastal states adopted the national indicators as developed by MoSPI without adapting them to the state specific environmental aspects. Also, in the states where SIFs had been formulated, further localization to District levels was done only by the State of Karnataka by notifying District Indicator Framework (DIF).

(Para 7.1, 7.2 and 7.4)

Recommendations

We recommend that:

1. SCZMAs and NCZMAs may be made as permanent bodies with full time members to carry out all the mandated activities for protecting the coastal environment.
2. The DLCs may be formed and reconstituted without delay in all the relevant districts. The composition of DLCs may be inclusive in nature representing all the relevant stakeholder sectors.
3. MoEF&CC needs to ensure that the NCZMA/ SCZMAs share information regarding their discussions/minutes of meetings with the public in a uniform manner. Interactive Grievance Redressal Mechanism may be adopted by the SCZMAs.
4. The Ministry may ensure that the PP carry out in-depth ecological evaluation of the project environment before granting the clearances to the projects as well as enforce the practice of cumulative assessments already defined in the EIA Notification, 2006.
5. MoEF&CC may ensure that the PPs submit a viable EMP addressing all the risks to the environment and the EMP along with the Impact Prediction analyses are largely coherent. Also, the mitigation proposals may be clearly brought out in the EMP and costed.
6. MoEF&CC may revisit the roles and composition of different agencies to strengthen the post clearance monitoring.

7. Expert cells, which are well versed in GIS tools may be created in DLCs to effectively and efficiently monitor the changing landscape on the coastline and track irregular developments. Presence of such a surveillance mechanism would not only track irregular activities but would also serve as a deterrence tool.
8. The State Governments may make necessary efforts for mapping and preparation of Management Plans for the coral reefs, turtle nesting sites etc.
9. Efforts may be made by MoEF&CC to notify the IMPs for Ecologically Sensitive Areas at the earliest.
10. MoEF&CC should ensure deploying sufficient manpower with technical expertise at SICOM and various institutes strengthened under the project. Efforts should be made to rationalise the manpower deployment to ensure optimum utilisation.
11. MoES and MoEF&CC may review the stakeholder mapping to ensure the inclusion of all relevant institutions with respect to SDG 14 targets.
12. Localisation of the indicators should be prioritised in the stakeholder states by ensuring formulation of District Indicator Frameworks in the states.



Chapter 1: Introduction

Coastal areas comprise some of the most dynamic natural ecosystems of our planet, where three main components—the hydrosphere, the lithosphere, and the atmosphere—meet and interact, forming interconnected systems. Coastal ecosystems including marshes, mangroves, near-shore coral reefs, seagrass beds, sandy beaches and dunes provide numerous benefits like livelihood through fisheries, protection from sea surges/cyclones. These benefits have ensured that demographic pressures on coastal resources have increased over the past several decades: 38 percent of the world's population lives within 100 km of the coast. Recognising the significance of life under water, the United Nations included SDG 14, aims at conserving and sustainably using the oceans, seas and marine resources, to be achieved by all the member countries of UN SDG 14.

India, with a coastline of about 7516 kms, is one among the 12 mega biodiversity countries and 25 hotspots of the richest and highly endangered eco regions of the world. Coastal regions of India provide home to 13.36% of the people of the country and thus place tremendous pressure on the resources along the coast. There are nine coastal states in the country, namely, Gujarat, Maharashtra, Goa, Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, Odisha, West Bengal.



Fig. 1: Coastal states of India

The nodal institutions at the national level, Ministry of Environment, Forests and Climate Change (MoEF&CC), and Ministry of Earth Sciences along with various stakeholder ministries and other key scientific and research bodies all over India has been entrusted with the responsibility of protecting the coast and the fragile coastal resources and ensuring their sustainable use. The most significant among these is the Coastal Regulation Zone Notification in 1991, 2011 and 2019 promulgated by MoEF&CC. This is the overarching legislation for management of activities in Indian coastal space. Thus, evaluation of enforcement and implementation of this zonation mechanism is central to the assessment of Government measures to protect the coastal ecosystems.

1.1 Regulation of activities in coastal areas

The Central Government notified the Coastal Regulation Zone (CRZ) Notification, 1991 with a view to ensuring the livelihood security of fishermen and other local communities living in the coastal areas, to conserve and protect coastal stretches and also to promote development in a sustainable manner. The Notification also imposed restrictions on setting up and expansion of industries from operating in the CRZ areas. CRZ Notification was revised in 2011[1] and in 2019, based on the recommendations of a committee chaired by Sh. Shailesh Nayak. All CRZ

1 Based on the recommendations of the Committee chaired by Prof. M.S. Swaminathan in 2009

notifications had demarcated the coastal areas into zones, with only permitted activity allowed in these zones. Under the CRZ notification 2011, the coastal regulated areas are categorised as CRZ I, CRZ II, CRZ III and CRZ IV:

CRZ I

- areas which are ecologically sensitive, form the geomorphological features which play a role in the maintaining the integrity of the coast.
- includes-mangroves and 50 m buffer area for mangroves exceeding 1000 sqm.; corals, coral reefs and associated biodiversity; sand dunes; biologically active mudflats;
- national parks, marine parks, sanctuaries, reserve forests, wildlife habitat and other protected areas notified as biosphere reserves;
- Salt marshes; turtle nesting grounds; horse shoe crab habitats; sea grass beds; nesting grounds of birds;
- areas or structures of archaeological importance/heritage sites/area lying between the Low Tide Line and High Tide Line

CRZ II

- areas within the existing municipal limits/other urban areas which are substantially built-up and drainage, approach roads and other infrastructural facilities

CRZ III

- relatively undisturbed /do not belong to either CRZ-I or II; This includes coastal zone in the rural areas, areas within the existing municipal limits or other urban areas which are not substantially built up.

CRZ IV

- designated to the water area from the Low Tide Line to twelve nautical miles on the sea ward side and inland waters influenced by tide

Areas requiring special consideration in the CRZ

- for the purpose of protecting critical coastal environment/difficulties faced by local communities; consist of -CRZ area falling within municipal limits of Greater Mumbai;
- the CRZ areas of Kerala including the backwaters and backwater islands;
- CRZ areas of Goa and Critically Vulnerable Coastal Areas like Sundarbans
- other ecologically sensitive areas identified as under Environment (Protection) Act, 1986 and managed with the involvement of coastal communities including fisherfolk.

All states had to prepare Coastal Zone Management Plans (CZMP), based on cadastral maps[2] and demarcation of high tide and low tide lines, to regulate specific activities under these zones. Further, a World Bank assisted project called Integrated Coastal Zone Management Project (ICZMP) was introduced for building national capacity for implementation of comprehensive coastal management approach in the country, starting with three coastal states of Odisha, West Bengal, and Gujarat.

2 A cadastral map is a map that shows the boundaries and ownership of land parcels.

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1.2 Institutional Mechanisms involved in the conservation of coastal areas

Institutional Mechanism for implementation of CRZ Notifications

MoEF&CC

- The Impact Assessment Division of the Ministry regulates developmental activities of the coastal areas falling within CRZ. The Ministry constitutes Expert Appraisal Committees with domain experts for grant of approvals to Category A project proposals along the coasts.

NCZMA

- National Coastal Zone Management Authority is the apex agency for coastal regulation. It advises central government on the matters for changes in the classification of coastal zone areas and CZMPs. It also provides guidance and technical assistance to SCZMAs.

SCZMAs

- State Coastal Zone Management Authorities evaluate the project proposals from their respective states and recommend them to MoEF&CC or SEIAA for approval.

SEIAA

- State Environmental Impact Assessment Authorities are state bodies responsible for granting project clearance to Category B projects on the basis of recommendations of SCZMAs. The composition of SEIAA is similar to that of Expert Appraisal Committees at the centre.

DLC

- DLCs are the district level authorities for monitoring and enforcement of CRZ Notification

Institutional Mechanism for Implementation of ICZMP

SICOM

- Society of Integrated Coastal Management (SICOM) is a registered society under the aegis of the MoEF&CC, it is the designated National Project Management Unit for planning management, execution, monitoring and implementation of ICZMP.

Institutional Mechanism for Implementation of selected targets of SDG-14

MoES

- It is the data source Ministry for SDG 14.1- Prevention and reduction of marine pollution of all kinds and SDG 14.3- Minimisation of impacts of ocean acidification. National Centre for Coastal Research, an attached office of MoES collects all the data pertaining to SDG 14.1 and 14.3 in the country.

MoEF&CC

- It is the data source Ministry for SDG 14.2 sustainably manage and protect marine and coastal ecosystems and 14.5-Conservation of at least 10% of coastal and marine areas

1.3 Audit Objectives

Audit framed five overarching objectives encompassing the relevant activities of the key players in the coastal environment. The audit objectives are as follows:

(i) To examine if institutional mechanism exists at Centre as well as State to regulate the activities in CRZ areas as per the provisions of CRZ notification 2019.

(ii) To examine if CRZ clearances granted by the Government are as per due procedure, to conserve coastal ecology

(iii) Whether post clearance monitoring as well as enforcement of CRZ notifications safeguarded coastal ecosystems

(iv) To examine if the project development objectives under Integrated Coastal Zone Management Programme (ICZMP) were successful.

(v) To evaluate the measures taken up by the Government towards achieving the targets under SDG-14.

1.4 Audit Criteria

The main sources of audit criteria for the performance audit were CRZ Notification, 2011/2019[3]; Environment Impact Assessment Notification 2006; agenda and minutes of Expert Appraisal Committees; state specific Coastal Zone Management Plans; Terms of References of Expert Appraisal Committee (EAC), Environment Impact Assessment (EIA) and Environmental Management Plans (EMP) for project clearances, conditions imposed in Environment Clearance and CRZ clearance; records at Society of Integrated Coastal Management (SICOM), National Centre for Sustainable Coastal Management (NCSCM) and National Centre for Coastal Research; General Financial Rules and SDG 14 related records at MoES.

1.5 Audit Scope and Sampling

Audit covered the activities of institutions under the MoEF&CC and the MoES for the period from 2015-2020 with regard to implementation of CRZ notifications. In this regard, records at the State Coastal Zone Management Authorities (SCZMAs) of all the nine coastal states (West Bengal, Odisha, Andhra Pradesh, Tamil Nadu, Kerala, Karnataka, Goa, Maharashtra and Gujarat) for the period 2015 to 2020 were examined. We also reviewed the implementation of ICZM projects in the states of Gujarat, Odisha and West Bengal. Further, given the significance of Sustainable Development Goals and the commitments of the country towards achieving them, we have also attempted to evaluate the efforts viz., planning, implementation and delivery mechanism towards attaining the targets related to coastal regulations under SDG 14- Life below water.

[3] CRZ notification 2011 is the criteria for clearances as on February 2022 as the CZMPs based on CRZ 2019 are yet to be prepared by the States and approved by the MoE&FCC.

1.5.1 Sampling of Project clearances for examination under audit

(i) MoEF&CC accords two kinds of clearances, (a) composite clearance[4], and (b) CRZ clearance[5]. 71 composite clearances and 139 CRZ clearances were granted by MoEF&CC during the period 2015-2019, of which 15 composite clearances and 28 CRZ clearances were sampled[6].

(ii) 118 project clearances were sampled and examined by the state audit offices out of 1978 project clearances accorded by the State Bodies[7] .

(iii) Two districts in each of the nine coastal states were examined[8] to evaluate the health of coastal environment with focus on endemic vulnerable flora and fauna.

(iv) We also examined 128 CRZ violations that formed 20 percent of the total reported violations (1898 violations) in the states to assess the measures taken by the State Coastal Zone Management Authorities on the CRZ violation cases reported to them[9].

(v) We examined 13 pilot projects undertaken under ICZMP in the states of Odisha, West Bengal and Gujarat.

1.6 Audit Methodology

Entry conference was held on 1st July 2020, with representatives from the constituent units of MoEF&CC and MoES, wherein the audit objectives/ criteria/ scope and methodology of the performance audit were discussed. Field audit included examination of records at MoEF&CC, MoES, National Centre of Coastal Research, and State Coastal Zone Management Authorities (SCZMAs) of the nine coastal states. Joint physical verifications were conducted to ascertain the status of sampled reported violations. Audit used GIS tools to map the approved CZMP for selected region with satellite images from Google Earth to observe unreported violations.

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4 Where the projects require Environmental Clearance (EC) as per the EIA Notification 2006 as well as CRZ clearance.

5 Where the project requires only CRZ clearance, in accordance with the Coastal Regulation Zone Notification in place.

6 Based on criteria a) inherent risk associated with the developmental activity b) vulnerability of marine ecosystems in and around the project site c) sufficiency of gestation period of the project (most of the selected projects, which had been granted clearance in the earlier part of the audit period).

7 SEIAA, Town Planning Authority, Municipalities, Panchayats etc.

8 The districts were sampled based on a number of factors such as risk from ongoing developmental activities, presence of endemic flora and fauna, reports on deterioration of coastal environment etc. The selected districts are as: Andhra Pradesh (East Godavari and Srikakulam), Goa (North Goa and South Goa), Gujarat (Bhavnagar and Gir Somnath), Karnataka (Dakshin Kannada and Udupi), Kerala (Ernakulam and Thiruvananthapuram), Maharashtra (Mumbai Sub Urban and Sindhudurg), Odisha (Kendrapara and Ganjam), Tamil Nadu (Chennai and Ramanathapuram), West Bengal (South 24 parganas and Purba Medinipur).

9 The cases which were sub-judice were left out and sampling was done from the remaining cases for each state.

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Audit findings were shared with the respective ministries for their response. The exit conference was held with MoEF&CC and MoES on 16th February 2022.

The draft report on this Performance Audit was issued to both MoEF&CC and MoES on 9th December 2021. Despite repeated requests, till the time of finalization of this report, with the exception of MoES, the SICOM and Statistical Division of MoEF&CC, no responses to the draft report have been received from the MoEF&CC.



Chapter 2: Institutional Framework

The three institutions responsible for the implementation of the CRZ notification are: i) the National Coastal Zone Management Authority (NCZMA) at the centre ii) State/Union Territory Coastal Zone Management Authorities (SCZMAs/UTCZMAs) in every coastal state and union territory[10] iii) District Level Committees (DLCs) in every district that has a coastal stretch and where the CRZ notification is applicable. MoEF&CC and State-level Environment Impact Assessment Authority (SEIAA)[11] approve projects located in CRZ areas based on the recommendations of the SCZMAs. The monitoring and enforcement related to CRZ violations is carried out by concerned Pollution Control Boards (PCBs), Regional offices of MoEF&CC and DLCs.

Hon'ble Supreme Court of India in April 1996, on the basis of a writ petition filed by Indian Council For Enviro-Legal Action (1993) observed that the Pollution Control Boards are not only overworked but simultaneously have a limited role to play in so far as it relates to controlling of pollution and for the purpose of ensuring effective implementation of the notifications of 1991, the Central Government should consider setting up State Coastal Management Authorities in each State or zone and also a National Coastal Management Authority under Section 3 of the Environment Protection Act 1986.

Examination of the constitution of these bodies and their role in preparation of the coastal zone management plans revealed the following:

2.1 Constitution of NCZMA, SCZMA & DLC

a) Composition & functioning of NCZMA

Ministry of Environment Forests and Climate Change (MoEF&CC) constituted NCZMA on 26 November 1998 for a period of two years for protecting and improving the quality of the coastal environment and preventing, abating and controlling environmental pollution in coastal areas. The authority was empowered for the following:

a) Coordination of actions of the SCZMAs and UTCZMAs under the EP Act

b) Examination of proposal for change in classification of CRZ areas and in Coastal Zone Management Plans received from SCZMAs and UTCZMAs and make specific recommendations to the Central Government

c) Review of cases involving violation under EP Act 1986 for coastal areas and issuing directions for compliance

d) File complaints in case of non-compliance to the directions issued for cases involving violation.

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10 Nine SCZMAs in Andhra Pradesh, Goa, Gujarat, Karnataka, Kerala, Maharashtra, Odisha, Tamil Nadu and West Bengal, and four UTCZMAs in Andaman and Nicobar Islands, Daman and Diu, Lakshadweep and Puducherry.

11 SEIAA can grant clearance to projects below a threshold limit in terms of EIA notification 2006.

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Audit observed that the MoEF&CC has not notified NCZMA as a permanent body with recommended members. It had also not specified the desired composition of NCZMA, inclusion of non-official members and domain expertise of the members. NCZMA is reconstituted every few years and in the absence of defined membership, it was functioning as an ad-hoc body, devoid of permanent members. The members of NCZMA comprised of officials from various ministries/technical bodies who carried out the duties in ex-officio capacity. Further, the composition of NCZMA has not been uniform over these years, indicating a lack of continuity of approach towards coastal conservation issues.

Further, audit observed that in the absence of defined number of meetings to be held, it meets as and when necessitated (14 times during 2015-2020) to consider the proposals received from various SCZMAs, primarily for reclassification of CRZ areas and to update on the status of completion of CZMPs.

Despite the wide range of responsibilities entrusted to it, audit observed that NCZMA in its meetings did not deliberate on environmental issues relating to coastal regulation zone. Audit also noted that the meetings held by NCZMA are demand driven with very specific agendas, related to either reclassification of CRZ areas or matters related to CZMP. Further, scrutiny of minutes of meetings held by NCZMA showed that NCZMA did not discuss any issue related to violations under the CRZ notification after April 2015. No reasons for the same were found in the records. As such, NCZMA was effectively not involved in monitoring and discussion of action on CRZ violations, which was one of the responsibilities assigned to it.

b) Absence of domain expertise in Expert Appraisal Committees

The Expert Appraisal Committee (EAC), constituted for examination of projects by MoEF&CC, gives recommendations to MoEF&CC on project proposals after considering the project impact. Based on EAC's recommendation, MoEF&CC either rejects the proposal or grants clearance with conditions that would mitigate the impacts on the coastal ecology. As per the requirements of the EIA Notification 2006, the EACs shall include members with requisite expertise and experience in the concerned field or discipline. The EACs comprises of 10-15 members, including experts in wildlife and forestry, life science experts in floral and faunal management, environment quality etc.

Audit observed that one EAC is dedicated for the appraisal of projects under CRZ notification. During audit, instances were found where EACs granted clearances, even though domain experts were not present during the project deliberations. Also, cases were noted where the members of EAC were less than half of the total strength during the deliberations as there was no fixed quorum for EAC members.

c) Composition & functioning of SCZMAs

With regard to SCZMA, audit observed that SCZMAs were not reconstituted after the term had expired. In Karnataka, the SCZMA was not reconstituted for 11 months after the term expired in March 2020. Similarly, SCZMA was reconstituted after a delay of 5 and 8 months.

respectively in Kerala and Andhra Pradesh. Instances of delayed reconstitution of SCZMAs were also noted in states of Goa, Odisha and West Bengal.

As per the orders of MoEF&CC in 2005, the SCZMAs should be composed of one NGO, four expert members and five to six ex-officio members from various stakeholder organisations such as Pollution Control Boards, fisheries, environment, urban development etc. The Chairman of the authority should be Secretary, Environment Department of the concerned state. Audit observed that many SCZMAs held meetings without fulfilling the quorum requirements. In Karnataka, 15 out of 21 meetings during 2015-20 were held without quorum. Thus, SCZMAs recommended the projects without fulfilling the mandatory quorum requirements.

One of the major responsibilities of SCZMA was to inquire into cases of violation of CRZ Notification, file complaints against violations and review these violations. Failure of SCZMA to discharge this responsibility effectively is discussed in Chapter 4 (Para 4.2).

Audit also found that the SCZMAs lacked representation from relevant stakeholder bodies. Maharashtra SCZMA did not have participation from Department of Tourism, though it is a significant stakeholder organisation responsible for sustainable management of tourism activities in coastal areas. Goa SCZMA did not have any member from the Directorate of Fisheries. Goa and West Bengal SCZMAs lacked participation from respective SPCBs. Also, it was noted that significant stakeholder institutions did not participate in the meetings of SCZMAs. The members from key departments such as Urban Development Department, Fisheries and Revenue Department did not participate in most of the meetings held by the SCZMAs of Maharashtra and West Bengal.

d) Manpower in SCZMAs

Audit observed that the SCZMAs in most of the coastal states did not have sufficient manpower to perform their mandate. In Andhra Pradesh, Karnataka, Goa, Tamil Nadu, Odisha and West Bengal, the functions of SCZMAs were carried out by the officials of the State Department of Environment or the State Pollution Control Boards. It was found that 58 posts were lying vacant against the sanctioned strength of 73 posts for SCZMA and DLCs in Goa. In Odisha, the SCZMA was functioning with one Junior Scientist and Technical Assistant without any secretarial manpower.

e) Composition of DLCs

As per section 6(C) of CRZ notification 2011, DLCs were to be established to assist SCZMAs in enforcement of the CRZ notification under the chairmanship of the District Magistrate, comprising of at least three representatives of local traditional coastal communities including from fisher folk. DLCs of Tamil Nadu lacked participation from local traditional communities. During examination, instances were found where the SCZMAs failed to constitute DLCs. It was also noted that DLCs were not reconstituted after the term had expired. In Andhra Pradesh, DLCs were not established in all the nine coastal districts as on March 2021. In Goa, DLCs were formed in 2017 after delay of six years of promulgation of the CRZ notification. DLCs of seven

coastal districts of Odisha were reconstituted after a delay of two years from the expiry of its term. In Karnataka, the term of the DLC expired in May 2018, however DLCs are yet to be reconstituted in two coastal districts as of March 2021.

Thus, the composition of these bodies and lack of manpower impeded their development into specialised bodies for coastal protection, as envisaged in the CRZ Notifications.

As such, deficiencies in the constitution and functioning of NCZMA, SCZMA and DLCs would dilute their effectiveness in addressing challenges in ensuring sustainable development of the coastal areas.

2.2 Role of agencies in preparation of Coastal Zone Management Plans

The coastal states and the union territories were to prepare the Coastal Zone Management Plans (CZMPs) within a period of twenty-four months from the date of issue the CRZ Notification 2011. The State/UT Government CZMA were to submit the draft CZMPs to MoEF&CC along with its recommendations on the CZMP within a period of six months, after incorporating the suggestions and objections received from stakeholders. MoEF&CC was to consider and approve the CZMPs within a period of four months from the date of receipt of the CZMPs complete in all respects. In this regard, audit observed the following:

(i) Delay in demarcation of High Tide Lines and delay in preparation of CZMPs

MoEF&CC identified National Centre for Sustainable Coastal Management (NCSCM) for demarcation of the High Tide Line[12] (HTL) in August 2015 and the same was completed in October 2016. The coastal states and the Union Territories were to prepare the CZMPs within a period of twenty-four months from the date of issue of the CRZ Notification 2011. The State/UT Government CZMA were to submit the draft CZMPs to MoEF&CC along with its recommendations on the CZMP within a period of six months, after incorporating the suggestions and objections received from stakeholders. The delay in demarcation of various components (Hazard line and HTL) of CZMP resulted in the delay in finalisation of CZMPs by the states as indicated below:

Table 2.1: Delay in finalisation of CZMPs in coastal states

S. No.	State	Approval by MoEF&CC
1	Andhra Pradesh	February 2019
2	Goa	Not yet approved
3	Gujarat	February 2020
4	Karnataka	August 2018
5	Kerala	February 2019
6	Maharashtra	February 2019
7	Odisha	August 2018
8	Tamil Nadu	October 2018
9	West Bengal	October 2018



[12] HTL means the line on the land up to which the highest water line reaches during the spring tide and is important as it indicated the level to which the coastal waters reach.

In the absence of the approved CZMPs as per the CRZ notification 2011, MoEF&CC kept extending the validity of CZMPs prepared in 1991 from time to time, which resulted in the grant of CRZ clearances to various projects on the basis of 1991 CZMPs, which were not reflective of ground realities.

(ii) Lack of assessment of Accuracy levels for maps

The MoEF&CC Manual on Demarcation of HTL, LTL[13] and preparation of CZMPs prescribed specific accuracy level[14] for HTL, LTL as well as CZMPs. The accuracy of reference line is critical to ensure the accuracy of the CZMPs. It was noticed that eight coastal states[15] failed to assess the accuracy of reference lines though more than a year has lapsed since CZMP were approved by MoEF&CC. Furthermore, achievement of accuracy threshold is important since CZMP as per CRZ Notification 2019 would be prepared by updating the CZMP already prepared on the basis of CRZ Notification 2011.

(iii) Lack of digitization of Cadastral Maps

Cadastral maps were required by the local bodies for land use planning. CRZ notification, 2011 stipulated preparation of cadastral[16] (village) level CZM maps for the use of local bodies and other agencies to facilitate implementation of the CZMP. MoEF&CC had issued guidelines and prescribed digitisation and integration of village cadastres to the Geographic Information System (GIS). We noticed that cadastral information in respect of any coastal state except Goa has not been digitised and brought to the GIS.

(iv) Failure to prepare action plans for protection of Ecologically Sensitive Areas

MoEF&CC in 2014 directed the coastal states to prepare action plan that provides a detailed road map for conservation and protection of Ecologically Sensitive Areas (ESAs), protection of life and property of local communities and infrastructure and to undertake developmental activities in a sustainable manner. The action plans were to provide adequate budgetary provisions and details of agencies involved in such implementation. We noticed that all the coastal states failed to prepare the action plans for conserving these areas till now.

Failure to prepare the CZMPs in time and lack of plans to conserve the ESAs would pose great risks to the coastal ecology.

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13 Low tide Line which is the line on the land up to which the lowest water line reaches during the spring tide.

14 90% classification accuracy at 90% confidence interval for classification accuracy. Positional accuracy of 1 metre, 2 metre and 5 metre for HTL, LTL and CZMP demarcation respectively.

15 Karnataka assessed the aaccuracy level for the reference lines.

16 The cadastral maps contain survey boundaries and survey numbers of individual plots, the basic infrastructure such as roads, institutions including religious and the like, rivers/ canals/ ponds and survey stone locations.

2.3 Lack of public outreach

One of the primary functions of NCZMA is to hold review of cases involving violations of the provisions of the Environment Protection (EP) Act[17], either *suo-moto*, or on the basis of complaint made by an individual or body, or organisation. It is also empowered to issue directions under Section 5 of the said Act. Further, the constitution order mandates NCZMA to post agenda items and minutes of the meeting on the website.

In this connection, we observed that NCZMA did not maintain its own website. We found that the matters related to NCZMA are being hosted in a small window on the website[18] related to project submission and approvals for CRZ clearances. The links provided on the website to access the agenda or minutes do not provide any information. Further, we noticed that in the constitution order of NCZMAs, it is required that the Authority shall place information regarding the agenda and minutes of its meetings in the public domain, including through a designated website[19]. The website mentioned in the order, however, leads to general website of the MoEF&CC, where information related to NCZMA is not easily accessible.

Absence of any active and functional website to disseminate the information related to NCZMA such as the agenda notes, minutes of the meetings goes against the orders of the constitution of NCZMA. There was no option to register complaint or report any violations in the coastal environment on the website in public domain. West Bengal and Tamil Nadu SCZMAs also do not have websites for public dissemination of information. In remaining states, even though websites have been created, important information such as violations, action taken, court cases, agenda minutes and minutes of meeting are not regularly posted.

In absence of such facility, NCZMA/SCZMA cannot expect to receive any complaints from the public, thus hindering its ability to issue directions under Section 5 of the EP Act, one of its mandated activities.

2.4 Conclusion

- NCZMA as well as the SCZMAs failed in carrying out their primary responsibilities due to ad-hoc status and manpower constraints. Despite the Hon'ble Supreme Court directions for setting up NCZMA and SCZMAs for effective implementation of CRZ notifications, the NCZMA as well as the SCZMAs depended on MoEF&CC and the respective coastal state environment departments for funds and functionaries.
- DLCs have not been established in Andhra Pradesh as of March 2021 and there are delays in reconstitution of DLCs in other coastal States.



17 and the rules made thereunder, or any other law which is relatable to the objects of the said Act.

18 http://environmentclearance.nic.in/NCZMA.aspx

19 www.envfor.nic.in

- Though preparation of the Coastal Zone Management Plans formed the primary step in the process of sustainable development of coastal areas, the states failed to come up with CZMPs in the stipulated time.
- Though the institutions had a major part in protecting the coastal environment, their role shrunk to mere deliberations or decision making on reclassification of CRZ areas and recommendation for approval / grant of approval of developmental activities.
- NCZMA and SCZMA did not maintain dedicated websites for dissemination of information related to their functioning.



Chapter 3: Project Clearances under CRZ Notifications

To implement the CRZ notifications which sought to regulate developmental activities in the coastal areas, MoEF&CC classified the coastal areas into different zones based on their vulnerabilities. Activities in these zones were to be restricted to the activities specified in the CRZ notifications and industries falling in the CRZ areas had to seek prior clearance from the MoEF&CC/SEIAA, based on recommendations of NCZMA/SCZMA. Over the last two decades, development activities were granted clearances according to the provisions of the EIA Notification 2006 and CRZ Notification 1991/ 2011/2019 (whichever applicable). The clearances were accorded by the following authorities subject to recommendations given by the concerned SCZMAs:

Table 3.1: Various authorities mandated to accord clearance to projects in CRZ areas

Type of Projects	Authorities mandated to accord clearance
For the projects attracting EIA Notification 2006	MoEF&CC or SEIAA
For the projects not covered by the EIA Notification, 2006 but attracting para 4 (ii) of the CRZ Notification	MoEF&CC
For construction projects involving more than 20, 000 sq.m. built up area	MoEF&CC
For construction of building projects less than 20,000 sq.m. built up area	State /Town Planning authorities

Projects are approved by MoEF&CC/SEIAA based on the Environment Impact Assessment (EIA) report submitted by the Project Proponents[20] (PP). EIA report consists of the Environment Management Plan (EMP) which proposes mitigation measures to be taken by the PP to reduce adverse environment impact. EIA process aids the decision maker to carry out a cost benefit analysis of the project proposals and are the most important tool to ensure sustainable management of the coastal space. The main steps in the EIA process depicted in the ***(Annexure 1)*** in the form of a process flowchart.

Audit studied the project clearance process of sampled projects that were accorded approvals by MoEF&CC /SEIAA. The audit observations are given in the succeeding paragraphs.

3.1 Project approvals despite Inadequacies in EIA reports

Audit observed many infirmities in preparation of EIA reports, despite which the projects based on these EIA reports were approved. This would affect the quality of decision making regarding the conservation of coastal ecosystems. Some of these are discussed below:

(i) Preparation of EIA by non- accredited consultants

MoEF&CC in its instructions (March 2010) stipulated that the EIA received for a given project after July 2010 would be considered for Environmental Clearance, only if the EIA was conducted by the consultants accredited by National Accreditation Board of Education &

[20] The agency which proposes to set up a project.

Training (NABET)/ Quality Council of India (QCI). Further, the consultants could carry out EIA in only those sectors for which they were accredited.

Audit observed 21 project approvals ***(Annexure 2)*** where the EIA consultant was non-accredited or was not accredited for the sector specific to the project. A few cases are illustrated as below:

Table 3.2: Preparation of EIA by non-accredited consultants

Project	Project approval	Consultant for EIA
Laying of Natural Gas pipeline by Mahanagar Gas Ltd, Maharashtra	Accorded clearance by MoEF&CC in 2018	The project entailed transportation and distribution of natural gas by laying of pipelines from Uran to Navi Mumbai Municipal Corporation. The consultant JV Analytical Services, Pune was not accredited for Pipeline Sector.
Construction of Hotel Building in Mangalore, Dakshina Kannada District by M/s. Motimahal Hotels Pvt. Ltd., Karnataka	Accorded clearance by MoEF&CC in 2017	The Environment Management Plan and the Disaster Management Plan which formed a part of the EIA was proposed by the project proponent itself and an accredited consultant was not appointed for this project.

(ii) Use of outdated baseline data for Environment Impact Assessment:

MoEF&CC in its instructions (August 2017) had specified that the baseline data[21] should not be older than 3 years, at the time of submission of the proposal for grant of Environmental Clearance. Audit observed 12 project approvals **(*Annexure 3*)** where the EIA made use of outdated baseline data, where the data collected was outdated by 2 to 11 years. Some cases are discussed below:

A. The project ***'Construction of 35 Km Road coastal road from Princess Flyover to Worli in Mumbai'***, was accorded clearance by MoEF&CC in 2017. Government of Maharashtra in June 2011 constituted a Joint Technical Committee (JTC) to examine various options in the construction of the Coastal Road in Mumbai and its impact on the environment. The JTC report, a component of EIA study (2016) justified the construction of road for smoother traffic movement based on comprehensive Traffic Studies conducted for Mumbai Metropolitan Region in 2008. MoEF&CC approved the project in 2017 without updating the baseline study and without taking into account the major infrastructural development projects in the vicinity during this period.

B. The project ***'Development of the petroleum, chemical and petrochemical investment region' (PCPIR) in Dahej, District Bharuch of Gujarat*** aimed to establish production facilities for petroleum, chemicals and petrochemicals in the region. As per the Terms of Reference approved by MoEF&CC in 2013, the project proponent was to carry out surface water quality analysis. Audit observed that the EIA report of the project included

[21] Baseline study serves the purpose of a base reference against which the changes due to implementation of the project are measured.

water quality analysis data pertaining to 2010-11. The baseline data was outdated by more than 7 years. The project was accorded clearance by MoEF&CC in 2017.

C. The project '***Construction of Mumbai Trans- Harbour Sea link (MTHL)' by M/s Mumbai Metropolitan Region Development Authority*** was accorded clearance by MoEF&CC in 2013. As the impacts of the project on mangroves, habitat of flamingos and mudflats were not addressed in the EIA, the National Green Tribunal in October 2015 ordered that MoEF&CC needs to consider the project afresh. Audit observed that the project proponent applied to MoEF&CC in 2015 and the project was granted clearance in December 2015 based on EIA report which used the baseline data of only air, water, noise, soil quality, pertaining to the year 2011 while the information regarding the migratory birds visiting the area pertained to 2008[22]. Thus, the baseline data was outdated by four to seven years.

(iii) Environment impacts not fully analyzed in the EIA

EIA aims in evaluating the full range of effects on the environment of the proposed project which begins with the evaluation of ecological significance of the project area i.e., identification of significant biodiversity in the project area. The ecological evaluation is followed by a detailed impact prediction analysis. Audit observed that MOEF&CC granted project approvals even though the EIA did not comprehensively address the ecological aspects in the project area. It was observed that in respect of 14 project clearances (***Annexure 4***) out of 43 sampled projects approved by MoEF&CC, the environment impact studies failed to identify key biodiversity in the area and did not include mitigation measures to alleviate the risks faced by the unique biodiversity. Some cases are illustrated below:

Table 3.3: Cases where Environment Impact Studies failed to identify key biodiversity in the area

Project	Approved	Biodiversity not assessed/mitigation measures not taken up
Expansion of facilities at port Redi, Sindhudurg, by M/s Redi Port Ltd. in Maharashtra	Accorded clearance by MoEF&CC in 2018	The project area was home to 56 species of phytoplanktons, 27 species of freshwater fishes and mangroves. EIA study did not assess the impact of reclamation activities on these.
Laying of Natural Gas pipeline, Mumbai by Mahanagar Gas Ltd, Maharashtra	Accorded clearance by MOEF&CC in 2018	The EIA study, failed to identify the presence of mangroves existing in the area and did not assess the impact of the project on these ecosystems.
Deepening of Approach Channel by Mormugao Port Trust in Goa	Accorded clearance by MoEF&CC in 2016	Neither the impacts nor the mitigation plan for endangered species windowpane oyster[23], corals and associated life forms in Chicalim-Sancole Bay, four kms away from the dredging area. These biotas were identified by the PP and formed a part of the EIA report.

22 Assessment made by the Salim Ali Center for Ornithology and Natural History (SACON).

23 Which is classified as endangered species by IUCN.

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(iv) Disaster management not fully addressed in the EIA

EIA studies include assessment of large scale technological and sudden onset of disasters resulting from natural hazards to prevent and mitigate consequent environmental damage. The Disaster management plan (DMP) is one of the key prerequisites that the project proponent has to submit to the approval authorities. We observed 16 projects clearances (***Annexure 5***) by MoEF&CC that were either devoid of DMPs or did not specifically address disasters. A few cases are highlighted below:

Table 3.4: Clearances granted in absence of DMPs or where they did not address specific disasters

Project	Approval	Deficiency in Disaster management plan
Redevelopment of Edible Oil Transit Terminal by Ruchi Infrastructure Limited at Chennai, Tamil Nadu	Accorded clearance by MoEF&CC in 2018	The project area was prone to floods and cyclones. The EIA did not contain Disaster Management Plan to address these issues.
Setting up of Mini Bulk Carriers Handling Facility by Kolkata Port Trust, West Bengal	Accorded clearance by MoEF&CC in 2017	Project site was classified as a severe intensity seismic zone[34]. As per the recommendations of the WB SCZMA, the project area was prone to cyclonic storms. The EIA report was devoid of disaster management plan to address this.
Development of four berths in Western Dock Arm in New Mangalore port, Karnataka	Accorded clearance by MoEF&CC in 2016	Project site was classified as Zone III in accordance with the BIS, 2000, Seismic Map of India and had moderate exposure to earthquakes, storms, cyclones and Tsunami. The Disaster Management Plan did not envisage any mitigation measures.

Thus, deficiencies in the preparation of EIA reports like use of old baseline data, EIA reports made by non-accredited consultants, lack of efforts to address disasters and failure to address the full range of ecological impacts in the EIA would weaken the process to conserve the coastal ecosystem.

3.2 Deficiencies in the Environment Management Plan (EMP)

The EMP consists of all mitigation measures under each activity of the project during construction, operation and the entire life cycle of the development activity, along with costs and aims to minimize adverse environmental impacts of the project. As per the EIA Notification 2006, the project proponent was required to make provisions for and earmark detailed budget for EMP. Also, as per the EIA Notification 2006, the EMP should include

[34] In accordance with the Bureau of Indian Standards (BIS) 2000, Seismic Map of India.

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description of all the administrative aspects of ensuring that mitigation measures are implemented and their effectiveness monitored.

(i) **Mitigation Activities not included in EMP**

We observed in 13 project clearances (***Annexure 6***) where activities forming a part of the mitigation plans like mangrove conservation/ replantation biodiversity conservation plan, rain water harvesting plan failed to be included in the EMP as the same was left to the project proponent (PP) to be carried out. Also, we observed that MoEF&CC did not verify whether the same had been carried out by the project proponent as directed. A few cases are highlighted below:

A) The project '**Modification of existing iron ore terminal to handle coal at Kamarajar port' Tamil Nadu** was approved by MoEF&CC in 2018. MoEF&CC, while granting the clearance, directed the PP to design a management plan for prevention of fires. Also, the PP was to create an inventory of floral composition of the biota of marine and intertidal biotopes and draw up a detailed marine biodiversity conservation management plan. However, it was observed that these activities did not form a part of the EMP, and the cost of implementation was not worked out by the PP.

B) The project '**High Speed Railway Project across CRZ areas' in Mumbai** was approved by MoEF&CC in 2019. While recommending this project, the EAC imposed a specific condition that a robust conservation and management plan for Thane Creek Flamingo Sanctuary with detailed action plan for immediate implementation in consultation with the concerned agency in the State. However, it was observed that the EMP was devoid of any information regarding the costs to be incurred for this activity.

(ii) We observed that in nine project clearances **(Annexure 7)** by MoEF&CC, the project proponent had neither earmarked any quantifiable funds for EMP nor provided details of the cost break-up of the EMP budget. Further in two cases, we observed that project proponent did not include cost of activities that were to be undertaken as a part of mitigation measures.

A few instances are highlighted below:

A) The project which entailed setting up of '**Sewage Treatment Plant in CRZ-I area in Malad, Maharashtra'** was approved by MoEF&CC in 2017. Around 36 hectares of mangrove cover was required to be compromised and compensatory afforestation of 180 hectares was required under the project. The CRZ clearance required the Project Proponent to develop a mangrove conservation plan in consultation with the Mangrove Foundation of Maharashtra or any reputed Institute for rehabilitation of mangroves. We observed that though the EMP stipulated removal and replantation of the mangroves, the cost for the same were not prescribed.

B) Another project '**Construction of Mumbai Coastal Road' in Maharashtra** which was approved by MoEF&CC in 2017 involved reclamation of around 90 hectares. The mitigation measures involved installation of noise barriers all along the coastal road, appropriate

handling of solid and liquid wastes and preparation of marine biodiversity conservation plan for the region from an institute which had an expertise in the field. However, the EMP only comprised of activities relating to management of air, water, soil and noise pollution around the project site.

Failure of the EMP to address the full range of ecological impacts of the project would weaken the process of ensuring projects are not detrimental to the coastal area.

3.3 Absence of cumulative impact studies for project clearances

Cumulative environmental impact assessments are significant to study the incremental effects resulting from the combined influence of various actions at the project area. Mitigation, monitoring and management of the environment can be recommended taking into consideration the risks from the combined effects of the projects in an area. As per the EIA Notification 2006, PPs were to provide information regarding the factors which could lead to detrimental environmental effects or which have the potential for cumulative impacts of the project with other existing or planned activities in the locality. We observed that in 11 project clearances (***Annexure 8***), no information was given regarding the cumulative effect. Instances were noted where the PPs did not conduct any substantive cumulative impact studies. A few cases are highlighted below.

A. The project **'Laying of an effluent pipeline' by Madhu Silica Pvt. Ltd. (MSPL) in Bhavnagar, Gujarat** was granted clearance by MoEF&CC in 2015. The project envisaged for 10 MLD of effluent disposal to the marine outfall which was already disposing 20 MLD of effluents from Chitra Industries Association and Bhavnagar Municipal Corporation. CPCB had had listed Bhavnagar as one of heavily polluted industrial clusters. Despite this, that clearance was granted to the project without conducting cumulative environmental impact assessment studies

B. In two projects, **'International Leather Complex by Adani Port and SEZ Ltd.'** and **'Marine disposal of treated effluent through dedicated pipeline by M/s Hyacinths Pharma Pvt. Ltd.' in Andhra Pradesh**, the EAC recommended (2014) a cumulative study to assess the impact of marine disposal, considering the presence of other marine outfalls in vicinity of the proposed project. EIA studies did not include any cumulative EIA and the projects were approved in 2015. In another pharmaceutical project, **'Setting up of bulk drug unit by Divi's laboratories, East Godavari District in Andhra Pradesh'** was accorded clearance by MoEF&CC in 2019.Though the EIA report had identified a number of marine outfalls around the project site, no cumulative study was undertaken by the PP. The EAC failed to address this during the appraisal.

Failure to address cumulative effects of the project in light of other projects in the area would increase the risks to the ecology of the coastal areas.

3.4 Non-verification of information provided by project proponents

We observed three cases of project approvals where the MoEF&CC failed to make independent efforts to verify the veracity of the opinion given by private consultants. MoEF&CC merely relied on the information submitted by the Project Proponent with respect to potential ecological risks due to the project activities. It is to be noted that some of the project clearances were quashed later by the NGT on learning that the PP had deliberately suppressed vital information while requesting for clearance.

A. The project **'Mumbai Trans-harbour sea link (MTHL) by M/s Mumbai Metropolitan Region Development Authority (MMRDA)'** was accorded clearance by MoEF&CC in 2013. The clearance as per the information provided by the project proponent indicated that the area of mangroves and mudflats affected under the project was 0.18 hectares. As per the Maharashtra Coastal Zone Management Authority (MCZMA) recommendation, the affected area was 0.99 hectares (i.e. 0.06 hectares at Sewri and 0.93 hectares at Chirle). The project involved diversion[25] of 38.58 hectares of mangrove areas along with 8.84 hectares of forest land. It was also observed by NGT the impacts on costal ecosystem comprising of mudflats and flamingos had not been evaluated by the PP. The clearance thus granted by MoEF&CC was quashed in October 2015 on grounds that critical information had been suppressed by the project proponent. The project was considered afresh and was granted clearance in December 2015 after addressing the requirements of NGT.



Fig. 2: Mangroves in the Sewri area in 2018



Fig. 3: Mangroves in the Sewri area in 2021

B. The project **'Laying of treated effluent disposal pipeline in the Gulf of Kutch at Mithapur in Gujarat by M/s Tata Chemicals Ltd'** was accorded clearance by MoEF&CC in 2017. According to an EAC meeting, Poshitra Bay which is adjoining area to the effluent discharge point was known to be the last remaining feeding ground of Critically Endangered Dugong species[26]. Poshitra was also an endemic site for critically endangered molluscs[27]. The EIA study was silent about marine fauna around the project site and the EIA report merely stated that 'marine reptiles and mammals common to the Gulf would not be affected due to the construction activities since they keep away from such sites.' It was observed that

25 As per the appeal filed by Sh. Dileep B.Nevatia in the NGT in 2013.

26 The Western Indian population was confined to this part of Gulf of Kutch.

27 Such as *Sukuroeolis gujaratica* and *Anteaeolidiella poshitra*.

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MoEF&CC accepted the PP's assertion and did not recommend environmental impact analysis to verify the critical facts.

C. The project **'Expansion of Adani Petronet (Dahej) Port in Gujarat'** involved reclamation of 23 hectares of intertidal mudflats. They are areas of high biological productivity with abundant invertebrates which provide food for migratory birds. Also, they function as breeding grounds for many fish species. However, the EIA study of this project stated that the mudflats in the project area were biologically inactive. Audit observed that MoEF&CC accepted the opinion of the PP and did not independently examine this issue and accorded clearance in 2016.

Thus, failure on part of MoEF&CC to verify information critical to conservation of the coastal ecosystem would impact its conservation.

3.5 Deficiencies in the process of Public Hearing

Public hearings provide an opportunity to those directly affected by the project to express their views on the environmental and the social impacts of the proposal. Public consultation may provide new information, improve understanding and help the EIA process to be transparent and fair. Public hearings are to be conducted for projects attracting EIA Notification 2006. We observed five cases of project approvals ***(Annexure 9)*** where the project proponent failed to adhere to various provisions regarding public consultation.

Audit observations for some cases are as follows:

A. The project **'High-Speed Railway corridor by National High Speed Rail Corporation Ltd.'** approved by MoEF&CC in 2019 passed through the states of Gujarat, Dadra & Nagar Haveli and Maharashtra. The Public hearing for this project was conducted in 12 locations in these states. It was noticed that the notice period for public hearing in all the 12 locations ranged between 03 to 15 days[28], and the notice was published only in a local newspaper[29]. Also, in response to the issues raised during public hearing regarding the impact of vibrations on Greater flamingos of Thane bird sanctuary, the PP stated during the public hearing that the impact of vibrations caused by construction activities would have no adverse impact on flamingos. However, when the same concern was raised by the EAC, the PP responded that the impact of vibrations would be understood only when the site work starts. Mismatch between the information given in public hearing and that furnished during the EAC meeting was noted by the audit.

B. The project involving setting up of **'Mini Bulk Carriers Handling Facility at Haldia dock Complex, by Kolkata Port Trust'** was granted EIA clearance by MoEF&CC in 2017. It was observed that 46 persons apart from the SPCB and the port authorities had attended the public hearing. However, the EIA report did not include any of the responses from the local communities raised during the hearing.

[28] The minimum notice period is 30 days.

[29] One national paper and 1 vernacular paper.

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Deficiencies in the process of public hearings which provide valuable input on impacts to local community, would violate the principles of equity and that of sustainable development.

3.6 Grant of clearance to projects without giving due consideration to Ecologically Sensitive Areas (ESAs)

During examination of the project clearances, we observed two instances where clearances were granted without factoring in the presence of Ecologically Sensitive Area in and around the project area. Some of these cases are illustrated below.

Table 3.5: Non-factoring in the presence of Ecologically Sensitive Area in and around the project area

Project	Approval	Sensitive area not considered
Cochin Residential Development Project by TRIF Kochi Projects	Accorded clearance by MoEF&CC in 2016	It was observed that though Mangalavanam Bird sanctuary was situated within a distance of 400 metres from the project site, clearance from NBWL was required as it was located within 10 Kms of an ecosensitive zone around a wildlife sanctuary, however, the same was not taken.
Mumbai Manmad pipeline project by Bharat Petroleum Corporation Limited, Maharashtra,	Accorded clearance by MoEF&CC in 2015	It was observed that against 3.17 hectares of mangroves to be replanted, no replantation was taken up.

Such clearances would affect the ecosystem balance of these fragile and vulnerable areas.

3.7 Irregular Grant of clearances and recommendations by the State Coastal Zone Management Authorities

3.7.1 SCZMA exceeded authority to clear projects

The SCZMAs are required to examine the project proposals, assess the risks posed by the project and potential impact of the same on the ecosystem. As per CRZ Notification 2011, SCZMAs are to examine the project proposals that attract the notification and recommend them to approval authorities i.e., MoEF&CC or SEIAA for grant of clearance. Audit observed 20 cases where the SCZMA usurped the powers of clearance granting authorities and granted clearance to the projects. A few cases have been highlighted below:

A. MoEF&CC stipulated (December 2012) that if a project requiring Environmental Clearance was located within the eco-sensitive zone around a Wildlife Sanctuary or National Park[30], the PP was required to obtain prior clearance of National Board of Wildlife (NBWL). We observed that the project **Establishment of Kundhukal Fishing Harbour in TamilNadu** was located within 1 km from Kurusadai Island which was a part of the Core area of Gulf of Mannar Marine National Park (GoMMNP), in which activities can be carried out only after obtaining prior approval from the NBWL. However, TN SCZMA granted CRZ clearance for the project in 2018 without the requisite prior clearance from the NBWL.

[30] Or in absence of delineation of such a zone, within a distance of 10 kms from its boundaries

B. SCZMA of Karnataka in 2015, granted CRZ clearance to a project with an objective to **strengthen the 7.76 km long embankment along the left bank of estuarine stretch of Aghanashini River.** Though the proposed project area was in ecologically sensitive zone(CRZ I), it was observed that the SCZMA accorded clearance without carrying out an EIA or a detailed study of the environment, the aquatic life and effect on the mangroves. Also, grant of clearance by SCZMA was irregular as SCZMAs could only recommend for clearance as MoEF&CC/SEIAA are the approval bodies.

3.7.2 Project approval without submission of mandated documents

We observed 46 project approvals where the proponent failed to submit mandatory documents such as EIA reports, disaster management report, risk assessment report, CRZ maps, No Objection Certificate from the concerned State Pollution Control Boards for the projects involving discharge of effluents, sewage etc. as detailed at ***Annexure 10.*** Some cases are illustrated below:

A. The project ***'Construction of* Tuna Fishing Harbour in Tiruvottiyur, Chennai by Fisheries Department, Govt. of Tamil Nadu'** was granted clearance by TN SCZMA in 2017. The project aimed at decongesting the Chennai fishing harbour and to create facilities for catching, processing of Tuna Fish. the EIA report of the project proponent revealed that the project involved construction of Desalination plant, intake of Sea water, discharge of treated effluents, RO rejects into the Sea. The SCZMA in its clearance had stipulated provision of ETP of adequate capacity for treatment of sewage and trade effluents from vessel washing. Also, the unit was advised not to generate effluents from fish packing facility in the harbour. This necessitated the requirement of No objection Certificate from SPCBs, however, we observed that the same had not been taken in the extant case.

B. The project **'Additional Salt Works (2395.15 acres) located at village Kalatalav and Narmad, Bhavnagar district in Gujarat'** was granted clearance by SEIAA in 2017. We observed that the clearance was granted in the absence of mandatory documents, namely EIA Report including the marine and the terrestrial components, risk assessment report, Environment Management Plan, the CRZ map with HTL/LTL marked by the authorized agency which was highly irregular.

Grant of project approvals in excess of its authority and without mandatory documents would weaken the checks placed in the approval mechanism and thus, hinder conservation of the coastal ecology.

3.8 Modification of CRZ notification to permit specific projects

MoEF&CC amended the CRZ notification 2011 to allow for two specific development projects in the state of Maharashtra. The projects are discussed as below.

A. The project for **'Construction of a Coastal Road in Mumbai by Municipal Corporation of Greater Mumbai (MCGM)'** was accorded clearance by MoEF&CC in 2019. The project required reclamation of land in CRZ-I area which was not permissible as per the

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provisions of the CRZ Notification 2011. Hence, on the basis of a recommendation received from SCZMA of Maharashtra, MoEF&CC amended the CRZ Notification 2011 in 2015 allowing for construction of road by way of reclamation in CRZ area.

B. A project of **'Construction of a memorial and a statue of Chhatrapati Shivaji Maharaj, at Nariman Point, Mumbai'** along with art museum, amphitheatre, exhibition gallery, marine aquarium, coastal/ marine resources interpretation centre, cafeteria, lavatories, medical facilities, stalls and offices were also planned. Maharashtra Coastal Zone Management Authority recommended the project to MoEF&CC in 2014 as a special dispensation under the CRZ Notification 2011. Based on the recommendation of the Maharashtra SCZMA, MoEF&CC in December 2014 amended CRZ Notification 2011 to allow for the construction of the memorial in CRZ-IV areas (which included water areas from the low tide line to 12 nautical miles on the seaward side) on case-to-case basis. However, audit examination revealed lapses in the EIA process of the project. Audit observed that the EIA was prepared by a non-accredited consultant and EIA lacked comprehensive ecological evaluation of the project site. Further, though the project attracted EIA appraisal as per the EIA Notification 2006, the project was exempted from public hearing and was granted environmental clearance in 2015.

Modification of CRZ notifications for approval of specific projects not only sets a bad precedence but also ends of defeating the efforts to conserve the coastal ecosystems.

3.9 Non-inclusion of major infrastructure project categories in the EIA Notification

The provisions of CRZ notification requires the projects that attract both EIA Notification 2006 and CRZ Notification to undergo the approval process as per the EIA Notification. However, the EIA Notification 2006, does not comprehensively cover all kinds of development projects. Audit noted that projects by nature and scale of operation attracted the comprehensive EIA assessment in addition to CRZ clearances. However, these projects were approved without undergoing the multistage process of EIA. This gap in the project approval mechanism resulted in awarding project clearance without Terms of Reference (ToRs) and public consultation. The projects are discussed below:

A. **Mumbai Coastal Road**: As construction of municipal roads do not fall in any of the categories of project attracting EIA Notification, the proposed project of Mumbai Coastal Road was granted clearance under CRZ Notification in 2017. Thus, the project which had otherwise significant environmental concerns bypassed the critical stage of public hearing as CRZ Notification does not provide for public consultation in the approval process. It is pertinent to note that Rule 4 (e) of the Notification envisaged that MoEF&CC may under a specific or general order specify the projects which require prior public hearing of project affected people.

B. **Mumbai Trans-harbour Sea link (MTHL)**: The project involved construction of a 22 Km long road bridge across Mumbai Harbour between Sewri and Chirle. The bridge passed through CRZ-I area comprising of mudflats (at Sewri and Shivaji Nagar), mangroves and a

flamingo breeding site. The project was granted environmental clearance as per EIA Notification 1994 and CRZ Notification 1991 in 2005. As the project work could not begin in the stipulated time period, the EC expired. In 2015, the project was granted clearance as per the provisions of the CRZ Notification 2011. The project did not attract provisions of EIA Notification 2006 as standalone bridges did not fall into any category of EIA Notification. This resulted in approving the project without ToRs and public consultation, though the project included land acquisition, rehabilitation and resettlement of local residents. It is pertinent to note that the standalone bridges now find a place in the Draft EIA Notification 2020, however the bridges with the built-up area >= 1,50,000 sq. m or 15 hectares, as this project, would be treated as Category B2 project and its clearance would require only two processes i.e., preparation of Environment Management Plan and its appraisal by SEIAA. Thus, the project would still not be considered in a comprehensive manner as main processes such as public consultation and preparation of an EIA Report would be skipped.

3.10 Conclusion

- There were deficiencies in the project approval mechanism of MoEF&CC. EIA studies lacked holistic ecological evaluation and failed to identify the key ecological risks and downplayed potential ecological impacts. Clearances were granted to the Project Proponents though the projects failed to address the impact on vulnerable flora and fauna.
- Failure to perform cumulative impact assessment resulted in the grant of clearances to projects without studying the combined effects of individual impacts in the project area.
- MoEF&CC failed to ensure that the Project Proponents earmarked budget for EMP.
- The Ministry relied on the Project Proponent without carrying out independent verification of the information furnished by the Proponent/EIA studies.
- There were cases where MoEF&CC amended the CRZ notification to facilitate for approval of individual projects. These modifications were made without conducting any technical studies on the repercussions of the same to ecosystems and impacted the entire coastline.
- As such, the process of grant of clearances for setting up projects could not ensure fully that the proposed projects would not have a detrimental impact on the coastal ecology.

Chapter 4: Post clearance monitoring and enforcement of CRZ Notifications

Monitoring is an essential component for sustainability of any developmental project. It forms an integral part of any environmental assessment process. Monitoring of the project after its approval helps in verifying the outcome of the implemented mitigation measures and also to alter the mitigation measures in case of identification of problems.

4.1 Effectiveness of post clearance monitoring

We examined the effectiveness of post clearance mechanism of the approved projects through site verification, and examination of the compliances to the conditions as stipulated by SCZMAs as well as the clearances granted by MoEF&CC. Regional Offices of the MoEF&CC have been assigned the responsibilities for monitoring compliances to the conditions stipulated in the clearances. PPs are to submit half yearly compliance reports and annual environmental statements to the Regional Offices. SPCBs are to monitor the compliance to the conditions while granting 'Consent to Establish/ Operate'. Our observations in this regard are given in succeeding paragraphs.

4.1.1 Non-compliance to conditions stipulated in the Clearances

We observed that in 18 projects (***Annexure 11***), the Project Proponent failed to comply with conditions mentioned in the Clearance as well as the conditions stipulated by SCZMA while recommending for the clearance. A few cases are illustrated below.

A. The proposed project of **Construction of Petroleum Products Storage Terminal, Karnataka Port by Tropicana Liquid Storage Pvt. Limited** was accorded clearance by MoEF&CC in 2015. Audit observed that oil spillage contingency plan as required under the clearance was not formulated and dedicated boats were not deployed to avoid oil spillage, as specified while granting approval. There was no computerized SCADA (Supervisory Control and Data Automation) system at the project site to identify leakages in the pipeline and to cut off the pumping immediately. The project proponent had not set up separate environmental management cell for effective implementation of the stipulated environmental safeguards as instructed by MoEF&CC while granting clearance.

B. The proposed project of **Integrated Cooum River Eco-restoration Project by Chennai Rivers Restoration Trust, Tamil Nadu** was granted clearance by MoEF&CC in 2017. While recommending clearance for this project, TN SCZMA allowed for de-siltation of 5,08,177 cu.m. silt of the Cooum River. Also, MoEF&CC imposed condition that the silt generated through dredging was to be scientifically disposed outside the CRZ area. Bunding and landscaping changes were also prohibited. It was observed that the project proponent carried out desiltation of 8,94,757 cu.m, and only 40 percent of the silt generated was sent to dump yards. The remaining silt was deposited on the river banks, leading to formation of bunds that affected the landscape.

C. A proposed project of **Cochin Residential project by TRIF, Kochi Projects Pvt. Ltd. In Kerala** was approved by MoEF&CC in 2016. As per the EC, no development was to be carried

out within 0 to 200 metres from the High tide Line. It was observed that the entire project was carried out within 200 metres from HTL. The CRZ Notification 2011 permitted drawl of groundwater only when done manually through ordinary wells for drinking requirements, horticulture and fisheries, and where no other source of water was available. Audit noticed that water was drawn from a tubewell which met the entire water requirement for construction related activities.

D. A proposed project **Mumbai Trans Harbor Sea Link by MMRDA, Maharashtra** approved in 2016, aimed to divert 47.41 ha of forest land. MoEF&CC granted clearance while imposing the condition that the Government of Maharashtra should create and maintain alternate habitat for the avifauna whose nesting trees were cleared under the project. Artificial bird nests made out of the eco-friendly material was to be used in the area including forest area and human settlements adjoining the forest area being diverted for the project. We observed that although a total of 669 number of trees were removed for the project, no alternate habitat for the affected avifauna was created.

Thus, MoEF&CC and its regional offices failed to ensure that the project proponents adhere to the conditions prescribed in the clearances. Non-compliance to these key conditions have an adverse impact on the surrounding ecosystem of the project as well as indicate inefficient monitoring on part of the MoEF&CC and its regional offices.

4.1.2 Non-submission of mandatory reports

The post clearance mechanism for the projects which are granted clearance under EIA/CRZ Notification mandate submission of half-yearly compliance reports in respect of the stipulated terms and conditions of the environmental clearance. These are to be submitted to the concerned Regional Offices of MoEF&CC and form the basis for monitoring by different authorities.

(i) Non-submission of half-yearly reports

Audit observed that the project proponents in 13 cases (***Annexure 12***) granted clearance by MoEF&CC failed to periodically submit these reports. MoEF&CC, while granting clearance stipulates a condition that it has the right to revoke the clearance in the event of non-compliance to the provisions of the notifications. However, audit could not find any case where MoEF&CC initiated action on the project proponent in this regard.

MoEF&CC assured (February 2022) that the ministry is planning for online submission of the half yearly monitoring reports by the project proponents.

(ii) Non submission of annual environment statements

As per the provisions of the notification, the proponent has to submit an annual environmental statement to the concerned State Pollution Control Board. It was noticed that this statement dealt with generic issues of air and water quality and, did not contain the details specific to the project. It was also observed that the mandatory annual environmental

statement was not furnished for 17 projects (***Annexure 13***) out of 43 sampled projects granted by MoEF&CC during 2015-20.

(iii) Consent to Operate/ Establish not obtained before commencement

As per Section 25 of the Water (Prevention and Control of Pollution) Act 1974, all industries and local bodies discharging any domestic sewage or trade effluent into water, stream, well, sewer or on land are required to obtain Consent to Establish (CTE) from the State Pollution Control Board for establishment of any new unit or before carrying out construction activities. The units are also required to obtain Consent to Operate (CTO) before commencing commercial production.

We found that 13 projects in the CRZ areas (***Annexure 14***) were observed to have commenced without obtaining any CTE or CTO from the concerned State Pollution Control Board. Further, no project proponent was penalized though contravention of Section 25 of this Act was an offence punishable with imprisonment for a term not less than one year and six months but which may extend to six years and with fine.

As such, the system of post monitoring of clearances suffered due to lack of necessary information from the project proponents regarding the environment impact of the projects. Further, audit noticed instances where the clearance conditions were not followed by the project proponents, indicating failure of MoEF&CC and its regional offices to monitor effectively. These infirmities would impair the ability of regulatory agencies from noticing and stopping any negative impacts on the coastal environment as a result of the approved projects.

4.2 Enforcement of CRZ provisions

CRZ Notification 2011 authorises SCZMAs to recommend grant of approvals to permissible projects and ensure compliance of their orders, identify violations, if any and direct the concerned authorities for follow up action. Audit reviewed the enforcement of CRZ provisions by SCZMAs and DLCs and observed instances where SCZMAs failed to take action against CRZ violations. Also, the DLCs failed to identify violations and report the same to SCZMAs. Audit reviewed the status of sample CRZ violations[31] in the states and observations in this regard are detailed below.

4.2.1 Irregular development activities in CRZ 1 areas

(i) Construction on Olive Ridley Turtle Nesting Sites

Audit observed irregular construction of a jail complex in CRZ 1A area located at Bangar in Puri district, Odisha. The construction was inside Balukhand-Konark Wildlife Sanctuary, which

[31] Cases of violation reported in the para are of two kinds. First is reported violations, wherein a complaint was made to SCZMAs and audit conducted a joint physical verification, which is mentioned in report, wherever applicable. Second type are the unreported violations where audit have used GIS to compare the satellite images of irregular construction with approved CZMPs for the place and concluded if they are in prohibited zones.

also has Olive Ridley Turtle nesting sites on the beaches. The figures below indicate the approved CZMP for the area and the satellite images obtained by audit for the area in December 2020.

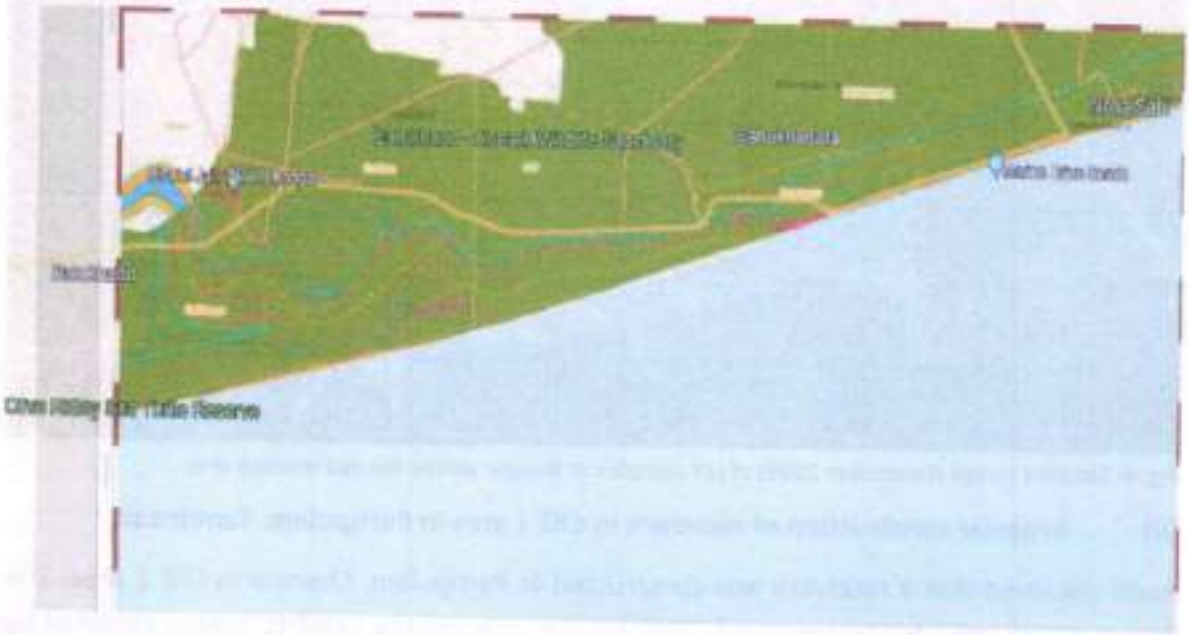


Fig. 4: CZMP for the coast around Balukhand sanctuary and Turtle reserve, indicating CRZ 1A zone in green shade and irregular construction is marked in red

Further, satellite images obtained by audit below indicates that there was no construction in the area in 2011.



Fig. 5: Satellite Image (October 2011) of area before construction of jail complex showing empty land within the red marked area



Fig. 6: Satellite Image (December 2020) of jail complex at Bangar within the red marked area

(ii) Irregular construction of racetrack in CRZ 1 area in Pattipulam, Tamilnadu

Audit observed that a racetrack was constructed at Pattipulam, Chennai in CRZ 1 area. The figures below indicate the approved CZMP for the area and the satellite images obtained by audit for the area in March 2021. As per the approved CZMP, the area where racetrack is constructed (marked in red) falls partly in CRZ 1A area and partly in No Development Zone (NDZ). The satellite images obtained by audit from March 2021 indicates the presence of irregular construction of the racetrack in the restricted area.



Fig. 7: Approved CZMP of Pattipulam area indicating CRZ 1A zone in green shade and NDZ in yellow shade



Fig. 8: Satellite image (March 2021) of racetrack constructed in CRZ 1A and NDZ area

4.2.2 Irregular activities in No Development Zone

a) Irregular construction of Beach Resort in No Development Zone

A complaint was received at TN SCZMA about the construction of a resort (Golden Bay Resorts) in No Development Zone in Kuvathur area of Kanchipuram district. The CZMPs approved as per CRZ notification 2011 defines No Development Zone as area upto 200 metres[32] from HTL on the landward side in case of seafront and 100 metres along tidal influenced water bodies or width of the creek whichever is less. Audit assessed the follow up action of TN SCZMA and found that DLC, Kanchipuram district visited the resort and reported to TN SCZMA that the resort has been in operation since 2013 without a valid Consent to Establish Certificate. It was also reported that the resort had been discharging untreated sewage to the sea. TN SCZMA issued show cause notice to the resort in 2017. It was noted that no further follow up action was taken by TN SCZMA as on March 2021. Audit obtained satellite images of the area and compared it with the approved CZMP, as shown below.

[32] Revised to 50 meters from the HTL, or width of the creek whichever is less, along the tidal influenced water bodies, as per CRZ notification 2019.

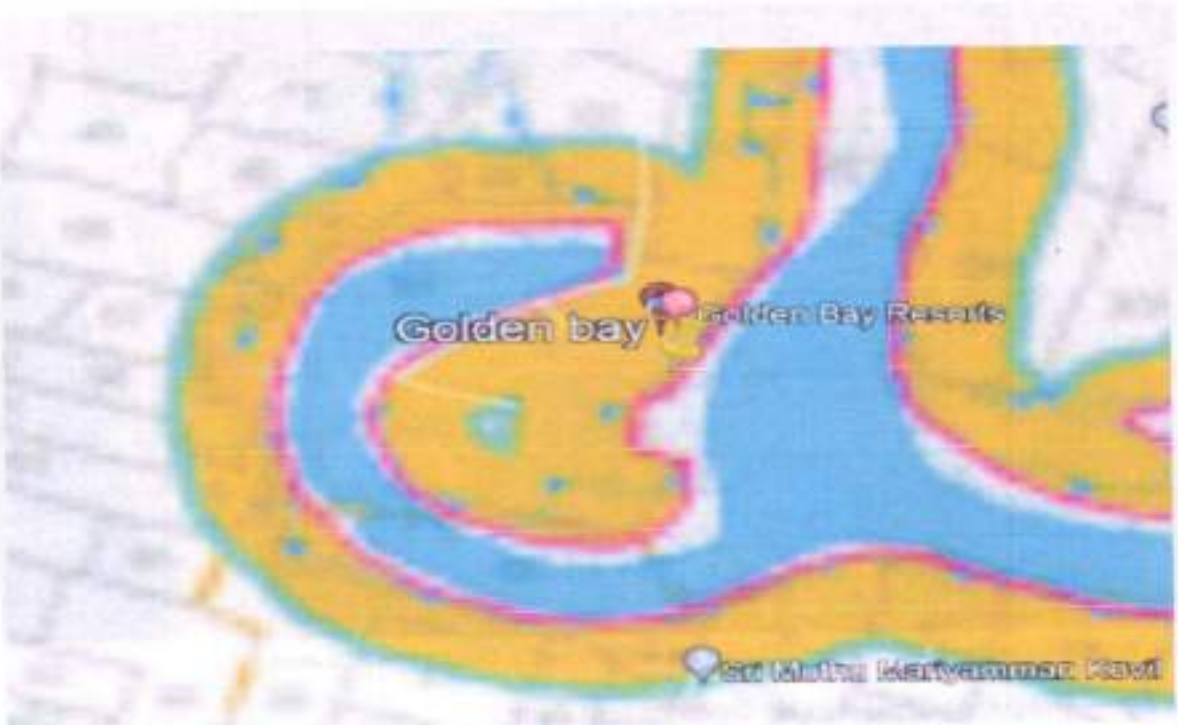


Fig. 9: Approved CZMP for the area with NDZ indicated in yellow shade



Fig. 10: Satellite Image (October 2021) of the resort in No Development Zone

During JPV by the audit team and relevant officials from the State in March 2021, the presence of the resort as well as a boat jetty was confirmed.

(b) Irregular construction of Jetty extension in No Development Zone

Gujarat SCZMA received a complaint in June 2018 about an irregular construction in Devbhumi, Dwarka and instructed the Gujarat SPCB for site inspection. Gujarat SPCB confirmed the illegal construction of a 30-meter-long jetty and instructed the violators to remove the construction. Audit obtained satellite images of the area as shown below:

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Fig. 11: Satellite image (November 2015) of area without jetty extensions in yellow marked region



Fig. 12: Satellite image (September 2021) of the jetty extensions

From the images above, it is observed that even though the Gujarat SPCB instructed the violators to remove the construction in 2018, the structure still remains even as of 2021, indicating ineffective follow up on part of concerned authorities.

c) Encroachment and CRZ violations in Vembanad Lake region

Vembanad lake[33] is the largest lake in the state of Kerala and is designated as Critically Vulnerable Coastal Area. Approved CZMP for the region identifies the islands in the lake ecosystem as No Development Zone. The Vembanad ecosystem is under developmental pressures from irregular reclamation and construction in and around the lake area.

Kerala SCZMA in June 2018 received a complaint about construction of a resort in Nediyathuruth island in Panavally panchayat, Alleppey district. As per approved CZMP for the region, the island is designated as No Development Zone. The Hon'. Supreme Court in January 2020 declaring the resort as encroachment in the lake region, directed to demolish the resort. It was found that the resort is yet to be demolished. While analysing the satellite images of

[33] With an area of 2033 sq. kms. and a maximum length of 96.5 km, it is the second largest lagoon in India

the project area, audit identified another resort, Grand Ayur Island in Anjuthuruthu island in Panavally panchayat, Alleppey district. These islands formed a part of No Development Zone in the lake region under CRZ notification. The figures below indicate the approved CZMP for the island area (NDZ indicated in yellow shade) and satellite images obtained by audit for the area indicating irregular construction in No Development Zone.



Fig. 13: Approved CZMP of the area on left and satellite image from 2021 for the area on right

d) Irregular development activities in Akkulam lake region

Akkulam lake in Trivandrum is a wetland ecosystem in Thiruvananthapuram, that has continuously been threatened by reclamations and construction activities[34] in the lake region. Audit observed that based on a complaint received by Kerala SCZMA about illegal constructions and reclamation in the Akkulam lake region, Kerala SCZMA directed Municipal Corporation of Thiruvananthapuram to furnish an Action Taken Report (ATR), to which response is still awaited. DLC conducted a site verification September 2020 and found irregular construction in the region. While analysing the satellite imagery of the region, audit found irregular construction of a residential building on the HTL. We observed that the residential complex is constructed around the HTL and an approximate area of 1.48 Hectares falls in the intertidal zone (seaside from HTL). The images for the same are given below:

[34] The MoEF&CC conducted a study on Akkulam lake in 2017 and observed that reclamation and modification on many parts of backwaters resulted in the shrinkage of wetland area. Kerala State Remote Sensing and Environment Centre (KSREC) reported construction of public offices within the lake region. These activities have resulted in shrinkage of wet land area of 28.49 hectares from 1967 to 2020.



Fig. 14: Site image in 2021 indicating approx. 1.48 hectares construction in intertidal zone (HTL in purple shade)

e) Construction of a mall in No Development Zone

M/s Lulu International Shopping Mall is constructed in the NH Bypass Road near Aakkulam in Thiruvananthapuram. JPV conducted by the audit revealed that the portion of land adjacent to the boundary line with nearby TS Canal falling under NDZ area has been reclaimed and concrete beams and basins for fixing high mast lights were constructed. A stone wall with an average height of three metres with a wire mesh fencing on the top of it was constructed in the CRZ area adjacent to TS canal, as shown in the following photos:



Fig. 15: Images indicating reclamation and construction of stone wall in No Development Zone

f) Illegal Road construction in No Development Zone in Udupi district, Karnataka

A complaint was received by Karnataka SCZMA about illegal construction of a road in the islands of Shambhavi River. During the site inspection, it was observed that a road and two bridges were constructed without obtaining CRZ clearance. Further, it was reported that

mangrove plantations were destroyed for construction of the road. Though show cause notice was issued to the state works department, no follow up action has been taken by Karnataka SCZMA. The presence of the road was verified by the audit team during JPV. Audit obtained satellite images of the site which clearly show the road as depicted below:



Fig. 16: Satellite image of the road constructed in the middle of the island (No Development Zone)

g) Irregular approval of a commercial project in wetland area of Vembanad Lake by M/s TRIF, Kochi

The proposed project of residential complex by TRIF was recommended for clearance by EAC of MoEF&CC in September 2011. MoEF&CC raised query to Kerala SCZMA about the nature of the land and the clearance was kept in abeyance. The report of Kerala SCZMA declared the project area as CRZ area and that reclamation cannot be carried out for commercial activity in the project area, which is a part of wetland. Kerala SCZMA conveyed the same stance when MoEF&CC in 2012 sought the status for the nature of land. In 2016, clearance was granted for the project by MoEF&CC. During audit examination, it was found that the project proponent started construction in 2013, much before the grant of clearance. It was noted that MoEF&CC granted approval to the project though the project area falls in notified wetland area in violation of the provisions of CRZ notification 2011 as well as Wetland notification 2010.

h) Discharge of untreated effluents by coastal aquaculture units in Guntur district, Andhra Pradesh

Complaints were received by Andhra Pradesh Pollution Control Board (APPCB) in 2018 about discharge of wastewater from the prawn seed hatcheries namely M/s Gayathri Hatchery-I and M/s Surya Vamsi Shrimp Hatcheries[35] operating on shore area causing contamination of coastal waters. APPCB while issuing show cause notice, directed the firms to stop further discharge of untreated wastewater outside the premises within three days. Audit conducted a JPV with APPCB at Gayatri hatcheries in August 2021 and found that the hatcheries continued to discharge untreated effluents directly into the sea (CRZ IV).

[35] M/s Gayathri Hatcheries-I, Pandurangapuram Village, Adavi Panchayat of Bapatla Mandal, Guntur District.

We further observed that APPCB issued show cause notices (March 2018) and closure orders (May 2018) as they did not obtain/renew consent. The firms applied (May/June 2018) for CTOs by claiming ignorance of law and the APPCB granted/renewed consents revoking (May/June 2018) the closure orders subject to condition that they shall not discharge untreated effluents outside the industry premises under any circumstances. Audit obtained satellite images of the area which showed the existence of many hatcheries which were releasing their effluents into the sea.



Fig. 17: Surrounding area of Gayatri Hatchery on Kothapeta Rural Beach side in East Godavari district, indicating direct release of effluents in the sea by many other hatcheries

We further examined the aerial imagery of the Konapapapeta beaches in East Godavari district and observed that Konapapapeta beach also has clusters of hatcheries and shrimp farms that release effluents directly into sea as seen in the satellite image from March 2021 below:



Fig. 18: Presence of many hatcheries on coastline and open discharge of the effluent into sea by hatcheries on Konapapapeta beach, East Godavari district.

(i) Irregular operation of Ice plants and Fish Packing Units in CRZ areas of Kanyakumari district, Tamil Nadu

Setting up and operation of ice plants in CRZ areas require CRZ clearance. We noted cases of ice plants operating in Kanyakumari district without obtaining CRZ clearances. During JPV, it was observed that a fish packing unit was operating within the premises of an ice plant. The activities were irregularly granted clearance by DLC, Kanyakumari. TN SCZMA in August 2020 directed DLC, Kanyakumari to take penal action against the violation and report on the same. It was noted that DLC is yet to take any action in this regard till March 2021.



Fig. 19: Pictures taken during JPV for unauthorised operation of Ice plant and Fish Packing unit

Another instance of irregular operation of an ice plant was noted in Kanyakumari district, where the plant discharged wastewater directly to the sea. It was also found that the ice plant was drawing ground water, violating provisions of CRZ notification. Though TN SCZMA directed DLC to take penal action, DLC was yet to take any action in this regard.



Fig. 20: Pictures taken during JPV for open discharge of wastewater to sea by the Ice plant

4.2.3 Storage of impermissible products in port areas

As per the CRZ Notification 2011, 15 specified petroleum and chemical products were permitted for storage in CRZ area. While examining the compliances to the terms of clearance granted, we observed that in two cases, impermissible items were allowed to be stored in the CRZ area:

A. **Expansion of Adani Petronet (Dahej) Port by Adani Petronet Port Private Limited (APPPL)** was granted clearance in October 2016. The project involved expansion of cargo handling capacity along with reclamation of 23 hectares back- up area to store and handle dry bulk multi-purpose cargo (steel and silica sand) and development of additional coal stockpile

Development of a storage area for the aforesaid dry bulk cargo in the intertidal zone (CRZ-IB) and development of coal stockpile in CRZ- III zone in the instant case was in contravention to the CRZ Notification 2011 as none of the aforementioned items were included in the list of permissible products of the notification.

B. **Construction of Petroleum Products Storage Terminal at Karwar by Tropicana Liquid Storage (P) Limited** was granted CRZ clearance in March 2008. We observed that the facility was used to store bitumen by the project proponent, which does not figure in the list of the petroleum products permitted for storage in the port areas as per the CRZ Notification 1991 and 2011. Even though the fact that the facility was being used to store bitumen was indicated in the compliance report submitted by the PP, no action was taken against the violation. Though storage of bitumen in CRZ area is now allowed under the new CRZ Notification 2019, the fact remains that EIA Report prepared then for seeking CRZ clearance had evaluated only the impacts of storing and transferring liquid petroleum in the tanks.

Thus, SCZMAs and DLCs did not proactively monitor the violations in coastal space and irregular constructions in restricted CRZ zones were carried out.

MoEF&CC stated (February 2022) that information related to violations are of utmost importance to the Ministry and assured that the recommendations would be taken up at the highest level of the Ministry.

4.3 Conclusion

- Post clearance monitoring of the project was ineffective as mandatory reports such as half yearly compliance reports and annual environmental statements were not being furnished by project proponents. Project proponents did not adhere to the conditions prescribed in the clearance.
- SCZMAs did not take proactive action against the CRZ violations and in the instances where they acted upon, follow up action was ineffective. With help of GIS tools, we identified unreported violation such as irregular constructions in CRZ 1A zone and No Development Zone.
- NCZMA did not monitor the activities of SCZMA related to monitoring and follow up of violations. Lack of monitoring and enforcement actions would result in providing ineffective deterrence for the destruction of coastal ecology by development projects.



Chapter 5: Conservation of Coastal Ecosystems

Audit sampled two coastal districts from each of the nine coastal states to assess the health of vulnerable and fragile marine ecosystems due to impacts of anthropogenic activities. Observations in this regard are discussed below.

5.1 Threats to biodiversity

(i) Threats to Corals in the Gulf of Mannar Biosphere Reserve, Tamil Nadu

Coral reefs are referred to as tropical forests of the ocean as they provide food, protection, shelter and breeding ground to nearly one-quarter of all the known marine species globally. They are classified as Ecologically Sensitive Areas under CRZ Notification 2011.

The key coastal habitats in the Gulf of Mannar are coral reefs, sea grass and mangroves. These habitats are some of the most diverse and valuable ecosystems on Earth. In 1989, the entire Gulf of Mannar area covering 10,500 sq. km was declared as the Gulf of Mannar Marine Biosphere Reserve by Government of India. The Gulf of Mannar Biosphere Reserve Trust (GoMBRT) was formed in 2002 to implement the UNDP-GEF (United Nations Development Program – Global Environmental Facility) funded project on the conservation and sustainable use of the marine resources of the Gulf of Mannar Biosphere Reserve. After completion of the project in 2012, the Government of Tamil Nadu took over the functions of the trust from 2013. The following deficiencies were noticed:

a) Absence of baseline data for marine environment at the Biosphere Reserve

Audit observed that no baseline data for monitoring the status of coral reefs had been maintained at the Gulf of Mannar Biosphere Reserve till 2018. It was only in 2019 that a Baseline survey of the Coastal habitats and associated biodiversity between Rameshwaram and Kanyakumari in the Gulf of Mannar was conducted by a research institute[36] that was centrally sponsored by the MoEF&CC under the National Adaptation Fund for Climatic Change.

b) Alien invasive algae species at Biosphere Reserve

Smothering effects of the *Kappaphycus alvarezi*, an algal species introduced for commercial cultivation[37] in 1990, on live corals in Gulf of Mannar were reported in 2007-08. An alarming increase in the percentage of dead corals in all four group of islands in the Gulf of Mannar was noticed during 1998-2014. Joint Physical Verification of Coral reefs in the island of Thalayari (Keelakarai group of islands, Ramanathapuram) with officials of the Wildlife Range, Keelakarai, confirmed this situation.

[36] Named Suganthi Devadason Marine Research Institute at Thoothukudi, Tamilnadu

[37] An alternative livelihood income generation for the coastal community.



Fig. 21: Dead coral covered with algae

Audit observed that out of the 100 sq. km coral area in Gulf of Mannar Marine National Park, the department removed these seaweeds only to an extent of two sq. km (2% of the total reef area) during 2015-16 to 2019-20 as targeted in the management action plans for the Conservation and Management of Corals Scheme of MoEF&CC. Also, despite the serious reduction and degradation of the live coral cover, no viable strategy to mitigate the propagation of the invasive species had been devised or implemented by the Department of Forest, Tamil Nadu.

(ii) Absence of a monitoring system for coral reefs, Goa

As per the World-Wide Fund for Nature (WWF) India survey of coral reefs at Grande Island in 2018, one of the few coral sites in Goa, a long-term periodic monitoring system for the protection and conservation of the reefs was required. The corals are classified as CRZ IA. We however observed that:

- The Forest Department had not done any mapping or identification of the areas inhabited by corals and as a result, a management action plan for their protection was also not prepared.
- No guidelines from Forest Department or Goa CZMA were issued to the Department of Tourism or operators of waterborne vehicles who carry out water sports activities around Grande Island, with an aim to preserve the Corals in the area.
- WWF-India, in its survey, had found rare marine species in these reefs. However, no guidelines for the fishing activities around these reefs were issued by any state government authority to the Fisheries Department which regulated fishing activities in Goa with an aim to protect and conserve such species.

(iii) Olive Ridley Sea Turtles in Goa



Fig. 22: Olive Ridley Turtles[39]

Olive Ridley turtles are legally protected under Schedule I of the Wildlife Protection Act, 1972, which prohibits trade in the turtle products. Olive Ridley is the only species of sea turtle known to nest at the beaches of Goa. There are four designated nesting sites[38] as per the CRZ Notification. As per CRZ notification 2011, management plans for turtle nesting sites was required to be prepared. Audit observed that management plans for these sites were not prepared. Further, as per the provisions of the notification, no development activities were permitted in these turtle nesting sites. However, we observed shacks being allowed at the nesting sites of Agonda , Morjim and Mandrem beaches, as shown in the pictures below-



Fig. 23: Wooden huts at Agonda Beach



Fig. 24: Beach beds in intertidal zone (turtle nesting sites) at Morjim Beach

(iv) Coastal Sand Dunes in Goa

A coastal sand dune is a mount, hill or ridge of sand formed mainly by aeolian action that lies behind the beach affected by tides. They provide natural coastal protection against storm surge and high waves, preventing coastal flooding and structural damage, as well as providing important ecological habitat. The Coastal Regulation Zone, 2011 declared the sand dunes as CRZ I(a) areas and dressing or altering the sand dunes for beautification, recreation has been declared as prohibited activities within the CRZ.

To carry out mapping of coastal sand dunes along the Goa coast, on the request of the Goa Coastal Zone Management Authority (Goa SCZMA), the National Centre for Sustainable Coastal management (NCSCM) Chennai prepared a 'Sand Dune Report'. The report assessed

38 Mandrem and Morjim beaches in North Goa and Galgibag and Agonda beaches in South Goa

39 Source: K Sivakumar, Wildlife Institute of India, Dehradun

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the collective length of sand dunes demarcated across Goa[40]. It also depicted that construction of hotels/resorts/guesthouses, dune reclamation for making approach road to the beaches, and landscaping were the major causes of destruction of sand dunes of Goa, prominently along the coastal stretches of Betul to Cansaulim, Sinquerium to Baga, Arambol, and middle of Morjim.

Audit observed that Goa SCZMA despite existence of sand dunes, gave permissions for infrastructure development and construction of hotel and residential houses in these areas. Some of these instances are highlighted below:

A. Goa SCZMA, in March 2015, granted recommendation to **Chakshu Properties Private Limited in for construction of a hotel in Morjim Village, Pernem Taluka, Goa**. The PP approached Goa SCZMA again in December 2015 with a revised plan for construction of villas instead of hotel consisting of two floors (Ground and First Floor). Despite the fact that the proposed site was a pristine beach area having sand dunes (three to four metres in height) covered with vegetation, Goa SCZMA recommended the revised proposal.

B. A proposed project for **Construction of four lane National Highway 17 B from Varunapuri to Sada Junction (Mormugao) near Baina beach** was recommended by the Goa SCZMA in 2015 despite observations of the site inspection team which stated that Baina beach contained sand dunes covered with vegetation and that it was prone to annual cycles of erosion which made it ecologically sensitive. The report also stated that digging of huge pits for the foundation of several columns was bound to disturb the ecological stability of a sensitive beach.

During a JPV, it was observed that the sand dune was cut and flattened to make space for new beach shacks as shown below:



Fig. 25: Destruction of sand dunes for new beach shacks

[40] 22.62 km (99 patches); with 6.90 km of the coastal stretch (24 patches) in North Goa and 15.72 km of the coastal stretch (75 patches) in South Goa

C. The Sand Dune report also revealed sand dune erosion along the coastal stretches of Morjim, Ashwem and Colva beaches. The South Goa Collector, under the provisions of the Motor Vehicle Act, issued directions in 2018 according to which movement of all kinds of motor vehicles were prohibited on beaches. However, audit observed that there was no monitoring to stop the vehicle movement on the beaches as vehicles were seen plying/parked on the beaches at Utorda and Morjim Beach (which is also designated Turtle Nesting Site).



Fig. 26: Motor vehicles plying on beaches

(v) Mangroves

Mangroves are salt tolerant plant community found in tropical and sub-tropical inter tidal regions and are unique eco-systems which provide breeding and feeding ground for many aquatic species. Mangrove forests have also proved to be capable of acting as a protective belt against the tsunami waves and as such require effective conservation and scientific management intervention. They are designated as Ecologically Sensitive Areas (ESAs) under CRZ I under the CRZ notifications.

(a) Gaps in the Mangrove conservation efforts in Goa

In order to protect the mangroves that occupied about 2000 hectares of area[41], the Government of Goa in 2011, notified 14 Mangrove species as protected species and their cutting and felling was banned. We, however, noted several instances of cutting of mangroves and other issues in conservation of mangroves in the state as detailed under:

- Goa SCZMA, in 2015, granted permission to the proposal of cutting of 247 mangroves for the **Construction of bridge over river Mandovi (Atal Setu) by M/s Goa State Infrastructure Development Corporation**. One of the conditions in the permission stipulated that the project proponent was to carry out plantation of the same number of mangroves on completion of the project. However, the replantation had not been carried out by the proponent.

- Goa SCZMA, in 2017 granted permission to the proposal of cutting of 69 Mangrove trees for **Construction of bridge across river Zuari on NH-17 by M/s Public Works Department, Panaji, Goa**. The permission envisaged a condition that the project proponent should deposit with the Mangrove Society of India, an amount for the plantation of the mangroves. However, it was observed that mangrove replantation had not been carried out.

[41] Along the estuaries of Zuari, Mandovi, Terekol, Chapora, Sal, Talpona, Galgibag and Tiracol Khua Cana

(b) Failure of Gujarat SCZMA to restore mangrove destruction in Kutch, Gujarat

Deendayal Port Trust (DPT)[42] a major port of India, owned by the central government, leased out areas (CRZ-I) to salt manufacturers for extraction of salt.

Audit noticed that though salt manufacturing was a permitted activity as per the CRZ Notification 2011, CRZ clearance for undertaking salt works in the area was not sought by the lessees. In 2018 Gujarat SCZMA received a complaint regarding large-scale destruction of mangroves at Nani Chirai and Moti Chirai areas of Bhachau Taluka, Kutch. Further, Kachchh Camel Breeders Association (KCBA), Bhuj besides making a complaint to DLC, filed an appeal before National Green Tribunal (NGT) regarding mangrove destruction in 2018. On the directions of NGT, Gujarat Pollution Control Board (Gujarat SPCB) and the Central Pollution Control Board (CPCB) conducted site inspection and prepared a report which revealed substantial work of bunding and blocking of creeks which restricted the flow of tidal water to the mangroves, thus, resulting in their destruction. On the orders of NGT, Gujarat SCZMA carried out assessment by remote sensing (July 2020) which revealed that the bunds[43] had been constructed in the Jangi area and nearly 32 hectares[44] of mangroves had been destroyed. The destruction of these mangroves in CRZ I areas not only proved to be costly to ecosystems like mangroves but also posed threat of extinction to unique breed of "Kharai" camels which were dependent on the mangroves in the area for their food. The decrease in mangrove areas as seen in satellite photos obtained by audit is shown below:



Fig. 27: Mangrove area (indicated in red shade) before allocation of lease in 2016

42 Erstwhile Kandla Port Trust.

43 With a total length of 5,271 metres.

44 Total mangrove area before allocation of lease in 2016 was 159.26 ha which was reduced to 127.34 ha in the year 2020 due to creation of bunds.

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Fig. 28: Mangrove area (indicated in red shade) reduced to 127.34 hectares in the year 2020

The non- compliances as noticed by Audit are as follows:

- As per the NGTs order (September 2019), all obstructions in the creeks were to be removed and continuous flow of estuarine water in the creeks was to be ensured. Neither the persons responsible for obstruction of creeks were identified nor the restoration of mangroves was initiated even till February 2021.
- The NGTs order also stated that the quantum of damage caused to the mangroves shall be assessed by the Gujarat SCZMA the same shall be recovered from the persons responsible for the same within a period of one month from the issue of the order. However, Gujarat SCZMA could not ascertain whether creation of bunds and destruction of mangroves was done by lease holders or by other miscreants. Therefore, no compensation for creation of bund and destruction of mangroves could be collected as of February 2021.
- NGT in its order directed the Forest Department, Government of Gujarat to take immediate action to restore the damaged mangroves within a period of 6 months from the issue of the order. It was observed that although Gujarat SCZMA directed DPT to carry out compensatory afforestation at the rate of three times of total mangrove destruction, no action for restoration of mangroves was taken till date.

(vi) Gaps in the management of Khazan lands in Goa

The eco sensitive low-lying areas that are influenced by tidal action known as Khazan lands are used primarily for cultivation, fish farming and salt panning. As they have been classified as ESA, all types of development activities were prohibited therein. We observed that the State of Goa had demarcated the Khazan lands and also had not prepared the Management plan these lands as required under the CRZ Notification. Details regarding the Khazan land was limited to that available with the Town Planning Authorities of Goa.

It was further observed that due to non-demarcation of Khazan lands by the State, Goa SCZMA granted approvals to projects which were otherwise impermissible in these protected areas. For instance, clearances for projects involving construction of a bypass from Bambolim plateau to Verna Plateau and for cutting of 69 mangroves and temporary land filing in the said area were granted by Goa SCZMA in December 2015 and October 2017, respectively, without ascertaining that the projects involved use of Khazan Lands. Although, Goa SCZMA in their reply stated that the permission granted by Authority for construction of bypass was temporary in nature, the fact that 12 columns constructed in the salt pans under the project were of permanent nature and were impermissible in the Khazan Land.

5.2 Pollution caused by untreated municipal waste

The CRZ Notification 2011 prohibited activities leading to the disposal of untreated wastes and effluents into coastal waters and dumping of city and town wastes like construction debris, industrial solid wastes in CRZ areas. It provided that the concerned authorities shall implement schemes for phasing out:(i) the existing practice of discharging untreated waste and effluents within a period not exceeding two years from the date of issue of the Notification; (ii) the existing practice of dumping of solid wastes within one year from the commencement of the Notification.

Audit observations of the test checked districts indicated that the sewage treatment plants were either altogether absent or were functioning without any monitoring, leading to discharge of harmful effluents into coastal waters as detailed below:

(i) Municipal sewage discharge into the sea at coastal districts of Karnataka

Out of the 12 Urban Local Bodies[45] located along the coast of Karnataka, only Mangalore City Corporation had a sewage network to cover 100 per cent of its area with four STPs.



Fig. 29: Flow of untreated sewage from wet wells of the western area of Mangalore City to the Arabian sea

The City Municipal Council of Udupi, Karwar and Bhatkal had a partial sewerage network that catered to only 25 per cent, 14 per cent and 25 percent area respectively.

Rest of the households either had individual septic tanks or soak pits to treat sewage. As per the Status of sewage generation, treatment and disposal in the coastal area prepared by the

[45] There 12 urban local bodies located along the coastline of Karnataka (Mangalore city Corporation, CMC Ullal, TMC Mulki, CMC Udupi, TMC Kuap, TMC Kundapura, TP Saligrama, TMC Bhatkal, TP Honnavar, TMC Kumta, TMC Ankola, CMC Karwar).

Karnataka Pollution Control Board (Karnataka SPCB) in December 2019, there was a gap of 26.85 MLD in sewage treatment in the coastal areas in Karnataka, out of which 7.6 MLD of untreated sewage was being discharged into the sea. The satellite pictures obtained by audit show the flow of untreated sewage from the wet wells of western area of Mangalore City to the Arabian sea. We also observed that untreated waste from the coastal towns of Karwar, Murudeshwar was being let into the sea.



Fig. 30: Urban sewage directly entering coastal waters at Murudeshwar Beach

The matter of Urban untreated sewage being let into coastal waters was brought to the notice of Karnataka Pollution Control Board during 2017-19 by the State Environment Department of Uttara Kannada and Dakshina Kannada, however no further action was taken by Karnataka SPCB.

(ii) Inadequate monitoring of Sewage Treatment Plant effluents, Goa

A total of seven[46] STPs were functioning in Goa and another two STPs at Bandora and Colva were under construction as of December 2020. We observed that out of seven STPs, three STPs namely, Baina (20 MLD), Margao (20 MLD) and Durbhat (1 MLD) were functioning since 2017 without obtaining 'Consent to Operate' from Goa Pollution Control Board (Goa SPCB). We observed that these three STPs were discharging effluents directly into the sea. As per coastal data prepared by Goa SPCB for the month of October 2020, fecal coliform present in the coastal waters of eight out of 10 Goan Beaches[47] ranging from 110 to 140 (Most Probable Number/100ml) that were more than the prescribed limits (i.e.100 MPN/100 ml).

Goa SPCB while issuing (August 2018) a renewal of Consent to Operate for STP Margao, had specified that the treated effluent should not be discharged into any river/creek/nallah and should be recycled to the maximum with the remaining being used for gardening activities. However, this STP after utilizing some effluent for gardening and non- potable use in the premises was discharging treated effluent into River Sal. However, no action was taken by Goa SPCB.

[46] Panaji -Tonca (15 mld), Panaji Tonca (12.5 mld), Margao (20 mld), GMC Bambolim (1.35 mld), Vasco-Baina (20 mld), Ponda-Durbhat (1 mld), Sanquelim (0.80 mld).

[47] Samples taken from Miramar, Calangute, Morjim, Mobor, Baina, Galgibag, Colva and Vagator beaches.

(iii) Discharge of untreated sewage into the sea by the Municipal Corporations/ Municipalities in Maharashtra

On the request of Maharashtra Pollution Control Board, National Institute of Oceanography (NIO), Mumbai, carried out a study (2018) which showed that the domestic wastewater was the major contributor to degrading ecology of creeks and estuaries that received such wastes. The report suggested that the inshore areas should be freed from unplanned release of sewage.

We observed that nine[48] Municipal Corporations (MCs) in the coastal region of Maharashtra discharged untreated sewage into the rivers, seas and creeks during 2015-16 to 2019-20. 22 Municipal Councils coming under Palghar, Raigad, Ratnagiri and Sindhudurg districts of coastal region generated 71.80 MLD of sewage in 2015-2020, which was not treated at all and was disposed directly into water bodies.

The Mumbai region alone had 8 operational STPs. Audit analyzed the data relating to the annual performance evaluation of the STPs in Mumbai region by Maharashtra Pollution Control Board (MPCB) during 2015-16 to 2019-20 and observed that the treated sewage too, did not meet the standards prescribed by MPCB. We, further, observed that though the MPCB issued directions[49] to these local bodies wherein they were instructed to provide adequate STPs, achieve the consented standards prescribed by MoEF&CC and implement short term & long- term measures for treatment of sewage, no further action or follow up was taken up by MPCB against these bodies. In a few cases, it was observed that show cause notices issued by MPCB stipulated environmental compensation that was required to be paid by the errant local bodies for the discharge of untreated/ partially treated sewage. However, no efforts were made by the MPCB to ensure that the same had been paid by the offenders.

5.3 Waste from Fish processing industry at Veraval, Gujarat

Processing and preserving of fish, crustaceans in India annually generate 70 million m^3 waste/ effluents. Among the coastal states, maximum fish processing waste generation was observed in Gujarat (30.51%) followed by Maharashtra (23%).

We observed the discharge of sewage generated at the Veraval Fishing Harbour directly into the sea. Though Veraval harbour was designed for 3,500-4,000 boats it was observed to handle approximately 8,000 boats, which would increase the waste being generated. The harbour lacked an effluent treatment facility due to which untreated effluents and the sewage generated at the harbour were being discharged directly into the harbour waters. Further, the directions issued by the Gujarat SPCB envisaged regular dredging of the harbour, provision for collection of fish waste from the harbour area to compost units. However, we observed that the Veraval Harbour did not comply with the directions issued by Gujarat SPCB.

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48 Greater Mumbai, Navi Mumbai, Thane, Bhiwandi Nizampur, Ulhasnagar, Kalyan-Dombivli, Mira-Bhayander, Vasai Virar and Panvel.

49 Under Water (Prevention & Control of Pollution), Act 1974.

Also, Gujarat SPCB took no further action against the harbour. Hence, Veraval Fishing Harbour continues to operate without Composite Consent and Authorisation (CCA) discharging untreated effluent into Veraval Sea.

5.4 Aquaculture Waste Discharge at Coringa Wildlife Sanctuary, Andhra Pradesh

Entire Coringa, East Godavari as well Krishna in Andhra Pradesh, has been identified as CVCA[50] site as per CRZ Notification 2011. The Government of Andhra Pradesh declared the Coringa Sanctuary as Coringa Wildlife Sanctuary (CWLS) in 1978[51] and contains mangrove swamps, mudflats, sandy beaches and sandy islands. Coringa mangrove forest is the second largest mangrove region along the east coast of India.

It was observed that out of 1483.05 Ha. of land registered under aquaculture in Tallarevu Mandal, an area encompassing the CWLS on three sides, around 861.64 hectares was within the periphery of Coringa Sanctuary.

Audit observed that eleven aqua/shrimp units located around CWLS in Tallarevu Mandal were discharging their untreated effluents into the drains which eventually joined the Coringa river. Due to discharge of untreated effluents in Coringa waters, except for pH value which was within the set standards of Coastal Aquaculture Authority (CAA), the remaining values of the effluent analysis were found to be abnormally higher[52] than the standards prescribed.

We observed that the Andhra Pradesh Pollution Control Board (APPCB) issued show cause notices to five out of the aforementioned 11 units during 2017-20 as most the units were operating without a 'Consent to operate'. However, no further action in the form of imposition of penalty or legal proceeding as per the provisions of the Water (Prevention & Control of Pollution), Act 1974 was taken by APPCB against these five units. Also, APPCB failed to take any action against the other 6 units that were also discharging their waste without treatment.

Audit observed that the Fisheries department accorded permissions for operating the aqua culture units without ascertaining the method for effluent treatment and the area for its disposal. The Regional Office, APPCB accorded Consents for Establishment (CFE) and Operation (CFO) without ascertaining the presence of facilities in the units for treatment of effluent. Audit noticed no ETP facility in any of the units during joint physical inspection with

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50 In all, there are 34 species of mangroves, 312 estuarine fish species, 14 species of prawns, 34 species of crustaceans, a wide range of 103 species of molluscs, 65 species of phytoplankton besides other species of snails and reptiles. As many as 257 avian species have been identified as visitors every year.

51 Under the Wildlife Protection Act, 1972.

52 Higher level of BOD results in more rapid depletion of oxygen in the stream and availability of less oxygen to higher forms of aquatic life. A greater amount of oxidizable organic material in a sample with high levels of COD, would reduce dissolved oxygen (DO) levels. Presence of abnormally high Total Suspended Solids (TSS) in the effluents discharged results in clogging of fish gills, either killing them or reducing their growth rate. They also reduce light to penetrate through which impairs the ability of algae to produce food and oxygen, which can be fatal to life below water which would adversely impact the marine ecosystem of the sanctuary.

the officials of APPCB. Further, prior recommendation from Andhra Pradesh SCZMA and clearance from State/Town Planning Authorities was mandatory as the area fell under CRZ-I, however, these were not obtained. Audit also observed that the zoning regulations related to CRZ were ignored which resulted in establishment of aquaculture units within the 100 meters zone from the high tide/flood line from the Coringa which was in contravention to the CRZ Notification 2011.

5.5 Conclusion

- There were many deviations from the approved CZMP which affected vulnerable biodiversity of the fragile ecosystems. Further, many activities which were banned in these sensitive coastal areas continued unabated, with the PCBs/SCZMAs not taking any action to stop these violations.
- State Government did not prepare management plans for vulnerable ecosystems such as the coral reefs, turtle nesting sites etc. which impacted their conservation. Despite the existence of CRZ notifications, coastal areas continued to be impacted by anthropogenic activity, often resulting in their degradation.



Chapter 6: Integrated Coastal Zone Management Project

To achieve the objectives of integrated and sustainable coastal management, MoEF&CC approached the World Bank in March 2010 to seek technical and financial assistance for taking up an Integrated Coastal Zone Management Project (ICZMP) which was approved[53] in March 2010. The World Bank proposed to extend financial assistance to the Government of India for ICZMP with overall cost of ₹ 1153.63 crore in which the World Bank component was ₹ 896.37 crores which was 77.7 percent of the project cost. The balance of ₹ 177.66 crore (15.4 percent) was proposed to be borne by the Government of India and ₹ 79.60 crore (6.9 percent) was to be borne by the participating State Governments.

The project's objective (PDO) was capacity development in sustainable coastal management approach for India's coastal zones, and piloting integrated coastal zone management approaches in select states, namely Gujarat, Odisha and West Bengal. The components of the Project are depicted in the table below:

Table 6.1: Components of ICZMP

National Component	State component (Gujarat)	State component (Odisha)	State component (West Bengal)
• mapping, delineation and demarcation of hazard lines, ecologically sensitive areas (ESAs) and delineation of coastal sediment cells all along the mainland coast of India • capacity building of MoEF&CC as the secretariat for (NCZMA), setting up of the National Centre for Coastal Zone Management and nation-wide training program for ICZM	• piloting ICZM approaches in the state of Gujarat which included preparation of ICZM Plan for the Gulf of Kachchh and capacity building of departments such as Forest and Environment, State Pollution Control Board • priority investments in the Gulf of Kachchh region like conservation and protection of coastal resources, pollution abatement and Livelihood security of coastal communities.	• Piloting ICZM approaches in the state of Odisha which included preparation of an ICZM plan for coastal stretches of Paradip-Dhamra and Gopalpur-Chilika • Capacity building of state departments including the Chilika Development Authority. • Priority investments in Orissa for Gopalpur-Chilika and Paradip-Dhamra, conservation and protection of coastal resources, pollution abatement and livelihood security of coastal communities.	• preparation of ICZM plan for West Bengal • capacity building • priority investments in the two targeted coastal stretches of Digha-Shankarpur and Sagar Island in the Sundarban

The project had four implementing agencies i.e., MoEF&CC at the National Level with lead responsibility and the Department of Forest & Environment (DoFE) in each of the three participating states for implementing the project[54]. In addition, Steering Committees at the National and state levels were set up for inter-sectoral coordination.

Our observation on the activities taken up under four different components of the ICZMP are given below:

53 By the Cabinet Committee on Economic Affairs

54 Each of the four implementing agencies set up Special Purpose Vehicles in the form of registered societies i.e., National Project Management Unit (NPMU) at the National Level and State Project Management Units (SPMU) at the State level to manage the Project Development Objectives, coordinate project activities and directly execute some of the relevant project sub-components.

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6.1 Assessment of activities under the National component of ICZMP (Component 1)

6.1.1 Absence of Ground Demarcation of Hazard Line

The concept of Hazard Line[55] was central to the implementation of IZMP. Hazard Line mapping aimed to identify and thus mitigate risks from various disasters to life and property in the coastal areas. The mapping was to be carried out for the entire coastline of the country by the Survey of India at a cost of ₹125 crore, which was later revised to ₹139.04 crore in 2018. Expenditure of ₹112.49 crore was incurred under the project till March 2020. The entire work of mapping of Hazard Line was completed in August 2018. The composite hazard line was to be marked on the ground by iron tip pegs in private land and stone pillars were to be erected on government land subject to requisite approvals taken by MoEF&CC. However, the same was yet to be done by MoEF&CC. As such, the lack of a visible hazard line on the ground prevented its use as tool for planning for local purposes.

6.1.2 Non preparation of Integrated Management Plans (IMPs) for Critically Vulnerable Coastal Areas (CVCAs)

Considering the vulnerability to developmental and other threats, the CRZ notification had designated 12[56] ecological sensitive areas as CVCAs. The same were to be declared as CVCAs through a process of consultation with local fisher folk and coastal communities with the objective of promoting conservation and sustainable use of coastal resources and habitats. MoEF&CC was to develop and notify guidelines detailing the process of identifying, planning, and implementing such CVCAs in consultations with the stakeholders[57]. Also, Integrated Management Plans (IMPs) were to be prepared for the CVCAs keeping in view the conservation and management of mangroves, needs of local communities[58] and the impact of sea level rise and other natural disasters.

We observed that though the guidelines for IMPs, had been prepared by National Centre for Sustainable Coastal Management (NCSCM) and submitted to MoEF&CC in September 2016, it was yet to be notified and disseminated to the States. As such, the IMPs could not be prepared by the coastal states. The CVCAs thus remained unprotected, and their sustainable development could not be ensured even after their identification.

MoEF&CC stated (February 2022) that the guidelines would now be notified to enable the coastal States/UTs to prepare the IMPs.

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55 Hazard Line is the line at which natural hazards like adverse weather incidents and tsunamis are likely to impact the coast.

56 Sunderbans mangrove area, Gulf of Khambat and Gulf of Kutchchh in Gujarat, Malvan, Achra in Ratnagiri in Maharashtra, Karwar and Kundapur in Karnataka, Vembanad in Kerala, Gulf of Mannar in Tamil Nadu, Bhaitarkanika in Orissa, Coringa, East Godavari and Krishna in Andhra Pradesh.

57 State Government, local coastal communities and fisherfolk inhabiting the area.

58 Dispensaries, schools, public rain shelter, community toilets, bridges, roads, jetties, water supply, drainage, sewerage.

6.2 Assessment of activities under Component 2 of ICZMP: Piloting ICZM approaches in State of Gujarat

6.2.1 Delay in the preparation of the ICZM Plans

Under ICZM Programme, ICZM Plans were to be prepared for selected coastal stretches of the state of Gujarat within 2 years i.e., 2012 from the start of the project. However, Gujarat could complete the preparation of ICZM plan only in 2018. Inordinate delay in the preparation of these plans resulted in the implementation of pilot investment activities which did not emerge from the ICZM plans and thus, these activities could not complement the plans to this extent.

6.2.2 Capacity building of various stakeholder institutions such as Gujarat Ecological Education and Research Foundation (GEER) and Gujarat Pollution Control Board (Gujarat SPCB)

A project for capacity building and coral transplantation activities under the ICZMP was undertaken by SPMU through GEER in the year 2010 at an estimated cost of ₹ 15.74 crore. The project aimed at capacity building of the project staff and establishing marine field stations at different places. During the physical verification of two of the marine field stations at Mandvi and Jamnagar, it was observed that out of 40 instruments installed under the project at these two places, 33 instruments were operated only for checking and calibration and were never used for the intended purpose i.e., to study the physiochemical parameters of soil and water of the intertidal area of the Gulf of Kutch. Further, as against four persons required to be deployed at each field station, only one person at Mandvi and two persons at Jamnagar field station were found deployed.

MoEF&CC attributed (February 2022) the non-utilisation of the equipment to COVID-19 pandemic. However, the fact remains that the equipment had not been utilized during 2016-19 i.e. before the pandemic.

In a similar instance, under the capacity building of Gujarat PCB, the laboratory infrastructure was to be enhanced by purchase of sophisticated analytical instruments. Gujarat SPCB developed State of Art Laboratory at Gandhinagar, Bhuj, Jamnagar and Rajkot and procured 18 sophisticated Scientific Analytical Instruments under ICZM Project. During the joint physical verification of visited Central laboratory at Gandhinagar, it was observed that four scientific instruments, costing ₹4.47 crore were procured under the project, but were never used by the Gujarat SPCB for sample analysis and were lying idle in the labs. The Comprehensive Maintenance Contracts of these instruments also lapsed in the year 2019.

6.3 Assessment of activities under Component 3 of ICZMP: Piloting ICZM approaches in State of Odisha

6.3.1 Delay in the preparation of the ICZM Plans

Under ICZM Programme, ICZM Plans were to be prepared for selected coastal stretches of the state of Odisha within 2 years from the commencement of the project. However, ICZM

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plan was prepared only in 2018. Also, the ICZM plan of Odisha was yet to be accorded the formal approval by MoEF&CC. Inordinate delay in the preparation of this plan resulted in the implementation of pilot investment activities which did not emerge from the ICZM plan and thus, these activities could not complement the plan to this extent.

6.3.2 Insufficient capacity building measures at Odisha State Pollution Control Board (OSPCB) and Chilika Development Authority (CDA)

(i) Owing to various industrial activities in the Paradeep- Dhamra coastal stretch in Odisha, the region figured as one of the worst polluted coastal stretches in terms of various coastal Water Quality parameters. OSPCB established a Centre for Management of Coastal Ecosystems in 2010 which aimed to analyse the sources, levels and pathways of various pollutants in the Paradeep-Dhamra coastal stretch. 19 laboratory equipment was procured at Rs. 2.76 crore during the period of 2013-2015. This Centre was to collect water and soil samples and assess the coastal water quality parameters. It was noted that during the period 2015-20, the Centre failed in carrying out this activity effectively. Against the targets set for the collection and analysis of samples there was shortfall ranging from 33 per cent to 59 per cent. Further, the Centre was working at 55 % of the required manpower[59] and this resulted in non- operation of the equipment procured for the analysis of the samples. Though the aim of the Centre was to address the coastal pollution in the region by identifying the local sources of pollution, the Centre could not achieve the same.

MoEF&CC stated (February 2022) that the step-wise recruitment is in process.

(ii) For effective management of Chilika Lake eco-system[60], a study[61] revealed that the northern sector of this eco-system was getting infested with an invasive weed, Phragmitis karka on an area of nearly 150 sq. km, considerably reducing the water holding capacity of the lake. To address this issue, one multipurpose Amphibian Weed Harvester (AWH) was procured (December 2018) under ICZMP at a cost of ₹2.14 crore. Audit observed that the machine was handed over to CDA at Ansupa lake (a freshwater lake) instead of the research center at Chilika Lake which had entered into the agreement for procurement of the weed harvester. It was also observed that the deployment of the machine at Ansupa Lake was more than at Chilika where the weed infestation was major. Although CDA could furnish satellite images of deweeded area of Ansupa Lake, it could not furnish the data regarding the area deweeded at Chilika. Thus, the effectiveness of the Weed Harvester remained unassessed at Chilika for which it was procured.

MoEF&CC stated (February 2022) that the weed harvester machine was currently deployed at Ansupa Lake and would be deployed at Chilika after deweeding at Ansupa is over.

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59 Deficient staff with 22 persons as against the requirement of 41 personnel as of February 2021.

60 A Ramsar Site that is known to support the largest congregation of migratory birds and Irrawaddy dolphins besides supporting the livelihood of more than 0.2 million local communities.

61 Study 'Qualitative and Quantitative assessment of biological diversity of macrophytes of Chilika Lagoon' was conducted by Regional Plant Resource Centre, Bhubaneshwar.

Further, the CDA had been collecting water and sediment samples from 30 pre-determined stations of the lake at an interval of 30 days. As the salinity gradient of the lake changes with every tidal cycle, the monitoring of the lake at an interval of 30 days was found inadequate. Hence, CDA decided to deploy sensor-mounted floating data buoys, powered by solar panel, at 10 strategic locations in four ecological sectors of the Lake to monitor various parameters[62]. These parameters would be measured in each station on real-time basis and transmitted to the modelling computer at the Wetland Research & Training Centre at Chilika.



Fig. 31: Water Quality Monitoring Buoy System

Ten Water Quality Monitoring Buoy System, twelve multi-parameter Water Quality Monitoring System (WQMS) with sensors and one Control Centre Data reception were purchased and installed (October 2012) at 10 different locations in Chilika lagoon at ₹ 2.69 crore.

On scrutiny of records, we observed that within one year and four months of deployment, out of 10 WQMBS, six were stolen and only four buoys were in operation as of June 2016. Also, the pH data had not been received from any of the buoys since 2014. Thus, without complete and continuous data from 10 stations, the monitoring of Chilika Lake despite an expenditure of ₹2.69 crore could not be achieved by Chilika Development Authority.

6.3.3 Activities under the sub component Conservation and protection of coastal resources in Odisha

(i) Inadequate protection of Olive Ridley turtles in Odisha

Gahirmatha rookery near Dhamra river mouth, Rushikulya river mouth and Devi River mouth of Odisha have become important mass nesting sites of Olive Ridley sea turtles which are designated as 'vulnerable' species under the IUCN Red List of Threatened Species. To provide protection to the Olive Ridley turtles, Rajnagar Forest Division, Kendrapara District in March 2016 procured two highspeed sea going vessels for coastal patrolling in Gahirmatha Marine Wildlife Sanctuary for ₹ 6.23 crore. Both the vessels were operated between September to October 2017, after which defects arose in both. Even though one vessel was made operational in December 2018, audit observed that the engines of both the vessels became defective in February 2020 and thereafter could not be repaired. Thus, even after the incurring an expenditure of ₹ 6.23 crore, the objective of effective sea patrolling in Gahirmatha Sanctuary remained unachieved.

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[62] Salinity, temperature, conductivity, dissolved oxygen, pH, depth, turbidity, chlorophyll and blue green algae.

(ii) Non-operation of research laboratory at Dangmal, Kendrapara District, Odisha

Bhitarkanika Wildlife Sanctuary, a unique biodiversity hot spot supports a rich biodiversity including mangroves, largest population of estuarine crocodiles, and other wildlife[63]. There was no facility available for rescue and treatment of injured wild animals, analysis of viscera of dead wild animals for assessment of food habits, pathological/microscopic studies for diseases and development of treatment protocol, preservation of various parts/organs of wild animals for study and analysis.

To facilitate these objectives, under ICZM Project, a research laboratory at Dangmal was constructed in November 2016 at a cost of ₹ 32.78 lakh. Audit observed that the laboratory was not functional since beginning. During physical verification of the laboratory, we observed that the laboratory was still not functional, and the facility was in a dismal state, as shown in the following photographs:



Fig. 32: Room no.1 of the laboratory at Dangmal



Fig. 33: Room no.2 of the laboratory at Dangmal

(iii) Efforts towards conservation of the Mangroves

The mangroves along the coast of Odisha are threatened due to high density of population in these areas and competing demand for land for agriculture and prawn farming. Under ICZMP, mangrove plantation was taken up over 228 ha of land in Mangrove Forest Division, Rajnagar and Puri Wildlife Division in three phases during 2016-2018. Audit observed that one of the activities envisaged under the Management Action Plan for Conservation of Mangroves in the Mahanadi Delta of Odisha was construction of trenches and channels to facilitate tidal inundation and smooth flow of tidal water. Audit observed that the flow of tidal water was obstructed as most of the feeder channels around the plantation sites were filled with sand. The survival rate of mangrove plantation carried out under the project ranged from zero to 35 *per cent*.

(iv) Shore line protection at Pentha in Odisha:

Pentha is an agricultural village located in the south of Dhamra in Paradeep-Dhamra stretch in Kendrapara District of Odisha. To prevent the shoreline erosion at Pentha, a proposed pilot

[63] Such as rare white crocodile, largest water monitor lizard, snakes, varieties of resident and migratory birds and mammalian species (spotted deer, sambar, wild boar, fishing cat, jungle cat, otter) etc.

project 'Laying of geosynthetic tubes[64] as protection measure for control of erosion' was granted clearance by Odisha Coastal Zone Management Authority in 2012. An embankment was to be created by covering the geotubes filled with river sand by gabion boxes that are made up of stones tied up by polypropylene ropes. The work was awarded (2012) to M/s Garware Wall Ropes Pvt. Ltd at a cost of ₹32.96 crore and was completed by June 2016. We examined the following deficiencies relating to the construction of embankment:

- During the visit of the review committee in January 2014, it was observed that a part of the wall constructed was damaged by the tidal waves during the cyclone Phailin in 2013 and that most of the rope gabion boxes exposed to the seaside were damaged, as a result of which the stones filled inside the rope gabions had come out and were scattered due to loose filling of granite stones. The damage was due to poor construction, as the size of the stones used were smaller than those specified in the contract agreement.

- The clearance awarded by OCZMA and the DPR of the project had envisaged that coastal afforestation was to be taken up between the Sea and the Geo-tube embankment[65]. The species identified for the sustainability of the project were casurina, prospsis, neem, pandanas and babul. However, it was observed that the plantation was not done, citing that there was no space available in front of geo-tube embankment.

- The armoury stone protection works in front of the geo-textile tube embankment that were to act as a first line of defence to high tide waves was taken up for an additional cost of ₹4.65 crore from the State Fund and completed in March 2018. This armoury section of the geo-tube embankment was damaged in May 2019 when the coast of Odisha was hit by severe cyclonic storm 'Fani'. The embankment suffered further damage in August 2019 when some miscreants set some gabion ropes on fire. This entailed an additional expenditure of ₹ 3.28 crore.

6.3.4 Provision of Alternative Livelihood to the coastal communities

(i) Idling of infrastructure created under the activity relating Hygienic drying of fish:

As the fishermen of Odisha lose almost seven months livelihood support in a year due to ban on fishing for the protection of Olive Ridley turtles, ICZMP aimed at providing livelihood support to the fishermen living in the periphery of Chilika Lake and Gahirmatha Wildlife Sanctuary. An activity relating to Infrastructure development for dry fish production was taken up under the project[66] in 2014.

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64 Under this scheme, geo-synthetic tubes were to be laid in the beach over a length of 675 metres of the coast followed by coastal afforestation with an objective to reduce the wave energy on the coast and facilitate the settlement of sand between the geo-tube and the coast.

65 So as to break the wave energy and to increase the stability and functioning of the Geo-tubes.

66 The project involved purchase of solar drier, construction of concrete platform, [illegible] and operationalizing the same. This activity was executed by the Fisheries & Animal Resources Department (F&ARD) as Pilot Executing Agency with formation of Self- Help Group (SHG).

We observed that a total of 150 SHGs were formed in Puri and Ganjam districts which were provided ₹ 1.50 lakh each towards seed money and 99 solar dryers[67] were installed for ₹ 5.23 crore in 2014. During the Joint Physical verification (August 2021) of 82 solar dryers under Gopalpur cluster, the following deficiencies were noticed:

a) Audit observed that the Gopalpur site was devoid of any solar dryers except the godowns constructed for the purpose. The site where the solar dryers were installed was occupied by a garbage processing plant installed by the Gopalpur Notified Area Council.

Further, it was reported by F&ARD department that as the project had become defunct since 2016 and the equipment installed had got damaged and was stolen, the solar dryer yard was demolished by the district administration to facilitate another project under 'Swachha Bharat Mission' to develop Micro Composting Centre.

b) At Sana Aryapalli, audit observed that only platforms had been constructed for the installation of the solar dryers. The sheds and solar panels had been damaged in cyclone and the dryers were stolen.

c) At Purunabandha and Nolia Nuagaon, we observed that the dryers were rusted and in a non-functional condition.



Fig. 34: Damaged Solar Panels at Nolia Nuagaon



Fig. 35: Rusted dryers left unused at Purunabandha

As none of the dryers examined in audit was functional enough to provide livelihood support to the community, the expenditure of ₹6.72 crore on creation of facilities under the ICZMP was rendered unfruitful.

(ii) Infructuous expenditure on activities for promotion of Eco-tourism

To address the livelihood issues through ecotourism for long term conservation of biodiversity along the coast of Odisha, a few activities like construction of camp infrastructure[68] were to be undertaken at the three sites namely, Gahirmatha Wildlife sanctuary, Bhitarkanika Wildlife Sanctuary and Chilika Coast.

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67 A solar dryer is a system for hygienic drying of fish using solar energy.

68 With a provision of kitchen, drinking water, solar lighting, along with furniture and fittings, construction of platforms for pitching tents etc.

(a) Audit observed that even though five camp infrastructure along the Chilika coast[69] were constructed in 2018 after incurring an expenditure of ₹ 1.46 crore, the same could not be made functional due to lack of proper water supply and electricity.

(b) A project on Development of Participatory Eco-tourism at Chilika and Tampera under Livelihood security was taken up by Odisha Tourism Development Corporation (OTDC). Scrutiny of records revealed that various assets like construction of food courts, public convenience, parking, tourist information centre etc., were created by OTDC at an expenditure of ₹ 2.97 crore to enhance tourism potential through Eco-tourism Development Society (EDS). Although, these assets were handed over to EDS during May 2016, they could not be made operational by EDS by September 2021, as such the site failed to attract tourists.

(c) To promote livelihood through eco-tourism in Chilika coast and Bhitarkanika, seven transit boats, four luxury boats and three catamaran boats were purchased between March to July 2014 by Wildlife Division of Chilika, Forest Division of Rajnagar and Forest Division of Berhampur respectively at a cost of ₹ 7.95 crore.

On scrutiny of records, it was observed that the seven transit boats purchased by the Chilika Wildlife division were operated for only 11 months[70] by the department. However, due to huge consumption of fuel, these boats were not found useful from the ecotourism point of view. Three catamaran boats purchased by Berhampur Forest division were transferred to Rajanagar Forest Division in February 2016 after lying idle for almost two years from the date of purchase. These three boats were operated up to September 2017 and thereafter left defunct. Audit noticed that four luxury boats under the Forest Division of Rajnagar also could not be made operational. After remaining idle for one year and three months, an agency which was engaged (January 2016) to operate the boats up to September 2017, exited from operation in October 2017 as it sustained huge loss due to lack of support from the department.

6.4 Assessment of activities under Component 4 of ICZMP: Piloting ICZM approaches in State of West Bengal

6.4.1 Delay in the preparation of the ICZM Plans

Under ICZM Programme, ICZM Plans were to be prepared for selected coastal stretches of the state of West Bengal within 2 years from the start of the project. However, the preparation of ICZM plans could take place only in August 2020. Inordinate delay in the preparation of these plans resulted in the implementation of pilot investment activities which did not emerge from the ICZM plans and thus, these activities could not complement the plans to this extent.

[69] Rambhartia, Berhampura, Khirisahi, Ballania, Pokharikuda.

[70] December 2014 to October 2015.

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6.4.2 Gaps noticed in respect of activities under the Environment and pollution management sub- component of the ICZMP in West Bengal

(i) Poor functioning of Sewage Treatment Plant (STP) at Digha leading to release of polluted water into sea

Under the Environment and pollution management sub- component of the ICZMP in West Bengal, a project namely 'Renovation of Sanitary Sewerage Scheme at Digha' was undertaken by the Public Health Engineering Directorate (PHED), West Bengal in December 2012. The project envisaged construction of an STP with a capacity of 201 million litres per month at an estimated cost of ₹ 34 crore. The same was constructed in September 2016 at a cost of ₹ 28.87 crore.

It was observed that although parameters relating to Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), suspended solids, Nitrogen, Phosphate, etc. were measured, no periodicity was fixed for collection and testing of the samples. Further, the parameters of the treated water, namely pH, Total Dissolved Solids, Oil & Grease were found to exceed the permissible limits. Further, it was observed the tests for checking the fecal coliform in effluent were not carried out during 2015-20. Thus, even after incurring an expenditure of Rs. 28.87 crore on construction of the STP, the treated sewage water continued to carry pollutants in excess of permissible limits, thereby threatening the marine ecosystems.

(ii) Non- implementation of Solid Waste Management at Digha

One of the objectives of the ICZMP in Digha and Shankarpur area was to develop a scientific management plan to tackle the issues associated with municipal solid waste collection, transportation and sanitary disposal and reduce the coastal pollution. Digha Shankarpur Development Authority (DSDA) was the implementation agency for this project.

DSDA took up the work in 2010 and got a feasibility study conducted through a consultancy firm[71] after incurring an expenditure of Rs. 24.22 lakh. The study showed that out of the total waste generated i.e., 12.43 TPD, on normal days and 33.64 TPD during peak season, only 3.36 TPD on normal days and 7.86 TPD during peak season could be collected by DSDA and the same was found to be dumped in an open area. This open dumping site was operational since 2002 and had a composting facility which was non- operational. Audit observed that this project was dropped due to paucity of funds as the DSDA authorities pointed out that they would not be able to provide Rs. 2.20 crore per annum required as annual maintenance and operation charge of the project. We also observed that no other project was subsequently taken up by the State Government. Thus, the objectives of reducing the coastal pollution remained unaddressed.

[71] M/s CRISIL Risk and Infrastructure Solutions Limited.

(iii) Renovation of Fish Auction Centre at Digha

An unhygienic temporary fish auction centre was operating without a proper drainage and disposal of solid waste at Digha Mohana in the district of Purba Medinipur for more than two decades. Under ICZMP, the fish auction centre was proposed (2010) to be renovated by March 2015. The West Bengal Fisheries Corporation Limited (WBFCL), an enterprise of the Government of West Bengal was entrusted with the responsibilities for planning, designing and executing the construction of fish auction centre at a cost of Rs 6.75 crore. WBFCL prepared the Detailed Project Report after proper site selection and survey of the land required for executing this project. However, it was observed that the land earmarked for construction of Fish Auction Centre that had been transferred to WBFCL by Digha Fisherman and Fish Traders Association was reallocated to BENFISH (West Bengal Fishermen's Co-operative Federation Ltd) for construction of an ice plant without intimating WBFCL. Further, the World Bank experts on their site visit to Digha noticed that there was shortfall in the area of the land for construction of proposed auction centre and the actual area on the ground did not match with the drawing based on which the bid document was prepared, and the advertisement was made.

The project was dropped in the 11th Governing Council Meeting of SICOM held in 2014 for the reason that it had not obtained necessary clearances. Thus, the absence of necessary ground survey by WBFCL before initiating the bidding process resulted in a total expenditure of Rs 18.00 lakh incurred on advertisement cost, pre-bid meeting, bid opening meeting, site visit for measurement of land etc. wasteful.

6.5 Conclusions

- Although the ICZM project, Phase I was termed successful, a number of deficiencies were noticed during the audit of this project at both the Centre and the States. The lack of a visible hazard line on the ground prevented its use as tool for planning for local purposes.
- The IMPs for CVCAs could not be notified even after completion of Phase-I of ICZMP and remain unprotected in the absence of specific management plans. The preparation of ICZMP plans were also delayed, resulting no linkage between the plan and actual projects undertaken.
- The project could not strengthen the capacity building of the selected institutes as most of them were operating with insufficient manpower. Infrastructure created under the project was lying defunct due to the inability of the State authorities to raise funds to maintain the same. The monitoring and protection measures of the coastal resources were found to be inadequate. Non- execution of critical projects which had the potential of reducing the coastal pollution to a great extent defeated the very purpose of this project. As a result, the ICZM project was not very successful in the development of capacity for sustainable coastal management for India's coastal zones.

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Chapter 7: Sustainable Development Goals

The United Nations adopted the Sustainable Development Goals (SDGs) in September 2015 as a universal demand for actions to end poverty, protect the planet and to ensure that all people enjoy peace and prosperity by 2030. 17 Sustainable Development Goals (SDGs) were formally adopted for the next 15 years by the 70th Session of the UN General Assembly with the adoption of the document titled 'Transforming our World: the 2030 Agenda for Sustainable Development' on 25 September 2015. At the session, each of the countries, including India, accepted the primary responsibility for follow-up and review, at the national, regional and global levels, in relation to the progress made in implementing the goals and targets over the coming 15 years. The SDGs came into effect from 01st January 2016.



SDG 14- 'Life below water'

This Sustainable Development Goal aims to conserve and sustainably use the oceans, seas and marine resources for sustainable development. The targets under this goal relevant to conservation of coastal areas which were examined in audit are as detailed below:

Target	Description
14.1	By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution
14.2	By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans
14.3	Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperate on at all levels
14.5	By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information

In India, National Institution for Transforming India (NITI Aayog) has the overall responsibility of SDGs implementation and aligning government schemes/ programs to SDGs. It was entrusted with the responsibility for identification of national targets for the SDGs and assigning them to the Ministries/ Departments concerned for implementation. NITI Aayog, designated Ministry of Earth Sciences as a nodal ministry for the implementation of activities towards SDG-14. Audit reviewed the efforts of the Government towards achieving targets under the goal. Audit focused majorly on the preparedness of the Ministries strategy as well as the by the relevant institutions.

7.1 Incomplete stakeholder mapping

Stakeholder mapping aids the decision maker to assess how the interest of the stakeholder is to be addressed in the project plan, policy and programme or other action. NITI Aayog carried

out stakeholder mapping with respect to the targets under SDG-14. Accordingly, the stakeholder/ line ministries for SDG-14 were- Ministry of Earth Sciences; Ministry of Environment Forest and Climate Change; Department of Fisheries, Ministry of Fisheries, Animal Husbandry, & Dairying; Ministry of Agriculture and Farmer's Welfare. This mapping was revised in August 2017 and August 2018.

Audit examined the stakeholder mapping and found that a few significant stakeholder organisations were not included in the mapping. The Indian Coast Guard, designated as the central coordinating agency for combating oil pollution, has the mandate of surveillance of maritime zones of the country against oil spills. Despite being a significant stakeholder in the activities related to SDG 14.1 (Marine Pollution), Indian Coast Guard was not identified in the stakeholder mapping.

Ship source pollution is one of the significant causes of marine pollution affecting marine biodiversity. Various provisions under Merchant Shipping Act 1958 mandates the Ministry of Ports, Shipping and Waterways to prevent and contain pollution arising from ships, ship wrecks, ship building and ship repair industries and ship breaking. The stakeholder mapping did not include Ministry of Ports, Shipping and Waterways.

MoES stated (February 2022) that the recommendations related to stakeholder mapping for achievement of SDG-14 have been noted and the issue would be taken up with NITI Aayog and other stakeholder ministries in this regard.

7.2 Inadequacies in the National Indicator framework

SDG Indicators are the quantitative outputs that helps the implementer to assess the progress of implementation efforts. UN General Assembly in 2017 adopted 232 indicators as the Global Indicator Framework (GIF) of SDGs. The member countries were to prepare the National Indicator framework (NIF) based on the GIF which would give appropriate directions to the policy makers and implementers of various schemes and programmes to track their progress on achieving related SDG targets. The Ministry of Statistics and Programme Implementation (MoSPI) was entrusted with the responsibility of developing National Indicator Framework (NIF) for measuring the progress of SDGs and associated targets. MoSPI in July 2019 came up with the guidelines for development of SDGs State Indicator Framework (SIF). Given the significance of SDG indicators in assessing the progress towards SDGs, the national indicators were to align with the Global Indicators taking into account the country specific environmental aspects. In this regard audit reviewed the indicators framed against the individual SDG 14 targets and found a few shortcomings.

7.2.1 The global indicators for SDG 14.1 include 'Index of coastal eutrophication and plastic debris density'. While the national indicator Coastal Water Quality Index (CWQI) prepared by MoES takes into account the nutrient pollution, MoES was yet to prepare an indicator related to plastic debris density. MoES stated (January 2022) that they have initiated collection of preliminary data with regard to this indicator in 2019.

7.2.2 The Global indicator for SDG target 14.2 was 'use of ecosystem-based approach to manage marine areas.' The ecosystem approach promotes integrated management of land water and living resources in a way that achieves mutually compatible conservation and sustainable use and delivers equitable benefits for people and nature. The National indicators for SDG 14.2 were 'percentage change in area under the mangroves' and 'percentage change in marine protected areas. We observe that the indicators do not address holistically the SDG target and do not conform to global indicators to this extent as the indicator essentially measured only the output of the programmes developed for management of mangrove ecosystems. The list of activities planned to achieve the target should have also formed the sub-indicators and biodiversity, fisheries indices should have ideally formed the output indicators for the target.

7.2.3 As per the NIF prepared by MoSPI, 'Implementation of CRZ notification 2011' was included as one of the national indicators for Global indicator SDG 14.2.1. We observed that this indicator was later removed in 2020 due to the fact that the indicator was static in nature and that it was not suitable for measurement. However, the enforcement of CRZ is critical to the implementation of ecosystem-based approach in the coastal environment. Implementation of CRZ as well as ICZMP involves a sequence of activities that begin with the preparation of CZMPs, demarcation of CVCAs, demarcation and ground marking of various spatial reference lines. However, these deliverables were not brought into the indicator framework.

7.3 Data quality related issues

Quality data is vital to track the progress on implementation of SDG targets. Tracking progress on SDG targets require collection, analysis and integration of data from different sources. Audit assessed the data gaps related to SDG-14 output indicators and observed the following:

a) CWQI is one of the significant indicators to assess the achievement of SDG 14.1 related to marine pollution. Various parameters forming the CWQI are measured by MoES under Sea Water Quality Monitoring Programme (SWQM) by National Centre for Coastal Research. The objective of the SWQM was to periodically monitor water quality parameters in the coastal waters of India. The programme included collection and analysis of data from selected major towns / cities on land-based sources of marine pollution such as domestic, industrial, agriculture and aquaculture wastes. Audit found that the data collection points reduced drastically from 81 locations during 1990-2011 to 17 in the year 2017. The number of data collection points were further increased to 50 in 2021. Also, it was observed that data was not collected continuously for all the four seasons by all the participating institutes. Lack of continuous data will affect the analyses that were to be conducted to understand the data patterns over time.

7.4 Localisation of indicators

While reviewing the state indicators for SDG targets, it was found that most of the coastal states had not come up with localized indicators based on their individual critical

development priorities and data requirements. We observed that the State Indicator frameworks were not prepared by the states of Maharashtra and Kerala. It was observed that with the exception of Gujarat, all other coastal states adopted the national indicators as developed by MoSPI without adapting them to the state specific environmental aspects. Also, in the states where SIFs had been formulated, further localization to District levels was done only by the State of Karnataka by notifying District Indicator Framework (DIF).

7.5 Conclusion

- The stakeholder mapping for SDG-14 does not factor in some of the key players associated to the target achievement.
- Localisation of SDGs is in its nascent stage with two of the coastal states yet to notify the State Indicator Frameworks and only the state of Karnataka developing a District Indicator Framework for SDG-14.



Chapter 8: Conclusion and Recommendations

Coastal and estuarine ecosystems deliver a wide range of goods and services, many of which provide material benefits such as food supply, regulation of water-quality processes, storm protection, and carbon storage. For conservation of the coastal ecosystem and ensure its sustainable use, the Government of India introduced the CRZ notifications and the ICZMP project. We audited the CRZ notifications and the implementation of ICZMP project to arrive at conclusions about their efficacy and effectiveness.

1. Adequacy of Institutional mechanism at Centre as well as State to regulate the activities in CRZ areas as per the provisions of CRZ notification 2019

Our examination of the institutional mechanism to regulate the activities in CRZ areas as per the provisions of CRZ Notification 2019, existing at Centre/States showed that the NCZMA was not a permanent body with defined members. NCZMA largely met to clear the proposal for projects and did not fulfil the other research and advisory role assigned to it. The Expert Appraisal Committee lacked technical members in the meetings, thus its recommendations lacked scientific basis. SCZMAs in the states were not reconstituted in time, lacked participation from important stakeholders, were not sufficiently resourced, and cleared projects without quorum. DLCs were not reconstituted in many states, and lacked participation from significant stakeholders; thus, could not function effectively to enforce the CRZ notifications. As such, deficiencies in the constitution and functioning of NCZMA, SCZMA and DLCs would dilute their effectiveness in addressing challenges in ensuring sustainable development of the coastal areas. Also, the different agencies involved in implementation of CRZ notifications could not ensure timely preparation of Coastal Zone Management Plans as well as plans for the protection of Ecologically Sensitive Areas in the coast which was a key to the sustainable development of the coastal areas. Thus, the institutional mechanism to regulate activities in the coastal areas as per CRZ notification was weak and could not function as effectively as envisaged in the CRZ notifications.

2. Procedure for grant of CRZ clearances by the Government, to conserve coastal ecology

We examined whether CRZ clearances granted by the Government were as per due procedure, to conserve coastal ecology. As per CRZ notifications, only permitted activities are allowed in different coastal zones and projects are approved, based on the environment impact studies and the mitigations plans to address risks posed to the coastal ecology. Audit observed that even though the environment impact studies had various inadequacies like preparation of environment impact reports by non-accredited consultants, use of old baseline data, lack of complete analysis of environment impacts, disaster management not fully addressed in the EIA reports, projects based on these EIA reports were approved by MoEF&CC/SCZMAs.

Further, mitigation plans to address the risks to environment posed by these projects were not adequate as the risks were only cursorily addressed in many projects. Cumulative impact studies were not prescribed as a precondition for approval, to check if the addition of the project would alter the coastal ecology. Further, MoEF&CC accepted and did not verify critical environment parameters for the project. Audit also observed that the process of public hearing which would have valuable input on impacts to local community were short-changed. Audit also observed that clearances to projects were given without considering that they were located in Ecologically Sensitive Areas, which would affect the ecosystem balance of these fragile and vulnerable areas. Grant of project approvals in excess of its authority and without mandatory documents by SCZMAs would weaken the checks on the approval mechanism and hinder conservation of the coastal ecology. Audit also observed that the CRZ notifications were amended to allow for specific projects, hence mitigation plans to reduce the risks to the coastal ecology that these projects would lead to, would not be ensured.

Hence the safeguards put in place to ensure that the projects did not impact the environment were contravened. As such, these projects could have a detrimental impact on the coastal ecology.

3. Safeguard of coastal ecosystems by post clearance monitoring as well as enforcement mechanism of CRZ notifications

Monitoring of projects after their approval by MoEFF&CC and its agencies ensures that the conditions under which the project was approved are being complied with. Audit examination showed that MoEF&CC and its regional offices failed to ensure compliance to conditions stipulated in the clearances. Further, the project authorities did not submit mandated reports timely, which would have facilitated the monitoring process. Critical clearances like Consent to Operate and Consent to Establish were not taken by the project proponents. Thus, the post clearance mechanism was not effective in ensuring compliance to the provisions of CRZ notifications. As such, the risks posed by these projects to the coastal ecology would go unchecked.

Further, audit observed that the enforcement mechanism to detect and punish violations of CRZ notifications suffered from a lot of infirmities. With the help of satellite imagery, Audit observed that there were irregular development activities in CRZ 1 areas like construction on the nesting sites of Olive Ridley turtles in Odisha and construction of racetrack in CRZ 1 area in Pattipulam, Tamil Nadu. With help of GIS tools, we identified unreported violation such as irregular constructions in CRZ 1A zone by construction of Beach Resorts in Kachipuram district and jetty extensions built in the No development Zone in Devbhumi, Dwarka. Audit also observed encroachment and CRZ violations in the eco-fragile Vembanad Lake and Akkulam lake region, construction of a mall in NDZ in Thiruvananthapuram, road construction in No Development Zone in Udipi district, Karnataka, construction of a commercial/residential project in wetland area of Vembanad Lake. Further, audit observed that many industries caused pollution of the coastal areas like coastal aquaculture units in Guntur district, Andhra Pradesh and ice plants and fish packing units in CRZ areas of Kanyakumari district, Tamil Nadu.

No effective action was taken by authorities like SCZMA/Pollution Control Board/DLCs. As such, in the absence of effective action against violations, there was no deterrence and degradation of the coastal areas continued. Thus, the post clearance monitoring and enforcement of CRZ notifications were ineffective which would result in irreversible changes to the coastal ecosystem.

Audit also sampled two coastal districts from each of the nine coastal states to assess the health of vulnerable and fragile coastal ecosystems due to impacts of anthropogenic activities. We found that coastal biodiversity like corals in the Gulf of Mannar Biosphere Reserve and in Goa faced threats due to absence of data to monitor their spread and condition. The Coastal Sand Dunes in Goa suffered as construction permission was given in the areas where they existed. Mangroves were also not fully conserved as instances of cutting of mangroves for development projects were observed in Goa. In Gujarat, SCZMA failed to restore mangrove destruction in Kutch and impermissible activities affecting mangroves was allowed in the Khazan lands in Goa.

Further, the coastal ecology suffered due to municipal sewage discharge into the sea at coastal districts of Karnataka, and Discharge of untreated sewage into the sea by the Municipal Corporations/ Municipalities in Maharashtra. Audit also observed waste from fish processing industry at Veraval, Gujarat being dumped in the coastal waters, and aquaculture waste discharge at Coringa Wildlife Sanctuary, Andhra Pradesh.

As such, despite the existence of CRZ notifications, coastal areas continued to be impacted by anthropogenic activity, affecting vulnerable biodiversity and resulting in their degradation.

4. Achievement of Project development objectives under Integrated Coastal Zone Management Programme (ICZMP)

The aim of ICZMP programme was capacity development in sustainable coastal management for India's coastal zones, and piloting integrated coastal zone management approaches in Gujarat, Odisha and West Bengal. We observed that at the central level, preparation of Integrated Management Plans for Critically Vulnerable Coastal Areas (CVCAs) could not take place and there was no ground truthing of the hazard line. This impacted the conservation of the CVCAs and the objective of safeguarding them was defeated. Audit scrutiny of ICZMP program in Gujarat showed delay in the preparation of the ICZM Plans and the capacity of various stakeholder institutions were not developed. In Odisha also, the preparation of ICZM plans were delayed, capacity building measures at Odisha State Pollution Control Board (OSPCB) and Chilika Development Authority were insufficient. Further, measures to protect of Olive Ridley turtles in Odisha were inadequate, capacity of labs for analyses of coastal water data was inadequate and alternate livelihood initiatives did not succeed. Measures taken under ICZMP for conservation of the mangroves and shore line protection at Pentha in Odisha were not successful. Audit examination of ICZMP in West Bengal also showed delay in preparation of ICZM plans, and activities taken up under ICZMP like sewage treatment plant at Digha, solid waste Management at Digha, renovation of fish auction centre at Digha were

ineffective in stopping pollution of the coastal areas. As such, the ICZM project was not very successful in the development of capacity for sustainable coastal management for India's coastal zones.

5. Evaluation of the measures taken up by the Government towards achieving the targets under SDG-14.

Audit also examined the efforts of the Government towards achieving targets under the SGD 14 which aims to conserve and sustainably use the oceans, seas and marine resources for sustainable development. We found that all the stakeholders in the field of coastal management were not mapped, Ministry of Earth Sciences was yet to prepare an indicator related to plastic debris density which was a vital part of action to preserve the coastal and marine ecosystem. Further, National indicators for SDG 14.2 were not completely defined in terms of activities and outputs. Implementation of CRZ as well as ICZMP involves a sequence of activities that begin with the preparation of CZMPs, demarcation of CVCAs, demarcation and ground marking of various spatial reference lines. However, these deliverables were not brought into the indicator framework. The there was a lack of sufficient data collection centres to monitor coastal water quality which would affect the analyses that were to be conducted to understand the data patterns regarding coastal water quality over time. Further, states had not localised their Indicator frameworks to suit their local conditions. As such, the measures taken up by the Government towards achieving the targets under SDG-14 need further impetus.

Recommendations

1. SCZMAs and NCZMAs may be made as permanent bodies with full time members to carry out all the mandated activities for protecting the coastal environment.
2. The DLCs may be formed and reconstituted without delay in all the relevant districts. The composition of DLCs may be inclusive in nature representing all the relevant stakeholder sectors.
3. MoEF&CC needs to ensure that the NCZMA/ SCZMAs share information regarding their discussions/minutes of meetings with the public in a uniform manner. Interactive Grievance Redressal Mechanism may be adopted by the SCZMAs.
4. The Ministry may ensure that the PP carry out in-depth ecological evaluation of the project environment before granting the clearances to the projects as well as enforce the practice of cumulative assessments already defined in the EIA Notification, 2006.
5. MoEF&CC may ensure that the PPs submit a viable EMP addressing all the risks to the environment and the EMP along with the Impact Prediction analyses are largely coherent. Also, the mitigation proposals may be clearly brought out in the EMP and costed.
6. MoEF&CC may revisit the roles and composition of different agencies to strengthen the post clearance monitoring.

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7. Expert cells, which are well versed in GIS tools may be created in DLCs to effectively and efficiently monitor the changing landscape on the coastline and track irregular developments. Presence of such a surveillance mechanism would not only track irregular activities but would also serve as a deterrence tool.
8. The State Governments may make necessary efforts for mapping and preparation of Management Plans for the coral reefs, turtle nesting sites etc.
9. Efforts may be made by MoEF&CC to notify the IMPs for Ecologically Sensitive Areas at the earliest.
10. MoEF&CC should ensure deploying sufficient manpower with technical expertise at SICOM and various institutes strengthened under the project. Efforts should be made to rationalise the manpower deployment to ensure optimum utilisation.
11. MoES and MoEF&CC may review the stakeholder mapping to ensure the inclusion of all relevant institutions with respect to SDG 14 targets.
12. Localisation of the indicators should be prioritised in the stakeholder states by ensuring formulation of District Indicator Frameworks in the states.

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Director General of Audit
Environment and Scientific Departments

New Delhi
Dated: 30 March 2022

Countersigned

(GIRISH CHANDRA MURMU)
Comptroller and Auditor General of India

New Delhi
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Annexures


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Annexure 1: Process flowchart entailing the main steps involved in the CRZ Project approval

(Reference: Introduction, Chapter 3 of the report)



Annexure 2: Employment of non-accredited consultant/ non- accreditation of the consultant in a particular category of the project

(Reference: Para 3.1 (i) of the report)

S. No.	Project	Project approval by MoEF&CC	Consultant for EIA
1.	Laying of Natural Gas pipeline by Mahanagar Gas Ltd, Maharashtra	2018	The consultant JV Analytical Services, Pune not accredited for Pipeline Sector.
2.	Construction of Hotel Building in Mangalore, Dakshina Kannada District by M/s. Motimahal Hotels Pvt. Ltd., Karnataka	2017	The Environment Management Plan and the DMP which formed a part of the EIA was proposed by the PP itself and an accredited consultant was not appointed.
3.	Expansion of port facilities by Redi Port Ltd in Maharashtra	2018	The consultant engaged was not accredited in the areas of Air Pollution, Prevention, Monitoring and Control, Hazardous Waste Management, Ecology and Biodiversity.
4.	Construction of Petroleum Products Storage Terminal at Karwar, Karnataka Port by M/s Tropicana Liquid Storage (P) Ltd. , Karnataka	2015	The Environment Management Plan was prepared by Marine Science Research Institute, Karwar, which was not an accredited consultant organisation.
5.	Establishment of intake and outfall facility for Nuclear Power Plant at Mithivirdi, District Bhavnagar, Gujarat by M/s Nuclear Power Corporation of India Limited, Gujarat	2015	M/s Engineers India Limited, appointed as a consultant for this project was not accredited by NABET for "Nuclear Power and processing of fuel" sector.
6.	Development of the petroleum, chemical and petrochemical investment region (PCPIR) at Dahej, Vagra, District Bharuch by M/s Gujarat Industrial Development Corporation Gujarat	2015	The consultant, NEERI, Nagpur was not accredited under by National Accreditation Board of Education and Training/ Quality Council of India.
7.	Mumbai Trans Harbor Sea Link by M/s Mumbai Metropolitan Region Development Authority, Maharashtra	2016	A consortium of Arup, Consulting Engineers and KPMG had been appointed as consultants for this project. However, the NABET Accreditation certificate annexed in the records pertaining to M/s Consulting Engineers Services Pvt. Ltd and the same was not accredited for sea link construction sector.
8.	Laying of an effluent pipeline by Madhu Silica Pvt. Ltd. (MSPL) in Bhavnagar, Gujarat	2015	Consultant M/s Indomer Coastal Hydraulics (P) Ltd., Chennai was not accredited by National Accreditation Board of Education and Training/ Quality Council of India
9.	Widening and improvement of the existing highway of Bhavnagar-Pipavav- Porbandar-Dwarka Section of NH-8E, Gujarat	2016	The consultant M/s STUP Consultant Pvt. Ltd., Kolkata was not accredited by National Accreditation Board of Education Training/ Quality Council of India

S. No	Project	Project approval by MoEF&CC	Consultant for EIA
10.	Additional Salt works (2846.15 acres) located at village Kalatalav & Narmad, Taluka & Dist. Bhavnagar	Accorded clearance by SEIAA in 2017	The consultant National Institute of Oceanography-CSIR was not accredited by National Accreditation Board of Education and Training/ Quality Council of India
11.	Mumbai Coastal Road Project (South) - Princess Flyover to Worli end of Sea Link by M/s Municipal Corporation of Greater Mumbai	2017	Certificate of accreditation provided by consultant did not state the period of validity due to which it could not be ascertained, whether at the time of preparation of EIA report, the consultant was eligible for the same.
12.	High Speed Railway Project across CRZ areas in Mumbai, Mumbai Sub-urban, Thane and Palghar District by M/s National High Speed Rail Corporation Ltd, Maharashtra	2019	The Consultants, M/s GPS Technologies Pvt. Ltd was not accredited by National Accreditation Board of Education and Training/ Quality Council of India
13.	2X800 MW Uppur Supercritical Thermal Power Plant at District Ramanathapuram by TANGEDCO, Tamil Nadu	2017	The consultant was not accredited by National Accreditation Board of Education and Training/ Quality Council of India.
14.	Laying of treated effluent disposal pipeline from their Plant to final disposal point in the Gulf of Kutch at Mithapur by Tata Chemicals Limited, Gujarat	2017	The consultant National Institute of Oceanography-CSIR was not accredited by National Accreditation Board of Education and Training/ Quality Council of India
15.	Setting up of Bulk Drug Manufacturing Unit in East Godavari District by M/s Divi's Laboratories Limited, Andhra Pradesh	2019	The Consultant M/s Indomer Coastal Hydraulics Pvt. Ltd. was not accredited by National Accreditation Board of Education and Training/ Quality Council of India.
16.	International Leather Complex at Kothapatnam village, Nellore District by M/s Adani Port and SEZ Ltd., Andhra Pradesh	2015	The Consultant Environment Protection Training and Research Institute (EPTRI) was not accredited by National Accreditation Board of Education and Training/ Quality Council of India.
17.	Deepening of approach channel for capesize vessels at Mormugao Port by M/s Mormugao Port Trust, Goa	2016	The Consultant M/s WAPCOS Limited, Gurgaon was not accredited by National Accreditation Board of Education and Training/ Quality Council of India.
18.	Rerouting of Mumbai Manmad pipeline by M/s Bharat Petroleum Corporation Limited, Maharashtra	2015	The Consultant M/s Eco Chem Sales and Services, was not accredited by National Accreditation Board of Education and Training/ Quality Council of India.
19.	Proposal for 5 MLD Hybrid Desalination Project at IREL Complex, Chatrapur, Ganjam District by M/s Indian Rare Earths Limited, Odisha	2018	It was observed that the accreditation certificate pertaining to Mecon, Ranchi, was placed on the records instead of accreditation certificate of Mecon Ltd., Bangalore which was actually involved.

S. No.	Project	Project approval by MoEF&CC	Consultant for EIA
20.	Integrated Cooum River Eco-Restoration Project by M/s Chennai Rivers Restoration Trust, Tamil Nadu	2017	The Consultant M/s SV Enviro labs and consultants, was not accredited by National Accreditation Board of Education and Training/ Quality Council of India.
21.	Converting open parking into covered parking in beach resort at Chengalpattu Taluk, District Kancheepuram by M/s Adayar Gate Hotels, Tamil Nadu	2015	The Environmental Management Plan submitted by the PP did not mention the name of the accredited consultant organisation which prepared it.



Annexure 3: Employment of old baseline data

(Reference: Para 3.1 (ii) of the report)

S.No.	State	Name of the Project	Date of Project clearance	Years by which the data was outdated
1.	Andhra Pradesh	Development of offshore LNG FSRU Facility at Kakinada Deep Port Water by Andhra Pradesh Gas Distribution Corporation Limited (APGDC)	09.02.2016	3 to 4 years
2.	Andhra Pradesh	International Leather Complex at Kothapatnam village, Nellore District by M/s Adani Port and SEZ Ltd.	19.12.2015	4 years
3.	Gujarat	Establishment of intake and outfall facility for Nuclear Power Plant at Mithivirdi, District Bhavnagar, Gujarat by M/s Nuclear Power Corporation of India Limited	03.05.2015	3 years
4.	Gujarat	Laying of treated effluent disposal pipeline from their Plant to final disposal point in the Gulf of Kutch at Mithapur by M/s Tata Chemicals Limited	10.07.2016	6 years
5.	Gujarat	Common treated effluent disposal pipeline project along river Kolak upto deep sea via Kolak Estuary by M/s Wel Treat Enviro Management Organization	05.09.2016	6 years
6.	Gujarat	Development of the Petroleum, Chemical and Petrochemical Investment Region (PCPIR) at Dahej, Vagra, District Bharuch by M/s Gujarat Industrial Development Corporation		
7.	Karnataka	Construction of Petroleum Products Storage Terminal at Karwar, Karnataka Port by M/s Tropicana Liquid Storage (P) Ltd.	17.06.2015	7 years
8.	Maharashtra	Mumbai Trans Harbor Sea Link by M/s Mumbai Metropolitan Region Development Authority		
9.	Maharashtra	Mumbai Coastal Road Project (South) - Princess Flyover to Worli end of Sea Link by M/s Municipal Corporation of Greater Mumbai		
10.	Maharashtra	Malad sewage treatment plant	28.08.2017	8 years
11.	Odisha	Multi product SEZ/ Industrial Park at Gopalpur, Ganjam, Odisha by M/s Tata Steel SEZ Ltd.	20.09.2018	2 years
12.	Tamil Nadu	2X800 MW Uppur Supercritical Thermal Power Plant at District Ramanathapuram by M/s Tamil Nadu Generation & Distribution Corporation Ltd. (TANGEDCO)		

Annexure 4: EIA failed to assess the possible impacts of the projects on marine flora and fauna, ecologically vulnerable areas

(Reference: Para 3.1 (iii) of the report)

S. No.	State	Name of the Project	Risk to marine flora and fauna, ecologically vulnerable areas	Mitigation measures not envisaged in the EIA
1.	Andhra Pradesh	Marine disposal of treated effluent by M/s Covalent Laboratories Pvt. Ltd	As per the information available in the EIA, the pipeline passed through CRZ-III area, the 'NDZ' and the inter-tidal zone with patches of sand dunes with coastal vegetation of height less than 3 meter all along the shoreline.	EIA did not include any impact on the sand dunes and no mitigation measures was envisaged.
2.	Andhra Pradesh	Development of offshore LNG FSRU Facility at Kakinada Deep Port Water by Andhra Pradesh Gas Distribution Corporation Limited (APGDC)	The only mitigation measures that were included in the EIA of this project was that piling operations should use a soft start so as to allow marine fauna to leave the area before high noise levels are generated.	EIA report did not deliberate upon the impact of the project on any of the marine life forms except fishes in the study area which clearly indicated that the mitigation of the environmental impacts of the project on marine ecosystems were not considered.
3.	Goa	Deepening of approach channel for capesize vessels at Mormugao Port by M/s Mormugao Port Trust	1. The EIA report stated there was significant pressure due to tourism on the Humpback dolphin and the coral reefs surrounding Grande Island and that dredgers and associated vessel movement may harm the dolphins, due to collision, propeller action etc. Studies have shown that the risk of a collision occurring and the likelihood that it will result in severe or lethal injury increases when vessels exceed 10–14 knots and as the vessels to be considered in the approach channel were to move at a speed of 11 knots, it was likely to cause injury.	The Impact studies for the same were not carried out in the EIA as a result of which no mitigation measures were stipulated.
			2. As per the EIA report, Chikalim- Sancole bay known for its intertidal marine biodiversity was just 4 kms away from the dredging area and was known to harbour more than 200 faunal and 34 phytoplankton species in addition to mangroves and windowpane oyster (Placuna placenta) (schedule-4 species). The EIA report also mentioned that dredging influence was normally restricted to a maximum of 4 km of the activity.	The impact of dredging was not carried out for such an eco-sensitive zone within the study area and no mitigation measures were stipulated.



S. No.	State	Name of the Project	Risk to marine flora and fauna, ecologically vulnerable areas	Mitigation measures not envisaged in the EIA
			3.The EIA Report exhibited that the intertidal area of Zuari estuary which included Chicalim- Sancole Bay, Grande Island, Caboraj- Siridao rocky patch within the study area showed species diversity comprising of 186 aquatic species (150 finfish comprising of pelagic and demersal fishes and 36 shell fish comprising of crustaceans and molluscs). The Grande Island was rich in Coral, sponge, fish and the intertidal habitats between Caboraj- Dona Paula- Siridao had high seaweed abundance and diversity.	Although, the report listed the impacts such as land reclamation, mining, industrialization and dredging posing considerable threat to the marine flora and fauna. The mitigation measures to be taken for their conservation and management were not elaborated in the EIA
4.	Gujarat	Expansion of Adani Petronet (Dahej) Port, Bharuch District by M/s Adani Petronet (Dahej) Port Pvt Ltd	The EIA Report envisaged generation of wastewater during concrete casting, cleaning of construction equipment, vehicle garage workshop, oil spills from the operation of construction equipment and Diesel Generating set and the same was stated to affect the marine water quality near the shoreline.	Despite the identification of the impacts, no mitigation measures were enunciated in the EIA report.
			The population of the intertidal macro benthos indicated relatively high standing stock of macro benthos with moderate group diversity. The EIA further stated that the reclamation would impact nearly 23 ha. of benthic habitat and no recovery of benthic organisms was possible as the habitat would be permanently lost due to reclamation.	No mitigation measures were envisaged for the protection of benthic organisms in the project area.
5.	Gujarat	Establishment of intake and outfall facility for Nuclear Power Plant at Mithivirdi, District Bhavnagar, Gujarat by M/s Nuclear Power Corporation of India Limited	1. The EIA report indicated that the project area was moderately productive in terms of phytoplanktons and zooplanktons. Mangrove vegetation comprising of Rhizophora and Avicennia species was found in good number on the river banks near Alang shipyard and coastal vegetation comprising of Cassia species, Prosopis, Azadirachta species. The project area near the Alang shipyard had vast expanse of Tidal flats/ mudflats.	Both the EIA Report and the CRZ clearance were silent on the impacts of the project on such varied flora and fauna in and around the project area. As the impacts were not identified, no mitigation measures were stipulated.
			2. The EIA report stated that the temperature of Condenser cooling water (CCW) would be 7° C above the ambient temperature of the sea water and it would probably be the only major impact on the marine ecosystem. From the scientific data available in the public domain, it	The effect of increased temperature was studied for fishes only, even when the fish landing was reported to be the lowest in the region. The same was not studied for

S. No.	State	Name of the Project	Risk to marine flora and fauna, ecologically vulnerable areas	Mitigation measures not envisaged in the EIA
			could be understood that increased temperature reduces the solubility of oxygen in water, thereby increasing the Biological Oxygen Demand (BOD).	phytoplanktons and zooplanktons which showed moderate productivity.
			4. According to the marine EIA, Alang- Sosiya Ship Breaking Yard (ASSBY) was located at 5 kms south of the project area and according to the information available in the public domain, there was heavy metal contamination in the intertidal zone of the shipbreaking yard. Also, a proposed Kalpsar project dam across Gulf of Khambat was at a distance of 18 kms north of the Chhaya (Mithi Virdi) site. The site selection report (June 2007) of Department of Atomic Energy (DAE), had recommended that a detailed study should be conducted to examine the effect of Kalpasar dam in the upstream of Nuclear Power Plant site on the flooding of the proposed site due to breaking of dam in the event of an earthquake of very high magnitude as the Kalpasar dam was located over deep silted fault.	The impact of the Alang shipbreaking yard and Kalpasar Dam on the project was not taken into account. As no impacts were identified, no mitigation measures were envisaged.
6.	Maharashtra	Mumbai Coastal Road Project (South) - Princess Flyover to Worli end of Sea Link by M/s Municipal Corporation of Greater Mumbai	1. The EIA stipulated that the mangroves in the project area would be impacted leading disappearance of reproduction and food zone for species of fish, aquatic and migratory birds, irreversible salinisation and acidification and Coastline erosion.	Against such consequences, the mitigation measures suggested are merely perfunctory such as dust suppression measures, sprinkling of water, monitoring of noise etc. and did not directly address the impacts identified.
			2. The EIA report identified impacts, such as: Formation of sediment plumes that would affect fish and benthos, increased turbidity affecting the growth of the plants, increase in PH of the water causing algal bloom, increase in temperature with reduced dissolved oxygen, immediate and long term degradation of sensitive and essential breeding and nursery habitats for marine organisms leading to long term reduction in commercially important fish.	It was observed that the mitigation measures suggested like the use of best practicable technology, appropriate handling of liquid and solid wastes and adequate noise control measures did not directly address the identified impact.

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S. No.	State	Name of the Project	Risk to marine flora and fauna, ecologically vulnerable areas	Mitigation measures not envisaged in the EIA
7.	Maharashtra	Malad sewage treatment plant by M/s Municipal Corporation of Greater Mumbai	1. The EIA Report catered to development of existing facilities to improve the environmental conditions in and around the Mumbai city instead of focusing on Malad STP alone. As such it failed to incorporate the terrestrial and aquatic ecology comprising of the Benthos, Phytoplanktons, zooplanktons in and around the project area.	As no details of terrestrial and aquatic fauna were included in the EIA, no impacts on them were identified and no mitigation measures were envisaged.
8.	Maharashtra	Laying of Natural Gas from Uran (District Raigad) to Navi Mumbai Municipal Corporation pipeline by M/s Mahanagar Gas Ltd.	The pipeline was passing through villages of Uran, Bokadvira, Dronagiri, Funde, Sonari, Jasai, Ulwe and Killegaothan, all of which were famous for their mangroves. The presentation given by the PP during the EAC meeting also showed an image of the pipeline passing through a dense patch of mangroves.	Instead of devising mitigation plan for protection and conservation of the mangroves, the EIA Report denied the presence of mangroves itself along the route of the pipeline.
9.	Maharashtra	Expansion of facilities at port Redi, Sindhudurg, by M/s Redi Port Ltd	The EIA report only identified Turbidity of water as an impact during reclamation of the area with dredged material.	EIA did not deliberate upon the impacts of land reclamation and dredging in terms of loss of marine habitats; effect on marine benthos; No mitigation measures were proposed for even identified threats to environment.
10.	Maharashtra	All weather Greenfield Jetty' at Nandgaon of Taluka Palghar, District Thane, Maharashtra by JSW Infrastructure Ltd.	As per the EIA Report the entire facility was to be created on reclaimed land. We noted that only conceptual layout of the jetty at Nandgaon was available in the EIA Report. However, this conceptual layout was not further deliberated upon anywhere in the EIA report.	As no impacts of land reclamation were identified, no mitigation measures were envisaged.
11.	Maharashtra	Mumbai Trans Harbour Sea Link by M/s Mumbai Metropolitan Region Development Authority	The MCZMA in its recommendation stated that the PP was to consult an expert agency, undertake training programmes for construction personnel regularly to minimize the damage to mudflats before commencement to construction work. Also, the proponent was to take expert opinion from Bombay Natural History Society (BNHS) regarding safeguards to be placed so as to mitigate the disturbances to flamingo habitat. etc.	Niether any studies for evaluation of impacts on mudflats and flamingos was carried out by the proponent nor any expert agency was consulted. As no impacts were identified, no mitigation measures were envisaged.

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S. No.	State	Name of the Project	Risk to marine flora and fauna, ecologicaly vulnerable areas	Mitigation measures not envisaged in the EIA
12.	Odisha	Multi- product SEZ/ Industrial Park at Gopalpur, Ganjam, Odisha by M/s Tata Steel SEZ Ltd.	The project area showed rich diversity in terms of phytoplanktons, zooplanktons and moderate diversity of Benchic fauna (polychaete worms, crustaceans, gastropods etc.). and the project envisaged laying of pipeline.	The impact of trenching on the benthic fauna and the mitigation measures to ward off such impact were not studied.
13.	Tamil Nadu	Intake and outfall facility of Marine Algae in District Ramanathapuram by M/s EID Parry (India) Ltd	The EIA report mentioned ecologically important specialized ecosystems like sand dunes, seagrasses or mangroves in the project area.	As no impacts were identified, no mitigation measures were envisaged.
14.	West Bengal	Setting up of Mini Bulk Carriers Handling Facility on the upstream of 3rd oil Jetty and west bank of river Hooghly at Haldia Dock Complex, Kolkata Port (West Bengal) by M/s Kolkata Port Trust	The EIA Report showed the area had a rich density of phytoplanktons, zooplanktons and benthos. The dominant flora of the Haldia industrial zone comprised of various species of trees, shrubs, herbs and climbers, fern species. The study area comprised of Nayachar island at the mouth of the Hooghly River which had mangroves.	The impacts on phytoplanktons, zooplanktons, benthos, flora including mangroves were not identified in the EIA Report. As the impacts were not identified, no mitigation measures were stipulated.

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Annexure 5: EIA was either devoid of DMP, its specific details or the onus of framing the suitable DMP was left to the project proponent

(Reference: Para 3.1 (iv) of the report)

Cases where onus of framing specific details of DMP were left to PP				
S.No	State	Name of the Project	Criteria	Observations
1.	Goa	Deepening of approach channel for capesize vessels at Mormugao Port by M/s Mormugao Port Trust	Emergencies like accidents involving vessels, Oil spill from vessels, Fire/explosion on board vessels within the Port limits and berths, Breakdown of ship engine in the sea, and earthquake were mentioned in the EIA Report and the project site fell under the Zone -III of Seismic Map of India- a moderate intensity zone.	We observed that no mitigation measures for the delineated emergencies were found incorporated in the DMP.
2.	Karnataka	Development of four berths in Western Dock arm in New Mangalore port by M/s New Mangalore Port Trust	Highlighted in the Report.	
3.	Maharashtra	High Speed Railway Project across CRZ areas in Mumbai, Mumbai Sub-urban, Thane and Palghar District (PH) by M/s National High Speed Rail Corporation Ltd	The EIA Report stated that the project site was classified under the Zone -III, a moderate intensity earthquake zone and that the western coast was subject to occasional severe cyclonic storms.	DMP did not envisage mitigation measures to be taken by the PP during such disaster and whether earthquake resistant structures were used for construction and operation phase.
4.	Maharashtra	Construction of Hotel Building (Resort 3) in Mauje Karde, Ratnagiri District, Maharashtra by M/s Dajikaka Gadgil Developers Pvt. Ltd.	The project site was classified under the Zone -IV of the Bureau of Indian Standards (BIS) 2000, Seismic Map of India, a zone having major damage risk.	The DMP delineating the types of disasters and the mitigation measures to be taken by the PP during such disaster was not found on the records.
5.	Maharashtra	Mumbai Trans Harbor Sea Link by M/s Mumbai Metropolitan Region Development Authority	As per the Rapid EIA Report 2012, the project site was classified under the Zone -III of the Bureau of Indian Standards (BIS) 2000, Seismic Map of India, a moderate intensity zone and that the western coast was subject to occasional severe cyclonic storms.	DMP did not detail mitigation measures to be taken by the PP during such disaster and also if earthquake resistant structures were to be used for construction of this sea link.
6.	Maharashtra	Construction of Hotel Building (Resort 2) in	As per the EIA report, the project site was classified under the Zone	It was observed that a DMP delineating the types

		Mauje Karde, Ratnagiri District, Maharashtra by M/s Dajikaka Gadgil Developers Pvt. Ltd.	-IV of the Bureau of Indian Standards (BIS) 2000, Seismic Map of India, a zone having major damage corresponding to intensity VII on the MM (Modified Mercalli Intensity) scale.	of disasters and the mitigation measures to be taken by the PP during such disaster was not prepared by PP.
7.	West Bengal	Setting up of Mini Bulk Carriers Handling Facility on the upstream of 3rd oil Jetty and west bank of river Hooghly at Haldia Dock Complex, Kolkata Port by M/s Kolkata Port Trust	Highlighted in the report.	

Projects where the EIA Reports did not contain any DMP

S. No.	State	Name of the Project
1.	Gujarat	Development of Greenfield Beach Resort at Mandvi, District Kutch by M/s Tourism Corporation of Gujarat Ltd.
2.	Gujarat	Common treated effluent disposal pipeline project along river Kolak upto deep sea via Kolak Estuary by M/s Wel Treat Enviro Management Organization
3.	Gujarat	Laying of treated effluent disposal pipeline and diffuse system for disposal of treated wastewater at Marine outfall point in Gulf of Kutch at Mithapur by M/s Tata Chemicals Limited
4.	Gujarat	Construction of marine bridge between Beyt and Okha, Dwaraka by Road & Building Department
5.	Gujarat	Additional Salt works (2846.15 acres) located at village Kalatalav & Narmad, Ta. & Dist. Bhavnagar by Nirma Limited
6.	Karnataka	Construction of Petroleum Products Storage Terminal at Karwar, Karnataka Port by M/s Tropicana Liquid Storage (P) Ltd.
7.	Maharashtra	Rerouting of Mumbai Manmad pipeline by BPCL The risk assessment study of the proposed installations which were to be used to formulate the DMP was put as a specific condition in the clearance letter issued to the PP
8.	Tamil Nadu	Intake and outfall facility of Marine Algae in District Ramanathapuram by M/s EID Parry (India) Ltd
9.	Tamil Nadu	Highlighted in the report

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Annexure 6: Clearances granted by MoEF&CC where crucial prerequisites were left to the PP to prepare and adhere to after grant of clearance

(Reference: Para 3.2 (i) of the report)

S. No.	State	Name of the Project	Important prerequisites not ensured before the grant of clearance	Remarks
1.	Gujarat	Development of the petroleum, chemical and petrochemical investment region (PCPIR) at Dahej, Vagra, District Bharuch by M/s Gujarat Industrial Development Corporation	A specific condition in the clearance letter, stipulated that a firm and time bound action plan for conservation of mangroves and mudflats in CRZ area was to be prepared through a reputed institute and adequate funds were to be earmarked for its implementation. The plan was required to be monitored by a committee comprising representatives of PPs , Gujarat State Forest Department and the Gujarat Maritime Board.	It was observed that action plan for conservation of mangroves and mudflats in CRZ area was not made as a pre-requisite before granting clearance to the project. The Ministry left the matter of protection of mangroves and mudflats in the area to PP's convenience.
			Another specific condition of clearance letter required preparation of scientific studies for Coastal Management Plan by a reputed expert institution. The results were to be implemented by all the stakeholders keeping in view the river ecology and dependency for sustenance on fisheries in coastal areas. Alternate water resources were also to be explored to meet the huge water demand for the project, in addition to exploring the best recycling practices.	The condition should have been made a pre requisite by the ministry before the grant of clearance as it is unlikely for any PP to carry out scientific studies and explore alternative methods or resources after receiving a clearance letter from the ministry for its project.
2.	Gujarat	Laying of treated effluent disposal pipeline from their Plant to final disposal point in the Gulf of Kutch at Mithapur by M/s Tata Chemicals Limited	A specific condition of clearance letter required the PP to develop the Baseline for Marine and coastal biodiversity of Poshitra Bay and monitor the same bi-annually with specific focus on sea grass beds, and endemic species *Sakuraeolis gujaratica* and *Anteaeolidiella poshitra* (molluscs species).	As a baseline could not be recorded retrospectively after initiating a project, inserting such a condition in the clearance letter was meaningless. The same should have been made as a pre-requisite of the project clearance.
3.	Gujarat	Construction of Residential project 'Sun City' at Barbodhan village, Surat by Pramukh Organizers LLP	Some part of construction area proposed by PP was falling within CRZ-III. Instead of insisting for revised project lay out map from the PP, GCZMA sought only undertaking from the PP that it will not carry out any construction activity in the CRZ-III	Gujarat SCZMA in its recommendation letter to SEIAA had put a condition that PP should not carry out any construction in NDZ. SEIAA did not insist upon the revised project lay out

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S. No.	State	Name of the Project	Important prerequisites not ensured before the grant of clearance	Remarks
				map before granting clearance to ensure adherence to this condition.
4.	Gujarat	Development of Greenfield Beach Resort at Mandvi, District Kutch by M/s Tourism Corporation of Gujarat Ltd.	Some part of construction area proposed by TCGL was falling within NDZ (NDZ) i.e., 200 m landward side from HTL.	Gujarat SCZMA in its recommendation letter to MoEF&CC had put a condition that PP should not carry out any construction in NDZ. EAC did not insist upon the revised project lay out map from the PP to ensure adherence to this condition.
5.	Karnataka	Construction of Hotel Building in Mangalore, Dakshina Kannada District by M/s. Motimahal Hotels Pvt. Ltd.	The proposed project site fell in the CRZ-II area and the proposed construction activity was at a distance of 34 metres from the HTL of Gurupur River. The clearance letter stipulated that the parking site should be shifted beyond the 'NDZ' of 200 metres from the HTL.	It was observed that the EAC left it on the PP to shift the parking site beyond NDZ and did not require a revised conceptual plan before recommending the project for clearance.
			The clearance letter required that a robust rainwater harvesting system should be installed in consultation with the concerned authority.	The submission of the rain water harvesting plan was not made as a pre-requisite before grant of clearance.
6.	Maharashtra	High Speed Railway Project across CRZ areas in Mumbai, Mumbai Sub-urban, Thane and Palghar District (PH) by M/s National High Speed Rail Corporation Ltd	While recommending the project the EAC required that comprehensive mangrove plantation and management plan was to be prepared by The Mangrove Cell, Thane, Forest Department, Government of Maharashtra.	Preparation of comprehensive mangrove plantation and management plan was not made a pre-requisite condition but was instead put as a specific condition in the clearance letter.
			While recommending the project the EAC required that a robust Conservation and Management Plan for Thane Creek Flamingo Sanctuary with detailed action plan for immediate implementation in consultation with the concerned agency in the State be developed in consultation with the concerned agency in the State.	Fulfilment of this requirement was not insisted before granting clearance to the project.

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S. No.	State	Name of the Project	Important prerequisites not ensured before the grant of clearance	Remarks
			A feasibility study on muck transportation for possibility of alternative mode of early transportation of muck was to be submitted to the MoEF&CCC within six months of CRZ clearance for further examination and possible inclusion as part of the project programme.	Feasibility study of this nature should have preferably been a part of the prerequisites of the project clearance. In the instant case, no such studies were later submitted by PP.
			The Expert Appraisal Committee highlighted the need for a separate clearance from the Dahanu Taluka Environment Protection Authority as Dahanu taluka had special protection since 1991 (MoEF&CC — at the behest of the Supreme Court — had passed a notification declaring the area as ecologically fragile one and had restricted hazardous industries in the area, among other things).	We observed that separate clearance from the Dahanu Taluka Environment Protection Authority before granting clearance was not made as a pre-requisite before grant of clearance.
7.	Maharashtra	Malad sewage treatment plant by M/s Municipal Corporation of Greater Mumbai	The mangrove replantation was made a specific condition of the CRZ clearance letter. As per Clearance letter, five times the mangrove cover area was to be replenished under this project i.e., 180 ha (36 ha X 5). The PP however approached the Ministry stating that it would not be possible for it to obtain 180 ha of land for replantation and requested for amending the specific condition and replacing the condition of replantation of five times the area with 5 times the mangroves affected. The same was granted approval by modifying the clearance letter in December 2018	We noted that the Ministry amended the CRZ Notification 2011 for allowing this particular project in CRZ-I area. The Ministry further allowed modification of the specific condition of the clearance letter. Both these exceptions were against the spirit of protection of marine environment, which is the actual mandate of the Ministry.
			The PP in the 196th EAC meeting informed that it had already acquired 24 ha of Government land suitable for mangrove replantation in the adjoining Thane district and the same had been handed over to the additional Principal Chief Conservator of Forests (Mumbai Mangrove Cell) for further process. The balance 11 ha. land was being acquired. However, no evidence relating to this acquisition of the land was found on the records.	Land acquisition is a time taking process but MoEF&CC did not make land acquisition for mangrove replantation a pre-requisite for grant of clearance. The mangroves affected in this case were the best stock in Mumbai region. Also, compliance to conditions of the project clearance was not assured.

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S. No.	State	Name of the Project	Important prerequisites not ensured before the grant of clearance	Remarks
8.	Maharashtra	Mumbai Coastal Road Project (South) - Princess Flyover to Worli end of Sea Link by M/s Municipal Corporation of Greater Mumbai	As per CRZ clearance, proponent was to develop a marine biodiversity conservation plan from an institute with domain expertise and to submit the same to MoEF&CC within one year.	Grant of clearance in absence of marine biodiversity conservation plan defeated the purpose of the granting clearance itself.
9.	Maharashtra	Construction of Hotel Building (Resort 3) in Mauje Karde, Ratnagiri District, Maharashtra by M/s Dajikaka Gadgil Developers Pvt. Ltd.	The cadastral map (1:4000 scale) of the proposed site showed that a portion of the Resort 3 was in the 'NDZ (NDZ)' which according to the site plan was to be used for building service roads and parking place. But the clearance letter categorically stated that no construction (including cemented/concretized parking space) should be made in the NDZ area.	The EAC did not ask the PP to submit a revised site plan showing construction for parking space/service roads, beyond the NDZ area before recommending the project and the clearance letter was issued for the project by MoEF&CC without ensuring the same.
			The clearance letter condition required that a robust rainwater harvesting system should be installed in consultation with the concerned authority.	The plan was not made as a pre-requisite before recommending the project
10.	Maharashtra	Construction of Hotel Building in *Mauje Chandranagar*, Ratnagiri District, Maharashtra by M/s Dajikaka Gadgil Developers Pvt. Ltd. and Construction of Hotel Building in *Mauje Karde*, Ratnagiri District, Maharashtra by M/s Dajikaka Gadgil Developers Pvt. Ltd.	The clearance letter enunciated that a robust rainwater harvesting system should be installed in consultation with the concerned authority.	The rain water harvesting plan was not made as a pre-requisite before grant of clearance.
11.	Odisha	Multi- product SEZ/ Industrial Park at Gopalpur, Ganjam, Odisha by M/s Tata Steel SEZ Ltd.	Odisha CZMP as per CRZ Notification 2011 was approved by MoEF&CC in August 2018 and the clearance to this project was granted in September 2018. A specific condition was inserted in the EC/CRZ clearance letter of this project that the PP should ensure that the project is in consonance with the new Coastal Zone	EAC left the onus of complying with the new CZMPs on the PP itself, whereas it the responsibility of the EAC to deliberate upon and ensure such compliance. The Ministry in this case should have granted clearance only

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S. No.	State	Name of the Project	Important prerequisites not ensured before the grant of clearance	Remarks
			Management Plan. We however observed that the appraisal of the project was done as per CRZ Notification 1991 zonation.	after PP got a fresh demarcation done based on the new CZMPs.
12.	Tamil Nadu	Modification of existing iron ore terminal to handle common user coal at Kamarajar port by M/s Kamarajar Port Ltd.	A specific condition in the clearance letter stipulated that the PP would have to draw up and implement a management plan for the prevention of fires due to handling of coal.	By clearing the project without a fire prevention plan due to coal handling, ministry disregarded an important disaster management and mitigation aspect.
			The PP was to inventorise the floral composition of the biota of marine and intertidal biotopes and draw up a detailed marine bio diversity conservation management plan based on possible impacts.	Such an inventory was to serve as a basis of any environment management plan and the fact that this work was not finished before the grant of clearance raises doubts over the impact assessment done by the PP.
13.	Tamil Nadu	Alignment of conveying main to Buckingham Canal for the discharge of treated sewage from the proposed 36 MLD Sewage Treatment Plant (STP) by M/s Chennai Metro Water Supply and Sewerage Board Sholinganallur	A specific condition in the clearance letter stipulated that the marine environment of the Buckingham Canal during construction and operational phase was to be watched through a robust marine environment management plan.	Marine environment management plan was ideally required to be prepared by the PP and approved by the Ministry before the project was granted clearance.

Annexure 7: Non- provision of separate budget towards EMP

(Reference: Para 3.2 (ii) of the report)

S. No.	Name of the Project	Remarks
1.	Laying of treated effluent disposal pipeline from their Plant to final disposal point in the Gulf of Kutch at Mithapur by M/s Tata Chemicals Limited, Gujarat (2017)	No separate budget was earmarked for carrying out environment management activities.
2.	Discharge of treated effluent in Bhavnagar creek by M/s Madhu Silica Pvt. Ltd., Gujarat (2015)	PP did not earmark any fund for implementing the EMP.
3.	Development of four berths in Western Dock arm in New Mangalore port by M/s New Mangalore Port Trust, Karnataka (2016)	Although, an EMP costing Rs. 30 lakh was earmarked for the project, the detailed budget (capital and recurring cost) was not mentioned in the EIA.
4.	Laying of Natural Gas from Uran (District Raigad) to Navi Mumbai Municipal Corporation pipeline by M/s Mahanagar Gas Ltd., Maharashtra (2018)	PP did not make any provisions for detailed EMP budget.
5.	Mumbai Trans Harbor Sea Link by M/s Mumbai Metropolitan Region Development Authority, Maharashtra (2016)	Although, an EMP costing Rs. 335 crore was earmarked for the project, the detailed budget (capital and recurring cost) was not mentioned in the EIA.
6.	Rerouting of Mumbai Manmad pipeline by BPCL, Maharashtra (2015)	PP did not make any provisions for detailed EMP budget
7.	Multi- product SEZ/ Industrial Park at Gopalpur, Ganjam, Odisha by M/s Tata Steel SEZ Ltd., Odisha (2018)	Although, an EMP costing Rs. 45.28 crore was earmarked for the project; the detailed budget (capital and recurring cost) was not mentioned in the EIA.
8.	Relaying of Pipeline & Redevelopment of Edible Oil Transit Terminal at Chennai by M/s Ruchi Infrastructure Limited, Tamil Nadu (2018)	Although, an EMP costing Rs. 1.5 lakh was earmarked for the project; the detailed budget (capital and recurring cost) was not mentioned in the EIA.
9.	Integrated Cooum River Eco-Restoration Project by M/s Chennai Rivers Restoration Trust, Tamil Nadu (2017)	PP did not make any provisions for detailed EMP budget.

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Annexure 8: Cases where cumulative studies were not conducted to assess the overall impact

(Reference: Para 3.3 of the report)

S. No.	State	Name of the Project	Remarks
1.	Andhra Pradesh	Marine disposal of treated effluent by M/s Covalent Laboratories Pvt. Ltd	A pharma industry was 1.9 km away from the outfall. Cumulative studies to check the effect of the effluents discharged from both the pipelines were not done.
2.	Andhra Pradesh	Marine disposal of treated effluent by M/s Hyacinth Pharma Pvt. Ltd	EAC desired a cumulative impact study to assess risk posed by many outfall points in the region. However, the PP did not assess the same.
3.	Andhra Pradesh	Setting up of Bulk Drug Manufacturing Unit in East Godavari District by M/s Divi's Laboratories Limited	Nothing on record indicated that a similar exercise to identify other marine outfalls in vicinity and need for a cumulative assessment was done.
4.	Andhra Pradesh	International Leather Complex at Kothapatnam village, Nellore District by M/s Adani Port and SEZ Ltd.	ToRs for the project required a cumulative impact study of marine disposal, considering other marine outfalls in vicinity. However, no such studies were submitted by PP to APCZMA
5.	Goa	Deepening of approach channel for capesize vessels at Mormugao Port by M/s Mormugao Port Trust (MPT)	Proposed project was within the active "Port Basin/Navigational Channel" area of the MPT Complex. There were large scale activities already on-going in this region with many industries and many Barge Yards and Ship Building units along the bank of Zuari River. EIA report too mentioned that the impacts on marine ecosystems will be of cumulative nature. But PP did not study them.
6.	Gujarat	Discharge of treated effluent in Bhavnagar creek by M/s Madhu Silica Pvt. Ltd.	Cumulative studies for assessing impacts on the Creek due to disposal by PP in addition to existing 20 MLD disposal of Chitra GDC was not carried out.
7.	Maharashtra	High Speed Railway Project across CRZ areas in Mumbai, Mumbai Sub-urban, Thane and Palghar District (PH) by M/s National High Speed Rail Corporation Ltd	Cumulative studies for studying the adverse effects of other infrastructure development projects such as Thane Creek Bridge III on the biodiversity of Thane Creek was not done.
8.	Maharashtra	Construction of Hotel Building (Resort 3) in Mauje Karde, Ratnagiri District, Maharashtra by M/s Dajikaka Gadgil Developers Pvt. Ltd.	The cumulative effects due to proximity to two similar hotel construction sites (Resort 1 and 2) were not assessed.
9.	Maharashtra	Construction of Hotel Building (Resort 2) in Mauje Karde, Ratnagiri District, Maharashtra by M/s Dajikaka Gadgil Developers Pvt. Ltd.	The cumulative effects due to proximity to two similar hotel construction sites (Resort 1 and 3) were not assessed.
10.	Maharashtra	Construction of Hotel Building (Resort 1) in Chandranagar, Ratnagiri District, Maharashtra	The cumulative effects due to proximity to two similar hotel construction sites (Resort 2 and 3) were not assessed.

S. No.	State	Name of the Project	Remarks
		by M/s Dajikaka Gadgil Developers Pvt. Ltd.	
11.	Odisha	Desalination plant for 5MLD hybrid Desalination project.	Cumulative studies for assessing the damage to Marine environment by disposal of brine waste in addition to existing STP discharge into the ocean was not carried out by PP.

Annexure 9: Issues related to public hearing

(Reference: Para 3.5 of the report)

S.No.	State	Name of the Project	Issues related to public hearing	Remarks
1.	Andhra Pradesh	International Leather Complex at Kothapatnam village, Nellore District by M/s Adani Port and SEZ Ltd.	While examining the records related to the public hearing, it was noticed that all the documents were in vernacular language.	Method adopted to deliberate upon the material in vernacular language by the EAC was not described. Further, the minutes of the meeting, public grievances, their resolutions were not available in the EIA Report.
2.	Goa	Deepening of approach channel for capesize vessels at Mormugao Port by M/s Mormugao Port Trust	The EAC in had asked PP to upload Volume- II of the EIA Report as it was claimed that the public hearing proceedings were covered in the said volume.	The same was not available on the records, thus, it could not be ascertained if the due procedure was followed.
3.	Gujarat	Widening and improvement of existing highway by NHAI	Mismatch between the information given during public hearing and that furnished in the EIA.	In public hearing, as per PP, a total of 35652 trees were to be cut for the project, however, as per EIA report, 15000 trees were to be cut.
4.	Maharashtra	High Speed Railway Project across CRZ areas in Mumbai, Mumbai Sub-urban, Thane and Palghar District (PH) by M/s National High Speed Rail Corporation Ltd	i. Non-provision of the minimum notice period of 30 days.	Public hearing was held in 12 places and the notice period at these places ranged between 03 to 15 days only.
			ii. Advertisement for public hearing needs to be published in one major National daily and regional Vernacular daily.	The notice was published in only local newspaper.
			iii. Mismatch between the information given in public hearing and that furnished during the EAC meeting.	On the issue of effect of vibrations on the Thane creek flamingos due to construction of tunnels, PP submitted in public hearing that vibrations would not propagate upto creek surface, so there is no adverse impact on flamingos. But PP in its submission to EAC stated that it was not possible to predict the impact of vibrations on flamingos till the work actually started.
5.	West Bengal	Setting up of Mini Bulk Carriers Handling Facility on the	As per public hearing procedure, the final EIA report should incorporate the	The EIA Report sent to the Ministry was devoid of the responses of the people, the

	upstream of 3rd oil Jetty and west bank of river Hooghly at Haldia Dock Complex, Kolkata Port (West Bengal) by M/s Kolkata Port Trust	concerns expressed in the public hearing along with action plan and financial allocation, to address those concerns before it is sent to for appraisal.	action taken by the PP to address the concern raised in the public hearing.



Annexure 10: Non submission of mandatory documents by the PPs

(Reference: Para 3.7.2 of the report)

S. No.	Name of the project/State	Rapid EIA[7]	Disaster Mgmt. Report	Risk Assmt. & Mgmt. Plan	CRZ maps with HTL and LTL marked on	Project layout laid on CRZ map	Map with CRZ zones	NoC from SPCBs for effluent discharge
1.	Deepening of approach channel for capesize vessels at Mormugao Port by M/s Mormugao Port Trust, Goa (2016)	✓	✓	✓	✓	✓	✓	X
2.	Installation of TIC, Toilet block, rain shelter Gazebos, Utorda, Goa	x	x	x	x	x	x	x
3.	Provision of Mobile Toilet block (GTDC), Querim Beach, Goa	x	x	x	x	x	x	x
4.	Construction of resort (Amit C Prabhu) , Goa	x	x	x	x	x	x	✓
5.	Construction of residential house (Anicito Fermino Fernandes) , Goa	N.A.	x	x	x	x	x	N.A.
6.	Construction of residential house (Etelvina Rodrigues), Goa	N.A.	x	x	x	x	x	N.A.
7.	Construction of Public Conveniences (GTDC), Candolim Beach, Goa	x	x	x	x	x	x	x
8.	Construction of toilet blocks, rain shelter and TIC , Terekhol, Goa	x	x	x	x	x	x	x
9.	Permanent Toilet block, Upgradation/beautification of places of touristic interest (GTDC), Palolem Beach, Cancona, Goa	x	x	x	x	x	x	x
10.	Const. of terminal building over existing jetty in Panaji	x	x	x	x	x	x	x
11.	Beautification of Rua De Orem Creek and Convention Centre, Goa	x	x	x	x	x	x	x
12.	Beautification of Beach Front Promendade, Goa	x	x	x	x	x	x	x
13.	Construction of residential house (Luisa Desouza) , Goa	N.A.	x	x	x	x	x	N.A.
14.	Construction of Sweage Treatment Plant at Colva (SIDCL) , Goa	x	x	x	x	x	x	✓
15.	Construction of STP (SIDCL), Bandora, Goa	x	x	x	x	x	x	✓
16.	Const. of Sewage Treatment Plant (1mld) (SIDCL), Durbhat, Goa	x	x	x	x	x	x	✓

[7] Including marine and terrestrial components

By Authorised agency

17.	Construction of residential House (Yuvraj K Bandodkar) , Goa	N.A.	×	×	×	×	×	N.A.
18.	Construction of new KCL storage unit (Zuari Agro Chem.), Goa	×	×	×	×	×	×	✓
19.	Expansion of Adani Petronet (Dahej) Port, Bharuch District by M/s Adani Petronet (Dahej) Port Pvt Ltd, Gujarat (2016)	✓	✓	✓	✓	✓	✓	×
20.	Development of Greenfield Beach Resort at Mandvi, District Kutch by M/s Tourism Corporation of Gujarat Ltd.(2015)	✓	✓	✓	×	✓	×	×
21.	Discharge of 10 MLD industrial effluent in Bhavnagar creek, Bhavnagar by M/s Madhu Silica Pvt. Ltd., Gujarat (2015)	¤	✓	✓	✓	✓	✓	✓
22.	Common treated effluent disposal pipeline project along river Kolak upto deep sea by M/s Wel Treat Enviro Management Organization, Gujarat (2016)	✓	✓	×	✓	✓	×	✓
23.	Laying of treated effluent disposal pipeline at Marine outfall point in Gulf of Kutch at Mithapur by M/s TCL, Gujarat, (2017)	¤	✓	✓	×	✓	×	✓
24.	Revival of Existing Jetty with Liquid Storage Terminal, Pipeline Road Connectivity, Gandhidham, Kutch by Ahir Salt & Allied Product Pvt. Ltd, Gujarat	✓	✓	✓	✓	✓	✓	×
25.	Residential (Subplot Type) purpose project 'Sun city' at Barbodhan Village, Olpad Taluka, Surat by Pramukh Organisers LLP, Gujarat	✓	✓	×	✓	✓	✓	×
26.	Construction of marine bridge between Beyt and Okha, Dwaraka by Road & Building Department, Gujarat	¤	✓	×	✓	✓	✓	✓
27.	Additional Salt works (2846.15 acres) located at village Kalatalav & Narmad, Ta. & Dist. Bhavnagar by Nirma Limited	¤	✓	×	×	✓	×	✓
28.	Mumbai Coastal Road Project (South) - Princess Flyover to Worli end of Sea Link by M/s Municipal Corporation of Greater Mumbai (2017), Maharashtra	✓	✓	✓	✓	✓	×	×
29.	Intake and outfall facility of Marine Algae in District Ramanathapuram by M/s EID Parry (India) Ltd.(2016), Tamil Nadu	✓	×	×	✓	✓	×	×
30.	Alignment of conveying main to Buckingham Canal for the discharge of treated sewage from proposed 36 MLD Sewage Treatment Plant (STP) by M/s Chennai Metro Water Supply And Sewerage Board Sholinganallur (2017), Tamil Nadu	✓	✓	✓	✓	✓	✓	×
31.	Construction of Training Walls for Permanent Stability of Bar Mouth at Pulicat Village by Fisheries Department, Tamil Nadu	✓	✓	✓	✓	✓	×	✓
32.	Widening of North Chennai Thermal Power Station Road & Ennore Port Road by Tamil Nadu Road Development Company, Tamil Nadu	✓	✓	✓	✓	✓	×	✓

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33.	Development of Mall at Thiruvottiyur Village, Chennai by M/s. Alwarpet Properties Pvt. Ltd., Tamil Nadu	×	×	×	×	×	×	×
34.	Development of Fishing Harbour at Vellapallam Village, Nagapattinam by Fisheries Department, Tamil Nadu	✓	✓	✓	✓	✓	×	×
35.	Renovation of Fishing Harbour at Mudhunagar, Cuddalore by Fisheries Dept, Cuddalore	✓	×	×	✓	✓	×	×
36.	Proposed Development of Eco-Park Bharathy Nagar, Tondiarpet Village, Chennai by Greater Chennai Corporation, Tamil Nadu	×	×	×	✓	✓	×	×
37.	Construction of new Fishing Harbour at Tharangambadi, , Nagapattinam District by Assistant Director of Fisheries, Nagapattinam North, Tamil Nadu	✓	✓	✓	✓	✓	✓	×
38.	Construction of Fish Landing Centre at Kunthukal, Ramanathapuram District by Assistant Director of Fisheries, Rameswaram, Tamil Nadu	✓	✓	✓	✓	✓	✓	×
39.	Construction of Government Guest House Building (Government Kerala) at Kanyakumari by Additional Director (Hospitality), Department of Tourism, Government of Kerala, Tamil Nadu	✓	✓	✓	✓	✓	✓	×
40.	Construction of Residential building by Brahma Kumari Beena, Kanyakumari by Prajapita Brahma kumaris, Ishwariyavishwavidhyalaya, Tamil Nadu	✓	✓	✓	✓	✓	✓	×
41.	Construction of Memorial for former Chief Minister of Tamil Nadu Selvi J. Jayalalitha by E E , Building & Construction Division I, P W D, Tamil Nadu	✓	✓	✓	✓	✓	✓	×
42.	Proposed Residential Complex at Ernavur village, Thiruvottiyur, Thiuvallur District by M/S. Coromondal International ltd, Tamil Nadu	✓	✓	✓	✓	✓	✓	×
43.	Construction tenements at Four shore Estate in R.S No. 7581, 7582 of Mylapore Village by M/S. Tamil Nadu Slum Clearance Board, , Tamil Nadu	✓	✓	✓	✓	✓	✓	×
44.	Modernization of Foundry unit at survey Nos.39 A &39 B, Kathivakkam village, Ambattur Taluk by M/S. Hinduja Foundries, Tamil Nadu	✓	✓	✓	✓	✓	✓	×
45.	Proposed Construction of packing of Dry Fish and Chilled Fresh Fish by M/S. GVD International, Chennai, Tamil Nadu	✓	✓	✓	✓	✓	✓	×
46.	Construction of Tuna Fishing Harbour, Tiruvottiyur, Chennai by Fisheries Department, Ponneri, Tamil Nadu	✓	✓	✓	✓	✓	✓	×

× EIA report did not contain terrestrial component

Annexure 11: Instances where the conditions as per the clearance letter as well as the conditions stipulated in the SCZMA recommendations were not being complied with by the PP

(Reference: Para 4.1.1 of the report)

S. No.	State	Project Name	Observation
1.	Goa	Deepening of approach channel for capesize vessels at Mormugao Port by M/s Mormugao Port Trust	As per EIA the report, the PP had to provision Rs. 35 lakhs under Environmental Management Plan. However, no funds were provisioned by PP under Environmental Management Plan.
2.	Gujarat	Development of Proposed Petroleum, Chemical and Petro-Chemical Special Investment Region, (PCPIR) by Gujarat Industrial Development Corporation	i. A scientific study for Coastal Management Plan was to be prepared by an expert institution and the same was to be implemented by all the stakeholders. However, the study was not undertaken by the PP. ii. PP had to prepare environmental policy and get the same approved by its Board of Directors. However, the Environmental Policy was not prepared by the PP.
3.	Gujarat	Laying of treated effluent pipeline and disposal of effluent into Bhavnagar creek	i. Online monitoring sensors were to be provided at the pipeline outlet and at the creek outfall. However, no monitoring sensors were provided by the PP. ii. Plantation of mangrove plantation in 25 ha. land was to be done and reported to the Forest & Environment Department/ MoEF&CC. No plantation was carried out till date (August 2021) by the PP.
4.	Gujarat	Laying of pipeline along the river Kolak up to deep sea for CETP in Village Morai, Vapi	PP was required to set up separate environmental management cell for effective implementation of the stipulated environmental safeguards under the supervision of a Senior Executive. The PP did not set up the cell.
5.	Gujarat	Laying of treated effluent disposal pipeline from their Plant to final disposal point in the Gulf of Kutch at Mithapur by M/s Tata Chemicals Limited	i. Baseline data for Marine and coastal biodiversity of Poshitra Bay were to be developed and monitored bi-annually with specific focus on sea grass beds, and endemic species Sakuraeolis gujaratica and Anteaeolidiella poshitra. Baseline studies were not conducted by PP. ii. Submission of annual environment audit reports to GCZMA. Annual environment audit reports were not submitted by PP. iii. Comprehensive EIA Report was to be prepared and submitted to GCZMA. PP did not submit any Comprehensive EIA Report to GCZMA.

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S. No.	State	Project Name	Observation
6.	Gujarat	Revival of Existing Jetty with liquid Storage Terminal, Pipeline, Road connectivity, Railway line & sidings at Mithirohar, Gandhidham, Kutch	i. PP had to obtain all necessary permissions from different Government Departments/ Agencies before commencing their activities. GPCB granted Consolidated Consent and Authorisation (CCA) for laying off only five pipelines, ii. During site visit, we noticed that PP had laid six pipelines each of 1800-meter length. iii. Thus, PP laid and operated an additional pipeline without obtaining CCA from GPCB. iv. The PP had to carry out mangrove plantation in 50 ha. area in consultation with GEC/ Forest Department within a period of two years from the date of commencement of the project. No plantation (August 2021) was carried out by the PP. v. PP was required to take up massive green belt development activity in consultation with GEC/ Forest Department/ GEER Foundation and submit a comprehensive plan to forest department/ SEIAA. PP neither consulted Forest Department/ GEC/ GEER Foundation nor submitted any comprehensive plan. vi. PP had to spend ₹ 20.67 lakh and ₹ 2.51 lakh included as Capital cost and Maintenance cost for green belt development as per the EMP. PP did not incur any expenditure for this purpose till date.
7.	Gujarat	Additional Salt works (2395.15 Acres) located at Village Kalatalav & Narmad, Bhavnagar	i. As per the condition imposed by GCZMA as well as SEIAA, PP was required to carry out mangrove plantation in additional 50 ha area. This condition was not complied by the PP ii. PP shall commission a comprehensive EIA through a reputed institute. Comprehensive EIA was not prepared by PP iii. PP was to regularly carry out study on environmental surveillance covering the status of mangroves and other coastal and marine ecosystems in the vicinity through the reputed institute and submit the report every year to the F&E Department. No such study was carried out by the PP. iv. PP was to submit annual environmental audit report indicating the changes with respect to the baseline environmental quality in the coastal and marine environment by the PP to F&E Department and SEIAA. This condition was not complied by the PP
8.	Gujarat	Construction of Marine bridge between Beyt Dwarka and Okha by Road and Building Department, Jamnagar, GoG	i. PP was required to set up separate environmental management cell. No such cell was created by PP. ii. Permission for Non-agricultural use for the land to be obtained. The construction camp was established on the agricultural land without permission for Non-agricultural use iii. Records related to monitoring of fugitive emission in the work area required to be maintained. Such records were not maintained. iv. Used oil to be sold to registered recyclers only. According to PP, used oil was being sold to local vendors and not registered recyclers.

S. No.	State	Project Name	Observation
			v. Annual environment audit reports indicating changes, with respect to the baseline environmental quality in the coastal and marine environment was to be submitted to Forest and Environment Department by the PP. Annual environment audit after commencement of construction was not carried out.
			vi. Construction Camp was to be kept outside CRZ area. We observed using Google Maps as well as the approved CZMP for the area that a part of the construction camp fell under CRZ area
			vii. Construction/installation of settling ponds and oil receptors to prevent the entry of the surface runoff from fuel and other contaminants into the marine water. No such settling ponds and/or oil receptors were observed at project site.
9.	Karnataka	Construction of Petroleum Products Storage Terminal at Karwar, Karnataka Port by M/s Tropicana Liquid Storage (P) Ltd.	i. There is no Proper oil spillage contingency plan put in place. Dedicated boats fitted with booms/skimies etc. are not deployed to avoid oil spillage. The PP had not tied up with the Karwar Port for firefighting and oil spill mitigation measures.
			ii. There is no computerized SCADA (Supervisory Control and Data Automation) system for identifying leakage in the pipeline to cut off pumping immediately.
			iii. The PP has not set up separate environmental management cell for effective implementation of the stipulated environmental safeguards under the supervision of a Senior Executive.
10.	Kerala	Cochin Residential Development Project by M/s TRIF Kochi Projects Private Ltd, Ernakulam	i. As per specific condition I(iv) of EC, there shall be no development within 0-200 metres from HTL. We observed that the entire construction of the project was carried out within 200m of HTL. No action has been taken by MoEF&CC/KCZMA against the violations of the conditions of EC.
			ii. Specific condition I (xxx) of EC stipulated that, under the provisions of EP Act, 1986, legal action shall be initiated against the PP if construction of the project was started without EC. The Chief Town Planner, Thiruvananthapuram approved (June 2012) the layout of buildings and usage of the plot subject to the condition that EC should be obtained for the project and, Kochi Municipal Corporation should ensure that construction is accord ng to CRZ Notifications. However, Corporation of Kochi has ssued (March 2011& July 2012) building permit to the project before the issue (February 2016) of EC by MoEF&CC. No punitive action was taken by MoEF&CC/KCZMA in this regard.
			iii. Clause 3(xi) of CRZ Notification 2011 drawl of ground water is permissible only when done manually through ordinary wells for drinking, horticulture, agriculture and fisheries and where no other source of water is available.

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S. No.	State	Project Name	Observation
			But during JPV it was noticed that the main source of water was Ground water for which a Tube well was constructed for meeting the entire water requirement. iv. As per specific condition II (vi) of EC, the installation of the Sewage Treatment Plant (STP) should be certified by an independent expert and a report in this regard should be submitted to the Ministry before the project is commissioned for operation. The project was commissioned without the certification by an independent expert on the installation of STP.
11.	Kerala	Construction of Star Hotel at Alapphuzha West Village, District Alapphuzha by M/s East Venice Hotels and Resorts Pvt Ltd	Construction of basement shall be allowed only if NOC is obtained from State Ground Water Authority. NOC from Ground Water Authority was not obtained for construction of the basement.
12.	Maharashtra	Mumbai Coastal Road Project (South) - Princess Flyover to Worli end of Sea Link by M/s Municipal Corporation of Greater Mumbai	Condition on rehabilitation and resettlement of the fishermen communities in the event project impacts existing livelihood pattern of these communities. Observation taken in the main report.
13.	Maharashtra	Mumbai Trans Harbor Sea Link by M/s Mumbai Metropolitan Region Development Authority (MMRDA)	i. MMRDA was to ensure that fishing activity is not hampered during construction and operation of the project and assess loss of business to the project affected fishermen due to the project. ii. The MoEF&CC approved (January 2016) for diversion of 47.41 ha of forest land for MTHL provided MMRDA in consultation with the State Government shall create and maintain alternate habitat/home for the avifauna whose nesting trees are to be cleared in this project. Bird nests artificially made out of the eco-friendly material shall be used in the area including forest area and human settlements adjoining the forest area being diverted for the project. Chief Conservator of Forest (T), Thane permitted (May 2017) cutting of trees before the commencement of construction work of MTHL. It was noticed that although a total of 669 no of trees were removed for the project no alternate habitat /home for the affected avifauna was created. MMRDA stated (September 2021) that based on the estimation of Rs 1.50 lakh for the purpose of artificial nests along with Rs 61 lakh for soil and moisture conservation work by the Deputy Conservator of Forest, Alibag it had deposited (November 2016) Rs 62.50 lakh with the forest department.

S. No.	State	Project Name	Observation
14.	Tamil Nadu	Integrated Cooum River Eco-Restoration Project by M/s Chennai Rivers Restoration Trust	i. Desiltation of the Cooum River in CRZ area was permitted for a quantity of 5,08,177 cu.m only. Against this, PWD had carried out desiltation of the river for a quantity of 8,94,757 cu.m, (i.e.) 3,86,580 cu.m. in excess of the quantity permitted by TNSCZMA in its recommendation.
			ii. Silt generated through dredging was to be scientifically disposed outside the CRZ area. Bunding and landscaping changes were prohibited activities. Public Works Department removed only 40% of the silt generated to dump yards, and the remaining silt was deposited on the riverbank, which led to formation of bunds that affected the landscape. The above violations were neither detected by the TNSCZMA nor by the DCZMA, Chennai region. Thus no action was taken by the authorities against the above violations. Further, due to unauthorized dumping of excessive silt and raising of bund height by PWD, the Greater Chennai Corporation had abandoned its ambitious Cooum River Front Development Project of construction/development of Parks, Walkways, Nature Trail Park etc at a cost of Rs 32.17 crore and terminated all contracts related to the project.
15.	Maharashtra	Rerouting of Mumbai Manmad Pipeline	The clearance letter stipulated that in all the major water bodies, the Horizontal Directional Drilling (HDD) method should be used to avoid damage to the mangroves. The Regional office, MoEF&CC, Nagpur was required to monitor the implementation of environment safeguard through inspection and the BPCL was required to submit half-yearly compliance reports. The Regional office has not monitored the project and BPCL had not submitted the mandatory half-yearly compliance reports to the regional office. Regional office, MoEF&CC, Nagpur stated (January 2021) that BPCL had not submitted any information pertaining to HDD. It was further cited deficient manpower for non monitoring.
16.	Tamil Nadu	Alignment of conveying main to Buckingham Canal for the discharge of treated sewage from the proposed 36 MLD Sewage Treatment Plant (STP) by M/s Chennai Metro Water Supply And Sewerage Board Sholinganallur	i. Allocation of 2% of the project cost towards fulfilling its Corporate Environment Responsibility (CER) during the currency of the project. Account of measures taken should be maintained and should also be submitted to the CZMA every six months. This condition was not complied with.
			ii. Regular soil and ground water test in and around the project site to ensure monitoring ground water quality / leaching of heavy metals and other toxic contaminants. This condition was not complied with.
			iii. Time bound action plan for treating the sewage and usage of resultant effluent for industrial and other applications was to be made. This condition was not complied with.
			iv. Uploading compliance report on the stipulated conditions on the website of the PP was not done

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S. No.	State	Project Name	Observation
			v. Submission of report on year wise expenditure from the funds earmarked for environment protection to the ministry and its regional office was not done
17.	Tamil Nadu	Relaying of Pipeline & Redevelopment of Edible Oil Transit Terminal at Chennai by M/s Ruchi Infrastructure Limited	i. Allocation of 2% of the project cost towards fulfilling its Corporate Environment Responsibility (CER) during the currency of the project was to be made. Account of measures taken were to be maintained and were also to be submitted to the SCZMA every six months. This condition was not complied with.
			ii. Uploading compliance report on the stipulated conditions on the website of the PP was required. This condition was not complied with.
			iii. Submission of report on year wise expenditure from the funds earmarked for environment protection to the ministry and its regional office was required. This condition was not complied with.
18.	Tamil Nadu	2X800 MW Uppur Supercritical Thermal Power Plant at District Ramanathapuram by TANGEDCO	i. Allocation of 2% of the project cost towards fulfilling its Corporate Environment Responsibility (CER) during the currency of the project was to be made. Account of measures taken were to be maintained and were also to be submitted to the SCZMA every six months. This condition was not complied with.
			ii. Uploading compliance report on the stipulated conditions on the website of the PP was required. This condition was not complied with.
			iii. Submission of report on year wise expenditure from the funds earmarked for environment protection to the ministry and its regional office was stipulated. This condition was not complied with.

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Annexure 12: Cases where PPs did not submit any half yearly compliance report

(Reference: Para 4.1.2 (i) of the report)

State	Name of the Project
Goa	Deepening of approach channel for capesize vessels at Mormugao Port by M/s Mormugao Port Trust
Gujarat	i. Widening and improvement of the existing highway to 2-lanes paved shoulder/ 4 lane/ 6 lane of Bhavnagar- Pipavav- Porbandar-Dwarka Section of NH-8E by National Highway Authority Limited
	ii. Development of Greenfield Beach Resort at Mandvi, District Kutch by M/s Tourism Corporation of Gujarat Ltd.
	iii. Common treated effluent disposal pipeline project along river Kolakupto deep sea via Kolak Estuary, Vapi by M/s Weltreat Enviro Management Limited
Karnataka	Construction of Petroleum Products Storage Terminal at Karwar, Karnataka Port by M/s Tropicana Liquid Storage (P) Ltd.
Kerala	i. Cochin Residential Development Project by M/s TRIF Kochi Projects Private Ltd, Ernakulam: As compared to 8 half yearly reports, only 3 compliance reports were submitted to KSPCB.
	ii. Construction of Star Hotel at Alapphuzha West Village, District Alapphuzha by M/s East Venice Hotels and Resorts Pvt Ltd
Tamil Nadu	i. Integrated Cooum River Eco-Restoration Project by M/s Chennai Rivers Restoration Trust
	ii. Intake and outfall facility of Marine Algae in District Ramanathapuram by M/s EID Parry (India) Ltd
	iii. Eco-restoration of Adyar River (2000 m – 4000 m chainage) from Thiruvika Bridge to 400 m upstream to Kotturpuram Bridge
	iv. Alignment of conveying main to Buckingham Canal for the discharge of treated sewage from the proposed 36 MLD Sewage Treatment Plant (STP) by M/s Chennai Metro Water Supply And Sewerage Board Sholinganallur
	v. Relaying of Pipeline & Redevelopment of Edible Oil Transit Terminal at Chennai by M/s Ruchi Infrastructure Limited
	vi. 2X800 MW Uppur Supercritical Thermal Power Plant at District Ramanathapuram by TANGEDCO

Annexure 13: Non- submission of Environmental Statement by the PP

(Reference: Para 4.1.2 (ii) of the report)

S. No.	Name of the project
1.	Alignment of conveying main to Buckingham Canal for the discharge of treated sewage from the proposed 36 MLD Sewage Treatment Plant (STP) by M/s Chennai Metro Water Supply And Sewerage Board Sholinganallur, Tamil Nadu
2.	Relaying of Pipeline & Redevelopment of Edible Oil Transit Terminal at Chennai by M/s Ruchi Infrastructure Limited, Tamil Nadu
3.	2X800 MW Uppur Supercritical Thermal Power Plant at District Ramanathapuram by TANGEDCO, Tamil Nadu
4.	Cochin Residential Development Project by M/s TRIF Kochi Projects Private Ltd, Ernakulam, Kerala
5.	Construction of Petroleum Products Storage Terminal at Karwar, Karnataka Port by M/s Tropicana Liquid Storage (P) Ltd., Karnataka
6.	MMPL rerouting project, Maharashtra
7.	Mumbai Trans Harbor Sea Link by M/s Mumbai Metropolitan Region Development Authority, Maharashtra
8.	Mumbai Coastal Road Project (South) - Princess Flyover to Worli end of Sea Link by M/s Municipal Corporation of Greater Mumbai, Maharashtra
9.	Malad sewage treatment plant by M/s Municipal Corporation of Greater Mumbai, Maharashtra
10.	Construction of Holiday Resort at Alibag, Dist. Raigarh by M/s Savitri Nandkishor Dube, Maharashtra
11.	Proposal for Transportation and Distribution of Natural Gas from Uran to Navi Mumbai Municipal Corporation, Mumbai, Maharashtra, Maharashtra
12.	Construction of Resort on Plot at Mauje Chandranagar, Tal: Dapoli, District Ratnagiri, Maharashtra
13.	Construction of Resort on Plot at Mauje Karde, Tal. Dapoli, District Ratnagiri, Maharashtra
14.	Construction of Resort on Plot at Mauje Chandranagar, Tal. Dapoli, District Ratnagiri, Maharashtra
15.	High Speed Railway Project across CR2 areas in Mumbai, Mumbai Sub-urban, Thane and Palghar District (PH) by M/s National High Speed Rail Corporation Ltd, Maharashtra
16.	All weather Greenfield Jetty' at Nandgaon of Taluka Palghar, District Thane, Maharashtra by M/s JSW Infrastructure Ltd. , Maharashtra
17.	Expansion of facilities at port Redi, Sindhudurg by M/s Redi Port Ltd, Maharashtra

Annexure 14: SCZMAs granted recommendations in the absence of CTE/CTO certificate from the concerned State Pollution Control Board (SPCB)

(Reference: Para 4.1.2 (iii) of the report)

Central Sampled Projects	
Tamil Nadu	i. Integrated Cooum River Eco-Restoration Project by M/s Chennai Rivers Restoration Trust
	ii. Intake and outfall facility of Marine Algae in District Ramanathapuram by M/s EID Parry (India) Ltd
	iii. Eco-restoration of Adyar River (2000 m – 4000 m chainage)from Thiruvika Bridge to 400 m upstream to Kotturpuram Bridge
Maharashtra	Rerouting of Mumbai Manmad pipeline by BPCL
State sampled Projects	
Tamil Nadu	i. Construction of Tuna Fishing Harbour, Thiruvottiyur
	ii. Construction of residential buildings at Kottivakkam Village, Sholinganallur Taluk, Kanchipuram District by M/s. Perungudi DevelopersPvt. Ltd
	iii. Proposed development of Fishing Harbour at Vellapallam, Nagapattinam by Asst. Director, Fisheries department, Nagapattinam (South)
	iv. Renovation of Fishing Harbour at Mudhunagar, Cuddalore by Asst. Director, Fisheries department, Cuddalore
	v. Proposed widening of North Chennai Thermal Power station Road and Ennore Port Road by M/s. TN Road Development Company Ltd (TNRDCL)
Maharashtra	Redevelopment on property in Mazgaon, Mumbai, renamed as "Harbour Heights" by M/s. Sumer Buildcorp Pvt.
Goa	i. Construction of 20 MLD STP at Baina
	ii. Construction of 20 MLD STP at Margao
	iii. Construction of 1 MLD STP at Durbhat

Abbreviations		
1.	BENFISH	West Bengal State Co-operative Federation Ltd.
2.	BIS	Bureau of Indian Standards
3.	BOD	Biochemical Oxygen Demand
4.	CAA	Coastal Aquaculture Authority
5.	CCA	Composite Consent and Authorisation
6.	CDA	Chilka Development Authority
7.	COD	Chemical Oxygen Demand
8.	CRZ	Coastal Regulation Zone
9.	CTE	Consent to Establish
10.	CTO	Consent to Operate
11.	CVCA	Critically Vulnerable Coastal Areas
12.	CWLS	Coringa Wildlife Sanctuary
13.	CWQI	Coastal Water Quality Index
14.	CZMP	Coastal Zone Management Plans
15.	DIF	District Indicator Framework
16.	DLC	District Level Committees
17.	DMP	Disaster Management Plan
18.	DoFE	Department of Forest & Environment (State body)
19.	DPR	Detailed Project Report
20.	DPT	Deendayal Port Trust
21.	DSDA	Digha Shankarpur Development Authority
22.	EAC	Expert Appraisal Committee
23.	EIA	Environment Impact Assessment
24.	EMP	Environment Management Plan
25.	EP Act	The Environment (Protection) Act, 1986
26.	ESA	Ecologically Sensitive Areas
27.	F&ARD	Fisheries & Animal Resources Development ...
28.	GEER	Gujarat Ecological Education and Research Foundation
29.	GIS	Geographic Information System
30.	GoMMNP	Gulf of Mannar Marine National Park
31.	HTL	High Tide Line
32.	ICZMP	Integrated Coastal Zone Management Programme
33.	IMP	Integrated Management Plans
34.	IUCN	International Union for Conservation of Nature
35.	IWAI	Inland Waterways Authority of India
36.	JPV	Joint Physical Verification
37.	JTC	Joint Technical Committee
38.	KCBA	Kachchh Camel Breeders Association
39.	LTL	Low Tide Line

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40.	MCGM	Municipal Corporation of Greater Mumbai
41.	MCs	Municipal Corporations
42.	MLD	Millions of Liters Per Day
43.	MoEF&CC	Ministry of Environment, Forest and Climate Change
44.	MoES	Ministry of Earth Sciences
45.	MoSPI	Ministry of Statistics and Programme Implementation
46.	MPCB	Maharashtra Pollution Control Board
47.	MT	Metric Ton
48.	NABET	National Accreditation Board of Education & Training
49.	NBWL	National Board of Wildlife
50.	NCSCM	National Centre for Sustainable Coastal Management
51.	NCZMA	National Coastal Zone Management Authority
52.	NDZ	No Development Zone
53.	NGT	National Green Tribunal
54.	NIF	National Indicator Framework
55.	NIO	National Institute of Oceanography
56.	NPMU	National Project Management Unit
57.	NW	National Waterway
58.	PCB	Pollution Control Board
59.	PDO	Programme Development Office
60.	PHED	Public Health Engineering Directorate
61.	PP	Project Proponent
62.	QCI	Quality Council of India
63.	SCADA	Supervisory Control and Data Automation
64.	SDG	Sustainable Development Goals
65.	SCZMA	State Coastal Zone Management Authorities
66.	SEIAA	State Environmental Impact Assessment Authorities
67.	SICOM	Society of Integrated Coastal Management
68.	SIF	State Indicator Framework
69.	SPMU	State Project Management Unit
70.	STP	Sewage Treatment Plant
71.	ToR	Terms of Reference
72.	TPD	Tonnes Per Day
73.	TS Canal	Trivandrum- Shornur Canal
74.	UNDP-GEP	United Nations Development Program Global Environmental Facility
75.	WBFCL	West Bengal Fisheries Corporation Limited
76.	WQMBS	Water Quality Monitoring Buoy System
77.	WQMS	Water Quality Monitoring System
78.	WWF	World Wildlife Fund

ANNEXURE A-14

**BEFORE THE NATIONAL GREEN TRIBUNAL,
PRINCIPAL BENCH, NEW DELHI**

**Original Application No. 424 of 2016
(Earlier O.A. No. 169 of 2015)
And
Original Application No. 11 of 2014**

In the matter of :

**M/s. Mehdad & Anr.
Vs.
Ministry of Environment, Forests & Climate Change & Ors.
And
Shamsunder Shridhar Dalvi & Ors. Vs. Govt. Of India & Ors.**

**CORAM : HON'BLE MR. JUSTICE SWATANTER KUMAR, CHAIRPERSON
HON'BLE DR. JUSTICE JAWAD RAHIM, JUDICIAL MEMBER
HON'BLE MR. BIKRAM SINGH SAJWAN, EXPERT MEMBER**

Original Application No. 11 of 2014:
Present: Applicant:
Respondent

Mr. Pradeep Mishra and Daleep Kr. Dhayani, Adv.
Mr. Rahul Pratap, Adv. for Ministry of Environment, Forest and Climate Change
Mr. Dilip Poolakat, Adv. for State of Goa
Ms. Hemantika Wahi and Puja Singh, Advs. for State of Gujarat and GSPCB

Original Application No. 424 of 2016
Present: Applicant:

Mr. Raj Panjwani, Sr. Adv. with Mr. Aagnay Sail, Adv.
Mr. Rajesh K. Singh and Mr. Rovina Verma, Advs. for Ministry of Environment, Forest and Climate Change
Mr. R. Rakesh Sharma, Adv, Mr. V. Mouli, Adv. and Mr. Naveen Raj, Adv. for State of Tamil Naidu, TNPCB
Mr. Guntur Prabhakar, Mr. Guntur Pramod Kumar and Mr. Prashant and Mr. Gautam Prabhakar, Advs. for State of Andhra Pradesh
Mr. Rajesh Kumar Das, Adv. for UT Lakshadweep Administration
Ms. G. Indira and Mr. Bhupesh Narula, Advs. for Andaman and Nicobar Administration
Mr. Shashank Bajpai, Adv. and Mr. Shakun Gudha Shukla, advs. for State of Odisha
Mr. Prashant Kenjale, Adv. and Mr. Nishant, Adv. for State of Maharashtra
Mr. Devraj Ashok, adv.
Mr. Nishe Rajen, adv.
Mr. Raja Chatterjee, Mr. Piyush Sachdev and Ms. Abhinandini Yadav, Advs for State of West Bengal
Ganguli and Mr. Piyush Sachdev, Advs. for the State of West Bengal
Mr. Mukesh Verma, Adv.
Mr. Prashant S. Kenjale and Mr. Nishant, Advs. for State of Maharashtra
Mr. Nishe Rajen Shonker and Ms. Anu K. Joy, Advs. for State of Kerala
Ms. Hemantika Wahi and Puja Singh, Advs. for State of Gujarat and GSPCB
Inspector Rajesh Kumar, Chanakyapuri
Mr. Abhimanyu Garg Adv. for Govt. of Puducherry
Mr. SS Rebello, Mr. Sidarth Arora and Ms. Shivangini Gupta, Advs. for State of Goa
Mr. Raj Kumar, Adv. and Mr. Bhupender KUmar, LA for Central Pollution Control Board
Ms. Nishe Rajen Shonker, Adv., Ms. Anu K. Jy, Advs. for State of Kerala
Mr. Naginder Benipal, Adv
Mr. Devraj Ashok, Adv
Mr. Jai A. Dehadrai, Adv Mr. S.S. Rebello, Adv., Ms. Shivangini Gupta Advs. for State of Goa

	Date and Remarks	Orders of the Tribunal
	Item No. 07 & 08 November 22, 2017	**Original Application Nos. 11/2014 and 424 of 2016** Learned counsel appearing for the Ministry of Environment, Forest & Climate Change from instructions from the Officer who is present before the Tribunal submits that the Secretary, Ministry of Environment, Forest & Climate Change had called for the meeting of all the concerned States in relation to the coastal areas on 01st November, 2017. Upon due deliberations the Secretary had directed that all the States must file their draft of CZMPs by 31st March, 2018, however the State Kerala and State of Gujarat had asked for more time before the Secretary for submission of the CZMP by the month of May and June, 2018 respectively. Since the matter was not attaining proper progress and the matter was lingering on one pretext or the other and non - cooperation by the State Governments, the Tribunal had directed all the States that States of Andhra Pradesh, Karnataka, Tamil Nadu, Kerala, Gujarat, Goa, West Bengal, Maharashtra, Pondecherry and Andman and Nicobar all counsel are present. They have also filed their Affidavit – cum- undertaking before the Tribunal where these very States have asked for time to file the CZMP of the respective States and UTs even extending the time upto June, 2018. Learned counsel appearing for the Ministry of Environment, Forest & Climate Change submits that they would be able to approve the draft CZMP and the hazard line within three months from the date of receiving the CZMPs drafts from the respective States. In light of the above and while ensuring that no

further undue delay should be caused in determination of the hazard line and finalization of the CZMPs for the respective States. As the entire development activity out of prohibited area, regulated area and area permitted to development in accordance with the CZMP would be dependent upon finalization of the above. It is suggested by Ministry of Environment, Forest & Climate Change that the States should not grant Environmental Clearance for development activity which falls within the permissible area/ regulated area as that may result in defeating the entire exercise. As per the statement of Ministry of Environment, Forest & Climate Change we direct accordingly. It is necessary that strict timeline for adherence should be fixed by the Tribunal. We shall issue the following directions:-

1. All the State Governments without default and delay will submit CZMP to Ministry of Environment, Forest & Climate Change by 30th April, 2018. In the event any State Government and UT do not submit the said plan, they shall be liable for exemplenary costs of Rs. 5 Lacs which should be recovered from the salary of the defaulting Officer. The non-compliance would invite action for violating the orders of the Tribunal.
2. Within three months thereafter that is by 31st July, 2018 the Ministry of Environment, Forest & Climate Change shall issue approval in regard to the fixation of hazard line and CZMP for the respective State covering the entire coastal area. Now if the Officers and Ministry of Environment, Forest & Climate

Change commit default they shall also be liable to be proceeded against in accordance with law.

3. We also grant liberty to Ministry of Environment, Forest & Climate Change to move the Tribunal well in time if there is default on the part of any of the States. But Ministry of Environment, Forest & Climate Change would not be permitted to contend non-cooperation from States as the reason for delay, if any, in compliance of this deadline in this order. We are putting Ministry of Environment, Forest & Climate Change at Notice.

The Applicant would also at liberty to approach the Tribunal if so advised.

The interim order dated 05th February, 2018 shall continue till July, 2018.

With above directions, Original Application Nos. 11/2014 and 424 of 2016 stand disposed of without any order as to costs.

.....,CP
(Swatanter Kumar)

.....,JM
(Dr. Jawad Rahim)

.....,EM
(Bikram Singh Sajwan)

NATIONAL GREEN TRIBUNAL, NEW DELHI

NOTARY SUBHASH KRISHNA KANEKAR SALCETE 'ALUVA' MARGAO-GOA Regn. No. 344/14 Exp. 31.12.2024 GOVT. OF (INDIA)

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ANNEXURE A-15

BEFORE THE NATIONAL GREEN TRIBUNAL, WESTERN ZONE BENCH, PUNE

APPLICATION NO.117/2014 (WZ)

Vanshakti Vs. Union of India Through MoEF & CC & Ors.

CORAM: HON'BLE MR JUSTICE U.D. SALVI, JUDICIAL MEMBER
HON'BLE DR. AJAY A. DESHPANDE, EXPERT MEMBER

Present:	**Applicant/ Appellant**	:	**Gayatri Singh Adv a/w Mr Zaman Ali Adv**
	Respondent No.1	:	**Aniruddha Topkire Adv holding for Mr. Amit Karkhanis Adv Mr. K.K.Ramchandran, Scientiest-F (NCESS)**
	Respondent No.2+(i)	:	**Mr. D.M.Gupte Adv a/w Supriya Dangare Adv**

Date and Remarks	Orders of the Tribunal
Item No.7 February 10, 2016 Order No.8	We have heard the parties. The present Application has been filed for seeking immediate release and publication of Coastal Zone Management Plan (CZMP) Maps for implementation of CRZ-Notification, 2011. According to the Applicant the Government has failed to fulfil its statutory obligations and is illegally extending period of validity of CZMP maps from time to time, the last of such extension being up to 31st January, 2016. As a result of it, the old CZM Map/s of 1996 are being used for granting permissions for constructions in CRZ areas and for regularization of CRZ violations, in contravention of the mandate of law. The record reveals that service of Notice is complete. However, the Respondent No.2 Maharashtra Coastal Zone Management Authority (MCZMA) and the Respondent No.1 Union of India, Secretary MoEF, who are concerned with the work of finalization of the CZMP Maps have not filed their replies, despite sufficient opportunity being granted to them to place their replies before us. On 27th January, 2016, learned Counsel appearing on behalf of MCZMA, submited that the CZMP Maps have been prepared by the Indian Remote Sensing (IRS) and the Centre for Earth and Science Studies (CESS) respectively to scale of 1:4000, but the Maps required for public hearing, which is stage in finalization of CZMP, to the scale of 1:25000 have not been prepared. We, therefore, issued Notice to the IRS and CESS and today in response to the Notice, Mr. K.K.Ramchandran, Scientist-F, CESS, is present before us. He submits that draft CZMPs for Thane and Sindhudurg districts in the scale of 1:25000 as well as 1:4000 have

NOTARY SUBHASH KRISHNA KANEKAR SALCETE GOA MARGAO

Item No.7
February 10, 2016
Order No.8

been prepared and submitted to National Coastal Zone Management Authority (NCZMA) in 2014 and copies of the said Maps in GIS format were sent to the National Centre for Sustainable Coastal Management (NCSCM) in 2014 for verification and vetting for High Tide Line (HTL) and Low Tide Line (LTL).

Learned Counsel appearing on behalf of the MCZMA placed before us communication dated 8.2.2016 received from the IRS. It makes reference to copy of the affidavit dated 8th February, 2016, which was to be tendered before us on behalf of the IRS. With reference to these documents, learned Counsel appearing on behalf of the MCZMA submits that the Ministry of Environment, Forests & Climate Change (MoEFF & CC), New Delhi has decided to take steps to ensure national uniformity because different institutions, agencies and authorities prepare the CZM maps, and as a part of the said initiative, the IRS was asked by MCZMA to deliver the demarcated HTL, LTL to NCESS for the purpose of reconciliation. He further submits that upon receipt of reconciliation of HTL and LTL from the NCSCM, the IRS will be in a position to deliver the draft of CZMP Map to scale of 1:25000 as per CRZ Notification, 2011. He further submits that this exercise will require a months' time to conclude and to have final draft of CZMP Map for all districts to the scale 1:25000 for public consultation, a stage in the process of finalization of CZMP. Learned Counsel appearing on behalf of the MCZMA submits that a proposal has been sent by the MCZMA to MoEF for CZMP-96 vaidity extension. Evidently, the exercise is going to take a time and field is open for further mischief in meanwhile.

We, therefore pass following directions:

Pending hearing and final disposal of this Application, the Respondent shall not grant permission regarding developmental and construction activities in CRZ areas and shall not allow any regularization of CRS violations until the CZMP Maps under the 2011 Notification, are published.

List this case on 21st March, 2016.

..... JM
(Justice U.D.Salvi)

..... I
(Dr.Ajay A. Deshpande)

NOTARY SUBHASH KRISHNA KANEKAR GOVT OF GOA (INDIA)

ANNEXURE A-16

ORDER

Read:-1) Order no. 29/8/TCP/2012-13/RPG-21/Status/1803 dtd. 4/6/2012.
2) Order no. 29/8/TCP/2015/Gen/3982 dtd. 28/9/2015.

1. Whereas the Government vide Order dated 4/6/2012 read at preamble (1) above, had issued directions to withhold the Regional Plan-2021 and to use Regional Plan 2001 as reference plan for the purpose of determining the land use while using the policies of Regional Plan 2021 with respect to FAR, village status and height of building. As per the said Order, permissions can be granted in plots falling under developable zone as per both the Regional Plans i.e. Regional Plan 2001 as well as Regional Plan-2021.

2. And whereas, by Order dated 28/9/2015 read at preamble at sl. No. 2) above, the decision of Government was conveyed for relaxation of Order dated 4/6/2012 read at preamble sl. No. 1) above, for proposals cleared by Goa Investment Promotion and Facilitation Board. As per the said Order projects cleared by GIPFB can be issued permission, if the land under reference falls in settlement zone, industrial zones and Institutional zones as per Regional Plan 2021.

3. And whereas, it has been brought to the notice of the Government, that many applications for personal housing in lands classified as Settlement areas as per Regional Plan 2021 are pending for clearance as the land pertaining to the same are not classified under Settlement Zone in the Regional Plan 2001 and vice versa, due to the instructions contained in the Order dated 4/6/2012, and putting the public at large to hardship.

"Information" made available under Right to Information Act, 2005
Town and Country Planning Dept. (H.Q.)
Panaji.
Issued to N.S. Diana Tavares
14-05-2018

NOTARY
SUBHASH KRISHNA KANEKAR
H.NO 344/14
Exp. Dt: 29/02/2024
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4. And whereas, there are cases of the nature that the properties zoned earlier under Industrial Zones in the Regional Plan for Goa 2001 have been shown under Settlement Zone as per Regional Plan for Goa 2021, in which case the owner of the land can neither get permission to develop industry nor develop the land for residential use as per the Order dated 04/06/2012.There are applications from institutions for setting up state of the art educational institutions and knowledge centres, pending for want of zoning clarity. Many tourism related projects are also awaiting nod which conforms to Regional Plan 2021.

"Information" made available under Right to Information Act 2005
Issued to MS Diana Tavares
14-05-2018
PIO - 6
Town and Country Planning Dept (H.Q.)
Panaji

5. And whereas, the Government has recently brought about amendment to section 49(6) of the Act, thereby making it mandatory for registration of plots which are not as per the survey plan or plots which are not having approval from competent Authority, to obtain a No objection Certificate from Chief Town Planner(Planning). This was enacted primarily to control large scale unauthorized fragmentation of Orchard and agricultural lands which was taking place at brisk pace in the state. Government has observed that many unauthorized land developments have already taken place by way of registration of sale deeds for smaller plots and construction of pucca houses/buildings have sprung up in many plots. Some of them are within settlement areas, as per RPG 2021 and where as many such developments are in non settlement areas as per both the Regional Plans, It was found necessary, that whatever developments which have come up in settlement area of Regional Plan 2021, could be considered for regularization by following rules.

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SUBHASH KRISHNA KANEKAR
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MARGAO-GOA
REG. NO. 3/2014
29/02/2024
GOA (INDIA)

...3/-

6. Now therefore, in view of the aforesaid circumstances it has become necessary to issue fresh directions, in supersession to Orders dated 4/6/2012 and 28/9/2015, as under:

A. Development in land zoned under Settlement zones or Commercial Zones or Industrial zones or Institutional Zones as per Regional Plan -2021 to be permitted as per its merit for uses permitted in respective zone, by following transparent process as under:-

i) Applications as received by the Taluka Level offices of the Department to be scrutinized with respect to the following:-

- Report on settlement character of the land and surroundings.
- Access conditions.
- Nature of land as to whether sloping/low lying or having forest trees etc.
- Permissibility as per Goa Land Development and Building Construction Regulations.

ii) The release of land shall further be subjected to the following:-

a) In case the area of land is more than 5000.0sq.mts, opinion of Forest Department and Agricultural Department shall be obtained.

b) Areas such as low lying paddy field, water body, khazan land, flood prone area, land having slopes more than 25%, forest land including private forest land, land falling in the buffer zone of Wild Life Sanctuaries(without the prior permission of Forest Department) and No Development Zone as per CRZ notification(without prior permission of GCZMA) even if they fall in settlement or developable zone shall not be permitted.

B. Land falling under Settlement Zones as per Regional Plan 2021, but falling under Industrial Zones as per Regional Plan 2001(both developable zones) the lower use i.e. residential and allied uses permitted in Settlement zone could be considered. Applications for educational complexes institutes recognized by the Government could be considered on priority, in case the land under reference fall under Settlement Zone or Institutional Zone in the Regional Plan 2021.

...4/-

"Information" made available under Right to Information Act 2005 Issued to Ms Diana Tavares
PIO - 6
Town and Country Planning Dept (H.Q.) Panaji

NOTARY GOA

C. Cases of this nature considered by the Government as per the provisions of RPG-2021 and not in conformity with the RPG-2001 shall be notified to the public through Department's website. The Taluka level/District level offices shall maintain a register for recording such cases considered by the Government for ready reckoning for public scrutiny and for updation of Plans.

(J. Ashok Kumar)
Secretary (TCP)

To,
1. The Collector (North), Panaji – Goa.
2. The Collector (South), Margao – Goa.
3. The Senior Town Planner (North), TCP Dept., Mapusa – Goa.
4. The Senior Town Planner (South), TCP Dept., Margao – Goa.
5. All Branch Offices of TCP Dept.
6. The Director of Village Panchayat. Panaji – Goa.
7. The Director of Municipal Administration, Panaji – Goa.

Copy for information to:
1. The OSD to Hon'ble Chief Minister, Secretariat, Porvorim.
2. The OSD to Minister for TCP, Secretariat, Porvorim.
3. P.A. to Chief Secretary, Secretariat, Porvorim.
4. P.A. to Secretary (TCP), Secretariat, Porvorim.

Town and Country Planning Dept (HQ)
Panaji
PID – 6
Issued to Ms. Diana Tavares
14-05-2024

NOTARY SUBHASH KRISHNA KANEKAR SALCETE GOA (INDIA)

ANNEXURE A-17

IN THE HIGH COURT OF BOMBAY AT GOA.

PUBLIC INTERST LITIGATION WRIT PETITION NO. 45 OF 2018.

FEDERATION OF RAINBOW
WARRIORS, THR. ITS
TREASURER, SIDHARTH KARAPURKAR
AND 8 ORS. ... Petitioners.
Versus
THE TOWN AND COUNTRY
PLANNING DEPARTMENT, GOVT.
OF GOA, THR. THE CHIEF
TOWN PLANNER AND ANR. ...Respondents.

Ms. Gayatri Singh, Senior Advocate with Ms. C. Collasso and Ms. Ronita Bhattacharya, Advocates for the petitioners.
Mr. D. Shirodkar, Addl. Govt. Advocate for respondent nos. 1 and 2.

Coram:- M. S. SONAK &
PRITHVIRAJ K. CHAVAN, JJ.
Date:- 26th February 2019.

P.C.

Heard Ms. Gayatri Singh, learned Senior Advocate with Ms. C. Collasso and Ms. Ronita Bhattacharya, Advocates for the petitioners and Mr. D. Shirodkar, learned Additional Government Advocate for respondent nos. 1 and 2.

2. On 30.11.2018, we had made following order in this petition.

> *" Issue notice to the respondents returnable on 11th December 2018.*
> *2. The learned Additional Government Advocate waives notice on behalf of the respondent nos.1and 2.*

NOTARY SUBHASH KRISHNA KANEKAR Regd. No 344/14 Exp. On: 28/02/2024 GOVT. OF GOA (INDIA)

3. *The learned counsel appearing for the petitioners has invited our attention to the order dated 28th March 2018, which is subject matter of the challenge in the instant petition.*

4. *It is submitted that if that order passed by the State Government is considered as it is, the action of the respondents in granting permission in certain cases is contrary to clause 6A (ii)(b) of the order dated 28.3.2018, which reads thus:*
"Areas such as low lying paddy field, water body, khazan land, flood prone area, land having slopes more than 25%, forest land including private forest land, land falling in the buffer zone of Wild Life Sanctuaries (without the prior permission of Forest Department) and No Development Zone as per CRZ notification (without prior permission of GCZMA) even if they fall in settlement or developable zone shall not be permitted."

5. *The concerned Authorities and State Government are expected to look into this aspect and act accordingly."*

3. In response to said order, Shri Rajesh Naik, Senior Town Planner North Goa, holding charge as Chief Town Planner (Planning) of respondent no.1 has filed an affidavit in reply. In paragraphs 36 and 37 of the affidavit in reply, this is what he has stated in the context of our order dated 30.11.2018.

"Paragraph 36:- I say that by order dated 30.11.2018, this Honourable Court was pleased to issue notice to the Respondents. At that time, a contention was raised by the Petitioners that certain permissions are granted contrary to Clause 6A(ii)(b). This Honourable Court observed that the concerned authorities would be expected to

look into the aspect and act accordingly.

Paragraph 37:- I say that the Department will ensure that the clauses and conditions specified in the said Orders, are strictly followed. I say that in the event any breach is noticed, appropriate action will be taken in accordance with law. I say that these conditions are aimed at ensuring that any applications for Technical clearance are decided based on the Plan but however following all the safeguards that are laid down. I say that the department will issue appropriate instructions to all Taluka level officers directing the officers to ensure strict compliance with all the orders and informing that necessary action will follow in case any violation is noticed."

4. We accept the aforesaid statements made by the affiant as statements made to this Court. We also direct that there should be strict compliance as assured. In case of any breach necessary action as proposed must be taken.

5. Ms. Singh, points out that according to the petitioners, permissions have been granted in the following ecologically sensitive areas:-

1. *Nuvem sy no 38(serial no 1)- Low lying paddy fields which have been illegally filled up.*
2. *Camurlim sy nos 179 and 175 (serial nos 2-5) - Private forests that are not yet demarcated, but are identified by the South Goa Committee.*
3. *Dicarpale sy no. 38 (serial no.14-16, 19-22, 24-26) - Low -lying paddy fields.*
4. *Sarzora sy no.93 (serial no.17,18, 22, 23) -*

NOTARY
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Low-lying paddy fields."

6. Mr. Singh submits that aforesaid permissions, are in breach of clauses 6(b) of the notification/order dated 28.3.2018 which is subject matter of the challenge in the present petition. She submits that although the petitioners seek to challenge order dated 28.3.2018, the petitioners, in the interregnum are interested in ensuring that at least some of the beneficial provisions in the order dated 28.3.2018 are strictly implemented.

7. Mr. D. Shirodkar, learned Additional Government Advocate, quite justifiably points out that he will not be in a position to respond on the aforesaid issue at this stage. Accordingly, we direct the respondents to look into the specific instances cited by the petitioners and to thereafter file an affidavit within two weeks, explaining status of such permissions, if granted.

8. Mr. Singh, points out that clause (c) of the impugned order dated 28.3.2018 has not been complied with. Clause (c) of the impugned order 28.3.2018 reads thus:-

> *"Cases of this nature considered by the Government as per the provisions of RPG-2021 and not in conformity with the RPG-2001 shall be notified to the public through Department's website. The Taluka level/District level Offices*

shall maintain a register for recording such cases considered by the Government for ready reckoning for public scrutiny and for updation of plans."

9. Mr. D. Shirodkar, learned Additional Government Advocate states that aforesaid clause will be complied with and cases of the nature referred in the impugned order dated 28.3.2018 considered by the Government as per the provisions of RPG-2021 and not in conformity with the RPG-2001 shall be notified to the public through Department's website. He states that Taluka level/District level Offices shall maintain a register for recording such cases considered by the Government for ready reckoning, for public scrutiny and for updation of plans.

10. Respondents have filed an affidavit in reply and the copy of the same is served upon the learned Advocate for the petitioners. If the petitioners desire to file a rejoinder, they are granted leave to do so within one week.

11. Stand over to 18.3.2019.

PRITHVIRAJ K. CHAVAN, J. **M. S. SONAK, J.**

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ANNEXURE A-18

Report of the Committee
to Review the Issues Relating to the
Coastal Regulation Zone Notification, 2011

(Information under RTI Act, 2005
Ref: 15/6/16
(CRZ-(A-2)
PROFFICE

NOTARY
SUBHASH KRISHNA KAKEKAR
SALCETE TALUKA
MARGAO-GOA
REG. NO. 24/14
EXPIRES ON 28/02/2024
GOVT OF GOA (INDIA)

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List of key abbreviations

CESS	Centre for Earth Science Studies (now designated as National Centre for Earth Science Studies)
CIDCO	City Industrial Development Corporation
CPDAC	Coastal Protection and Development Advisory Committee
CRZ	Coastal Regulation Zone
CVCAs	Critical Vulnerable Coastal Areas
CZMA	Coastal Zone Management Authority
CZMP	Coastal Zone Management Plan
DCR	Development Control Rules
DP	Development Plan
E(P)A 1986	Environment (Protection) Act, 1986
ESA	Ecologically Sensitive Area
FSI	Floor Space Index
HTL	High Tide Line
ICZMP	Integrated Coastal Zone Management Plan
IMBL	International Maritime Boundary Line
IMP	Integrated Management Plan
IPZ	Island Protection Zone
LTL	Low Tide Line
MoEF&CC	Ministry of Environment, Forests & Climate Change
MoES	Ministry of Earth Sciences
NCSCM	National Centre for Sustainable Coastal Management
NCZMA	National Coastal Zone Management Authority
NMMC	Navi Mumbai Municipal Corporation
NDZ	No Development Zone
SCZMA	State Coastal Zone Management Authority
SEIAA	State Environmental Impact Assessment Authority
SICOM	Society of Integrated Coastal Management
SLR	Sea Level Rise
SoI	Survey of India
UT	Union Territory

NOTARY SUBHASH KRISHNA KANEKAR SALCETE TALUKA MARGAO-GOA Regd. No 344/14 Exp. on 28/12/2024 GOVT. OF GOA (INDIA)

Executive Summary

The MoEF (now designated as MoEF&CC) constituted a six-member Committee on 17 June 2014 under the Chairmanship of Dr. ShaileshNayak, Secretary, MoES to examine the issues of coastal States/UT Governments relating to CRZ Notification, 2011 and to examine the errors or inconsistencies and procedural simplification in the said Notification. The other members of the Committee were Shri Shashi Shekhar, Additional Secretary, MoEF&CC, Prof. R. Ramesh, Director, NCSCM, Dr. M. Baba, Former Director, CESS, Shri Hardik Shah, Member Secretary, Gujarat CZMA and Dr. A. Senthil Vel, Additional Project Director, SICOM, the Member Secretary of the Committee.

The Committee examined the issues posed by coastal States/UTs with regard to CRZ Notification, 2011. The correspondences, communications and presentations made by the States/UTs are annexed. The Committee had sittings with the Governments of Maharashtra, Karnataka and Kerala in Mumbai, Bangalore and Thiruvananthapuram, respectively. Later, all the Statesand UTs were invited to Delhi and the Committee heard the representations. A summary of the presentations on the issues and suggestions of the States/UTs and the Committee's analysis of the same are given in detail in this report. The Committee also critically examined the CRZ Notification, 2011 with respect to the errors/inconsistencies and discussed the ways and means for procedural simplification.

After examining all the issuesdetailed by the State Governments and taking into consideration the implications of CRZ Notification, 2011 the Committee is of the opinion that the coastal zone management policy in the country should focus upon the following six principles:-

(i) Keeping in view the importance and incomparable valuesof ESAs, the geomorphological features, archaeological and heritage sites, the CRZ Notification should primarily focus on protection and conservation of such areas/features in the coastal areas.The protection and conservation including

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- The present CRZ Notification, 2011 has manyambiguities with regard to High Tide Line (HTL)/Low Tide Line (LTL) mapping, CRZ boundary demarcation and so on, which are prerequisites for CZMP, the preparation of which is considerably delayed. It is also observed that the Environment Departments of the States/UTs are extremely under-staffed to meet the challenges of coastal zone management (CZM). The existing staff in the States/UTs is mostly involved in addressing approvals and issues relating to CRZ-II and III. There have been very few instances where States/UTs have taken proactive steps in CRZ-I and CRZ-IV areas, the conservation of the ecosystems in it, combating pollution understanding the changes in the coastal areas and their impact and taken corrective steps inimproving the general environmental quality of the coast. Hence, the Committee is of the opinion that the Environment Departments of the States/UTs and MoEF&CC should be sensitized to address CRZ-I and CRZ-IV issues and in turn as a part of decentralization and empowering the local bodiesand provide such regulations that facilitate the States/UTs to undertake developmental activities that are ecologically sustainable.

Protection and conservation of Ecologically Sensitive Areas

- It has clearly emerged that the ecologically sensitive areas along the coastal and in the marine areas are extremely important to maintain the biodiversity of the marine life and also to maintain the functional integrity of the coast. Over a period of time the conservation and protection of ESA have been neglected and are under tremendous pressure due to increase in population and the developmental activities undertaken to meet the economic aspiration of the growing population. The destruction of ecosystems is a matter of concern and in several cases it is irreversible. The coastal ecosystems are important as they play a crucial role in the proliferation of marine fauna on which the local communities depend for livelihood. They reduce the vulnerability of coastal communities to natural disasters and play a crucial role in maintaining the functions of the coast including acting as a carbon sink. Hence, the Committee suggests that the Government should strengthen existing mechanisms, infrastructure, expertise and institutions at various levels to conserve and protect

the coastal ecosystems. The Government in this context may, in the larger interest of the country take appropriate steps in conservation, protection of ecosystems, while taking into consideration the basic requirements of the growing population.

Economic development along the coastal area

- The Committee is also of the opinion that new opportunities and initiatives need to be taken to address the economic and social development of coastal communities. Most of the traditional coastal communities that live on the resources from the coastal areas, especially fishing, need to be provided with adequate opportunities for economic development. In this regard, the Committee is of the opinion that while the ecosystems are being conserved and protected by the Governments, the local communities should also play an important role in the conservation and protection of the ecosystems. The local communities should be provided with an opportunity to take up tourism, artisanal fisheries such as traditional aquaculture and ornamental fish culture, in such ecosystem areas for their economic improvement. The Governments should work in this area, which will address both conservation and economic development of the communities thereby, reducing pressure on the already depleting fishery resources.
- The Committee has serious concern on the growing coastal pollution from industrial waste and sewage, dumping of solid waste, non-point source pollution from the agricultural areas, and so on. With the growing infrastructure in the coastal areas, especially in the cities and municipalitiespollution levels are bound to increase. This is a serious issue which needs to be addressed by the respective State/UT Governments on a mission mode by preparing effective CZMP and ICZMP.
- Another matter of concern which the Committee has noted is the changes in the shoreline. The shoreline change is mostly due to anthropogenic activities. In this context, certain initiatives have been taken by the MoEF&CC through the NCSCM wherein the shoreline changes are being mapped and studied. These studies need to be taken into consideration while undertaking foreshore developmental activities (CZMP and ICZMP). The studies need to be carried on

further to ascertain the exact reasons of shoreline change so as to implement remedial measures.

Impacts of climate change and initiatives to address the coastal vulnerability

- The Committee appreciates the initiatives taken by MoEF&CC in setting up exclusive Centres for coastal management such as National Centre for Sustainable Coastal Management (NCSCM), Society of Integrated Coastal Management (SICOM) and State-level Project Management Units (SPMUs) including strengthening of the consortium institutions in each of the coastal States/UTs. These agencies could be further developed for undertaking research and development in the area of coastal management and also to address the social needs of the coastal communities in the States/UTs.
- The Committee after detailed examination of all issues raised by the State/UT Governments and taking into account the current international scenario in the area, including the emerging scientific technologies in the field of coastal and marine management, is of the clear view that the MoEF&CC should embark upon new initiatives for protecting and conserving the coastal and marine areas, which are endowed with rich but fragile ecosystems. While taking up conservation and management of ecosystems, the MoEF&CCshall also identify/assess development of technologies/infrastructure that would have minimum impact on the coastal and marine environment and also address to the economic aspirations of the growing population of the country.

The Committee after examination of the issues raised by the coastal States/UTs and its own analysis, which are detailed out in the subsequent chapters of this report has proposed a revised CRZ Notificationin supersession of the existing CRZ Notification, 2011, the draft of which also forms a part of this report. The Committee suggests that the Government should examine the above-mentioned draft notification carefully and may also take into account any another emerging area/issues before considering it for implementation.

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Composition of the Committee

As per the Office Order No. 19-112/2013-IA-III dated 17 June 2014, the composition of the Committee constituted to review the issues relating to CRZ Notification, 2011 is as follows:

1)	Dr. Shailesh Nayak Secretary Ministry of Earth Science	Chairman
2)	Shri Shashi Shekhar, Additional Secretary MoEF, New Delhi	Member
3)	Prof. R. Ramesh, Director, National Centre for Sustainable Coastal Management, Chennai	Member
4)	Dr. M. Baba, Former Director, CESS Former Member, NCZMA	Member
(5)	Shri Hardik Shah, Member Secretary, Gujarat Coastal Zone Management Authority	Member
(6)	Dr. A. Senthil Vel, Additional Project Director, SICOM, New Delhi	Member Secretary

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Terms of Reference of the Committee

1. The broad Terms of Reference (ToR) of the Committee are:

   a) to examine issues relating to Maharashtra raised by the State Government vide letters dated 27.08.2013 and 23.12.2013;
   b) to examine issues relating to Karnataka raised by the State Government vide letters dated 16.08.2013, 28.02.2014 and 18.02.2014;
   c) to examine issues relating to Kerala raised by the State Government vide letters dated 10.02.2014;
   d) to examine errors/inconsistencies in the CRZ Notification, 2011 and procedural simplification and
   e) to examine any other issues raised by the State Government(s) during their interaction with the Committee.

2. The Committee may interact with the State/ UT Governments, if necessary.

Sittings of the Committee

The Committee in accordance with the ToR had the following meetings:

- 8 July 2014 at Mumbai – to examine the issues relating to Maharashtra,
- 21 August 2014 at Bengaluru – to examine the issues relating to Karnataka,
- 22 August 2014 at Thiruvananthapuram – to examine the issues relating to Kerala,
- 27 October 2014 at New Delhi – to examine the issues of West Bengal, Odisha, Tamil Nadu, Puducherry, Goa, Daman & Diu, Gujarat, Andhra Pradesh and
- 18 December 2014 at New Delhi – meeting of the Committee to draft the Report.
- 9January 2015 at New Delhi – meeting of the Committee to finalize the Draft Report.
- Thereport will be submitted in the third week of January, 2015

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Chapter 1

Introduction, Approach and Methodology adopted by the Committee

1.1Introduction

India's mainland coast extends to 5500 km and a total of more than 7500 km including the Andaman & Nicobar (A&N) and Lakshadweep Islands with nearly one-fourth of the country's population living within 50 km of the coast. A wide range of coastal ecologically sensitive areas such as mangroves, sea grass, coral reefs, tidal flats, estuaries, lagoons, sand dunes and salt marshes occur along the coast. A number of rivers flow into the Bay of Bengal on the east coast and into the Arabian Sea on the west coast, carrying large quantities of sediment. The east coast is dominated by large river deltas and sandy beaches, while the west coast consists of an intricate network of estuaries, backwaters and predominantly rocky coastline.

1.1.1 Importance of Coastal ESAs



Coastal habitats alone account for approximately one-third of all marine biological productivity and estuarine ecosystems (i.e., salt marshes, sea grasses, mangrove forests) are among the most productive regions. Coastal ESAs are home to unique flora and fauna. Coral reefs constitute less than 1% of the ocean floor but support over 25% of the marine biodiversity. Mangroves, beaches and coral reefs aid in controlling coastal erosion, shoreline change and also serve as a natural defense against coastal hazards such as storm surges, cyclones and tsunamis. The submerged

vegetation of these shallow habitats serve important functions as traps of suspended sediment, important winter forage for migratory birds and nursery areas for juvenile finfish and shellfish. While reefs, mangroves and sea grasses are important breeding and feeding grounds for shellfish and finfish, sand dunes and beaches play a major role as interface between sea and land by preventing erosion due to storm waves. In view of the immense value of the ESAs indicated here, including its contribution in maintaining the biological integrity of the coastas habitats for vast coastal biodiversity representing different levels in the food chain, it is imperative that necessary protection and conservation measures are put in place at the earliest. These sensitive ecosystems provide various ecosystem services, which provide livelihood avenues to millions of coastal population, directly and indirectly.

Coastal ecosystems are also very efficient **carbon sinks** and have a major role in sequestering atmospheric carbon dioxide. India has about 3,703,970 hectares of coastal wetlands, which accounts for ~25% of the total wetland areas of the country. Among these wetland ecosystems, mangroves occupy 4628 km^2, salt marshes ~1611 km^2, inter-tidal mud flats ~24,136 km^2, coral reefs ~1420 km^2 and sea grass ~360 km^2. Thesecoastal/ marine ecosystems are the most productive ecosystems of the world with a large potential for carbon sequestration. Overall, Indian mangroves are able to sequester about 1.5 metric tons of carbon per hectare per year. Recent data estimate that sea grasses together with salt marshes and mangroves are responsible for capturing up to 70% of the organic carbon in the marine realm making them one of the most intense carbon sinks on the planet.

In recent times, coasts have become a zone with multiple activities and stakeholders competing for coastal resources. However, coasts are also intensely prone to cyclones, storm surges, erosion and flooding. A combination of a contested space and a highly vulnerable environment means that coastal populations live in a high-risk landscape. The extent of erosion largely due to developmental activities along the coast is rapidly increasing. According to a recent study (2011) by the National Centre for Sustainable Coastal Management (NCSCM), almost 40% of the Indian coast is subject to coastal erosion. This figure is higher than earlier estimates by the Coastal Protection and Development Advisory Committee (CPDAC) which had

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reported in 2004 that about 22% of the coast was undergoing erosion and it had increased to almost 30% by 2010. Studies have indicated that loss of beach space has a serious impact on fishing communities in India, because much of the small-scale fishery is beach based and the houses of fishermen are located close to the shoreline.

1.1.2 Coastal Pollution

The coastal/ marine ecosystems are often considered the last receptacle of wastes. With increasing demographic pressure and activities along the coast, without a simultaneous increase in the treatment facilities available for the wastewater generated, pollution of coastal waters is rapidly increasing and is a matter of great concern. Major land-based pollution to the coast primarily includes domestic sewage – discharged directly into the sea or through the rivers, solid wastes dumped into waterways along the coastline, industrial effluents – untreated/partially treated and oil and grease – from land-based sources, marine sources such as ships, submarine seepage and refinery wastes.Municipal sewage is the main single source of pollution to the coastal waters due to land-based activities[1].

Key Issues along the Coast

- Destruction of coastal ecosystems for economic use or settlements
- Vulnerability to cyclones and storm surges
- Coastal erosion
- Pollution caused by industries, sewage discharge and agriculture in the drainage basin
- Overpopulation and settlements built at unsafe place or in wetlands
- Threatened food (e.g. fisheries) security
- Shortage in freshwater supply due to salt water intrusion.

It is estimated that 120 Class-I cities and Class-II towns of coastal areas generate about 6835 million liters per day (MLD) of wastewater per day, out of which, only 1492 MLD of wastewater undergoes various levels of treatment. The remaining is discharged directly to the coastal waters without any kind of treatment. This means that on an average 5343 MLD of untreated wastewater from municipal sources reachcoastal waters; which isequivalent to 5.343 million m^3 per day or 1.9 billion m^3 per year. This figure is

[1] http://www.cpcb.nic.in/comaps.php accessed 8 December 2014

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almost five times the earlier estimate of 0.41 x 10^9 m^3 (De Sa[2]). The disposal of solid waste generated by 120 coastal cities and towns are disposed in landfill sites, partly dumped openly and partly composted.About 16,734 tons per day of Municipal Solid Waste (MSW) was generated by 11 major coastal cities in 2011 (Status report on Municipal Solid Waste Management, CPCB, 2013). Some of the industries have adequate treatment facilities up to secondary/tertiary level.

In the case of small-scale industrial units and industrial clusters, treatment of wastewater is carried out by establishing Common Effluent Treatment Plants (CETPs). In Gujarat and Maharashtra, 24 CETPs discharge treated effluent to the coastal waters. Most of the CETPs comply with effluent standards. A first compilation of quantum of pollutants into the coastal ecosystem of India was given by De Sa (undated)[2] as follows:

S. No.	Item	Quantity
1.	Sediments	1600 million tons
2.	Industrial effluents	50 x 10^6 m^3
3.	Sewage – largely untreated	0.41 x 10^9 m^3
4.	Garbage and other solids	34 x 10^6 tons
5.	Fertilizer – residue	5 x 10^6 tons
6.	Synthetic detergents – residue	1,30,000 tons
7.	Pesticides – residue	65,000 tons
8.	Petroleum hydrocarbons (tar balls residue)	3500 tons
9.	Mining rejects, dredged spoils and sand extractions	0.2 x 10^6tons

A conservative figure for the quantum of sewage currently reaching the coast is 1.95 x $10^9$$m^3$ per year.

1.1.3 Coastal/Marine Fisheries:

The nature of fisheries in India is constantly changing with the emergence of new technologies and techniques in fishing, fuelled by local and global demandas access

[2]Present state of the coastal environment in India. http://www.teriin.org/teri-wr/coastin/papers/paper2.htm accessed 9 December 2014

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to markets improves. The estimated marine resource potential of the Indian EEZ is about 4.24 million metric tons at current exploitation levels. As the following graph shows, there has been an increasing trend in marine fish catch in the last 60 years.



Fig. 1: Estimated marine fish landings in India from 1950 to 2012 (Source:CMFRI Annual Report 2012--2013)

However, CMFRI attributes the increase largely to a few species such as oil sardines, perches and penaeid prawns. However, catch of fishes such as Hilsa and Mackerel have declined. According to CMFRI (2011), inshore waters have been almost exploited to unsustainable levels. Many reasons have been attributed to the reduction in the fish catch in the near-shore area apart from overfishing. These include habitat destruction especially of coastal habitats such as mangroves and other wetlands including estuaries, resulting in the loss of safe nursery areas for spawning and juveniles, pollution from municipal and industrial sources due to large-scale coastal development, construction of aquaculture farms in coastal areas and so on.

In India, according to CMFRI Census (2010), there are 3288 marine fishing villages and 1511 marine fish landing Centres in the maritime States and UTs. The total marine fisher population was about 4 million comprising 864,550 families. About 38% of the marine fishers were engaged in active fishing with 85% of them having full

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time engagement. About 63.6% of the fishers were engaged in fishing and allied activities.

1.1.4 Assessment of Coastal and Marine Ecosystem Goods and Services

Coastal regions provide most of the identified ecosystem services and account for highest value on per hectare basis for any ecosystem. The goods from the coastal ecosystems generate provisioning services which include food, salts, minerals and oil resources, construction materials and biodiversity including genetic stock that has potential for various biotechnological and pharmaceutical applications. There are 13 major ports and 176 non-major ports along the India's 7500 km (including island territories). India is the sixth largest producer of fish with an annual potential yield of 3.92 million tons.

Economic Evaluation of the Coast

- The total value of marine fisheries is estimated to be Rs. 32,844 crore for the year 2012–2013.
- The value of minerals found along the coastal/sandy beaches of the country is estimated to be around Rs. 1390 crore per year, based on annual extraction.
- The value of regulating function of mangroves and seagrass as sequesters of carbon has been estimated to be more than Rs. 600 crore per annum based on carbon values used in a previous MoEF&CC funded study on valuation of ecosystem services for forests in India.
- Dense and very dense mangroves account for 2368 km^2 (56% of the total mangroves cover), sparse mangroves account for 1514 km^2 (33%) and degraded mangroves account for 483 km^2 (10%).

An estimated 200,000 traditional crafts carryout traditional fishing and about 35,000 mechanized fishing boats are enhancing their fishing capacity annually. Employment generation due to coastal ecosystem services may be categorized under heads such as marine fisheries, backwater fisheries, seaweed collection, salt production, coastal aquaculture/shrimp production and coastal tourism. Ecosystem based coastal and marine tourism provides huge employment opportunities, especially to the local communities. If the ESAs are managed properly and adequate tourism facilities provided, the tourism sector in this area can have tremendous employment opportunities.

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1.1.5 Best Practices of Conservation management

Globally, diverse management practices are being followed for the conservation of coastal/ marine ecosystems. The management regime recommended by the International Union for Conservation of Nature (IUCN) is taken as one of the best practices followed internationally. The IUCN model of conservation is based on public policy and increasing attempts are made to include local communities in the conservation agenda. IUCN's prime objective is to foster a balanced, holistic and integrated approach for managing coastal ecosystems in order to meet long-term ecological, economic and social interests[3].

IUCN Asia's Coastal and Marine Programme supports sound policy and integrated coastal management interventions as a balanced response to coastal ecosystem issues and to help meet the long-term needs of the users of the coast. Knowledge management and capacity development are key focus areas, aimed at strengthening both marine and coastal management. The following are the main objectives:

- Achieve sustainable development of coastal and marine area
- Reduce vulnerability to natural hazards
- Maintain essential ecological processes, life support systems and biological diversity
- Strengthen institutional and governance capacity for Integrated Coastal Management
- Build sustainable financing opportunities for coastal management
- Capture and disseminate lessons in best practice, both locally and globally

IUCN's core principle asserts that thriving coastal ecosystems are fundamental for sustaining healthy livelihoods and act as a regional link in strengthening coastal management practices at the local, national and trans-boundary scales.

[3] Extracted from: http://www.iucn.org/about/union/secretariat/offices/asia/ [illegible] on 16th January 2015

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1.1.6 The Coastal Regulation Zone 2011 Notification – Legislations and policy guidelines to protect the coastal environment

To regulate the developmental activities and to protect the fragile coastal environment,India has implemented coastal regulatory frameworks: Coastal Regulation Zone (CRZ) Notification, 2011 and Island Protection Zone (IPZ) Notification, 2011. The background to the issue of CRZ 2011 and IPZ 2011 is as follows:

a) To protect the Indian coastline, a directive was issued in 1981 from the Central Government advising all coastal States/UTsto take necessary precautions to keep the beaches clean and regulate developmental activities.

b) The CRZ Notification, 1991 was issued under Environment (Protection) Act [E(P)A], 1986 to regulate all development activities in coastal areas.

c) This Notification prohibited and regulated certain activities within 500 m from the HTL on the landward side and within 100–150 m from the HTL on the landward side along water bodies influenced by tidal activities such as creeks and estuaries. The CRZ area was classified as CRZ-I, CRZ-II, CRZ-III and CRZ-IV. This Notification of 1991 was amended nearly 25 times.

d) Keeping in view the issues raised by coastal State/ UT Governments and stakeholders, several expert committees were constituted by the Central Government to examine these issues.

e) The Ministry constituted a Committee in July 2004 under the Chairmanship of Prof. M. S. Swaminathan to review various reports on CRZ, international practices and suggest the scientific principles for an Integrated Coastal Zone Management (ICZM) policy best suited for the country – to define and enlist various coastal and marine resources and recommend methodology for their identification and the extent of safeguards required for the conservation and protection and to review the CRZ Notification, 1991. The Committee submitted its report in February 2005.

f) A draft Coastal Management Zone [CMZ] Notification, 2008 was issued which was later withdrawn based on the suggestions and objections raised by the stakeholders.

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g) The Ministry constituted a Committee in June 2009 under the Chairmanship of Prof. M. S. Swaminathan to consider all the coastal issues and suggest the policy and legal framework for ICZM. The Committee submitted its report titled "Final Frontier" in July 2009. Based on the recommendations made in the report the Ministry issued two Notifications superseding the CRZ Notification, 1991: (i) CRZ Notification, 2011 and (ii) IPZ Notification, 2011.

h) These two Notifications are being implemented and are monitored by the National Coastal Zone Management Authority (NCZMA) and State/UT level Coastal Zone Management Authorities (SCZMAs). The NCZMA and 13 SCZMAs have been notified under the E(P)A 1986.

1.1.7 ICZM Project implemented by MoEF&CC

To implement the National Environment Policy 2006, recommendations of "Final Frontier 2009", Public Accounts Committee (2009–2010) [PAC], and CRZ Notification, 2011 and IPZ Notification, 2011 regulatory framework with public participation, the Government of India (GoI) embarked upon the implementation of the Integrated Coastal Zone Management (ICZM) project. This project was approved by the Expenditure Finance Committee (EFC) and Cabinet Committee on Economic Affairs (CCEA)during 2010. The project is being taken up on a pilot scale with the assistance of the World Bank in the identified stretches in the States of Gujarat, Odisha and West Bengal. To implement this project, the MoEF&CC has set up the Society of Integrated Coastal Management (SICOM) located in New Delhi.

The objectives of the ICZM Project are as follows:

a) To develop the capacity and institutions to implement the CRZ Notification, 2011 and achieve the objectives of integrated and sustainable coastal management as per the National Environmental Policy, 2006.

b) To address the issues relating to climate change, which have a major implication on the coastal areas and coastal communities especially with respect to sea level rise (SLR) and increased frequency of cyclones and storm surges. Under the programme, an exercise of hazard mapping will be carried out to protect the coastal people and infrastructure located in the coastal regions.

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c) To conserve and protect the fragile coastal ecosystems such as the mangroves, brackish water wetlands and coral reefs, including addressing the pollution of coastal waters and livelihood improvement of local communities.

1.1.8 Society for Integrated Coastal Management(SICOM)

SICOM was established under the Society Registration Act, 1986 by the MoEF&CC for implementing the World Bank Assisted ICZM Project in the country. SICOM is working as a National Project Management Unit for the project. In implementing the ICZM project, SICOM is coordinating with various Ministries, coastal State and UT Governments and SPMUs/Project Executing Agencies (PEAs) of the ICZM project. SICOM is also taking lead in designing the Phase II of the ICZM project which will include other coastal States and UTs. The major role and responsibilities of SICOM are as follows:

(a) Act as a fulcrum between MoEF&CC, State Governments, NCSCM, other Ministries, research and academic bodies, NGOs and people.

(b) To play a leading role in assisting MoEF&CC in implementing the CRZ and IPZ Notifications and preparing the CZMPs while coordinating with SoI, NCSCM and CZMAs.

(c) To guide in the preparation of ICZMP factoring in the hazard line for identified areas in coordination with the State Governments.

(d) To formulate Phase-II of the ICZM project wherein the other States/UTs would be included as approved in the EFC. Meanwhile, all the State/UT Governments which were not included in the Phase-I may be requested to form the SPMUs so that their capacity development process begins to help them in formulation of plan and their implementation.

(e) To explore various possibilities of exchange programme in terms of visits, information exchange etc., with other countries especially in South East Asia, where similar environmental and demographic pressures exist.

(f) To put in place monitoring systems for the three SPMUs independently to assess the implementation of the project.

(g) To leverage NCSCM in ensuring preparation of appropriate ICZM Plans for identified areas, with NCSCM providing all the necessary technical inputs to

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that the concerned Government can undertake an ecologically compatible and sustainable development of the area.

(h) To prepare a comprehensive capacity development plan for all the stakeholders like Ministry of Shipping, Tourism, Petroleum, Agriculture, Fisheries etc., and execute them.

(i) SICOM will also play a leading role with NCSCM in identifying the areas which have been destroyed/undergone serious damages due to various human interventions and take up steps through NCSCM and State Government to take up restoration and management of such sites.

(j) To immediately create a web platform and link with similar facilities with coastal States/UTs, SPMUs for exchange of ideas, best practices, knowledge etc.

To accomplish the above scope of work and to take up the work assigned under the proposed notification, SICOM may build adequate capacity with skilled manpower. The role of SICOM is crucial as it would play a leading role in coordinating with as indicated at 1.1.8(a) to (j) above.Further, SICOM will be instrumental in facilitating capacity building and institutional strengthening in the area of coastal zone management in the country.

1.1.9 National Centre for Sustainable Coastal Management

NCSCM was established by SICOM under the MoEF&CC in 2010 with the vision of promoting sustainable coasts through increased partnerships, conservation practices, scientific research and knowledge management for the benefit of current and future generations and assist MoEF&CC and States in implementing the provisions of CRZ Notification. NCSCM has established six multi-disciplinary Divisions in the Centre to undertake research and development in the area ofCZM practice through the development and provision of cutting-edge science, knowledge and networking with relevant national and international institutes of repute. These are being realized through inter- and trans-disciplinary scientific research, advisory capacities and by imparting knowledge into a seamless, holistic decision support system for effective implementation of CRZ Notification.

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Fourteen institutions have formed a consortium with NCSCM, with Anna University Chennai as the Hub. It would guide and coordinate the implementation of CZM approaches leading to enhanced conservation of coastal resources and sustainable development along the coast of India through applied and futuristic research. The Centre would develop a central repository of information and knowledge on CZM practices in India and elsewhere. The outputs from research at NCSCM would aid in the better protection, conservation and management of the coast. The following are the specific roles and responsibilities of NCSCM:

1. Preparation of HTL / LTL for the entire coast using ortho-imageries
2. Preparation of CRZ I boundary maps (including ESAs, geomorphologically important zones and areas or structures of archaeological importance and value sites) in 1: 10,000 scale by acquiring the ecosystem maps and boundaries of marine protected areas from national agencies identified by the Ministry.
3. Validation of cadastral maps prepared by State/ UT Governments
4. Preparation of State of Coast Report, which would include assessment of the extent of change in coastal ecosystems
5. Development of a comprehensive digital coastal database to help in policy decisions
6. Monitoring mechanism: Pre- and post-monitoring of major coastal projects as directed by MoEF&CC
7. Develop guidelines to aid in effective implementation of the provisions of the CRZ and IPZnotifications
8. Develop guidelines for ICZM projects for the purpose of conservation of coastal areas and to involve local communities in decision making
9. Assessment of carbon sequestration potentials of major coastal ecosystems
10. Building capacity at all levels in coastal management along with ICZM Plans



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1.1.10 Recent Initiatives in Coastal Management by MoEF&CC

a. Use of space application and IT technology for coastal mangement

Since the implementation of the CRZ Notification, 1991, MoEF&CC has been relying upon satellite imagery for mapping vital coastal resources. The satellite imagery and data obtained by aerial photography undertaken by SoI shall be used for preparing CZMP, which would include HTL, LTL, land use (Fig. 2), demarcation of ESA etc. Further, these technologies can be used extensively for estimation of primary productivity, ocean resources and fishery resources, pollution monitoring, detecting algal blooms and for oil spill mitigation.



Fig. 2: Decadal Changes in land use pattern

b. National Shoreline Change Assessment

Based on directionsby MoEF&CC, NCSCM undertook the study of shoreline change for the entire coast of India in order to identify coastal areas where significant erosion and accretion have occurred and continue to occur, quantify the rates of erosion/accretion, analyze the impacts of coastal structures on the shoreline, create a national database for coastal erosion and accretion with 1972 as the base year and contribute to an understanding and prediction of futuro shoreline positions. Earlier, shoreline mapping and analysis were carried out by a manual cartographic techniques, which since early 1980s has been changed to a highly sophisticated geographic information system (GIS). A GIS database has been created with layers such as base shoreline, historical shorelines, erosion rates and critical erosion maps by State for the entire coastline of mainland India (Fig 3).

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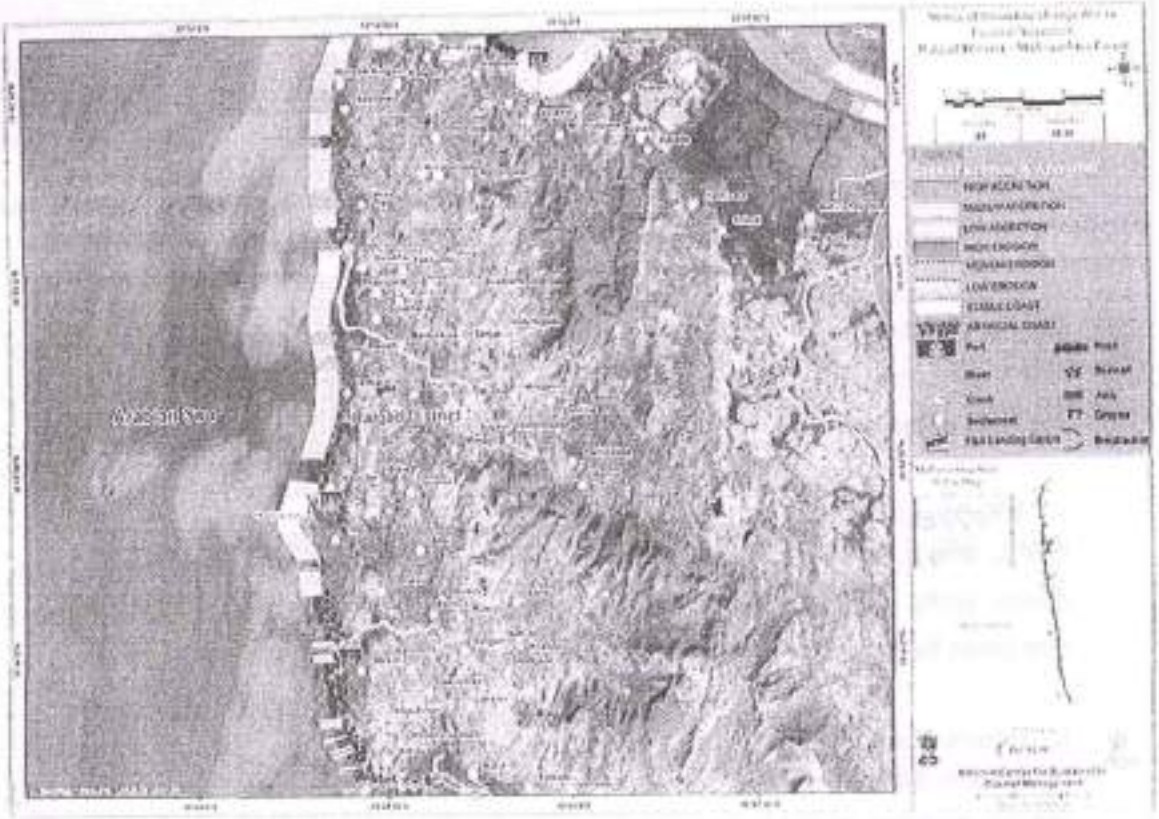


Fig. 3: Shoreline change along the coast of Maharashtra

c. Hazard Line mapping

As per the CRZ Notification, 2011 "the 'hazard line' denotes the line demarcated by MoEFF&CC through NCSCM, taking into account water level fluctuations, sea level rise (SLR) and shoreline changes". SICOM is implementing the hazard line (Hazard Line) mapping project through SoI. In this regard, MoU has been entered between MoS&T and MoEF&CC on 10 May 2010. The Hazard Line mapping involves;

(i) Survey and preparation of digital terrain model of 0.5 m contour interval for the entire mainland coast based on aerial photography and photogrammetry;

(ii) collection of historical tide gauge data and analyses to determine flood levels;

(iii) analyses of maps and satellite imagery to determine historic erosion line;

(iv) preparation of Hazard Line based on erosion and flood line;

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(v) transfer of the Hazard Line to topographic maps and to the ground for implementation of CRZ Notification, 2011.

d. HTL demarcation using ortho photos

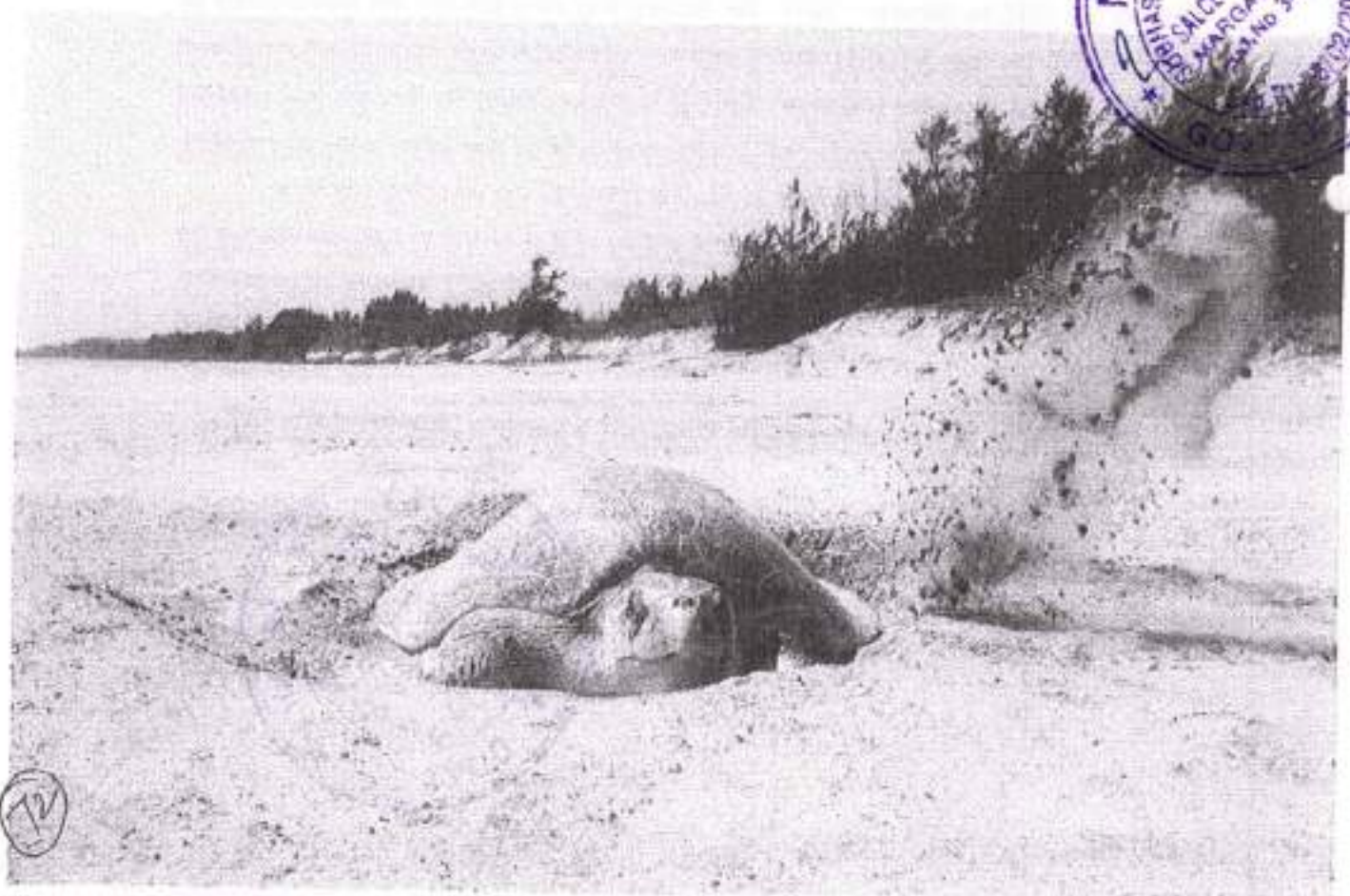
Based on directions from MoEF&CC and SICOM, NCSCM is in the process of delineating the HTL as per the requirement of the CRZ Notification using ortho photos available at SoI.

e. Mapping of ESAs

ESAs, which are part of CRZ Notification such as mangroves, coral reefs, sand dunes, turtle nesting ground/horseshoe crab habitats/nesting grounds of birds and sea grass beds, are being identified, delineated and mapped by NCSCM.

f. Information technology and awareness in all sectors

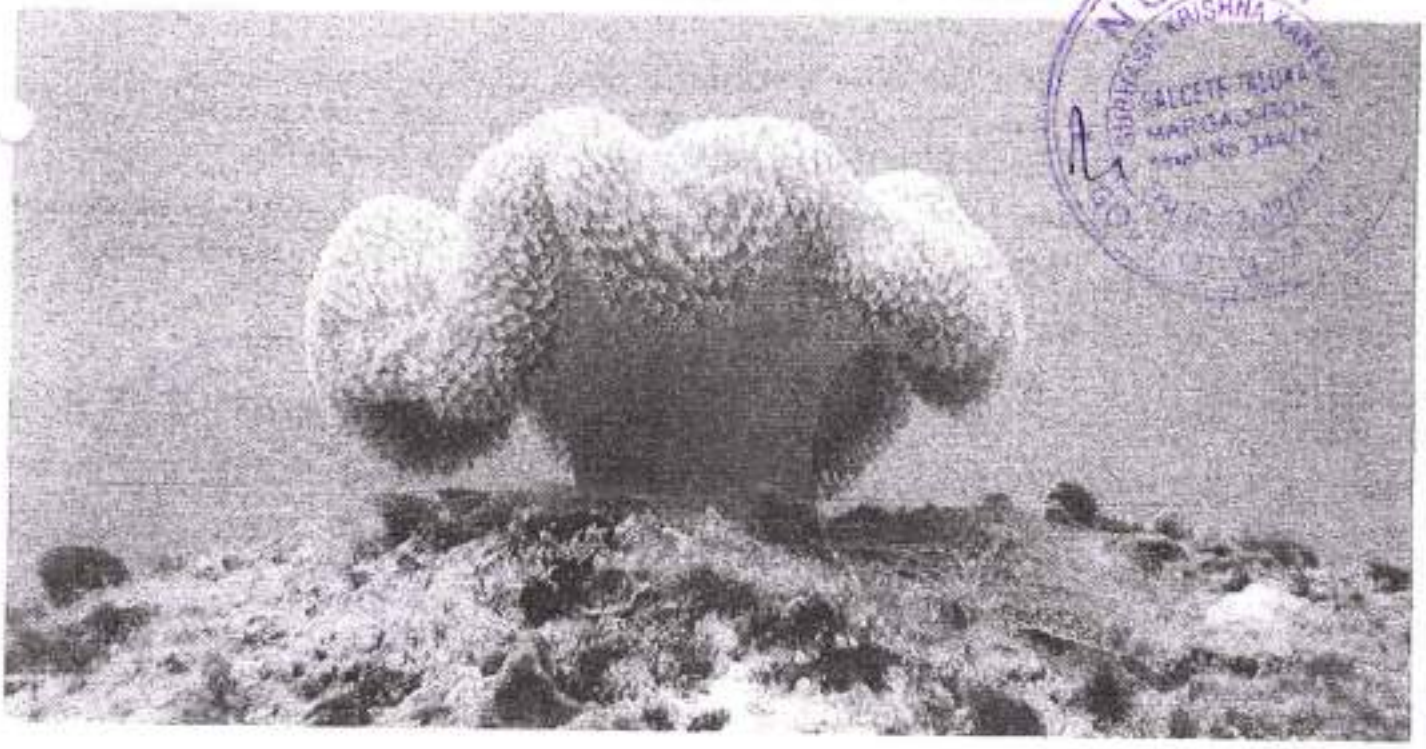
NCSCM is developing information and technological web map application tools that aid as decision support systems for policy makers. Such tools would also help communities address coastal issues and would eventually become one of the most used resources in the coastal management community.



1.2 Approach and Methodology adopted by the Committee to address the ToRs

In view of the several representations received from the Governments of various coastal States/UTs, especially from the Governments of Karnataka, Kerala and Maharashtra requesting for amending the CRZ 2011, the Ministry constituted Committee to review the CRZ Notification, 2011 (Ref: No.19-112/2013-IA-III, dated 17 June 2014).

After constitution of the Committee, three meetings were held with the officials of the Governments of Maharashtra, Karnataka and Kerala on 8 July 2014, 21 August 2014 and 22 August 2014, respectively. Subsequently other States and UTs requested the Committee to present their issues with respect to the implementation of CRZ, 2011. Accordingly, a meeting was held with all coastal States and UTs on 27 October 2014 in MoES, Delhi. Copies of the presentation made and representations received are given in Volumes II and III of this report. Based on the issues raised by the respective coastal State/UT Governments and taking into account the provisions of the CRZ Notification, 2011 including the recent initiatives taken by the MoEF&CC towards coastal management, the Committee has addressed the ToRs listed in the Office Order and made its recommendations.



Chapter 2

Issues and Representations made by the Coastal State/UT Governments as per ToRs

ToR-1(a) : "to examine issues relating to Maharashtra raised by the State Government vide letters dated 27.08.2013 and 23.12.2013".

TOR-1(b) : "to examine issues relating to Karnataka raised by the State Government vide letters dated 16.08.2013, 28.02.2014 and 18.02.2014".

TOR-1(c) : "to examine issues relating to Kerala raised by the State Government vide letters dated 10.02.2014".

(TOR-1(d) : to examine errors/inconsistencies in CRZ Notifications, 2011 and procedural simplification)

ToR-2 : The Committee may interact with the State Government, if necessary, and address any other issues raised by the State Government during their interaction with the Committee.



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A.Specific issues indicated by the State/UT Governments

2.1 Maharashtra [ToR-1(a)]

Based on the above-mentioned ToR 1(a), the Committee visited Mumbai on 8 July 2014 and had discussions with the officials of various departments of Government of Maharashtra (GoM). The details of the issues raised and the suggestions/requests made by the various departments/agencies of GoM such as CIDCO, BMC, Slum Rehabilitation Authority (SRA) and State Tourism Department, are detailed in the following sections. The copies of the presentations along with the communications made to MoEF&CC vide the above-mentioned letters indicated in the ToR are in Volume II of this report:

2.1.1 Loss of buildable land due to demarcation of the HTL based on CRZ Notification, 2011

(a) Most of the lands in Navi Mumbai were below low tide level when it was acquired in 1971. Prior to acquisition, these coastal lands were under agriculture and saltpans. For undertaking agriculture, bunds were constructed to prevent the ingress of tidal waters. The bunds were constructed based on Dutch method. The development of Navi Mumbai was taken up in a phased manner by acquisition of land by CIDCO. The HTL being demarcated based on CRZ Notification, 2011, indicates that the total land loss could be around 1240 hectares of developable area. Further, additional land is to be provided to project affected people and R&R-related activities including providing 260 hectare of land for the development of Navi Mumbai Airport.

(b) The reasons for ingress of creek water into the land area were examined by the Committee in detail along with graphic presentations made by CIDCO. Over a period of time due to non-maintenance of the bunds and breaking of the bunds by locals for shallow water fishing, the seawater has ingressed into the land. Due to the salinity ingress, the HTL has further shifted landwards. In several of such areas

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where salinity ingression has taken place, mangroves have grown. On account of the shifting of the HTL on the landward side, it was indicated that approximately 744 hectares of net saleable land which is 60% of the total 1240 hectares that CIDCO would lose is estimated around Rs.37,200 crore (with an average price of Rs. 50,000/m^2). Further, the land being allotted to the affected people due to the project, under the 'land for land' scheme would be coming under CRZ-I and CRZ-II. The people who have been affected by airport construction need to be located close to the creek as they are fishermen communities. On account of all these activities, CIDCO would lose further developable land area. In this regard, it was requested that the HTL as of 1991 should be retained.

(c) The Hon'ble High Court (HC) of Bombay in its Order dated 6 October 2005 has directed to observe total freeze on destruction of mangroves and to maintain an NDZ of 50 m width around any mangrove. Further, as per the above-mentioned Orders, no steps can be taken that would stop the ingress of saline water into areas with mangroves. Hence, CIDCO has stopped repairing the bunds and desilting of the ponds. The GoM has requested that the HTL demarcation as per CRZ Notification, 1991 should be allowed to continue.

(d) For the purpose of maintenance and desilting of Dronagiri holding ponds, CIDCO has again approached Hon'ble HC of Bombay. The Hon'ble HC directed MCZMA and MoEF&CC to decide whether holding ponds and channels fall in CRZ. It was indicated that MCZMA has submitted a report to MoEF&CC and MoEF&CC vide their letter dated 31 October 2013 have requested CIDCO to provide for five times compensatory mangrove afforestation in lieu of the mangroves along the holding ponds. The contention of the CIDCO is that none of the holding ponds and channels in Navi Mumbai falls in CRZ-I as they are not part of the creek. Some of the mangroves fall partly in CRZ-II as they are along the artificially created water bodies excavated out of the firm land. It was indicated that because the ponds were not desilted the water holding capacity in the ponds have decreased, thereby causing floods in the vicinity during monsoons.

2.1.2 Issues relating to slum redevelopment by SRA and redevelopment of dilapidated, cessed and unsafe buildings

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(a) The SRA Scheme is being implemented by GoM. It was indicated that large pockets of slums have settled along the seashore. About 291 slum pockets are present in CRZ-II, which houses 3.5 lakh huts with 15 lakh people living in such slums. It was indicated that in the CRZ-II areas the eligible Floor Space Index (FSI) within city is 1.67 while in suburbs it is 1.25 as against 3 or 4 FSI in the non-CRZ areas. The provisions of CRZ Notification, 2011 pertaining to slum rehabilitation scheme were explained in detail and the hardships faced by the slum dwellers and the environmental and social issues of slums explained.

(b) It was informed that as per the Notification, 2011, GoM had sought proposals on joint venture basis through wide publication in newspapers. It was also informed that not a single valid proposal was received even after repeated advertisements. On account of the provision in the CRZ Notification, 2011, the slum redevelopment in CRZ-II areas are languishing as the scheme indicated under the CRZ Notification, 2011 is not economically viable.

(c) The schemes with regard to the slum redevelopment in CRZ-II areas should be allowed to develop with current permissible FSI as prevailing outside CRZ. Further, no joint venture with Government organization should be made mandatory. The ratio of 51:49, Government:private party, as indicated in the CRZ Notification, 2011 be waived off and permitted to be developed by the proponent.

2.1.3 Municipal Corporation of Greater Mumbai on CRZ issues relating to redevelopment of dilapidated, cessed and unsafe building

(a) It was highlighted that the datum line of redevelopment of dilapidated, cessed and unsafe buildings is frozen as on 6 January 2011 by MoEF&CC vide corrigendum dated 29 March 2011 to the CRZ Notification, 2011. In this regard, it was indicated that declaration of dilapidated buildings is a continuous process based on ageing of structures. GoM declares buildings based on criteria as dilapidated. It was highlighted that the buildings which are now declared safe could become dilapidated in future. Hence, the Notification should provide for such dynamic situations. For undertaking redevelopment of dilapidated structures, the FSI/Floor Area Ratio (FAR) should not be frozen but enabling provision should be inserted in the notification for

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providing FSI and FAR on that particular date on which the redevelopment is accorded permission. It was suggested that it would be desirable to specifically incorporate permissibility of reconstruction/redevelopment in accordance with Town and Country Planning Regulations applicable as on the date on which such reconstruction is approved by competent authority.

(b) It was requested that the corrigendum may be modified as "*The Floor Space Index or Floor Area Ratio for such redevelopment schemes shall be in accordance with the Town and Country Planning Regulations prevailing as on the date on which the project is granted approval by the competent authority.*"

2.1.4 Issues relating to Koliwadas and Goathans of Maharashtra

(a) It was also highlighted that in the CRZ Notification, 2011, Koliwadas and Goathans are classified as CRZ-III. It was indicated that presently there are 23 Goathans and 16 Koliwadas in Mumbai affected by CRZ. Declaring these Koliwadas and Goathans as CRZ-III would severely limit the development thereby defeating the objective of ensuring livelihood security to the fisher and other local communities in a sustainable manner. Further, it was indicated that there is no clarity in respect of availability of Town and Country Planning Regulations for redevelopment/reconsideration of dwelling units in Koliwadas/Goathans. In this regard, BMC requested that instead of CRZ-III these Koliwadas and Goathans be classified as CRZ-II and current DCR to be made applicable to facilitate development. Accordingly, Clause (g) of Sr. No.(8)(V)(iii) for the CRZ Notification, 2011 be modified.

2.1.5 Issues relating to the development of coastal road project by MCGM

(a) It was indicated in the presentation that in the present scenario where the majority of the public use north--south local train, there has been several incidents of accidents. It was indicated that due to increase in population and large number of commuters taking the local train the accident rate has increased to around 2000

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deaths in a year. In this regard, the GoM proposes to construct 36 km long coastal road from Colaba up to Malad-Kandivali Link Road. The proposed road would be 4+4 access controlled freeway. For the proposed road, there shall be no land acquisition and no R&R. The proposed road would protect the beaches and fishermen's villages without obstructing the natural course of seawater. It was also clarified that for the construction of the road project, no significant damage would be caused to the mangroves or beaches. The road will be on stilts and in places through the tunnels. For the road project, approximately 9.8 km reclamation is proposed in the sea with a total area of 160 hectares and about 8 km reclamation in the mangrove areas. It was also indicated that in the mangrove stretch of 3.45 km of the road would be constructed on stilts and wherever mangrove destruction would take place re-plantation of mangroves will be taken up with the Forests Department. It was indicated that by construction of the road there would be significant reduction of traffic congestion on the existing roads and reduction in travel time.

(b) To develop the above-mentioned road project, MCGM requested for amendment of para 3(iv) of the required in CRZ Notification, 2011 providing for "land reclamation for construction of coastal roads". In the reclaimed area, MCGM proposes to develop promenades, gardens and green spaces. It was indicated that no real estate development for commercial use shall be permitted and no relaxation of CRZ regulation on the landward side of the proposed road shall be sought.

2.1.6With regard to new airport CIDCO vide their letter No. CIDCO/MD/2013/247, dated 23 December 2013 have sought for an in-principle approval for a proposal for development of islands airport in Thane creek, Navi Mumbai. As per the letter, the Navi Mumbai International Airport (NMIA) has obtained all necessary clearances including permission from the Hon'ble HC for removal of mangroves. The project involves 671 ha of private land and rehabilitation of 3500 families. The 3500 people affected by this project need to be rehabilitated. This is a serious issue that CIDCO is facing including escalating cost of airport development. In this regard, CIDCO intends to search for an alternative site for airport. CIDCO has proposed a development of an airport in an island in Thane creek which is west of existing NMIA site. As per the letter this islands airport in Thane creek would not require acquisition of private land and rehabilitation of any population. In the letter, CIDCO has

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requested MoEF&CC, "I request MoEF&CC to look into the proposal of development of airport on a reclaimed island in Thane creek, Navi Mumbai and grant us "In-principle approval" for the same. Upon approval, CIDCO would initiate further necessary studies such as preparation of Detailed Project Report (DPR) and EIA report for obtaining Environment and CRZ clearance for the island airport proposal".

2.2 Karnataka [ToR-1(b)]

The Committee visited Bengaluruon 21 August 2014 and had discussion with the officials of Government of Karnataka (GoKA) which was represented by Chief Secretary, GoKA. The issues raised by GoKA are detailed later and the copy of the presentations and letters are provided in Volume III of this Report.

2.2.1Fishermen issues inKarnataka

(a) Most of the fishermen villages are located on the sea coast, on account of the stipulations of 200 m NDZ the fisher folk are unable to undertake developmental activities especially the dwelling units and other infrastructure required for the protection of their life and livelihood. Therefore, the width of NDZ is to be reduced to 50 m as provided for the islands of Kerala instead of 200 m all along the sea coast and width of the river/creek with maximum of 50 m along the river/creek. Fisher folk need to build their dwelling units close to sea only for the convenience of earning their livelihood. Therefore, dwelling units should be permitted in the NDZ to enable accommodation for expansion of families of fisher folk and local inhabitants. Due to the restrictions the fisher folk and the local inhabitants are unable to avail the benefit of "MatsyaAshraya" and other housing schemes of Government. In view of the above, the state Government has requested amendment to the CRZ to provide for construction of new dwelling units be permitted within 100 meters from HTL.

2.2.2Issues relating to tourism sector

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(a) A proposal has been forwarded to the MoEF&CC through the Ministry of Tourism (MoT), GoI by Department of Tourism (DoT), GoKA with reference to the report on CRZ submitted earlier by the Expert Committee headed by Prof. M. S. Swaminathan. The proposal sought amendments to the CRZ Notification, 2011 in line with the special provisions provided for the states of Kerala, Maharashtra and Goa and addressing various issues faced by local agencies in tourism development. Under the 12th Five-year plan MoT, GoI planned development of Tourist Circuits across India. DoT, GoKA for the year 2013–2014 had proposed development of Mega Coastal Tourism Circuit as a measure to boost coastal tourism in the State. The development comprises basic tourist amenities to be provided to the tourists in 23 beaches along the coast of Karnataka. To promote and enhance the tourism experience of tourists, DoT GoKA had submitted a proposal to the MoEF&CC seeking relaxation of CRZ norms by way of "Special Tourism Zones".

(b) The State has identified 41 beaches and 11 islands with good tourism potential. In Karnataka the coastal stretches very narrow because of the Western Ghats. In certain stretches the coastal areas are less than 100mts. On the average the coastal stretch is around 300mts. The national highway, and in some cases state highway, pass through this narrow stretch of CRZ, even within NDZ. The State Government of Karnataka requested for special relaxation to permit certain constructions of temporary nature on the seaward side of such road when the roads fall in NDZ for temporary tourism related activities. On the landward side of the road the tourism development as indicated in the CRZ Notification could be taken up subject to environmental conditions.

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2.3 Kerala [ToR-1(c)]

The Committee visited Thirvananthapuram on 22 August 2014 and had discussions with the officials of GoK represented by Chief Secretary, GoK. The Chief Minister, GoK also met the Committee and he explained the hardships faced by the Government with regard to CRZ. The issues raised by GoK are detailed in the following sections and the copy of the presentations is provided in Volume III of this Report.

2.3.1 Issues relating to fishermen

(a) Fishermen/traditional communities living by the sea and by the tidally influenced water bodies where CRZ-III is applicable currently are unable to construct houses/toilet/stores (for safe keeping of their implements). Being highly essential to live by the ecosystem for earning their livelihood, the above-mentioned activities need to be permitted in the NDZ of CRZ-III.

(b) The space for constructing dwelling units in the CRZ area is limited. Hence, family members are not in a position to construct dwelling units in the land rightfully received as family right/share in the NDZs of CRZ-III. Moreover, in case of a local/fishermen community who buy a piece of land within the CRZ area are unable to build a house as per the present provisions. These are highly essential requirements for the traditional/fishermen community, the right for the same need to be reinstated in CRZ-II and CRZ-III area.

(c) Kerala being criss-crossed with numerous inland water bodies under the purview of CRZ Notification, 2011 the CRZ area landward of HTL up to 100 m creates the same hurdle as above for traditional communities. The construction of dwelling units needs to be permitted on the banks of paddy fields/pokkali fields/aqua farms for their sustenance.

(d) Considering the stress due to population on the banks of the tidally affected water bodies (majority of the area having density of population >2000/km^2), the NDZ of CRZ-III along the banks of inland water bodies may be reduced to 50 m from HTL (landward) from the present stipulation of 100 m.

(e) The provision to permit reconstruction in the NDZ of CRZ-III area without

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increase in existing plinth area, existing FSI and existing density may be modified *as permit reconstruction in the NDZ of CRZ-III without increase in existing plinth area or up to 100 m² in case of dwelling units of traditional community.* This would help the fishermen/local community to reconstruct small huts and dwelling units into a better place to live.

(f) Presently, construction in backwater islands is possible only beyond 50 m from the HTL. For the traditional/fishermen community, this may be amended to the extent that "residential construction can be permitted landward of existing authorized structures and approved roads".

(g) Construction of dwelling units of coastal community including fisher folk may be permitted leaving 50 m from HTL of sea except along the highly eroding sea coast and 10m from HTL of backwater or landward existing authorized structures or approved road whichever is less in CRZ-III.

(h) Considering the specific coastal settings of the State having numerous barrier beaches, spits and barrier islands with width less than 1 km separating the sea from the backwater the NDZ may be reduced to 20 m in those areas for traditional coastal communities including fisher folk for the construction of dwelling units and other livelihood essential facilities.

(i) Permission for the construction of 3–4 floor housing buildings under Government projects such as Rajiv Slum Development Project in CRZ-III area after leaving 100 m from HTL of sea. This is required for providing better dwelling facility for the fisherman community.

2.3.2 Tourism issues

(a) Tourismin Kerala has become a significant contributor to the sustainable development of the State. Tourism contributes about 10% to the GDP of the State. Tourism creates employment opportunity to more than 25 lakh individuals in the State. Tourism sector can further grow only with the active support of the Governments, both Central and the State, with favorable policies and creating enabling environment for attracting investment in tourism infrastructure. Even though CRZ Notification helps in conserving the beaches and tidal-influenced water bodies

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in a big way, it imposes limitations to tourism growth in the State, which heavily depends on the beaches and backwaters as its major tourism destinations.

(b) The Notification restricts the development of tourism infrastructure at the most potential tourism areas of the state such as beaches, backwaters and tidal-influenced water bodies. Hence, there is an urgent need for the reconsideration of the CRZ norms in the tourism potential areas in Kerala to facilitate controlled developments in tourism in a sustainable and responsible manner in the identified beach stretches in the State of Kerala. It is also essential to reconsider and modify the CRZ norms related to backwaters and tidal-influenced water bodies to enable environmental friendly tourism investments, as backwaters are the back bone of Kerala, creating large opportunity for employment and livelihood of the local population.

(c) Considerable number of tourism destinations that emerged in the State is in rural coastal areas and falls under CRZ-III, and hence no development is possible within 200 m of NDZ. This makes the destinations unattractive to the investors as well as the tourists. The NDZ for the tidal-influenced area for 100 m makes backwater-related tourism too restrictive and is unaffordable to the State as backwater tourism is the back bone of Kerala tourism industry.

(f) GoK suggested the following modifications to the CRZ rules in the case of Kerala state:-

(i) As per Section 8 (i) II of CRZ Notification, 2011, in CRZ-II, buildings shall be permitted on the landward side of the existing road, or on the landward side of the existing authorized structures. But as per Annexure III of the notification which describes the guidelines for the development of beach resorts for hotels, it is mentioned that the guidelines are for "designated areas of CRZ-III and CRZ-II". This imposes huge restrictions for tourism developments in CRZ-II area and is contradicting the statements in Section 8(i) II and III. In fact, Annexure III is referred only in Section 8(i) III which is meant for CRZ-III.

(ii) The NDZ for the beach stretches identified in rural areas falling in CRZ-III may be brought down to 100m instead of 200m. The same guidelines applicable as per Annexure III of the CRZ Notification, 2011 may be made

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applicable at the 100–500 m area from HTL. It may be noted that as per 8 (i) III (ii) of the CRZ Notification, 2011, construction of residential buildings for fisher folk is permitted from 100 m to 200 m of the NDZ and the proposal is only to extend this provision to tourism development with restrictive guidelines.

(iii) For beaches falling in the urban area, the prevailing CRZ-II norms has been proposed to continue by removing CRZ-II from the applicability of the provisions in Annexure III regulations of CRZ Notification, 2011. It may be noted that the above provision is not available in CRZ Notification, 1991 and is included as a new provision in CRZ Notification, 2011. There is anomaly in this provision as the restriction is imposed only to tourism development and not to any kind of other uses such as residential or commercial developments.

(iv) The backwaters of Kerala and houseboats are considered to be very important for the tourism industry of Kerala and contribute significantly to the local employment opportunity and foreign exchange earnings. The banks of these backwaters and river mouths are enchanting picnic spots. Stretched over a total expanse of 1500 km, the backwaters have a network of 44 rivers, lagoons and lakes from north to south. Alapuzha, Kumarakom and Ashtamudi are internationally known backwater destinations with world-class tourist facilities. Malabar backwaters in Kannur and Kasargod districts are developing fast and are emerging areas utilizing backwater potential for tourism investments. The 100 m NDZ for backwaters and tidal-influenced water bodies are imposing huge limitation in tourism investments. The 100 m wide NDZ is not viable to any investor. It may be noted that after the introduction of CRZ Notification, 2011 in 1991, 50 m NDZ was applicable for most of the period which is now made 100 m in CRZ Notification, 2011. Also the regulation applicable to backwater islands as per CRZ Notification, 2011 is only 50 m NDZ.

2.3.3 Conservation of backwaters

The inclusion of Vembanad as a CVCA and the preparation of IMP for Vembanad

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are major issues still remaining unresolved due to lack of clear directions and guidelines from MoEF&CC. This is a major impediment in the protection of the Vembanad ecosystem and sustainable development of the region. Application of two environmental laws to the same area is another matter of concern. The Ashtamudi and Vembanad backwaters are Ramasar sites and hence the wetland (Conservation and Management) Rules 2010 are applicable, while the same areas are also under the purview of CRZ.

2.4 Suggestions and comments made by other States/UTS including general issues [ToR-1(e)]

The Committee interacted with officials of the other coastal States/UTs, namely Odisha, Andhra Pradesh, Tamil Nadu, Puducherry, Goa, Daman and Diu, Gujarat, West Bengal. Most of the issues indicated by the above States/UTs were general in nature. All these issues are listed below:-

2.4.1 HTL demarcation and CZMP preparation

(a) It was indicated by the States/UTs that for effective implementation, physical demarcation of HTL on ground should be expedited.

(b) Several States/UTs indicated that they have expertise and institutional mechanism for HTL demarcation and CZMP preparation. In this regard the States/UTs sought for authorizing the institutions in each of the States/UTs for undertaking HTL and CZMP preparation.

(c) It was indicated that the CRZ boundary along tidal influenced water bodies based on salinity ingress is highly confusing and in several cases not practical due to various hydro dynamic and geomorphological features. The States/UTS requested for doing away with this kind of parameter for determining CRZ boundary.

2.4.2 Monitoring and enforcement

(a) It was indicated that the provisions under E(P) Act, 1986 is not effective for dealing with violations.

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(b) Several States/UTs sought for quicker redressal mechanisms for complaint and guidelines issued for taking action against violations.

2.4.3 Requirement of guidelines for implementation of various provisions of CRZ Notification.

(a) Many States indicated that both CRZ Notification, 1991 and 2011 does not provide for guidelines especially for FSI/FAR restrictions, ESA management, etc., including a simplified procedure for implementation of the notification. Hence the local communities are put into hardship due to the ambiguities prevailing in the notification.

(b) Simplified procedures for clearance for projects such as fishing jetties erosion control measures break waters, water pipelines and navigational facilities should be made available.

(c) All States/UTs sought for a clear cut list of activities that are either permitted or prohibited so that there is no ambiguity. It was also indicated that a large list with exempting clause is highly confusing.

2.4.4 Disaster management and hazard line mapping

(a) It was indicated by the States/UTs that the Hazard Line to be mapped by the MoEF&CCwill lead to large areas getting covered in the States/UTs especially in the east coast as there is a gentle slope in the coastal areas. A large extent of flood-prone areas is likely to be covered under CRZ, and imposing restrictions on such areas may be difficult due to high population density.

(b) It was indicated that there should be no height restriction for cyclone shelters in the NDZ of CRZ-III.

(c) Development of projects in coastal areas is delayed due to lack of clarity in determining the high erosion, low erosion and medium erosion. Hence, this should be mapped at the earliest. Due to the deficit of the above-mentioned information, development of the port projects has been delayed considerably.

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2.4.5 Fishery related issues including fish processing

(a) Many States/UTs raised the issue with regard to providing for safe handling of fish, landing centres require ice and storage plants in the CRZ areas. It was indicate that the fishery-related facilities should be made permissible in the NDZ including certain temporary constructions in the sand dunes.

(b) The small UTs especially Daman and Diu sought for allocating abandoned salt pans for fishery related activities as there is acute shortage of land.

(c) Setting up an expansion of fish-processing units including warehousing (excluding hatchery and natural fish drying) were prohibited, whereas existing fish-processing units for modernization purposes were permitted to utilize 25% additional plinth area required for additional equipment and pollution control measures only subject to existing FSI/FAR norms and subject to the condition that the additional plinth area shall not be towards seaward side of existing unit and also subject to the approval of State PCB/PCC. However, the exemption clause with regard to utilization of additional plinth area is deleted in Para 3(iii) of CRZ Notification dated 6 January 2011. This is inhibiting the modernization of existing fish-processing units by adopting pollution control measures. The representatives of industry and public representatives of coastal districts have also demanded inclusion of the provision in the CRZ Notification, 2011.

(d) The construction of building for livelihood activities such as peeling of prawns, fish-based small-scale non-polluting cottage industries/small shops and flour mills may be permitted in CRZ area other than CRZ-I and CRZ-IV. This will ensure jobs for the traditional community and will help to improve the livelihood of the local community.

(e) In the fish landing centres approved by GoK wherein all foreshore facilities required for fishing and fishery allied activities such as traditional fish-processing yards, boat building or repair yards, net mending yards, ice plants, ice storage, auction hall and jetties may be permitted by Grama Panchayat in the CRZ area.

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2.4.6 Protection of ESAs categorized as CRZ-I

(a) Several Stats/UTs indicated their difficulties in management of mangrove area and in the absence of proper guidelines certain essential development required for larger public could not be taken up in the mangrove area. It was indicated that mangrove patches should be classified based on the area, and minimum area for classification as CRZ-I should be specified to avoid wrong classification of areas and unnecessary litigations.

(b) It was indicated that Maharashtra has 30,000 hectares of mangroves of which there are 17,000 hectares in Government land and 13,000 hectares in private land. Of the total mangrove area of 30,000 hectare, 4000 hectares falls within protected forest. The Judgment of Hon'ble High Court (HC) of Bombay dated 6 October 2005 has imposed total ban on destruction and cutting of mangroves in the entire State including prohibition on dumping of solid waste in the mangrove area. This Judgment applies to all mangrove land irrespective of its ownership. Further, as per the same Judgment, no construction can be taken up within 50 m on all sides of mangroves. GoM has been directed not to issue any development permission in the mangrove area. Further, as per the directions of Hon'ble HC, mangroves in Government-owned land is to be notified as "protected forest" while mangrove areas in private land shall be notified as "forest". For the purpose of protecting mangroves, the GoM has set up a Mangrove Cell headed by CCF. The Mangrove Cell was established in January 2012 with a main focus for conservation of mangroves and to promote coastal biodiversity. Mangrove conservation projects with UNDP-GEF and GIZ are being taken up by the Forest Department. The most of the destruction of mangroves is taking place in private land. To prevent further destruction of mangroves and to empower the Forest Department to take action against violations, delegation of Section 23 of E(P)A 1986, to the Forest Department has sought.

(c) It was also requested to the Committee to provide for suitable provisions in the CRZ Notification, 2011, to permit certain constructions which can be accorded clearance at the State level especially for the development of marine interpretation Centres, low-intensity traditional aquaculture and hatchery activities in the CRZ-III areas. Request was also made to permit construction of

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promenades at the edge of the mangroves so as to prevent felling and also to prevent solid waste dumping in the mangrove area. Clearing of mangroves and destruction of wildlife habitat in the CRZ-I areas should be explicitly declared as prohibited activity under CRZ-I. Based on the above-mentioned facts, GoM requested for the following:

(i) to empower Section 23 of E(P)A 1986 to the State Forest Department to take punitive action against violations in CRZ-I areas;

(ii) to explicitly insert a provision under item CRZ-I of the CRZ Notification, 2011 that "Clearing of mangroves and destruction of wildlife habitat in CRZ-I areas as a prohibited activity";

(iii) to provide for construction of Marine Interpretation Centre in CRZ-III areas and construction of a walkway and research facilities in the mangrove area classified as CRZ-I. For undertaking the above-mentioned activities, the State Government shall be empowered to accord clearance under the Notification after due recommendations of the MCZMA.

(d) Further, CIDCO for conserving 1471 hectares of coastal wetland, mudflats and mangroves, along with Forest Department proposes to construct a genetic resource conservation park and provide for raised broad walkway along with an information dissemination centre to be built in the adjoining land in the mangrove area. It was indicated that the CRZ Notification, 2011 does not provide for any incentive in undertaking certain development in CRZ-I for the purpose of promoting awareness and conservation of mangroves. CIDCO requested the Committee to consider development of such facilities for public use in the CRZ-I areas without destruction of the mangroves similar to the Forests Department's request indicated above.

(e) In this regard, CIDCO explained in detail the legal provision pertaining to the inland mangroves and coastal mangroves as contained in the Forest (Conservation) Act [F(C)A], 1980, Maharashtra Felling of Trees (Regulation) Act, 1964, Maharashtra (Urban Areas) Preservation of Trees Act, 1975. It was requested that the Committee may distinguish between natural coastal mangroves and inland mangroves. Since, Navi Mumbai has inland mangroves mainly due to artificially created ingress of seawater the provisions applicable to

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coastal mangroves shall not apply on such inland mangroves. Request for permitting construction of walkway, interpretation centre, genetic research park and so on within CRZ-I/CRZ-III areas was sought.

(f) In the CRZ-I area, there is a need for preservation of land between LTL and HTL and the mangroves which have a strong ecological rationale should be integrated within the new development plan. With regard to CRZ-II areas, the zone defined as already developed and with infrastructure should become integral part of development/redevelopment as envisaged in the Town and Country Planning Regulations as brought out from time to time. In this regard, the land use zoning and the FSI should be decided as per the current needs and not tied down to 1967 Rules. Since the new DP is under preparation, BMC requested for inserting the following clause in 8(V)(iii), "*In case the Development Plan and DCR revised by following due process of public consultation, the provisions of the same will become applicable even in CRZ, after the same is approved by MoEF&CC.*" Hence, GoM has requested for applicability of the uniform DCR for entire Mumbai.

(g) It was indicated that as per the Notification, Achra-Ratnagiri and Malvan-Sindhudurg has been declared as Critical Vulnerable Coastal Areas (CVCA), where Integrated Management Plans (IMPs) are to be prepared. In the absence of such IMPs, no developmental activities are being permitted. Hence, it is requested that MoEF&CC may provide guidelines for preparing the IMPs.

(h) It was indicated that in CRZ-I there has been systematic landfill, reclamation, unauthorized encroachment, cutting of mangroves, and so on. In this regard, the local authorities should be empowered to take up eco-developmental programme by creating garden, open spaces and promenades for sustainable conservation of CRZ-I. This step would reduce encroachments and degradation of the costal environment.

(i) It was mentioned that the mangroves in case of more than 10,000 m^2 are required to provide 50 m buffer. However, unfortunately, the buffer zone of 50 m has led to encroachment, illegal dumping, construction activity and slum redevelopment. Hence, it was requested that the 50 m buffer shall be maintained

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with green belt under social forestry or gardens. This would serve as a barrier to encroachment and also provide protection to mangroves.



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2.4.7 Tourism

(a) Apart from the specific issues raisedby theStates ofKerala and Karnataka with regard to tourism several other States also sought relaxation of the CRZ provision or promoting tourism in the CRZ areas. It was indicated that temporary structures for beach resort should be made permissible in the NDZ.

(b) Specially the UT of Puducherry indicated that there are several heritage buildings which are more than 70 years old are located along the white town which falls under CRZ-II and has greater building coverage than the present permissible levels. As per the Town Planning norms of 1991, building height varies with existing road width and the coverage varies with plot size and usage of building. Hence, construction and reconstruction in CRZ-II should be allowed as per the prevailing Town Planning norms as on date.



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2.4.8 Clearance of projects

(a) Several States/UTs indicated that there is considerable ambiguity in the clearance of projects. The procedures are complicated and time taking. It was also indicated that the form for seeking clearance of projects in CRZ Notification, 2011 is complicated and very elaborate. Several States/UTs sought for delegation of powers for according clearance to projects in the coastal areas.

(b) The projects attracting EIA Notification should be permitted as per the said Notification and those not attracting the EIA Notification shall be dealt as per the norms of the State Government by the concerned authorities.

(c) As per the CRZ Notification, 2011 prior NOC from SPCB is mandatory for projects which are discharging effluents, solid wastes and sewage. It was indicated that only prior approval under Water (Prevention and Control of Pollution) Act, 1974 for disposal of treated effluent in the coastal water body may be made mandatory for the projects.

(d) The CRZ insists a rapid EIA report including marine and terrestrial component expect for construction project listed under 4(c) and 4(d). It is not clear whether rapid EIA is required for all projects expecting listed under 4(c) and 4(d).

(e) CRZ suggest Comprehensive EIA with cumulative studies for projects in the stretches classified as low and medium eroding by MoEF&CC based on scientific studies and in consultation with the State Governments and UT Administration. Clarification was sought whether this is applicable for all kinds of projects and the availability of the data in this regard.

(f) Whether Disaster Management Report, Risk Assessment Report and Management Plans are required for small projects such as hotels and guesthouse.

(g) It was suggested that CRZ map indicating HTL and LTL demarcated by one of the authorized agency in 1:4000 scale is insisted in this regard standardization of cost for map preparation is required based on project cost.

(h) No objection certificates from the concerned State Pollution Control Board or UT Pollution Control Committees for the projects involving discharge of effluents, solid wastes, sewage and so on are required prior to CRZ clearance, this

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procedure is difficult as no objection certificate from the Pollution Control Boards will not be issued by it prior to clearance by SCZMA.

(i) In 4(ii), Activities [(a)–(i)] of the CRZ Notification, 2011 shall require clearance from MoEF&CC. Clarification is needed on the following: whether the recommendation of the project after appraisal by SCZMA is to be sent to MoEF&CC for clearance and whether the entire process is to be done by MoEF&CC.

2.4.9 Capacity building and institutional mechanism

(a) Several States/UTs indicated that the CZMAs have no adequate capacity including funding. They requested for financing and providing technical assistance to the State Governments in the area of coastal management. The States/UTs sought for the ICZM Project which is presently being implemented by MoEF&CC through SICOM and NCSCM. The States/UTs sought for extending the expertise of SICOM and NCSCM to their States/UTs as well for the purpose of preparing ICZMPs including capacity building.

2.4.10 Regularization of the dwelling units constructed in violation of the CRZ Notification

(a) Some of the States/UTs especially Goa indicated that several dwelling units of local communities have been constructed in violation of the CRZ Notification. Keeping in view the larger public interest the State sought regularization of dwelling units of traditional coastal communities including fisher-folk.

(b) The GoM sought for regularization some of the large constructions in Navi Mumbai undertaken in violation of the CRZ Notification. However, it was indicated that these constructions had all other requisite approvals.

2.4.11 Mining of minerals

(a) Some of the Stats/UTs sought for permitting mining of sand based on scientific analysis including their removal. The Government of Gujarat indicated that

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certain stretches of the coastline have large reserve of high quality of limestone. It was indicated that the Gulf of Kachchh and Saurashtra have vast limestone reserves amounting to 10,000 million metric tons. This limestone has high calcium content (more than 92%) and is extremely valuable. Several industries especially cement industries in these areas use the limestone. Many of the industries have been set up prior to 1991 based on the limestone reserve. These industries have been affected due to the provision of the CRZ Notification. The State Government has sought relaxation of mining of limestone and has requested to make it a permissible activity outside eco-sensitive area with subject to the condition of proper mitigation measures, preservation of erosion, saline water incursion, pollution of coastal waters and so on.

(b) There is a need for clear regulations on estuaries. Estuary is a point of meeting of a river and sea; this area is special because of unique salt-tolerant flora they harbor and distinct fauna dependent on such floral components. Estuary is cradle for various life forms including mangroves. Regulation on estuaries should clearly define the carrying capacity of various bio-resources being removed from estuaries, for example, the sand mining by the mechanized method to be stopped.

2.4.12 Disparity in DCR in CRZ and non-CRZ areas

(a) It was also presented that there are several disparities in the DCR with respect to CRZ and non-CRZ areas. Some of which include, the DCR within the CRZ area is applicable as on 1967 while in the non-CRZ area the DCR applicability would be as per the present regulations. The applicability of DP & CR of 1967 is retrograde and against the principle of planning. Therefore, it was requested that there is a need to adopt a uniform DCR for entire Mumbai which has been already conveyed to Secretary, Environment and Principal Secretary, Urban Development on 9 March 2012 by BMC and the same has been forwarded to MoEF&CC. It was also mentioned that the Municipal Corporation of Greater Mumbai (MCGM) has undertaken the preparation work of revision of the development plan of 2014–2034 and it was pointed out that, out of 458.28 km²

109.24 km^2 is under CRZ which amounts to 25%. This 109.24 km^2 of CRZ area includes 52.61 km^2 as CRZ-I, 43.48 km^2 as CRZ-II and the rest 13.15 km^2 as CRZ-III. It was also mentioned that by 2034 the population of this city would increase from 12.44 million to 14.37 million as on 2011. The GoM indicated that this disparity among various norms has led to confusion and has restricted development. In order to resolve such conflicts between the construction norms and to get uniformity, the GoM requested the Committee to resolve this issue at the earliest. Reiterating this, it was indicated that the DCR of 1967 regulations inhibits development in the city and it would be unrealistic and anachronistic keeping in view the growing population.

2.4.13 CRZ-II and III related issues pertaining to Town and Country Planning norms

(a) Further, as per the CRZ Notification open spaces/parks has been classified as CRZ-III where no development can take place. In such areas, slums have come up. The Hon'ble Court has held that no redevelopment can be taken up in such CRZ-III areas. Due to the stalemate, neither slums can be redeveloped nor the open space developed. Keeping in view such complex problems, BMC suggested that there needs to be a fresh approach of integrated planning of CRZ-I and CRZ-III with rest of the city. GoM has requested for to provide uniform FSI/FAR for the city of Mumbai as per the prevailing Town and Country Planning Regulations for undertaking development of slum redevelopment schemes, redevelopment of dilapidated buildings, cessed and unsafe buildings.

(b) The CRZ Notification, 2011 provides for prior clearance for demolition and reconstruction of public use structures, such as education, workshops, medical care and cultural activities by MoEF&CC. It was requested that since most of the structures are Government projects involving public interest timely clearance is required. Hence, they may be permitted to be cleared at the state level. It was also requested that projects of public interest such as water sewerage pipeline, bridges and roads could be approved the state level instead of being referred to MoEF&CC which is presently followed.

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(c) The Notification provides only for the traditional fishing activity. It is silent with regard to mechanized fishing activity that is being carried out even now. In view of the reduction in the fish catches and owing to the advanced technology available to take up coastal aqua culture and mariculture, there is a need to make provision for undertaking such activities in CRZ-IV and for the establishment of facilities required for such activities on the adjacent land. No norms are prescribed for regulated activities. In view of this, the GoKA has requested for "The activities impugning on the sea and tidal-influenced water bodies will be regulated except for traditional fishing and related activities undertaken by local communities" be modified as "The activities impugning on the sea and tidal-influenced water bodies will be regulated except for traditional fishing, coastal aquaculture and mariculture including facilities required for such activities on the adjacent land as well as related activities undertaken by local communities".

(d) There are many riverine islands and long stretches of rivers with tidal influence. Traditional fishermen as well as other inhabitants are there all along the river and islands. These traditional families are finding it difficult to expand the dwelling units due to family expansion. CRZ for the islands in the State of Karnataka is presently 100 m or width of the river/creek. Therefore, the CRZ limit in the islands of the state as well as all along the rivers also to be limited to 50 m or width of the river/creek whichever is less as provided for Kerala. The GoKA has requested for 50 m width from the HTL on the landward side as the CRZ area for the islands within the backwaters.

(e) The fishermen villages are generally thickly populated in the coastal area with all the civic amenities provided by the Government. These fishermen are confined to the same area. Hence, the fishermen may be permitted for construction/re-construction of their dwelling units and to enable other infrastructure facilities. According to the existing Provision, CRZ-II comprises areas that have been developed up to or close to the shoreline. (Explanation – For the purposes of the expression "developed area" is referred to as that area within the existing municipal limits or in other existing legally designated urban areas which are substantially built-up and has been provided with drainage and approach roads

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and other infrastructural facilities, such as water supply and sewerage mains.) The GoKA has requested for the fishermen villages that have been substantially built up and be included under the definition of "developed area" in the explanation, as is allowed in the case of CRZ-II in urban local bodies.

(f) Buildings shall be permitted only on the landward side of the existing road or on the landward side of the existing authorized structures. Clarification was sought regarding the term "existing road": the type of road (metalled/non-metal/murrum, etc.) and date/year of construction of road.

2.4.14 Foreshore requiring facilities

(a) The CRZ restrictions are hindering the development of port-related activities. At present all the minor ports of the state have been classified under CRZ-III. But all the minor ports are situated on the shore line of developed areas within the municipal limits and already have created substantive built up area with other infrastructure facilities. As per the notification these ports should have been classified under CRZ-II. But unfortunately the minor ports of the state have been classified as CRZ-III. Thus, the resulting restrictions on the development of water front industries would seriously undermine the developments of the ports of the Karnataka state.

(b) Development of ports is mainly dependent on the construction of infrastructure facilities on water front area of the coastline. Port-based industries are vital to the economic development of the State; therefore, it was requested by GoKAthat the Karnataka ports either be classified under CRZ-II or be totally exempted from the preview of CRZ in the interest of the trade and economy of the State.

(c) At present, the CRZ clearance authority is given to the MoEF&CC in respect of port-related projects. The Karnataka Port Department is of the opinion that, as the development of the ports of the country comes under the purview of the Ministry of Shipping and Road Transport, it is advisable to empower the Ministry of Shipping, Road Transport and Highways, GoI, New Delhi to grant CRZ clearances for port projects in the best interest of the comprehensive and speedy development of the port sector.

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(d) As per the CRZ Notification, 2011 expansion of the existing ports is required to obtain the permission from SCZMA or MoEF&CC but expansion/infrastructure addition, up gradation of the existing port facilities is very essential and equally inevitable for efficient management of the ports. Hence, expansion of the existing minor ports may be exempted from the purview of the CRZ notification.

2.4.15 Inland islands in coastal waters and estuaries

(a) The NDZ along backwaters, estuaries, creeks, and so on, of the state may be limited to 50 m instead of 100 m. It may be noted that in most of the period after the introduction of CRZ Notification, 1991, the NDZ applicable to backwaters was only 50 m. Also, as per CRZ Notification, 2011, the NDZ for backwater islands is only 50 m and the proposal is only to extend this provision to the entire backwaters and tidal-influenced water bodies.

2.5 Analysis of the CRZ Notification, 2011

(TOR-1(d) – to examine errors/inconsistencies in CRZ Notifications, 2011 and procedural simplification)

2.5.1 The Committee has examined the various issues raised by the coastal State Government and UTs vis-à-vis CRZ Notification, 2011. The Committee has also examined some of the relevant Court Orders in the matter. After taking into account the hardship faced by the people in the coastal areas especially due to the restrictions imposed on housing, road development and tourism development, the Committee is of the opinion that the present CRZ Notification, 2011 should be recast and a fresh notification shall be considered by the Government, which will supersede the CRZ Notification, 2011. This decision of the Committee is mainly founded on the premises that each of the coastal State/UT has well-laid Town and Country Planning Regulations including other developmental regulations which address most of the issues in the CRZ Notification, 2011. The imposition of the Notification by the Central Government on the State and UT Governments has restricted the housing development of the coastal communities. Although there is a need to protect the coastal environment, the housing need of the communities is equally important.

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2.5.2 The Committee examined the CRZ Notification, 2011 and its implementation by the MoEF&CC and the coastal State/UT Governments. With regard to the Notification, the Committee observed that the objectives of the Notification are well laid out which takes into account the future issues of the coastal environment. With regard to the jurisdictions listed in the Notification **at item (i) and (ii) (iv) and (v) of para 1**, there are no issues.

2.5.3 In the **para (iii)** with regard to the Hazard Line, the Committee is of the opinion that at this stage, it is an excellent time worthy exercise embarked upon by MoEF&CC. However, the Committee observed that it would take a long time for actual demarcation on the ground. Further, the hazard line, which takes into account water-level fluctuations, elevation, SLR and shoreline changes shall also be considered along with the geological factors at a later stage (e.g. plate movement of the Indian subcontinent, as there is subduction in some areas and emergence of land in other parts of the country). Till such time, the zone between the HTL and the Hazard Lineshould be treated only as "hazard management zone" and not for any other regulatory purposes. However, if the Hazard Line falls below 500 m, then a minimum of 500 m will be under regulation.

2.5.4 The respective State Governments need to take into account the issues relating to hazard management within their Town and Country planning norms for developmental activities. Several State Governments have also raised the issue of Hazard Lineand its implications and its demarcation on the ground. The Committee is of the opinion that the MoEF&CC through NCSCM should move forward with the demarcation of Hazard Line as these are crucial input generated with valuable scientific data generated through SoI through aerial photography, photogrammetry and ground verification and erosion mapping by NCSCM using time-series high-resolution satellite imagery. The delineation of Hazard Line would be useful for the country to prepare proper hazard mitigation measures in the coastal areas. Further, the data generated by the SoI which is one of kind in the world; need to be factored into other developmental activities of the coast. It will be the responsibility of the State/UT Governments to include the coastal hazard mitigation activities/facilities

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provided in the respective CZMPs.The State/UT Disaster Management Authorities shall be overall responsible to meet the challenges of disasters arising from coastal and marine areas.

2.5.5 With regard to **para 2** of the CRZ Notification 2011, the Committee observed that the HTL demarcation which was to be completed within one year has not been completed so far. The Committee was apprised of the efforts taken recently by the MoEF&CC, where the methodology was finalized for demarcation of HTL. It has been decided that the ortho maps generated by the SoI during the year 2011 under the hazard mapping component would be used to delineate and provide authentic HTL at best possible accuracy. NCSCM has been authorized to coordinate with the State/UT Governments and the SoI to complete the HTL and LTL demarcation within the stipulated time of 2015. NCSCM has taken necessary steps for expediting the task on time. Most State Governments and UTs have provided necessary inputs in completing the HTL and LTL demarcation. This exercise, when completed, would resolve several outstanding issues, which has also been noted in the report of the high level Committee which reviewed various Acts administered by the MoEF&CC under the Chairmanship of T. S. R. Subramanian Committee at para 9.18. Once the HTL and LTL are demarcated, the CRZ boundaries and their classifications would become easy for demarcation.

2.5.6 With regard to **Para 3,** titled 'prohibited activities', the Committee examined it in detail and observed that several of the activities listed under prohibited activities have exemptions, which have led to ambiguity among the stakeholders. Several State Governments have raised the issue with regard to lack of clarity on clearance procedures for according environmental clearance for the proposed activities. Further, the Committee also is of the opinion that several of the activities listed under the prohibited activities are not exhaustive. It is also felt by the Committee that some of the activities relating to industrial activities are governed by the respective Acts and legislations. In order to avoid duplication and overlap, it is the opinion of the Committee that those respective Acts and legislations, norms should be strengthened further, to address issues relating to coastal areas rather than a separate legislation/provision under the CRZ Notification.

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2.5.7 The Committee is of the opinion that the very purpose of the issuance of a direction for coastal management by the Prime Ministers' Office in 1981, was to maintain beaches and its surrounding coastal areas clean. In spite of more than three decades of implementation of coastal management provisions by the Ministry and the State Governments, the conditions of the beaches in India, the coastal waters, the estuaries and other tidal-influenced water bodies remain highly polluted. Such a deterioration of water quality and the solid waste on the beaches has affected the coastal ecosystems and their regeneration capacity – deterioration of ground water with direct impacts on the livelihood of the coastal communities and coastal tourism. The Committee is of the opinion that it is high time that the Government takes a serious measure in controlling the discharge of effluents, untreated sewage, dumping of solid wastes in coastal areas and its waters. The "SWACHH BHARAT ABHIYAN" initiated by the Government should reach the coastal areas with high priority. MoEF&CC through its bodies such as SICOM, NCSCM and State Government should implement this programme vigorously.

2.5.8 Another major issue with regard to the security of the coastal areas, given the present security concerns, has arisen from 26/11/2008terror incident in Mumbai. The Committee is of the opinion that necessary facilities for coastal patrolling and vigilance activities, coastal police station and other defense-related activities need faster clearances. Hence, such matters relating to national security should be accorded fast clearances by the respective State /UT Governments within a stipulated time.

2.5.9 Ground water drawal at **Para 3 (xi)** of the Notification is a matter of serious concern. The Committee was made aware of the ground water depletion and resultant salinity intrusion that is taking place along the coastal areas of the country due to large-scale and unregulated extraction. Several anthropogenic activities such as seawall, embankment and road construction, dredging and sand mining in the coastal areas disturb the coastal aquifers thereby altering the fresh ground water resources. Destruction of sand dunes and beaches has reduced the percolation of rainwater, thereby affecting the coastal groundwater recharge. The respective State

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Ground Water Authorities including the Ground Water Authority at the Centre should take a serious concern of the issue and prepare guidelines for coastal area groundwater recharge mechanisms including protection of groundwater aquifer in the coastal areas. All construction activities such as roads and dwelling units should have built-in ground water recharge system.The Central Groundwater Board shall be entrusted to prepare an atlas of the coastal aquifers. This data shall be incorporated in the CZMP by the respective States / UTs.

2.5.10 With regard to **Para 4** of the CRZ Notification pertaining to regulation of permissible activities, the Committee was given to understand by the State Governments that there are several activities that are not listed in the Notification; hence, the stakeholders, especially communities, face problems due to ambiguities. Further, even for the small dwelling unit in rural areas, the community has to obtain clearance from the CZMAs which are located in the State capital. Such hardships faced by the communities are a matter of concern. The Committee is of the opinion that the local-level body should be empowered to provide clearance to such matters in accordance with the 73rd and 74th Constitutional Amendment. The Committee is of the opinion that the construction projects which attract EIA should be dealt with as per EIA Notification only.

2.5.11 Further, several States have brought to the notice regarding **para 4 (ii)** which empowers MoEF&CC to accord clearance for small projects such as laying of pipelines, transmission lines, conveyance systems and public buildings. The Committee is of the opinion that the MoEF&CC should restrict itself to policy making in the area of coastal management and monitoring of activities. Such clearances for small projects could be undertaken by the State/UT Governments or other agencies. The MoEF&CC should address coastal management through creating adequate institutions and strengthen existing institutions. A strong scientific skilled manpower should be developed by the MoEF&CC to address the emerging future challenges of coastal management.

2.5.12 With regard to **Para 5** relating to the preparation of CZMPs, the Committee is of the opinion that the demarcation of HTL is the most important aspect of CZMP

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With regard to preparing CZMPs, several State/UT Governments have indicated their concerns as there is lack of data, expertise, institutions and shortage of manpower, which is affecting the preparation of CZMP on time. These issues have remained unresolved since 1991. CZMP preparation even under 1991 Notification was not completed in spite intervention by the Hon'ble Supreme Court. Hence, the Committee is of the opinion that CZMPs shall be prepared by the States/UTs indicating the HTL, LTL, CRZ-I, CRZ-II,CRZ-III and CRZ-IV areas, the disaster management facilities and any other prohibited area declared by the States/UTs.

The States/UTs may also address some of crucial issues of coastal and marine areas including activities required for society such as coastal hazard mitigation, infrastructure for non-conventional energy, transportation, harvesting/extraction of resources, conveying systems, solid waste management, effluent and sewage treatment facilities and any other innovative schemes or those schemes suitable or unique to their location. The same could be included in the CZMP. It shall be ensured by the agencies and authorities that satellite based inputs/data shall be relied upon for preparing the CZMP. The above draft CZMP shall be recommended by the States/UT CZMAs and approval from the NCZMA shall be obtained. Thereafter, all the development activities including conservation and management of the ESA in the CRZ will be governed by the concerned bodies including those indicated in this Notification.All other projects of national importance declared by the Central Government shall be undertaken in CRZ area on a case to case basis based on EIA as provided in the E(P)A 1986.

Ministry shall put in place a monitoring mechanism, which will consist of State/UT CZMAs, NCZMA, SICOM and NCSCM. SICOM shall prepare a periodic status report of coast and marine areas which shall include the status of implementation of the CRZ Notification. This status report shall be prepared on a yearly basis and it shall provide recommendations and suggestions to the Ministry.

2.5.13 With regard to **Para 6**, relating to the enforcement of CRZ Notification, the Committee has been informed of a serious staff shortage in every State/UT. Further, the funds allotted by the State/UT Governments for coastal management is

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insufficient to address complex issues such as pollution, destruction of ESAs and land erosion, which are all matters of serious concern. These issues require continuous monitoring and rigorous enforcement of law. The Ministry, through its technical body SICOM, should set up appropriate mechanism for monitoring the coast and enforcement of coastal regulations.

2.5.14 With regard to **Para 7** pertaining to classification of the CRZ areas, the Committee observed that this section of the Notification is most critical, as it divides the coastal areas into conservation and development zones. The very heart of the Notification is contained in **Para 7 (i)** which deals with CRZ-I. The ESAs, geomorphologic features and the valuable archaeological and heritage sites are some of the most important and critical aspects of coastal areas. In addition, the beaches, which are crucial in maintaining the integrity of the coast, are subject to extreme degradation and need to be considered as part of the ESA. These features and assets have to be preserved as they are incomparable and extremely invaluable. The ESAs such as mangroves, corals, mudflats, forest areas, salt marshes, turtle nesting ground, horse shoe crab areas, sea grass beds, migratory bird areas and their nesting grounds require utmost attention from the MoEF&CC and States/UTs. These areas, if lost, cannot be regained and the damages in most cases are irreversible. The Committee, from the data available, has observed that serious damages have occurred to these ecosystems and habitats, resulting in irreversible damage. Some of the main causes are encroachment, pollution and unplanned development.

2.5.15 Based on the above-mentioned facts, the Committee observed that the MoEF&CC should mainly focus on developing mechanisms for the conservation and protection of the coastal ecosystems, which is its prime mandate. There is an urgent need to conduct resource mapping of such coastal ecosystems and habitats, including ground-level surveys. It is a fact that these ecosystems and features listed under CRZ-I of the Notification are essential for the growth of fish and fisheries on which the local communities depend upon for their livelihoods.

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2.5.16 Further, the Committee was also informed by the States/UTs that several eco-sensitive areas are inhabited by people, and the inhabitants harvest the natural resources from the ecosystems for their livelihood. These communities, especially the large population living in and around ESAs such as Sundarbans, Bhittarkanika, Chilika, Coringa, Pichavaram, Gulf of Mannar, Pulicat, Vembanad and Gulf of Kachchh, need certain basic infrastructure for their life and livelihood. The Ministry through SICOM shall preparethe appropriate management plans in consultation with the State/UT Governments to address the conservation and protection of these ecosystems along with the livelihood of local communities.

2.5.17 **Para 7.2**, which is CRZ-II, is another important para of the Notification which affects some of the densely populated cities such as Mumbai, Chennai, Visakhapatnam, Kochi, Mangalore and Puri. The most crucial issue of the provision is restriction of building norms. The Committee has dealt with this issue in detail and had discussions with all State Governments. It is a fact that all coastal States/UTs have a well-defined Town and Country Planning Regulation and have adequate staff and mechanism to implement the regulations. The provisions in CRZ Notification are often overriding the Town and Country Planning Regulation of the State/UT Governments and could be considered as not appropriate from the legal point of view.

2.5.18 Hence, it was felt that the provisions of Town and Country Planning Regulations should be adhered to the coastal areas, subject to strict implementation of certain conditions which include protection of ESAs, prohibition of discharge of untreated effluents, prevention of activities that alter the shoreline, providing adequate open space and connectivity to provide for quick and timely relief during natural calamities, regulated ground water extraction, recycle and reuse of water including prohibition on dumping of municipal solid waste in coastal areas and waters.

2.5.19 The Committee was also made aware of the slums, dilapidated, old and unsafe structures that are present in large numbers especially in the city of Mumbai. The GoM has brought to the notice of the Committee and at several occasions to

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GoI that the CRZ Notification has prevented the redevelopment of such slums, dilapidated structures and old buildings. The Committee was of the opinion that it is the responsibility of the respective State/UT Governments to undertake urgent and immediate steps to rehabilitate the people and provide for decent housing to the people living in slums, dilapidated structures and unsafe houses. This action needs to be taken within the ambit of the existing State/UT legislations.

2.5.20 With regard to para 7 (iii), CRZ-III relates to the rural areas, which are the largest geographical area of the coastal regions. These areas are inhabited by fishermen, farmers, salt pan workers and other coastal communities who depend on the coastal areas for their livelihoods. This stretch is important mainly from the local community point of view and has large tourism potential. The Committee is of the opinion that the local communities may be encouraged to take up tourism as a home stay option, which will provide alternative livelihood and also reduce pressure on coastal fishery. Further, some of the State/UT Governments, especially Kerala, Daman and Diu, have brought to the notice of the Ministry, the high population density of local communities living in such CRZ-III areas. The present regulations of NDZ of 200 m have been highly restrictive in the densely populated parts of the country, which has hindered the housing development of the local communities. The Committee is of the opinion that the housing issues of local communities must be addressed immediately.

2.5.21 Further, one important issue which was brought to the notice of the Committee include the small islands along the mainland coast of the country. While the Ministry has addressed the conservation and management of the oceanic islands of Andaman and Nicobar and Lakshadweep under the IPZ 2011 Notification, the issues relating to these small islands along the mainland have not been addressed. Most of these islands are inhabited and some of them are ratherdensely inhabited especially in West Bengal, Kerala and Karnataka. In view of the restriction of the present Notification, which mandates an NDZ of 50 and 100 m, development is hampered in these islands. Keeping in view the hardships of the local communities and the potential for tourism, the Committee recommends relaxing the restrictions in such islands.

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2.5.22 Certain omissions and corrections required in the Notification were also brought to the notice of the Committee. These include:

(a) the usage of the term "*creek*" while referring to the width in the place of "tidal-influenced water body";

(b) the term "*permitted areas*" in para 3(iii) without defining the same, omission of word "studies" in para 3(iv)(d) "*...based on carried...*";

(c) the omission of method of drawal of ground water within 200 m of HTL in para 3(xi)(a);

(d) the requirement of phrase "Any other construction except those permitted under paras 4 to 8 *except facilities required for patrolling and vigilance activities of marine/coastal police stations*" in para 3(xiv);

(e) omission of word "*agencies* authorized by MoEF&CC" in para 5(ii);

(f) the requirement of term "regulations" in the pace of "*regularization*" in para 8(i);

(g) note the missing of phrase "shall be permissible in CRZ" at the end of para 8.V.3.(iii) and such others.

2.5.23 The Committee also noticed that the essential guidelines for several of the procedures to be followed under the Notification including for the demarcation of HTL and LTL were not made available to the agencies/public resulting in delays and lack of clarity. This has attracted litigations on several occasions. Similarly, there are ambiguities in the guidelines for CZMP preparation appended to the Notification resulting again in differences in approaches by the authorized agencies.

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Chapter 3

Discussions on the Issues raised by the States and UTs

The Committee after examining the presentations and details provided by the Governments of Maharashtra, Karnataka, Kerala and other States/UTs with regard to difficulties and impediments in the implementation of the CRZ Notification, 2011 found that many of the issues raised by the States/UTs have several commonalities except for a few area specific matters. In this context, the Committee analyzed these issues topic wise and came to the following conclusions.

3.1 Development Issues in CRZ-II

3.1.1 The Committee examined the issue with regard to the applicability of **Development Plan (DP) and Development Control Rules (DCR)** of various years as presented by Maharashtra. The DCR of 1967 which was applicable under the CRZ Notification, 1991 inhibits certain developments in the CRZ areas of the city. With the growing population and to address the housing issues of Mumbai and other coastal cities in the country it is important that the local Town and Country Planning Regulations are made applicable uniformly in the coastal areas. The disparity in the regulations, governing constructions in the CRZ area is hindering development and causing hardship to the local communities. In fact, it is found that the



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restrictionsimposed have actually led to land encroachment and development of illegal slums particularly along the beaches of Mumbai.

3.1.2 The Committee examined the issues of slums in Mumbai in great detail. It was brought to the notice that these slums exist in extremely unhygienic conditions with no proper basic infrastructure. The slums are thickly populated and the population is prone to risks of flooding, cyclone, and so on. There are no proper roads or passage to evacuate the people during calamities. Since the slums are proliferating in unhygienic and inhuman conditions, it is the responsibility of the State Government to provide basic descent housing facility to the people. This is one of the fundamental requirements of the people. In view of the urgency and in the public interest, the Committee is of the opinion that the CRZ Notification, since its implementation from 1991, has not addressed the issues appropriately.The Committee also examined the Office Oder of September, 1998 issued by MoEF&CC which freezes the FSI as on 19.2.1991 including the Orders of Hon'ble High Court of Bombay which has upheld the above Orders of MoEF&CC. The Orders of Hon'ble High Court of Bombay in freezing the FSI as on 1991 have also been examined. The Orders of the Hon'ble High Court in this matter does not prevent the Government to amend the law. Hence, the Committee is of the opinion that in view of the serious environmental and social issues arising due to proliferation of slums the matter should be left to the State Governments to implement the slum rehabilitation schemes as per the concerned State Government norms issued from time to time. The Committee is of the opinion that rehabilitation of the slum areas is an urgent matter to be addressed in most of the cities of the country particularly in the coastal areas as they are vulnerable to hazard from the sea. However, the Committee recommends that while undertaking such housing for slum rehabilitation in the CRZ-II areas, the following shall be strictly adhered to:

a. All construction activities shall be undertaken in these coastal municipalities on the landward side of the road included in the approved developmental plan or authorized structure(s).

b. All developmental activities shall be undertaken (in these municipal areas) as per the prevailing local Town and Country Planning Regulations subject to the following conditions:

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(i) no discharge of untreated sewage/effluents;

(ii) no activities shall be undertaken that would cause shoreline change including disturbing the sediment balance in the coastal waters;

(iii) adequate provisions/facilities shall be built to provide for quick and timely rescue, relief and rehabilitation measures in case of natural calamities;

(iv) adequate open space shall be provided to meet the emergencies during natural disasters, to maintain aesthetics including adequate ground cover for fresh water recharge;

(v) all residential constructions shall be provided with groundwater recharge facilities;

(vi) all residential or commercial buildings shall be provided with water recycling systems and shall use the recycled water for non-contact purposes such as gardening, washing and flushing (through dual pipeline system);

(vii) no dumping of solid waste. The solid waste shall be managed as per the MSW Rules;

(viii) no conversion of land earmarked for parks, gardens, schools, hospitals and dispensaries, defense establishments, disaster management and other public utility purposes;

(ix) necessary provisions shall be put in place to ensure that the ambient air quality within the municipality is as per norms. All construction activities, transport, industrial activities and so on, shall follow strict air quality norms so as to provide congenial quality of air for people.

3.1.3 The Committee had detailed discussions with regard to the **dilapidated, cessed and unsafe buildings**. The Committee examined the existing provision at para 8V(c) titled "Redevelopment of dilapidated, cessed and unsafe buildings" under CRZ Notification, 2011 including the amendment to the Notification. The Committee observed that in para 8V(c)(2)(ii) of the Notification dated 6 January 2011 provided for FSI and FAR as per prevailing Town and Country Planning Regulations. However, in the amendment dated 29 March 2011 to the CRZ Notification, 2011, the Ministry has frozen the FSI/FAR as on 6 January 2011. Now, State Government seeks the implementation of the original provisions of CRZ Notification, 2011

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whichprovides for FSI/FAR in accordance with Town and Country Planning Regulations prevailing as on date on which the project is granted approval by the State/UT Government.

The State Government has provided the reasons for such provisions mainly to provide safe housing to the tenements. The Committee after detailed discussions is of the opinion that the requests made by State Governmentsneeds to be accepted as this will facilitate people to have a safe and decent housing. The Committee also discussed the issue relating to collapsing of the old buildings in Mumbai especially during monsoon which causes huge loss of life and property. In view of the above difficulties faced by the people, the Committee accepted the requests of State Governmentswith regard to undertaking redevelopment of such buildings as per the provisions of Town and Country Planning Regulations subject to certain specific conditions which are listed under slum redevelopment at item 4.1.2 (i) to (ix) above.

3.1.4 The Committee examined the relevant para of CRZ Notification, 2011 pertaining to **Koliwadas**(these are fishing villages). As per the provisions, the Koliwadas are classified as CRZ-III within CRZ-II. The above provision restricts the development of Koliwadas. The State Government is of the view that such Koliwadas and **Goathans**(are villages) be classified as CRZ-II in order to bring them on par with other developments in Mumbai. This position is acceptable by the Committee as the fishermen communities living within city municipal limits classified as Koliwadas/Goathans/fishermen colony and so on, of Mumbai or elsewhere in such localities in the coastal areas of the country should be developed to meet the economic aspirations of the fishermen communities. The development of these areas shall be subject to the conditions listed in slum redevelopment at item 4.1.2(i) to (ix) above.

3.1.5 The**open space and parks** shall not be converted into developable areas. It shall be ensured that the open space, parks and so on in the approved Development Plan shall be maintained and no constructions shall be permitted except for toilets, wall, walkway and so on, required for non-commercial public use.

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3.2 Development Issues in CRZ-III Including Dwelling Units of Fishermen

3.2.1 Several coastal States including Kerala brought to the notice of the Committee the need to **reduce the**No Development Zonein CRZ-III areas. The Committee after detailed discussion on the issues relating to local communities living in coastal areas was of the opinion that as per the information provided by State Government these local communities are put into great hardship due to the restrictions imposed by the CRZ Notification especially the NDZ specified in the CRZ-III areas. The local communities who possess land in such NDZ are deprived to construct or expand their houses. Further, the NDZ in the small islands in these water bodies is also restrictive and imposes restrictions on the housing/tourismfacilities. It was brought to the notice of the Committee by State Government that some of these rural areas in Kerala, Karnataka and other places are thickly populated with more than 2000 people/km^2. Kerala being the State which has veryless area for habitation is facing serious issues with regard to housing and otherdevelopment activities. The Committee after detailed discussion is of the view that the rural areas may be divided based on the population density. The categorization of such populated rural areas shall be as thickly populated and other rural areas. The thickly populated rural areas shall be those which have a population density of more than 2161 people/km^{2}which is as per class-III towns of 2001 census of India. Other rural areas would be those which are less than 2161 people/km^2. The

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Committee taking into consideration the hardships facod by the local communities and keeping in view the need for housing recommends that the NDZ may be reduced to (i) 50 m in the densely populated rural areas and (ii) 200 m NDZ along the other rural areas. The housing of the communities in densely populated areas could be taken up landward of the above NDZ subject to the following conditions:

(i) In densely populated CRZ-III areas, development can be taken up in accordance with the local prevailing normsincluding the height regulations.The local authorities shall ensure that:

a. no activities shall be undertaken that would cause shoreline change including disturbing the sediment balance in the coastal waters;

b. adequate provisions/facilities shall be built to provide for quick and timely rescue, relief and rehabilitation measures in case of natural calamities.;

c. adequate open space shall be provided (to maintain aesthetics including adequate ground cover for fresh water recharge) and also to meet the emergencies during natural disasters;

d. all structures shall be provided with groundwater recharge facilities. Further, drawal of groundwater shall be regulated as per the norms laid down by the local ground water authority;

e. no discharge of untreated sewage/effluents. All buildings shall be provided with water recycling systems and shall use the recycled water for non-contact purposes such as gardening, farming, washing and flushing;

f. no dumping of solid waste;

g. no conversion of land earmarked for parks, gardens, schools, hospitals and dispensaries, defense establishments, disaster management and other public utility areas including areas meant for fisheries.

(ii) Rural areas are those areas which are less populated. In such areas, development of new houses of local communities can be taken up beyond NDZ which is 200 m from the HTL. Expansion of existing houses in accordance with the prevailing local Town and Country Planning Regulations can be taken up subject to overall height of the construction not exceeding 9 m with ground plus one floor. For development of these rural areas, all provisions listed in a. to h. above shall be adhered to.

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3.2.2 In the NDZ of CRZ-III areas, all traditional activities including fisheries, public amenities, recreational facilities and foreshore requiring facilities can be taken up in larger public interest as per the relevant provisions contained in the State and Central legislations and those contained in this notification. Repairs and reconstruction of existing authorized structure in the NDZ shall be taken up as per the local Town and Country Planning Regulations.

3.2.3 The Committee after detailed discussion on the issue is of the opinion that the dwelling units of the coastal communities in CRZ-III areas which have been constructed in violation of the CRZ Notification shall be regularized by the concerned States/UTs Governmentfollowing the local town and country construction norms. If any of these violations are pending before the Court, the State Government may take up the matter, and with the approval of the Court such violations could be regularized.

3.3 Fishery-Related Matters

The Committee is of the opinion that the modernization of the fish-processing units is necessary in order to improve the quality of processing and to maintain the norms stipulated for standards. Further, facilities for effluent treatment should be in place for the existing fish-processing unitsto ensure zero liquid discharge. Since the setting up of fish-processing units fall under the purview of the State/UT Governments, issues relating to modernization may also be dealt by the respective coastal State/UT Governments.

3.4Tourism-Related Issues

3.4.1 The Committee after examining each of the issues raised by Karnataka, Kerala and other States regarding difficulties in the implementation of the tourism-related projects and taking into consideration the potential for tourism, which could help regional economic development including the local communities, suggests the following:

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Tourism projects in the CRZ-II areas may be taken up as per the local Town and Country Planning Regulations. Tourism project(s) in the CRZ-III areas can be taken up as follows:

(i) In the NDZ and in the intertidal area, temporary tourism facilities such as, cyclone shelter, toilets, wash rooms, change rooms, drinking water facility and temporary shack(s) can be taken up with the permission of the concerned local authorities. It shall be ensured by the local authorities that such facilities indicated above shall occupy only 33% of the area. Further, it shall be the responsibility of the authorities that the solid wastes are handled as per MSW Rules and no untreated effluents are discharged in the coast or in the waters. All disaster management mechanisms shall be put in place by the authorities for rescue and relief.

(ii) Wherever there is a national or a state highway passing through the NDZ, the tourism facilities indicated at (i) above shall be taken up on the seaward side of the road. On the landward side of such road or NDZ, the following tourism activities can be permitted:

a. Eco-friendly resorts, hotels and other such facilities for tourism not exceeding 9 m in height with ground plus one floorwith slope and tiled roof.

b. The total covered area of construction shall not exceed more than 33% of the total area. The open space in the site shall be utilized for greenery, non-paved parking, play fields, and so on. Green areas and open space shall be promoted so as to minimize the impact of storms and facilitate operation and rescue during natural hazards.

c. Drawal of freshwater from the aquifers shall be with the approval of the state ground water authority. Adequate facilities for groundwater recharging shall be provided.

d. No discharge of untreated sewage, no disposal of solid waste. The water shall be treated and reused within the project areafor gardening, flushing and washing.

e. No operation of any hazardous or harmful activities which are detrimental to the coast and marine environment.

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f. To provide for adequate space for operation of livelihood activities of local communities who depend upon the resources of coastal and marine environment.

3.4.2 The Committee recommends that local communities including fishermen who possess houses in CRZ-III areas can be permitted to undertake tourism through home stay without changing the plinth area/design or facade of the existing structure.

3.5 Hazard Management

The Committee recommends that in addition to the CRZ categories and its jurisdiction, there shall be an HMZ, which is, the zone falling between the CRZ boundary and the Hazard Line on the landward side. The Hazard Line is being demarcated by the MoEF&CC through SoI and NCSCM. In this HMZ, the concerned State/UT Governments shall provide for necessary hazard management measuresas per the HM Rules. The States/UTs shall prepare the hazard management plans for this zone and integrate it with the CZMP of their respective areas.

3.6 Demarcation of HTL/LTL

The Committee noted that the Ministry has assigned NCSCM to demarcate HTL and LTL based on the data/inputs provided by the SoI, NRSC and the coastal State/UT Governments. The above HTL/LTL is being demarcated by the NCSCM based on the advice of a Committee appointed by the Ministry. The HTL/LTL thus demarcated would be final and all the CZMP would be prepared based on the above HTL/LTL by the respective coastal States/UTs.

3.7 Preparation of CZMPs

3.7.1 This issue of **CZMP preparation** has been considered by the Committee, and the initiatives taken by the MoEF&CC in this regard have been appreciated. The HTL demarcation by NCSCM is a key step towards the preparation of the CZMPs. The uniform HTL all along the country shall resolve most of the issues related to it.

3.7.2 CZMPs shall be prepared by the States/UTs indicating the HTL, LTL, CRZ-I, CRZ-II and CRZ-IV areas, any other prohibited area declared by the States/UTs and

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the disaster management facilities superimposed on the approved Development Plan in case of CRZ-II areas (municipalities). In the case of CRZ-III areas, the CZMPs demarcating the HTL, LTL, CRZ-I, CRZ-III and CRZ-IV areas, any other prohibited area declared by the States/UTs and keeping in view the provisions contained in this Notification shall be prepared at the local body level.

3.7.3 The States/UTs may also address some of the important coastal issues, including climate change, renewable energy and any other innovative schemes suitable or unique for their location and include in the CZMP. Then this CZMP has to be recommended by the State/UT CZMAs and approved by the NCZMA. Thereafter, all the development activities in the CRZ will be governed by the local body as per the approved CZMPs.

3.8 Tidal-Influenced Water Bodies

3.8.1 The Committee discussed the issues relating to the water bodies connected to the sea such as estuaries, rivers, creeks, backwaters, lagoons, ponds and the like which are termed as "**tidal-influenced water bodies**".

3.9 Enforcement of CRZ Notification

3.9.1 All activities proposed to be undertaken in the CRZ-II and CRZ-III areas other than those which attract EIA Notification, 2006 shall be governed by the concerned State/UT Government regulations subject to the conditions stipulated in the CRZ Notification and CZMPs approved by the NCZMA.

3.9.2 The Committee agrees to the request for speedy clearance of the projects. The Committee examined the process of clearance under CRZ Notification, 2011 including the various requirements/information sought at Annexure-IV of the Notification dealing with the application for clearances. It was felt that the information sought is required for all category of projects listed in the Notification which includes small houses of local communities, ice plants, fishing-related activities, agriculture, roads, rain shelters, community toilets and so on. Such information sought under Annexure-IV of the Notification may not be available with the agencies proposing to undertake the activities. Further, such detailed information may also not be required

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for small projects. With a view of simplifying the procedures for obtaining clearance under the CRZ Notification and to make it transparent and people friendly, each of the State Governments shall formulate the criteria for seeking clearance under the CRZ Notification along with an application form. The application form, details of the procedures, the agencies/local bodies that would clear the project, time limit for the clearance and so on shall be appended to the CZMP of the respective coastal States/UTs.

3.9.3 The Committee is of the opinion that all Acts, Notifications, governing the environmental issues shall operate independently and shall not be interdependent until unless specified. However, the project authority shall ensure that the projects are taken up for implementation only after receiving all statutory clearances.

3.9.4 The Committee examined the role of the CZMAs and the notification constituting the CZMAs. The Committee was of the opinion that the CZMAs should focus mainly on conservation and protection of the coastal areas especially the coastal ecosystem and geomorphological features which are so unique and fragile. The CZMAs rather than carrying out such scientific activity at the ground level are mainly involved in accordingly clearance and examining developmental projects particularly in the CRZ-II and III areas. This activity is a duplication of the Authorities and Agencies created under EIA Notification, 2006.

Hence, the Committee is of the opinion that all such activities and clearances with regard to developmental projects in CRZ should be considered and examined by the respective Authorities created under EIA Notification, 2006. The CZMAs including NCZMA should be responsible mainly for monitoring, enforcement and examining the implementation of the CRZ Notification, particularly, the status of ESAs and approval of CZMPs. The CZMAs should coordinate with NCSCM and SICOM with regard to protection and conservation of ecosystem including monitoring of pollution, erosion, accretion, and so on. The CZMAs should also play an important role in developing a State level capacity in various research and development including awareness in the area of coastal management. The MoEF&CC may provide necessary technical assistance and financial assistance under the ICZM Project to the coastal States/UTs for developing such expertise.

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3.9.5 The Committee examined several issues in the present CRZ Notification where the terminologies are not explained or defined. This has led to ambiguities, litigations, violations and difficulty to the people. Hence, the Committee is of the view that the Ministry shall clearly indicate the definition, jurisdiction, the process of clearance, timelines and so on, so that the people are not put to difficulty. Further, the transparency mechanism shall be built in the new regulations to ensure speedy clearance process.

3.9.6 It will be the responsibility of the concerned State Government to address issues relating to complaint and redressal mechanism. The Environment Division of the State and the PCBs are delegated with necessary provisions of EPA 1986 to take action against the violations. Further, the Committee under Shri T. S. R. Subramaniam has also addressed this issue which may be taken into consideration.

3.10 Monitoring, Institutional Mechanism and Capacity Building

3.10.1 The Committee is of the opinion that the State/UT Environment Departments which have a dedicated website for CRZ matters shall be updated regularly. The CZMPs shall be uploaded in the website after obtaining necessary approvals from Competent Authority. The notified areas under this Notification and decisions taken at the local level shall also be hosted on the dedicated website of the States/UTs.

3.10.2 Ministry will put in place a monitoring mechanism which will consist of State/UT CZMAs. The Ministry throughspecialized agencies shall strengthen the monitoring agenciesand encourage monitoring through space and IT based technology. The Ministry will also put in place a third party monitoring system who will undertake periodic monitoring and evaluation of the coastal environment.

3.10.3 MoEF&CC through SICOM shall undertake strengthening of the existing institutions and periodic training and capacity building of the CZMAs and other stakeholders working in the area of coastal management. Further, the concerned State/UT Governments shall provide adequate infrastructure facilities keeping in

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view the international scenario and emerging technologies in the area of coastal management.

3.11 Issues Related to Conservation of ESAs

3.11.1 The Committee after examination of the provisions of the CRZ Notification, 2011 it is observed that there is no adequate provision for management of ESAs which are categorized as CRZ-I including the geomorphological and archaeological features. It was brought to the notice of the Committee that the mangroves are present in the Government as well as in the private lands. While the protection is provided in the Government land by the concerned State Government agencies, the owners of private land, who have planted the mangroves and face difficulties as the mangrove land is declared as 'no development area. This provision of imposing no development on a private mangrove land is a disincentive to such land owners. While the Committee appreciates the efforts and initiatives taken by the private owners in developing mangroves, it is found that there are no incentives to such initiatives. Further, the Committee feels that the private land owners should also be enabled to undertake development as per the local Town and Country Planning Regulations.

3.11.2 It was mentioned that the mangroves in case of more than 1000 m^2 are required to provide 50 m buffer. However, unfortunately, the buffer zone of 50 m has led to encroachment, illegal dumping, construction activity and slum redevelopment. Hence, to prevent such unauthorized and illegal activities which are harmful to mangroves, a walkway on stilts along the boundary may be permitted. The 50 m buffer could also be developed as a green belt under social forestry or gardens. Further, the Committee is of the view that marine interpretation centres and research facilities are a requirement to spread awareness about the mangroves and its flora and fauna associated with it. Such awareness about the mangroves and the associated flora and fauna by the public would bring out better conservation and protection of the mangroves. This would be a positive approach which may be encouraged. The walkways, promenades and social forestry could be promoted all along the mangrove buffer zone that would prevent illegal felling of mangroves and



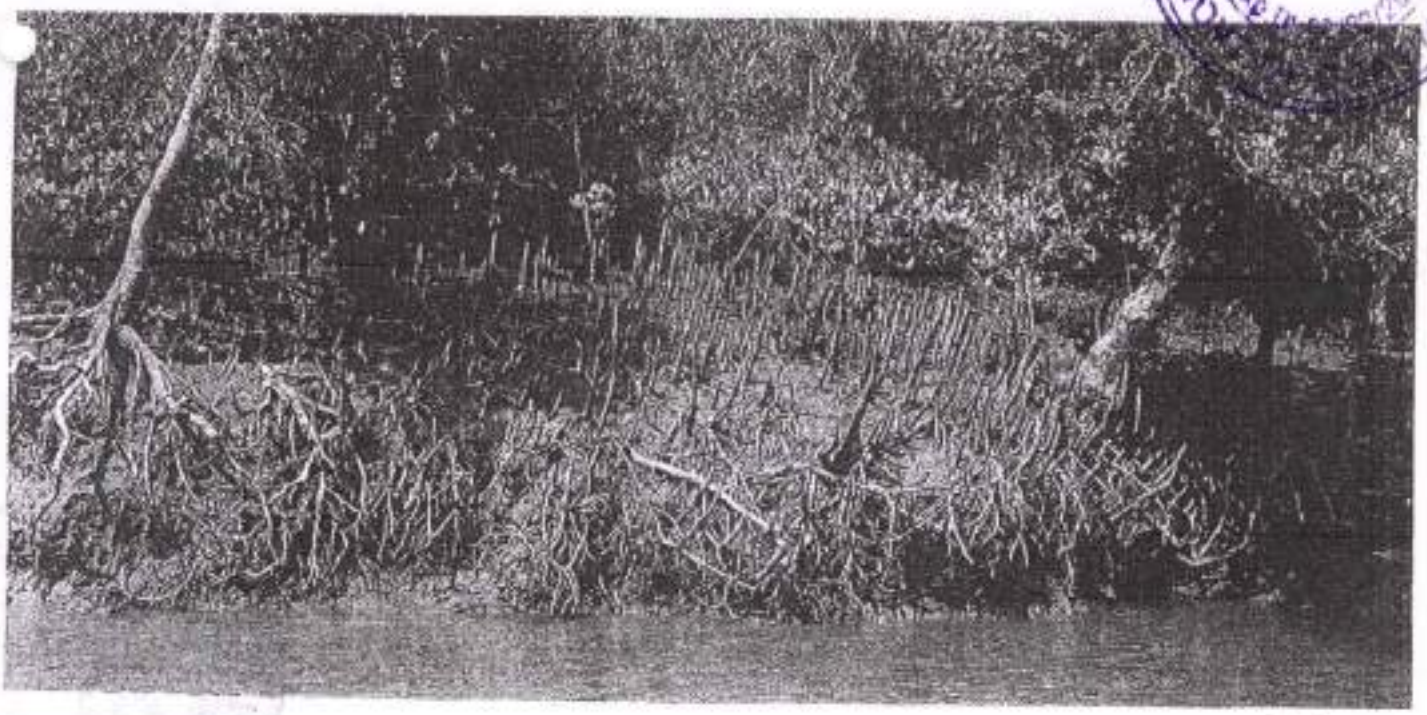
also prevent dumping of waste in the mangrove area. In order to promote the conservation of mangroves, the Committee is of the opinion that the approval mechanism should be made simpler and faster and the State Government should be delegated the power to recommend and clear such proposals.

3.11.4 The Committee examined the issue of mapping the ESAs and preparation of the management plan in detail. It was brought to the notice of the Committee by NCSCM that the mapping activity of ESAs including the preparation of management plans for the conservation and protection of these ESAs are undertaken by the NCSCM.

3.11.5 The Committee taking into consideration the various aspects of mangrove conservation and the request made by the State Government to undertake certain development in larger public interest recommends as follows:

Mangroves in the coastal areas act as breeding, spawning and rearing grounds of several aquatic fauna that are important for biodiversity. Several species of finfish and shellfish live in mangrove areas on which the local communities depend for their livelihood. Further, the mangroves help in minimizing the impact of storms, floods, erosion and so on and are also carbon sinks. Keeping in view the importance of mangroves, the concerned State/UT Governments shall earmark adequate funds and identify suitable land for promoting, conserving and afforestation of mangroves in the respective areas. This activity shall be undertaken by the concerned State Governments/UTs.

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The mangrove vegetation in the coastal areas are categorized as follows:

(i) Mangroves declared as forest under Forest Conservation Act, 1980 – Not withstanding anything contained in this notification, such mangroves declared by the concerned State Governments/UT Administrations/Central Government as forest land under the F(C)A, 1980 shall attract the provisions of the F(C)A, 1980 only.

(ii) Mangroves in (a) Government land not declared under Forest Conservation Act, 1980; (b) private land.

1(a) Mangroves in Government land shall be protected based on a detailed plan prepared by the concerned State/UT Governments. In case the mangrove area is more than 1000 m^2, a buffer of 50 m along the periphery of mangrove area shall be provided. This buffer zone of 50 m shall be utilized for constructing walkways, interpretation centers, promenades public facilities for developing parks, research facilities related to mangrove biodiversity, facilities for conservation and the like. Further, in the mangrove area and in the buffer, all activities are prohibited except for laying of pipelines, transmission lines, conveyor belts, construction of road on stilts and other conveying mechanisms that are required for public use. Defense establishments such as watch tower could be taken up in the mangrove area. In such cases where removal of mangroves is inevitable in public interest after examining all the alternatives, a minimum of ten times the area of mangroves shall be re-planted and protected within the coastal zone of respective States or UTs. Mangrove removal for the above purposes shall be undertaken only on the recommendation by CZMAs and on the approval of the concerned States/UTs.

2(a) Government land designated for agriculture, fishing, infrastructure meant for local communities, fresh water storage, aquatic bodies, public bodies and associated infrastructure facilities for public use in the development plan which was approved prior to approval of CZMP of 26 September 1996 under the CRZ Notification 1991 may be taken up.

Incase of such designated areas where mangroves have grown due to abandonment of agriculture, fishery related activities or lack of infrastructure

to prevent ingress of salinity into land/fresh water bodies, in such areas development can be taken up as per the development plan approved prior to 27 September 1996 subject to the condition that such development in the mangrove land are considered by a committee headed by the Chief Secretary of the States/UTs. For any mangrove area destroyed while undertaking developments as indicated above, compensatory mangrove afforestation should be taken up 20 times in lieu of the mangrove destroyed, in an area identified by NCSCM.

(b) For mangroves in private land, incentives shall be provided by the concerned State/UT Forest Departments for promoting mangrove conservation/afforestation in private land, for which there will be no requirement of a buffer zone. The developmental activities in the private mangrove land can be taken up.

3.11.6 The Committee taking into account the provisions of the CRZ Notification in this regard agreed that the proposed notification should provide for the following:

i. To clearly indicate that destruction of mangroves other than for the permissible activities under the notification is a prohibited activity.

ii. The mangroves shall be mapped by the NCSCM who have already been assigned the work of mapping ESAs. Detailed management plan for protection and conservation of mangroves shall be taken up by the concerned Department in the State Government. 50m buffer shall be provided along the mangrove area wherever the mangrove area is more than 1000 m^2.

iii. For the purpose of conservation, protection and to create awareness, certain basic public infrastructure such as walk ways, rain shelters, interpretation centres, research facilities, parks, forestry and promenades, field research facilities related to coastal ecosystems and marine interpretation centres, can be created. The walkway on stilts could be constructed along the buffer area of such mangrove patch. All such developments shall be for public purposes only. For any mangroves destroyed for such construction, compensatory mangrove plantation of ten times shall be taken up within the States/UTs. It shall be ensured that no benefit for construction shall accrue on the landward side of such constructions.

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3.12 Other Issues

3.12.1 The Committee discussed in detail the issue relating to coastal road in the CRZ-IV which is the water area. GoM has proposed such roads not only to ease the traffic congestion but also due to lack of land available in the mainland for this purpose. The justification provided is that such road would provide for faster means of transportation and can be taken up with no rehabilitation/relocation. Although the project is being taken up in larger public interest, the environmental issues especially from the coastal environment need to be addressed in detail for taking up such projects. Large-scale reclamation may transform the coastline. The project may cause erosion and other associated impacts such as destruction of mangroves, loss of beaches and loss to fisheries affecting the fishing community. In this regard, the State Government may have to carry out a detailed study along with a feasibility report. If found feasible from both economic and environmental angles; the coastal road project could be incorporated in the CZMP for which a separate approval may be sought from the MoEF&CC after following due procedures. The MoEF&CC shall examine the project under CRZ as the project falls within CRZ-IV category.

3.12.2 The Committee discussed in detail with regard to the new airport proposed by Maharashtra in an island in Thane creek. It was the view of the Committee that the GoM may reconsider the proposal since climate change and subsequent SLR is a serious issue. Further, in view of the increasing frequency of cyclones, storm surges, currents and so on, the feasibility from technical angle needs to be examined critically by the GoM. Though in several countries offshore airports are operating, this issue needs to be examined from both economic and environmental angles.

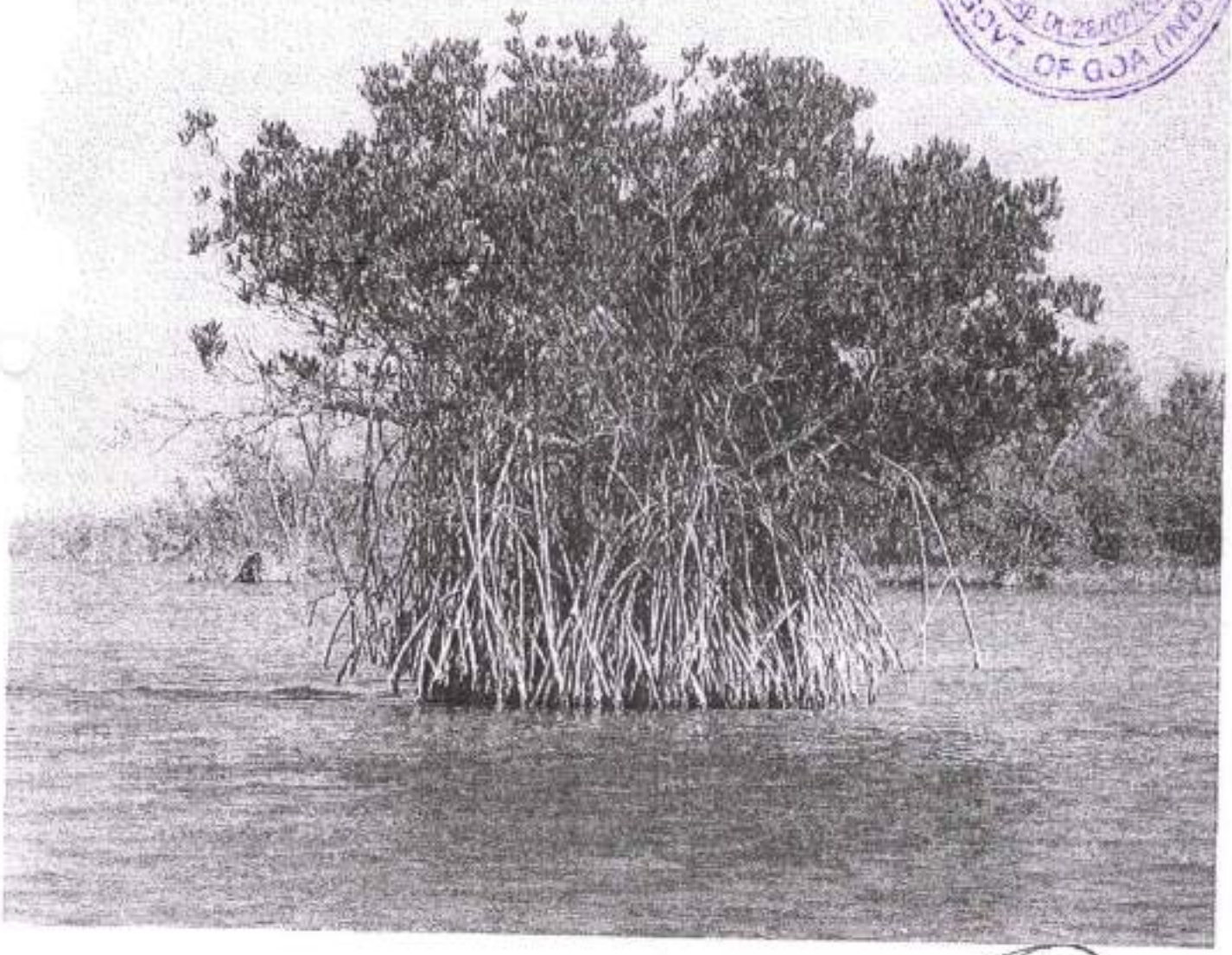
3.12.3 The request regarding the usage of old industrial buildings in CRZ area for developmental activities which are non-polluting in nature including tourism and other service sector activities was considered by the Committee. The Committee agrees with the proposal, however, the plinth area of such structures shall not be altered.

3.12.4 The Committee after taking into account the request of GoG seeking relaxation in mining of limestone in CRZ area was of the opinion that the limestone reserves are valuable and should be utilized for developmental purposes.

limestone reserves of Gulf of Kachchh and Saurashtra need to be examined and studied in detail by reputed scientific national institutes such as CSIR – Central Mining Research Institute, Dhanbad, National Cement and Building Material Institute, Faridabad and NCSCM. Based on the recommendations of these Institutes, selective mining with appropriate safeguards related to ground water, coastal erosion and others could be carried out. The mining of such minerals could be indicated in the CZMP of the State/UT which shall be prepared based on the above studies.

3.12.5 The Committee recommends that all other projects of national importance declared by the Central Government shall be undertaken in CRZ on a case-to-case basis based on EIA as provided in the EPA 1986.

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Chapter 4

Recommendations and Proposed Draft CRZ Notification

4.1 Recommendations

The Committee after examining in detail the issues of coastal environment, the hardship faced by the communities, the need for economic development of the country and based on the six principles, recommended the following:-

A. The coastal areas have fragile ecosystems which are sensitive to various parameters such as salinity, temperature, turbidity, pollution and disturbance to the substrata. Even small changes in these parameters lead to partial or total destruction of these ecosystems, which in most cases are irreversible; hence, they should be preserved and conserved. From the data made available, it is observed that these ecosystems have undergone destruction over a period of time. Such irreversible damages cause serious impact to the livelihood to the local communities as these ecosystems sustain the productivity of the coastal areas. Further, these ecosystems such as mangroves, coral reefs, sea grass beds and coastal forests act as barriers to cyclones, flooding and erosion and also act as major carbon sinks. In view of the immense importance of the ESAs, the MoEF&CC may formulate concrete proposals and initiate activities for the conservation and protection of these ecosystems.

B. The ecosystems while rendering immensely useful goods and services to the environment and coastal communities,can also attract tourism if properly managed. Hence, it is important that the Government takes major initiatives in identifying, conserving and drawing up concrete framework based on certain successful models worldwide including that of IUCN for the conservation, protection and promotion of eco-tourism in such areas. These would provide alternative livelihood to local communities, thereby, reducing pressure on the fish and fisheries.

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C. The Committee strongly opined that ESAs mapped under CRZ-I should be identified based on scientific assessment, each of which shall be notified. The States/ UTs through reputed scientific authorized agencies shall undertake conservation, protection measures as per the management plan based on the guidelines prepared by MoEF&CC.

D. The coastal areas also are places where several historical, archaeological and heritage value structures and areas are present. These features need to be protected and conserved from the historical point of view. The MoEF&CC in cooperation with the Ministry of Culture should undertake identification, mapping and conservation programmes of such areas.

E. The sea bed and the bed of the tidally influenced water bodies are the breeding, spawning and rearing grounds of several coastal/marine species on which the local communities depend upon. Several activities such as indiscriminate mining and dredging have destroyed the benthic flora and fauna. Such activities have affected the coastal processes leading to accretion, deposition and change in hydrodynamics and morphodynamics. Hence, there is a need to protect and regulate the activities that are detrimental to the integrity of the water bodies and their bed.

F. The marine waters and the coastal areas have been sites for disposal of sewage, effluents and solid waste. This indiscriminate dumping and disposal over a period of time has made the coastal waters and several of the coastal stretches toxic. It is a fact that the coastal cities are growing but there is inadequate solid waste management or sewage treatment facilities to address the pollution-related problems. If left unattended, the implications would be serious and could be irreversible. Hence, the Government, at local, State and Central level, should take serious note of this issue and address the problem at the earliest. The State Pollution Control Boards should be entrusted to take up the Government's initiative of "Swachchh Bharat Abhiyaan" in the coastal and marine waters as well.

G. It is observed that the CRZ Notification has tried to address some of the issues related to Town and Country planning in it. The Committee was informed by all the coastal States and UTs that they have well-laid Town and Country Planning

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Regulations. The regulations of the CRZ Notification in category II and III areas, especially with regard to construction, have affected the housing, slum redevelopment, redevelopment of dilapidated structures and other dangerous buildings. It is strongly felt that the concerned State Governments should be left to address the housing needs of the communities as per the State/UT Government norms. Providing decent housing to all communities is of prime importance and is a fundamental requirement of the people.

H. The States and UTs also brought to the notice of the Committee the need for safe, hygienic and decent housing with basic infrastructure facilities for large sections of the coastal fisher and other population who since several decades have been living in unhygienic, disaster-prone slums and unsafe buildings. The Committee is convinced that the CRZ Notifications have not addressed this human issue comprehensively. Although the Committee agrees that the construction of housing infrastructure would lead to congestion in the coastal areas, there is no alternative with the Governments as there are no mechanisms in place to prevent migration of population to coastal areas or to decongest the existing populated areas. In the absence of such mechanisms, it is imperative that housing with basic infrastructure facilities is provided to these communities in the national interest.

I. It has been brought out to the Committee by all the States/UTs that the CRZ Notifications have been made very complex and its interpretation and implementation is difficult. It was also observed that certain terminologies used in the CRZ Notification such as the word "existing" "HTL" etc were not defined in right time. Some of the issues being scientific, appropriate guidelines were not issued by the Government to the public. Hence, lot of ambiguity exists even today and several court cases and disputes have arisen due to such complexities. The HTL/LTL demarcation, boundaries of CRZ-I, CRZ-II and CRZ-III and so on, are complicated. It is recommended that the Ministry addresses each of the issues in detail and brings out guidelines, criteria and so on.

J. The other major issue that has come before the Committee is the conflicting and overlapping jurisdictions and provisions in the CRZ and other laws. The CRZ Notification, 2011 provisions especially in the CRZ-II and CRZ-III areas override

the Town and Country Planning Regulations of the coastal States/UTs in the CRZ area. This disparity between the CRZ and non-CRZ had led to several issues. Most State Governments have sought for uniform regulations in the State for smooth implementation. This suggestion of the State Governments is found justified since currently there are a lot of ambiguities with regard to HTL/LTL mapping, CRZ boundary demarcation and so on, which are prerequisites for CZMP, the preparation of which is considerably delayed. It is also observed that the Environment Departments of States/UTs are extremely under-staffed to meet the challengers of CZM. The existing staff in the States/UTs is mostly involved in addressing approvals and issues relating to CRZ-II and CRZ-III. There have been very few instances where States/UTs have taken proactive steps in CRZ-I and CRZ-IV areas, the conservation of the ecosystems in it, combating pollution and improving the general environmental quality of the coast. Hence, the Committee is of the opinion that the Environment Departments of the States/UTs and the MoEF&CC should be sensitized to mainly address CRZ-I and CRZ-IV issues and in turn allow the concerned Departments in the States/UTs to address the issues relating to CRZ-II and CRZ-III themselves as they relate mostly to town and country planning arena.

J. The Committee is also of the opinion that new opportunities and initiatives need to be taken to address the economic and social development of coastal communities. Most of the traditional coastal communities, who live on the resources from the coastal areas, especially fishing, need to be provided with adequate opportunity for economic development. In this regard, the Committee is of the opinion that while the ecosystems are being conserved and protected by the Governments, the local communities should also play an important role in conservations and protection of the ecosystems. The local communities should be provided with an opportunity to take up tourism, artisanal fisheries such as traditional aquaculture and ornamental fish culture, in such ecosystem areas for their economic improvement. The Governments should work in this area which will address both conservation and economic development of the communities thereby, reducing pressure on the already depleting fisheries.

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K. Another matter of concern which the Committee has noted is the change in the shoreline. The shoreline change is accelerated by anthropogenic activities. In this context, certain initiatives have been taken by the MoEF&CC through the NCSCM wherein the shoreline changes are being mapped and studied. The above-mentioned studies need to be taken into consideration while undertaking foreshore developmental activities. Also, the studies need to be carried further to ascertain exact reasons of shoreline change.

L. The Committee appreciates the initiatives taken by the Ministry in setting up exclusive Centres for coastal management such as NCSCM, SICOM and State level Project Management Units including strengthening of the consortium institutions in each of the coastal States/UTs. These agencies could be further developed for undertaking research and development in the area of coastal management and also to address the social needs of the communities in the States/UTs.

M. The Committee after detailed examination of all issues raised by the States/UTs Government and taking into consideration the international scenario in the area of CZM including the emerging scientific technologies in the area of coastal and marine management is of the clear view that the MoEF&CC should embark upon new initiatives for protecting and conserving the coastal and marine areas which have such precious and fragile ecosystems.

Based on the discussions with the States/UTs with respect to each of the issues raised by them, the decisions therein and the recommendations given above the Committee proposes a draft CRZ Notification, which, if approved by the MoEF&CC, shall supersede the CRZ Notification, 2011.

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4.2 Proposed Draft CRZ Notification

Whereas, the Ministry of Environment, Forests and Climate Change (hereinafter referred to as MoEF&CC) issued Coastal Regulation Zone (hereinafter referred to as CRZ) Notification, 2011 vide S.O.19(E)dated 6th January, 2011 under Section 3 of Environment (Protection) Act, 1986;

And whereas, the coastal and marine ecosystems also contain Ecologically Sensitive Areas (hereinafter referred to as ESAs) which sustain high biodiversity and offer immense value of ecosystem services to people for their livelihood;

And whereas, the ESAs such as mangroves, coral reefs, turtle nesting ground etc., provide protection to local communities from natural hazards such as cyclone, flood, tidal surges, sea level rise, etc.;

And whereas, certain ESAs provide for breeding, spawning and rearing grounds of economically important finfish and shellfish in the coastal and the marine areas on which the local communities depend for their sustenance;

And whereas, certain ESAs such as mangroves, coral reefs, forests under Forest Act (1980), sea grass beds and the like and the geomorphological features such as beaches, sand dunes, mudflats etc.,are important as they play a critical role in maintaining the integrity of the coastal and marine dynamics including helping in recharging the fresh water aquifers;

And whereas, coastal areas including the ESAs offer great opportunity for promotion and development of eco-tourism including beach tourism;

And whereas, the large amount of flora including that of ESAs along the coastal and marine areas act as a carbon sinks that help in reducing global warming;

And whereas, the coastal and marine environment of the country is highly diverse in terms of flora, fauna, geomorphological features, climatic conditions, hydrodynamics and demographic patterns;

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And whereas, certain areas along the coastal and marine regions have natural features that provide for increased scenic beauty, structures/monuments which are archeologically and heritage-wise valuable and such areas provide for high and incomparable aesthetic/historic value;

And whereas, the sea bed and the bed of the tidally influenced water bodies are being indiscriminately mined for sand and other resources, thereby, destroying the benthic flora and fauna that also affect the sediment dynamics;

And whereas, the coastal and marine areas are experiencing increase in pollution load mainly from industries and sewage generated not only from coastal infrastructure/townships and cities but also from the discharge of effluents, pesticides and sewage generated in the hinterland far away from the coast brought through the rivers;

And whereas, the livelihood of the local communities are affected due to depletion of economically important fish stock on account of destruction of marine ecosystems also due to indiscriminate effluent discharge and solid waste dumping;

And whereas, the coastal and marine areas are experiencing impacts of climate change including sea level rise;

And whereas, the State Governments and Union Territories (UTs) have expressed that the CRZ Notification, 2011 did not provide adequate measures and incentives for conservation and management of ESAs and areas along the coastal and marine areas;

And whereas, the Ministry is made aware of the conflict between certain State/UT level legislations and the provisions contained in the CRZ Notification, 2011 and these conflicts are adversely affecting the housing and livelihood of the local communities;

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And whereas, all the State Governments/UTs have requested the MoEF&CC to simplify the procedures laid down in the CRZ Notification, 2011, thereby making it people friendly and transparent;

And whereas, in the CRZ Notification, 2011 where the objective was to ensure livelihood security to the fishing communities and other local communities living in the coastal areas, to conserve and protect coastal stretches, its unique environment and its marine area and to promote development in a sustainable manner based on scientific principles by taking into account the dangers of natural hazards in the coastal areas, sea level rise; declared the coastal stretches of the country and the water area up to its territorial water limit, excluding the islands of Andaman and Nicobar (hereinafter referred to as A&N) and Lakshadweep and the marine areas surrounding these islands up to its territorial limit, as CRZ and restricted the setting up and expansion of any industry, operations or processes and manufacture or handling or storage or disposal of hazardous substances as specified in the Hazardous Substances (Handling, Management and Transboundary Movement) Rules, 2009 in the aforesaid CRZ;

And whereas, the MoEF&CC has received several representations from various coastal States and Union Territories (UTs) regarding the difficulties in implementing the CRZ Notification, 2011;

Having understood the above and the value of the coastal and marine ecosystems, the benefits that they offer and their potential to offer to mankind and the need for their conservation and preservation, in exercise of powers also conferred by clause (d) and sub rule (3) of rule 5 of Environment (Protection) Act, 1986and in supersession of the Notification of the Government of India in the MoEF&CC, number S.O. 114(E), dated the 6th January, 2011 except as respects things done or omitted to be done before such supersession, the Central Government hereby declares the areas as CRZ and imposes the following restrictions on setting up and expansion of industries, operations, processes and the like in the CRZ.

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2. In this draft notification, unless the context otherwise requires

(i) 'High Tide Line (hereinafter referred to as the HTL)' means the High Tide Line as demarcated by the National Centre for Sustainable Coastal Management (hereinafter referred to as NCSCM) based on 2011-12 satellite data generated specifically for this purpose by SoI under the Integrated Coastal Zone Management Project of MoEF&CC. The HTL demarcated by NCSCM based on the above data would be the final HTL for all purposes under this draft notification.

(ii) 'Low Tide Line (hereinafter referred to as the LTL)' means the Low Tide Line as demarcated by NCSCM based on 2011-12 satellite data and the data generated by SOI. The LTL demarcated by NCSCM based on the above data would be the final LTL for all purposes under this draft notification.

(iii) 'Hazard Line' means the line demarcated by the Survey of India (hereinafter referred to as SoI) taking into account the extent of flooding on the land area due to water level fluctuations, sea level rise and erosion/accretion (shoreline change) occurring over a period of time;

(iv) 'Coastal Zone Management Plan (hereinafter referred to as the CZMP)' means the plans mandated under the CRZ Notification to be prepared by the concerned State/UT Governments based on the criteria/guidelines laid down in this draft notification at Annexure-B. The CZMP prepared by the State/UT Governments and approved by NCZMA will be notified under E(P)A, 1986 after holding public hearing as provided for in the said Act.;

(v) 'Densely populated rural areas' means those coastal areas which have a population density more than 2161 people per sq km (as per Class-III towns of 2001 Census of India) within the smallest census unit along the coast prescribed in the census of 2001;

(vi) 'Rural coastal areas' means those coastal areas which have a coastal density of less than 2161 people per sq km (as per Class-III towns of 2001 Census of India) within the smallest census unit along the coast prescribed in the census of 2001;

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(vii) 'Tidally influenced water bodies' are those water bodies influenced by tidal effects of the sea such as estuaries, creeks, backwaters, lagoons, and the like connected to the sea;

3. Jurisdiction of this draft notification

(i) Land area from HTL to 500m on the land ward side along sea front;

(ii) Land area between HTL to 100m or width of the water body, whichever is less, on the landward side along the tidally influenced water bodies;

(iii) Land area between HTL and LTL which is termed as inter-tidal zone;

(a) Water area and the bed area of the sea from LTL to the limit of the territorial waters or International Maritime Boundary Line (IMBL);

(b) In case of tidally influenced water bodies, the bed area between LTL on one side of the bank to the LTL of the opposite side of the bank;

(iv) The CRZ is applicable to all mainland islands, which are located in the tidally influenced water bodies and those islands which are located in the offshore of the mainland. Oceanic islands of the Andaman & Nicobar and Lakshadweep are dealt with in the Island Protection Zone (IPZ) Notification 2011.

4. Hazard Management Zone:

In addition to the above, there shall be a hazard management zone (hereinafter referred to as HMZ), which is the zone falling between the CRZ boundary and the hazard line on the landward side. The hazard line is being demarcated by MoEF&CC through NCSCM. In this HMZ the concerned State(s)/UT shall provide for necessary hazard management measures as per the HM Rules.

5. Roles and responsibilities of authorities and agencies under this draft notification,

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(i) MoEF&CC shall be responsible for overseeing the implementation and enforcement of this n.

(ii) National Coastal Zone Management Authority (hereinafter referred to as NCZMA constituted under E(P)Act, 1986) shall be responsible for according approval to the CZMPs prepared by the concerned States/UTs Government along with other responsibilities/duties entrusted by MoEF&CC.

(iii) SICOM established by MoEF&CC under the Society Registration Act, 1860 shall be responsible for coordinating with various Central Ministries/ State/UT Governments and other agencies with regard to implementation of the notification including the CZMAs. SICOM shall coordinate and facilitate transfer of requisite data from different authorised agencies such as, MoEF&CC, ISRO, SAC, NCSCM, SoI, NIOT etc., to the States/UTs for the purpose of preparing CZMPs and other management plans. SICOM shall undertake capacity building and also facilitate in institutional strengthening of various agencies including the CZMAs and other stakeholders.

(iv) State/UTs shall be responsible for preparing the CZMPs of their respective areas including any other management plans listed under this draft notification. Further, the CZMAs shall be responsible for recommending the CZMPs prepared by the States/UTs, overseeing the implementation of the CZMPs and enforcing the provisions of this draft notification.

(v) NCSCM established by SICOM as a Society under Tamil Nadu Societies Act 27 of 1975 shall be the research and development Centre in the area of coastal and marine zone management. NCSCM will be responsible for providing HTL/LTL, the necessary inputs for demarcation, delineation and guidelines for management of ESAs, CZMPs, ICZMPs and the like.

(vi) Authorised agencies are reputed scientific bodies identified by MoEF&CC for the purpose of preparing the CZMPs for the States/UTs based on the guidelines. These authorised agencies can also take up implementation of the management plans if so assigned by the concerned State/UT Governments.

6. List of prohibited activities in the CRZ area:

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(i) Setting up of new industries and expansion of existing industries except,-

(a) those directly related to waterfront or directly needing foreshore facilities;

Explanation: The expression "foreshore facilities" means those activities permissible under this draft notification and they require waterfront for their operations such as ports and harbours, jetties, quays, wharves, erosion control measures, breakwaters, pipelines, lighthouses, navigational safety facilities, coastal police stations, projects of national strategic importance and the like.;

(b) projects of Department of Atomic Energy;

(c) facilities for generating power by non-conventional energy sources and setting up of desalination plants in the areas not classified as CRZ-I(i) based on an impact assessment study including social impacts;

(d) reconstruction, repair works of dwelling units of local communities including fishers in accordance with local town and country planning regulations;

(ii) manufacture or handling of oil storage or disposal of hazardous substances as specified in the notification of Ministry of Environment and Forests, No.S.O.594 (E), dated the 28th July 1989, S.O.No.966(E), dated the 27th November, 1989 and GSR 1037 (E), dated the 5th December ,1989 except,-

(a) transfer of hazardous substances from ships to ports, terminals and refineries and vice versa;

(b) facilities for receipt and storage of petroleum products and liquefied natural gas and facilities for regasification of Liquefied Natural Gas (hereinafter referred to as the LNG) in the areas not classified as CRZ- I subject to implementation of safety regulations including guidelines issued by the Oil Industry Safety Directorate in the Ministry of Petroleum and Natural Gas and guidelines issued by MoEF&CC and subject to further terms and conditions for implementation of ameliorative and restorative measures in relation to environment as may be stipulated by in MoEF&CC.

(ii) Provided that facilities for receipt and storage of fertilizers and raw materials required for manufacture of fertilizers like ammonia, phosphoric acid, sulphur, sulphuric acid, nitric acid and the like, shall be permitted within the said zone in the areas not classified as CRZ-I.

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(iii) setting up and expansion of fish processing units including warehousing (excluding hatchery and natural fish during in permitted areas):

(Provided that existing fish processing units for modernization purposes may utilize twenty five per cent additional plinth area required for additional equipment and pollution control measures only subject to existing Floor Space Index/ Floor Area Ratio norms and subject to the condition that the additional plinth area shall not be towards seaward side of existing unit and also subject to the approval of State Pollution Control Board or Pollution Control Committee.)

(iv) Reclamation, bunding or disturbing the natural course of seawater except for those measures,-

(a) essential for setting up, construction or modernisation or expansion of foreshore facilities like ports, harbours, jetties, wharves, quays, slipways, bridges, sealinks, roads on stilts, and facilities meant for defense and security purposes and other facilities that are essential for activities permissible under the notification;

(b) required for control of erosion, based on scientific studies including Environmental Impact Assessment (hereinafter referred to as the EIA);

(c) essential for maintenance or clearing of waterways and channels for ports / harbours / jetties based on EIA studies;

(d) required to prevent sand bars, installation of tidal regulators, laying of storm water drains or for structures for prevention of salinity ingress and freshwater recharge based on studies carried out by any agency to be specified by MoEF&CC.

(v) Setting up and expansion of units or mechanism for disposal of wastes and effluents except facilities required for,-

(a) discharging treated effluents into the water course with approval under the Water (Prevention and Control of Pollution) Act, 1974 (6 of 1974);

(b) storm water drains and ancillary structures for pumping;

(c) treatment of waste and effluents arising from hotels, beach resorts and human settlements located in CRZ areas other than CRZ-I and disposal of treated wastes and effluents;

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(vi) Discharge of untreated waste and effluents from industries, cities or towns and other human settlements. The concerned authorities shall implement schemes for phasing out existing discharge of this nature, if any, within a period not exceeding two years from the date of issue of this draft notification.

(vii) Dumping of city or town wastes including construction debris, industrial solid wastes, fly ash for the purpose of land filling and the like and the concerned authority shall implement schemes for phasing out any existing practice within a period of one year from date of commencement of this draft notification.

Note:-The MoEF&CC will issue a separate instruction to the States and Union Territories in respect of preparation of action plans and their implementation as also monitoring including the time schedule thereof, in respect of paras (v), (vi) and (vii).

(viii) Port and harbour projects in high eroding stretches of the coast, except those projects classified as strategic and defense related in terms of EIA notification, 2006 identified by MoEF&CC based on scientific studies and in consultation with the State Government or the Union territory Administration.

(ix) Drawl of groundwater and construction related thereto within 200m of HTL along the sea coast and in the CRZ of tidal influenced water bodies, except the following:-

(a) In the areas which are inhabited by the local communities for drinking and domestic use it shall be done only using manual methods.

(b) In the 200m-500m zone the drawl shall be permitted only when done manually through ordinary wells for drinking, horticulture, agriculture and fisheries and where no other source of water is available.

Note: Appropriate restrictions for such drawl may be imposed by the Authority designated by the State Government and Union territory Administration in the areas affected by sea water intrusion.

(x) Construction activities in CRZ-I except those specified in this draft notification.

Any other activities that need to be prohibited/ permitted by the concerned States/UTs other than those mentioned above or any discrepancies noticed by the State/UT Government with regard to the CRZ area between 1991 and 2011 shall be rectified and be specified in the CZMP. Only those essential activities required at

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larger public and national strategic interest and duly justified with approval at the highest level of the State/UTs shall be brought out clearly in the approved CZMP and can be implemented after the CZMP is approved by NCZMA and notified by MoEF&CC.

7. Classification of the CRZ:

For the purpose of conserving and protecting the coastal areas and marine waters, the CRZ area shall be classified as follows:

A. CRZ-I are those coastal zones which are ESAs, geo-morphologically important zones and archaeological and heritage areas.

a. Ecologically Sensitive Areas (ESA)

(a) Mangroves
(b) Corals and coral reefs and associated biodiversity
(c) Salt marshes
(d) Sea grasses
(e) Horse shoe crab habitats
(f) Turtle nesting grounds
(g) Bird nesting grounds
(h) The national parks, marine parks, sanctuaries, reserve forests, wildlife habitats and other protected areas declared under the provisions of Wild Life (Protection) Act, 1972 (53 of 1972), the F(C)A, 1980 (69 of 1980) or E(P)A 1986 (29 of 1986); including Biosphere Reserves would be conserved and protected as per the provisions of the respective Acts/notifications/guidelines.

b. Geo-morphologically Important Zones

(a) Intertidal areas
(b) Sand dunes
(c) Mudflats
(d) Sandy beaches

c. Areas or structures of archaeological importance and heritage value sites.

The conservation, protection and management framework for the CRZ-I shall be as given in Annexure-A of this draft notification.

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B. CRZ-II: The areas that have been developed up to or close to the shoreline along the mainland.

Explanation- The expression "developed area" referred to as that area within the municipal limits declared by the States/UTs from time to time or in other existing legally designated urban areas which are substantially built-up and has been provided with drainage and approach roads and other infrastructural facilities such as water supply and sewerage mains;

(1) Regulation of activities in CRZ-II shall be as follows:

(a) buildings, including slum rehabilitation, reconstruction of dilapidated structures and unsafe buildings, shall be permitted only on the landward side of the existing road or road proposed in the Development Plan or on the landward side of existing authorized structures;

(b) buildings permitted on the landward side of the existing road or road proposed in the Development Plan or existing authorized structures shall be subject to the local town and country planning regulations issued from time to time:

Provided that no permission for construction of buildings shall be given on landward side of any new roads which are constructed on the seaward side of an existing road

(c) Construction of buildings shall be taken up subject to the following conditions:-

(i) it shall be ensured that there is no discharge of untreated sewage and efforts shall be made for zero discharge;

(ii) no untreated or treated effluents shall be discharged. Any industrial unit operating in CRZ-II shall ensure that there is zero discharge maintained. The treated effluent shall be recycle and reused;

(iii) all residential or commercial buildings shall be provided with water recycling systems and shall use the recycled water for non-contact purposes such as gardening, washing and flushing;

(iv) adequate open space shall be provided to meet the emergencies during natural disasters and also to maintain aesthetics.

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(v) adequate open space shall be provided for groundwater recharge. All residential constructions shall be provided with groundwater recharge facilities;

(vi) no dumping of solid waste in the CRZ area. The solid waste shall be managed as per the MSW Rules issued from time to time;

(vii) no conversion of landreserved for parks, gardens, schools, hospitals and dispensaries, defense establishments, disaster management and other public utility purposes;

(2) In the case of mainland islands, a No Development Zone (NDZ) of 10 m from the HTL shall be provided. Developmental activities shall be taken up on the landward side of the NDZ subject to clause (1) (c) above. In the NDZ of such islands, temporary structures relating to fisheries, agriculture and the like can be developed.

(3) The clearances and approvals for the permissible activities in CRZ-II shall be accorded by the States / UTs themselves through the respective Municipalities without referring to CZMA but shall be as per the approved CZMP and the provisions contained in the CRZ Notification. All constructions proposed to be undertaken in the CRZ-II areas other than those which attract EIA Notification, 2006 amended from time to time shall be governed by the concerned State/ UT regulations para 7B(1). Any discrepancy in the CRZ-II area, prior to 1991 and post 1991 identified by the State/UT Government shall be brought before NCZMA with the recommendations of the CZMA. The NCZMA after taking into account the larger public interest shall examine the above discrepancies and convey its decision to the State/UT Governments. Such decisions of the NCZMA shall be included in the CZMPs.

C. **CRZ-III**– These are areas which are relatively undeveloped including mainland islands and can be divided for the purpose of this regulation into (a) Densely Populated Rural areas and (b) Rural areas. Development in CRZ-III shall be undertaken as follows:-

(a) Densely Populated Rural areas are those coastal panchayat areas which have a high population density as defined in clause 2(v) ofthis draft notification. In such

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areas, construction and other permissible activities shall be taken up beyond 50 m of HTL (NDZ) on the landward side in accordance with only the local prevailing norms of the State/UT. The local authorities are mandated under this draft notification to ensure that:

(i) adequate provisions/facilities shall be built to provide for quick and timely rescue, relief and rehabilitation measures in case of natural calamities;

(ii) adequate open space shall be provided (to maintain aesthetics including adequate ground cover for fresh water recharge) and also to meet the emergencies during natural disasters;

(iii) height regulations shall be as per the prevailing State/UT norms;

(iv) all structures shall be provided with groundwater recharge facilities;

(v) drawal of groundwater shall be strictly regulated and norms laid down by the local ground water authority followed

(vi) it shall be ensured that there no discharge of untreated sewage. Efforts shall be made for zero discharge;

(vii) no untreated or treated effluents shall be discharged. Any industrial unit operating in CRZ-II shall ensure that there is zero discharge maintained. The treated effluent shall be recycle and reused.;

(viii) All buildings shall be provided with water recycling systems and shall use the recycled water for non-contact purposes such as gardening, farming, washing and flushing.

(ix) no dumping of solid waste in CRZ area. The solid waste generated shall be managed as per MSW Rules as amended from time to time.

(x) no conversion of land earmarked for parks, gardens, schools, hospitals and dispensaries, defense establishments, disaster management and other public utility areas including areas meant for fisheries.

(xi) in case of the mainland islands a distance of 10m shall be maintained as NDZ. All developmental activities indicated above shall be taken up on the landward side of the NDZ.

(b) Rural areas are those areas as defined in 2(vi) and which are not covered under para 7(C)(a) above. In such areas, development of new houses of local communities can be taken up beyond the NDZ which is 200 m from the HTL.

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Construction of new houses and expansion of existing houses in accordance with the prevailing local Town and Country regulation can be taken up, such that the overall height of the construction does not exceed 9m with ground plus one floor and a sloping roof. Total covered area of construction shall not exceed 33% of the total area.

(c) In the NDZ of CRZ-III areas, all traditional activities including fisheries, public amenities, tourism facilities as indicated at 7(C)(e) and foreshore requiring facilities, can be taken up in larger public interest as per the relevant provisions contained in the state and central legislations and those contained in thisdraft notification. Repairs, reconstruction of existing authorized structures shall be taken up as per the local Town and Country Planning Regulations.

(d) In case of the mainland islands falling in densly populated rural areas of CRZ-III a distance of 10m shall be maintained as NDZ. Beyond the NDZ on the landward side, development as indicated as per 7(C)(a)(b) above shall be taken up.

(e) Tourism project(s) in the CRZ-III areas can be taken up as follows:

(i) in the NDZ temporary tourism facilities such as toilets, wash rooms, change rooms, drinking water facility, and temporary shack(s) can be taken up with the permission of the concerned local authorities. It shall be ensured by the local authorities that such facilities indicated above shall occupy only 10% of the area. Further, it will be the responsibility of the authorities to ensure that the solid wastes are handled as per MSW rules and no untreated sewage is discharged in the coast or in the waters. All disaster management mechanisms shall be put in place by the authorities for rescue and relief.

(ii) wherever there is a national or a state highway passing through the NDZ, the tourism facilities can be taken up on the seaward side of the road as per para 7(C)(e)(i) above. On the landward side of such road or NDZ, the following tourism activities are permitted with the following:

a. Resorts, hotels and other such facilities for tourism not exceeding 9 m in height with ground plus one floor with slope and tiled roof.

b. Total covered area of construction shall not exceed 33% of the total area. The open space in the site shall be utilized for greenery, non-paved parking, play fields, and so on. Green areas and open space shall be

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promoted so as to minimize the impact of storms and facilitate operation and rescue during natural hazards.

c. Drawl of groundwater is not permitted. Adequate facilities for groundwater recharging shall be provided.

d. Zero discharge of sewage shall be maintained. The tourism units shall undertake 100% recycling and reuse of treated water. The treated water shall be used within the project area for gardening, flushing, washing and the like.

e. No disposal of solid waste. The solid waste generated from the tourism unit shall be managed as per MSW rules as amended from time to time. Any violation of the MSW rules shall attract stringent punitive action as prescribed under the relevant Acts/Rules.

f. No operation of any hazardous or harmful activities which are detrimental to the coast and marine environment.

g. Provide adequate space for the conduct of livelihood activities by local communities.

(e) The local communities including fishermen who possess houses in CRZ-III areas can be permitted to take up tourism activities through home stay without changing the plinth area/ design or facade of the existing houses.

(f) The clearances and approvals for the permissible activities in CRZ-III shall be accorded by the States/UTs themselves through the respective Local Bodies without referring to CZMA but shall be as per the approved CZMP and the provisions contained in the CRZ Notification. Further, the CRZ-I areas indicated in para 7(A) above falling within CRZ-III areas shall be governed as per the provisions listed under the same para.

(g) All activities proposed to be undertaken in the above CRZ-III areas other than those which attract EIA Notification, 2006 shall be governed by the concerned State/UT Government regulations subject to the conditions stipulated under category of CRZ-III above.

D.CRZ-IV – These are the water areas falling below the LTL including the bed and the substrata up to territorial water limits. In CRZ-IV developmental activities shall ensure that-

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(i) Minimum or no impact to the sediment and littoral movement, except for mechanisms and facilities required for foreshore developmental activities including ports, harbors, erosion control measures and the like, subject to the provisions contained in the para 6(i), (iv) and (viii) of this draft notification and also based on sediment model studies.

(ii) Untreated effluents are not discharged into the waters. The industrial units shall maintain zero discharge. The effluent generated shall be recycled and reused within the unit.

(iii) Municipal sewage generated shall be treated and reused for various non-contact purposes such as gardening, washing and the like.

(iv) No solid waste shall be dumped in the CRZ-IV area. The solid waste shall be managed in accordance with the provision of MSW rules as amended from time to time.

(v) No reclamation of the sea bed except for port and harbour, fisheries-related activities and other infrastructure required in the larger public interest such as bridges, sealinks on stilts, roads, important national installations related to coastal security, tourism shall be accorded clearance by the respective authorities at the State/UT level. With regard to monuments/memorials proposed by the State/UT Government recommended by the local CZMA to be approved by MoEF&CC on a case-to-case basis taking into account the erosion control and other disaster mitigation measures. Wherever reclamation, if any, for the above projects are permitted, the original HTL as demarcated in the approved CZMP shall prevail.

(vi) The clearances and approvals for the activities in CRZ-IV that do not attract EIA Notification 2006 as amended from to time and that do not require special permission as given in (vi) above shall be accorded by the States/UTs themselves without referring to CZMA but shall be as per the approved CZMP and the provisions contained in the CRZ Notification

8. Enforcement, monitoring and transparency mechanism:

(i) For the purpose of implementation and enforcement of the provisions of this draft notification and compliance with conditions stipulated thereunder

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powers either original or delegated are available under Environment (Protection) Act, 1986 with the MoEF&CC, State Government or the UT Administration, NCZMA and SCZMAs;

(ii) The composition, tenure and mandate of NCZMA and State or UT CZMAs have already been notified by MoEF&CC in terms of Orders of Hon'bleSupreme Court in Writ Petition 664 of 1993;

(iii) The State or UT CZMAs shall primarily be responsible for enforcing and monitoring the implementation of this draft notification and to assist in this task, the States and UTs;

(iv) The monitoring of the implementation of the provisions of this draft notification shall be based on satellite data generated from time to time along with field verification to be carried out by CZMAs. SICOM and NCSCM shall be the repositories of such satellite data which shall be provided to various authorities and agencies mandated for monitoring and enforcement of the notification;

(v) The approved CZMPs along with any other notified areas under this draft notification and decisions taken by various authorities and agencies mandated to enforce this draft notification shall be hosted on the dedicated website of the States/UTs;

(vi) Ministry through SICOM shall bring out definitions, FAQ, guidelines for each of the activities indicated in the Notification and provide wide publicity in local languages.

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Annexure-I

NOTARY SUBHASH KRUSHNA KANEKAR SALCETE TALUKA MARGAO-GOA Regd. NO 344/14 Exp Dt: 29/06/2015 GOVT. OF GOA (INDIA)

CONSERVATION, PROTECTION AND MANAGEMENT FRAMEWORK FOR CRZ-I

The coastal and marine Ecologically Sensitive Areas (ESAs) and the geomorphological features play a vital role in maintaining the functions of the coast. Mangroves, beaches, coral reefs etc., aid in controlling coastal erosion, shoreline change, saltwater intrusion and also serve as natural defense against coastal hazards such as storm surges, cyclones and tsunamis. The ESAs maintain the biological integrity of the coast by providing direct and indirect ecosystem services to the coastal livelihood. In addition, several invaluable archeological and heritage sites are also located along the coast. Hence conservation and protection of the above areas/ features/ sites become necessary.

The conservation, protection and management framework for the CRZ-I is as follows:-

a. Ecologically Sensitive Areas (ESA)

1. General measures

(i) All ESAs shall be identified and boundary delineated by NCSCM using satellite data.

(ii) The State/UT Governments through the authorized agencies shall prepare CZMP as per the guidelines contained in the Notification at Annexure-B highlighting the conservation and protection of the CRZ-I areas.

(iii) All ESAs to be notified under E(P)A, 1986 by the concerned States/UTs following the above process.

(iv) Those activities permissible under this notification shall be included in the CZMPs

(v) The following specific conditions shall be adopted for the conservation, protection and management of each of the ESAs given below:-

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I. Mangroves:

Mangroves for the purpose of this draft notification are categorized as follows:

(i) Mangroves declared as forest under Forest Conservation Act, 1980:- Not withstanding anything contained in thisdraft notification, such mangroves declared by the concerned State Governments/UT Administrations/Central Government as forest land under the F(C)A, 1980 shall attract the provisions of the F(C)A, 1980 only.

(ii) Mangroves in (A) Government land not declared under Forest Conservation Act, 1980 and (B) private land.

A: Government Land :

(a) Mangroves in Government land shall be protected based on a detailed plan to be prepared by the concerned State/UT Governments. In case the mangrove area is more than 1000 sqm, a buffer of 50m along the periphery of mangrove area shall be provided. This buffer zone of 50m shall be utilized for constructing walkways, interpretation centers, promenades, public facilities for developing parks, research facilities related to mangrove biodiversity, facilities for conservation and the like.

(b) In the mangrove area and in the buffer, all activities are prohibited except for laying of pipelines, transmission lines, conveyor belts, construction of road on stilts and other conveying mechanisms that are required for public use. Defense related establishments such as watch towers could be taken up in the mangrove area.

(c) In such cases where removal of mangroves is inevitable in public interest after examining all the alternatives, a minimum of 10 (ten) times the lost area of mangroves shall be re-planted and protected within the coastal zone of respective States or UTs. Mangrove removal for the above purposes shall be undertaken only on the recommendation by CZMAs and on the approval of the concerned States/UTs.

(d) Any discrepancy in the mangrove area between prior to 1991 and post 1991 and falling within municipal limits be identified by the State/UT Government and brought before NCZMA duly recommended by the CZMA. The NCZMA after taking into account the larger public interest and national importance shall

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examine the above discrepancies and convey its decision to the State/UT Governments. Such decisions of the NCZMA shall be included in the CZMPs. In the process if mangrove areas are to be reclaimed to undertake projects for larger public interest, the State/UT Government shall undertake 10 (ten) times mangrove afforestation in lieu of the mangrove land area reclaimed for the purpose.

(B) Private Land:

Mangroves in private land, (incentives shall be provided by the concerned State/ UT Forest Departments for promoting mangrove conservation/ afforestation in private land) will not require buffer zone. If any developmental activities are desired in the private mangrove land, such development can be taken up as per the provisions contained for CRZ-II or III, as the case may be.

II. Corals and coral reefs and associated biodiversity:

(i) Destruction of coral and coral reefs and the surroundings is a prohibited activity.

(ii) All coral and coral reefs shall be protected except for those small quantities required for research purposes.

(iii) Coral and coral reefs transplantation activities shall be through recognized research institutions wherever required for regeneration after obtaining necessary approvals under Wildlife (Protection) Act 1972.

(iv) The dead and/or destroyed coral areas shall be taken up for rejuvenation and rehabilitation. The conservation and protection of corals and coral reefs shall be taken up as follows:

a) active and live coral and coral reefs identified and delineated shall be declared and notified as ESA under E(P)A 1986.

b) it shall be ensured that no activities that are detrimental to the health of corals, coral reefs and its associated biodiversity such as mining, effluent and sewage discharge, dredging, ballast water discharge, ship washings, fishing other than traditional non-destructive fisheries, construction activities and the like are taken up in and around the coral areas.

III. The National Parks, marine parks, Sanctuaries, reserve forests, wildlife habitats and other protected areas declared under the provisions of Wild Life (Protection)

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Act, 1972 (53 of 1972), the F(C)A 1980 (69 of 1980) or E(P)A 1986 (29 of 1986); including Biosphere Reserves would be conserved and protected as follows:

(i) conservation and protection of the above listed areas shall be as per the provisions of the respective Acts/notifications/guidelines.

(ii) efforts shall be made to increase the forest area in the coastal region in order to prevent loss of life and property from increased storms, tides and floods.

(iii) the concerned State Governments/UTs shall provide for adequate funds for such measures to undertake shelter belt plantation or bio-shields with planting material suitable to the location.

IV. Salt marshes: The conservation and protection of salt marshes shall be as follows:

(i) the salt marsh areas shall be conserved and protected and efforts shall be made to promote the endemic biodiversity in the salt marshes.

(ii) only those activities required for overhead conveying/transmission of cables and underground laying of transmission line cables and so on, shall be permissible.

(iii) traditional fishing is permissible in salt marshes.

(iv) Temporary tourism facilities around the salt marsh areas could be considered subject to adhering to strict norms laid down in the guidelines.

(v) certain salt marshes which have less biodiversity, identified by NCSCM and demarcated in CZMP can be considered for salt pan activities.

V. Turtle nesting grounds shall be protected and conserved as follows:

(i) turtle nesting grounds identified by the concerned States/UTs shall be protected as per Wildlife (Protection) Act of 1972.

(ii) no activities shall be permitted in and around the turtle nesting ground including those causing light and sound pollution except for those required for conservation and protection of these sites.

(iii) strict management plans for protecting the turtle nesting grounds shall be undertaken and implemented by the concerned State/UT Authorities.

VI. Horse shoe crabs habitats shall be protected and conserved as follows:

(i) the habitat identified shall be taken up for conservation and protection.

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(ii) no activities shall be taken up in and around these habitats which affect the horse shoe crab ecosystem.

VII. Sea grass beds shall be protected and conserved as follows:

(i) identified sea grass beds shall be conserved and protected.

(ii) no developmental activities that have adverse effect on the sea grass bed shall be undertaken.

(iii) efforts shall be made to propagate sea grass beds along the coastal waters where ever possible by States/UTs as it acts as a carbon sink.

VIII. Nesting grounds of birds shall be protected and conserved as follows:

(i) the nesting ground of birds including their local migratory route shall be protected. No developmental activities which have adverse impact on the nesting grounds and the migratory routes shall be undertaken including construction of wind mills, transmission lines and the like in the locality.

(ii) efforts shall be made to increase the forest cover and mangrove cover including enriching the biodiversity of salt marsh and other coastal water bodies so as to provide for suitable habitat for the avifauna.

b. Geomorphologically Important Zones shall be protected and managed as follows:-

I. Sand dunes identified shall be conserved and protected as follows:

(i) sand dunes identified shall be notified under E(P)A 1986;

(ii) no developmental activities be permissible except for providing ecofriendly temporary tourism facilities on stilts such as walkways, tents and the like;

(iii) mining of sand from sand dunes is a prohibited activity except for the removal of rare earth minerals with proper replenishment using the tailings or other suitable sand.

(iv) no activities on the sand dunes shall be taken up that would lead to erosion/destruction of sand dunes;

(v) afforestation, if any, on the sand dunes shall be done only with native flora

(vi) the States/UTs shall prepare management plans for the demarcated sand dunes which shall be approved by the Ministry.

II. Sandy beaches:

(i) no developmental activities except for those foreshore facilities permitted, shall be undertaken on the beaches

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(ii) mining of beach sand is prohibited except for the removal of rare earth minerals with proper replenishment using the tailings or other suitable sand

(iii) when the permissible developmental activities are taken up on the beaches if loss of beach in the neighborhood is predicted, necessary beach nourishment to compensate for the losses shall be undertaken by the project authorities and its long term maintenance shall be ensured by them

(iv) the States/UTs shall prepare management plans for the demarcated beaches which shall be approved by the Ministry.

III. Mudflats:

(i) developmental activities such as construction of foreshore facilities, laying overhead transmission lines and underground pipelines/ conveying systems/ transmission lines, saltpans and the like are permitted.

(ii) the States/UTs shall prepare management plans for the demarcated mudflats which shall be approved by the Ministry.

IV. Other areas falling between LTL and HTL:

(i) no developmental activities except for those foreshore facilities permitted in this draft notification shall be undertaken in these intertidal areas.

(ii) mining is prohibited except for the extraction of rare earth minerals with proper backfilling. The States/UTs shall prepare management plans for rare earth mining activity which shall be approved by the Ministry.

c. Areas or structures of archaeological importance and heritage value sites.

(i) all archaeological and heritage sites identified by Archaeological Survey of India, State Archaeological agencies shall be responsible for conservation and protection of these structures of sites as per the provisions of the respective Acts/notifications/guidelines.

(ii) no activities that are detrimental to the identified areas or structures of archaeological and heritage value shall be permitted.

(iii) it shall be ensured that these structures or areas are preserved and activities undertaken without changing the façade/plinth of such structures. Such structures could be considered for use in accordance with the relevant norms after undertaking careful designing of the interiors without changing the exterior architectural design of the structure.

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Annexure-B

Preparation of Coastal Zone Management Plans (CZMPs)

(i) Coastal Zone Management Plans (CZMPs) shall be prepared by the States/UTs indicating the HTL, LTL, CRZ-I, CRZ-II,CRZ-III and CRZ-IV areas including the disaster management facilities and any other prohibited area declared by the States/UTs.

(ii) For the purpose of conserving and protecting the CRZ-I area the steps indicated in Annexure A shall be followed

(iii) Other facilities/ development/ infrastructure specifically mentioned in this draft notification, shall also be included in the CZMP.

(iv) The States/UTs may also address some of the crucial issues of coastal and marine areas including activities required for society such as infrastructure for non-conventional energy, transportation, harvesting /extraction of resources, conveying systems, solid waste management, effluent and sewage treatment facilities and any other innovative schemes/schemes suitable or unique to their location. The same could be included in the CZMP.

(v) It shall be ensured by the agencies and authorities that satellite based inputs/ data shall be relied upon for preparing the CZMP.

(vi) The draft CZMP shall be recommended by the States/ UTs CZMAs and approval from the NCZMA shall be obtained.

(vii) Thereafter, all development activities including conservation and management of the ESA in CRZ-I will be governed by the concerned bodies including those indicated in this draft notification.

(viii) Coastal projects requiring foreshore facilities that are declared as nationally important by the Central Government, shall be undertaken in CRZ area on a case to case basis, based on EIA as provided in the E(P)A 1986.

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NOTARY
SHRIKRISHNA KANEKAR
SALCETE TALUKA
MARGAO-GOA
Regd. No 344/14
Exp On 28/02/2022
GOVT. OF INDIA

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ANNEXURE A-19

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FEDERATION OF RAINBOW WARRIORS, MARGAO

Reg. No. 190/Goa/2014 under Societies Registration Act, 1860
Shop CSH-1, Block C-2, Leandra Heritage,
Madel, Margao, Goa – 403601
Tel. 9822965629/8408960070

Ref No: FRW/ 134/2018

Date: 11.06.2018

To
Shri Arvind Nautiyal, Director,
Ministry of Environment, Forest and Climate Change,
J-615, Jal Block, Indira Paryavaran Bhawan,
Jor Bagh Road, New Delhi – 110003

SUB: DRAFT COASTAL REGULATION ZONE NOTIFICATION 2018

Dear Sir,

This representation is in response to the Public Notice issued by you on 18.04.2018 seeking comments/suggestions on the Draft Coastal Regulation Zone Notification 2018.

We unanimously find that the changes proposed in the Draft Coastal Regulation Zone Notification 2018 are regressive and against public interest, and that this Draft Notification blatantly violates the principles of legislation, logic and science. This Draft Notification and the procedures followed while preparing the Draft must be rejected completely and the process started afresh, if our National Interests are to be upheld and safeguarded. We submit in brief herein below the observations which form the basis of our conclusions and demands:

A) SOME FUNDAMENTAL FLAWS THAT CANNOT BE RECTIFIED

1. VIOLATES THE PRINCIPLE OF NON-REGRESSION: The Draft CRZ Notification 2018 is in gross violation of the principle of non-regression, which is now the law of the land in India. The Principal Bench of National Green Tribunal (NGT) has relied upon this principle in Application 677 of 2016 to quash provisions of the Notification of the Ministry of Environment, Forests and Climate Change dated 9th December, 2010 exempting building and

construction projects from mandatory requirement of obtaining Environment Clearance, while declaring in its judgment:

"*From the above comparative study of the two regimes, it is clear that the regime in terms of the Notification dated 9th December, 2016 would considerably dilute the environmental safeguards provided not only under the Regulation of 2006 but even under the Act of 1986. The Applicants have rightly placed reliance on the Principle of Nonregression. Under the International law, the doctrine of Nonregression is an accepted norm. It is founded on the idea that environmental law should not be modified to the detriment of environmental protection. This principle needs to be brought into play because today environmental law is facing a number of threats such as deregulation, a movement to simplify and at the same time diminish, environmental legislation perceived as too complex and an economic climate which favours development at the expense of protection of environment.*"

The Draft CRZ Notification 2018 is full of deregulations and diminutions of environmental legislation, without any regard to the Principle of Non-Regression. In view of the total failure to adhere to this basic Principle, the Draft Notification has been prepared with changes that are exactly opposite to what is necessary, thus losing the plot completely and placing the entire nation on the path to socio-economic and environmental disaster. It is therefore necessary that the Draft CRZ Notification 2018 must be discarded completely and the entire process be started again with the sole objective to increase and improve the environmental protection.

2. VIOLATES MOEF'S OWN MANDATE: The draft notification ought to have reflected that the remit of the Ministry of Environment, Forests and Climate Change is environmental protection. However, the draft notification is an industrialization and urbanisation plan, aimed at private profits, and not an environmental-oriented planning tool, aimed at public interest.

3. VIOLATES SECTION 3 OF EPA: The wilful dilutions or reductions in the protection given to the environment are in violation of Section 3 of the Environment (Protection) Act, 1986, i.e - "Subject to the provisions of this Act, the Central Government, shall have the power to take all such measures that it deems to be necessary or expedient for the purpose of protecting and improving the quality of the environment and preventing, controlling and abating environmental pollution."



4. ILLEGAL CHANGES TO PREAMBLE: The words "development in coastal areas" have been illegally added to the preamble, particularly since the raison d'être of the CRZ notification has been to reduce and eliminate non-essential activities that do not require to be on the water front. It is very clear that the intentions behind these changes is to compromise the aims and objectives of CRZ Notification, which is totally illegal. Similarly, the words "except as respects things done or omitted to be done before such supersession" have been deleted from the preamble with the obvious intention to regularize all violations of the CRZ Notification since 19th February 1991, and hence this deletion is also illegal. In principle, changes to the preamble of the Notification can only be in accordance with the objective of the parent Act, which is to protect the environment. The changes to the preamble of the Notification proposed in the Draft under review are against the objectives of the parent Act and hence are illegal. The dilution of the Preamble reflects the fundamental flaw with the Draft Notification that it is against the objectives of the principal Act and fails its mandate to improve the protection of the environment.

5. VIOLATES BASIC LOGIC, REASON & LEGISLATIVE PRINCIPLES: There is no doubt that despite the CRZ Notification 2011 and other environmental laws, the threats of sea level rise, increase in extreme natural events, other environmental changes and impacts upon the coastal communities, ecology and economies are accelerating at an alarming rate. It is also true that despite the CRZ Notification 2011 and other environmental laws, hotels, tourism, roads, highways, industries, thermal plants, real estate speculation, treatment plants, concretization and hardening of the coast, removal of sand dunes, filling of low-lying areas, destruction of mangroves and wetlands, etc are increasing every year in the coastal environment. As a result, our coastal environments are getting more polluted, more constructed upon and more disturbed/ destroyed every year, while the coastal communities are getting more and more displaced and impoverished. In view of the fact that despite the implementation of CRZ Notification 1991 and 2011 the objectives have not been met and the situation is only getting worse, it is simple common sense that any changes to the CRZ Notification must be to strengthen and increase the regulations and restrictions. In blatant defiance of logic, reason and legislative principles, the Draft CRZ Notification 2018 proposes to dilute the existing

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regulations, rather than strengthening them. The failure to follow fundamental logic and reason and to adhere to basic principles of legislation makes the Draft CRZ Notification 2018 unacceptable and makes it necessary to prepare a new law based on reason, logic and principles of legislative changes.

6. NEW CRZ LAW MUST BE AN ACT OF THE PARLIAMENT: A law that governs the well-being and long-term sustainability of over 250 million people cannot be in the form of an executive legislation. In view of the rising challenges of sea level rise and increasing extreme natural events, this law has now gained tremendous importance for the survival and growth of our civilization. Therefore, we demand that this law should be an Act of the Parliament and not a delegated legislation.

7. OBJECTIVES OF NOTIFICATION DEFEATED: Central government with a view to conserve and protect the unique environment of coastal stretches and marine areas, besides livelihood security to fisher community and other local community in the coastal areas and to promote sustainable development, has declared the coastal stretches of the country and the water area up to its territorial water limit, excluding the islands of Andaman and Nicobar and Lakshadweep and the marine areas surrounding these islands, as Coastal Regulation Zone.

The objective of this Draft gets defeated when activities like desalination plants, laying of pipeline/transmission line and/or any public utilities, school, colleges, parks, construction of roads by reclamation in exceptional cases of defense, monuments and memorials, limestone mining and mining of rare earth materials, and likewise is allowed to come within the various sub-zones of CRZ areas.

To say the least, the proposed draft had neither looked into livelihood security to fisher community and other local communities. While the objective of the notification would suggest that the livelihood of the fisher community and local communities are to be secured through the provisions of the notification, the import of the Notification is exactly the opposite. The activities that have been permitted in the various zones including CRZ-III and CRZ-IV would have serious impacts on the livelihood of the fisher community. Several cases have already been witnessed in the past under the previous CRZ regime itself, wherein fishermen rights were violated for port expansion of the situation were

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the colonies of fishermen were ordered to be demolished in Goa (also for port expansion) in the name that they were in violation of the CRZ norms, whereas, the Government had actually failed to notify the said fishing villages.

These issues still remain unresolved and the proposed new CRZ regime has no provision whatsoever to protect the interests of these communities against large corporate and commercial interests on the coastal resources.

8. NO PRIOR CONSULTATION WITH PEOPLE LIVING ON COASTS – ARBITRARY, UNCONSTITUTIONAL AND ILLEGAL: There are over 250 million Indians living within 50 kms from the coasts of India, who have lived and experienced all the environmental, economic and social aspects of the coast. The water and bed area of the sea and tidal influenced water bodies and coastal commons serve as the primary livelihood and food security for over 14 million people in India, as enumerated by the National Livestock Census, 2003. Before preparing the Draft CRZ Notification 2018, all of these people should have been consulted regarding the implementation and performance of the CRZ Notification 2011 and the issues faced by the local communities and the coastal environment in order to understand the successes and failures of the past, as well as the needs for the future.

The concerns raised repeatedly by Civil Society, local fisher folk, environmental groups and concerned citizens in the past have never been addressed. The Public Notice issued on 18.04.2018 by the Ministry of Environment, Forests and Climate Change (MOEF&CC) states, "Based on the representations received from various Coastal States and Union Territories and other stake holders including recommendations made by the Committee under the Chairmanship of Dr Shailesh Nayak, ...", implying falsely that consultations have been held with the stakeholders. The draft notification has not even been translated into local languages, making it inaccessible for the fisher communities of the coastal States, who can only access information in their local languages. The Shailesh Nayak Committee met only Government representatives, and this Report cannot and should not form the basis of any exercise to strengthen coastal protection or protection of sustainable livelihoods, particularly since the MoEF&CC has completely excluded Civil Society, fisher folk representatives, environmental groups and concerned citizens from the consultation process. The report of the committee, based on which one of the most important

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Notifications of the country is proposed to be amended, has however not been made public, and neither have the representations of the stakeholders. In the case of unavailability of the said documents, it is difficult to ascertain, the type of members considered as stakeholders and invited as part of consultation procedure, because the largest stakeholders, i.e., fishing communities were not at all consulted before coming up with this Draft.

The failure to consult the affected people is not only responsible for the arbitrary and anti-development provisions of the Notification, but is also in gross violation of the Constitutional mandates under Articles 14, 19, 21 and 243, as well as the well established Rights of Indigenous Communities that Free, Prior and Informed Consent (FPIC) must be obtained from any Indigenous Community if any of their rights are to be altered. The Public Consultation must be held before preparing the Draft, and this fatal flaw cannot be rectified at this stage. The Draft CRZ Notification 2018 must be rejected and a fresh process must be initiated for Free, Prior and Informed Consultation with the 250 million people living on the coast of India, especially the 14 million living off the coastal waters, and an even greater number who depend upon agriculture and other traditional activities in the coastal zones and hinterlands.

9. FAILS TO STUDY THE ISSUES: It is an accepted fact that any legislative change must be based on the history of the implementation of existing laws, the environmental and socio-economic trends in the past, the future challenges anticipated and the needs of the society at large. However, the Draft Notification has failed to collect any data or study any of the issues related with the implementation of CRZ Notifications of 1991 and 2011. This is obvious, since even the Coastal Zone Management Plans (CZMPs) have not been prepared as yet. The preparation of the Draft Notification should have been preceded by preparation of the CZMPs, collection of data on the status of the coastal environment, detailed descriptions of the issues faced by the Coastal Zone Management Authorities (CZMAs) of various States and MOEF&CC in the implementation of the CRZ Notifications, collection of the experiences of the local communities, scientific studies, including local impact of sea level rise and occurrence of extreme natural events in each locality, assuming the worst-case scenario.

Instead of collecting the essential baseline data stated above and first understanding the needs of the entire society, especially the future generations,

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the Draft Notification is arbitrarily and blindly catering to a few vested interests, namely the same profit seeking ventures and industries that cause the environmental destruction which the law aims to curb and regulate. There is no attempt made to understand environmental and socio-economic impact of the changes proposed. For example, there is no understanding how the large populations of Goan villages (see Annexure 1), along with their culture and knowledge, will be decimated by the major onslaught on their coasts that will be unleashed.

Mapping of CRZ areas of the whole nation along its coastline is important in order to assess the presence of natural resources and various marine and geological features that exist along the coastal belt of India. It is important to mention here that, the entire coastline of India is not similar in nature and it varies from place to place. Therefore without having a baseline mapping of geo-morphological features along the varied stretch of Indian coat, standardize restriction or permission to any particular activity is not a right approach towards coastal zone management.

It is therefore essential that the Draft CRZ Notification 2018 be discarded entirely and the new law be prepared only after collection of all baseline data necessary to understand the issues and challenges.

10. CZMPs SHOULD HAVE BEEN PREPARED AND IMPLEMENTED FIRST: The provisions of the CRZ Notification 2011 have not yet been completely implemented in all States due to the delay in the preparation of the Coastal Zone Management Plan. Even before the CZMPs can be approved and implemented, the MoEF&CC has begun diluting the protection that the plans offered. The CZMP under CRZ 2011 has not yet been approved by the MoEF&CC, almost seven years after its notification. Based on orders by the National Green Tribunal in November 2017, the governments of coastal states are now in the process of preparing and approving the coastal zone management plans. Before they can be approved and put into force, the Draft CRZ notification 2018 calls for its revision to accommodate the dilutions brought in. The Draft Notification exposes the mischievous intent of the Central and State Governments that have wilfully violated the 2011 Notification by preparing draft plans and maps that are incomplete and missing critical features such as the Hazard Line.

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It is essential that the CZMPs under CRZ Notification 2011 should be prepared first, before this Draft CRZ Notification 2018 is prepared. The local communities must be consulted while preparing the CZMPs and also while preparing the Draft CRZ Notification 2018. This Draft Notification could not have been prepared without first preparing the CZMPs under the existing law, considering the contents of such CZMPs and analysing their contents, the existing uses within the CRZ and the challenges faced by the coast. The provisions for future CZMPs under the new law will become clear only after the CZMPs under the present law are prepared and reviewed; any attempt to make a new law without preparing the CZMPs under CRZ Notification 2011 only indicates the intention to prevent the beneficial provisions of CRZ Notification 2011 from being implemented and the scientific and legal processes necessary to protect our coasts.

B) SPECIFIC OBSERVATIONS ON DRAFT CRZ NOTIFICATION OF 2018

11.WEAKENS SETBACK LINES – The Draft CRZ 2018 notification is an invitation to disaster as it opens up hazardous areas between the High Tide Line and Hazard Line to constructions. The Draft CRZ 2018 Notification has weakened the protection that Hazard Line offers to coastal areas under the existing CRZ Notification, 2011. Where the 2011 Notification aims to anticipate and prepare ourselves for the dangers of climate change and sea level rise by using the Hazard Line as a set-back for construction activities, the draft CRZ 2018 nullifies it. In removing the protection offered by the Hazard Line, the government has failed to take into consideration the properties, critical infrastructure and population that stands to be affected by effects of climate change and sea level rise. This fool-hardy move will expose today's constructions to tomorrow's hazards, and thereby pervert the principle of sustainable development.

12. REDUCES CRZ AREA FOR TIDAL INFLUENCED BODIES: The CRZ areas of tidal influenced water bodies have been reduced to 50m from the 100m that the 2011 notification prescribes. The CRZ notification 1991 that preceded the 2011 notification mandated a 500m buffer. These changes are against the

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basic principles of law-making, as explained in previous paragraphs, and also against the objectives of the Notification. The reduction of CRZ shall cause severe environmental degradation and impact the stability of the shoreline.

13. REDUCES CRZ AREA FOR ISLANDS: CRZ Notification 2011 provides for CRZ up to 500 metres from the HTL for offshore islands on landward side of the sea and up to 50 metres for islands in backwaters of Kerala. However, the draft CRZ Notification 2018 reduces the CRZ to 20 m from HTL for islands in coastal backwaters, as well as on landward side of islands along the mainland coast. Opening up these areas for development will have a direct and irreversible impact on the fragile ecology of these regions which are already at threat from rising sea levels.

14. CHANGES MEANING OF CRZ ZONES – The 2018 draft CRZ notification brings in changes in the language used to define CRZ zones.

CRZ-I area has been identified as the areas having Ecologically Sensitive Areas (ESA) and the geo-morphological features which play a vital role in maintaining the functions of the coast. The conservation, protection and management of ESA has been discussed in Annexure-I. As per the Draft, mangroves, beaches, corals, nesting areas and other eco-sensitive areas shall be ESA only if they have been identified by the NCSCM. This is highly problematic. This reduces the scope of actual conservation and protection measures that can be taken under the CRZ Regulation Regime, since most of these eco-sensitive areas lay outside the scope of the identified areas. It is therefore essential that all the beaches, mangroves, corals, nesting areas, mudflats, wetlands, sand dunes, low-lying areas, etc within the CRZ are designated as CRZ-I without any exceptions.

New Classification of CRZ III into CRZ-IIIA and CRZ-IIIB based on population density (2161/sq.m) has no rational basis. Further, the reduction of NDZ from 200m to 50 mts for landward side and from 100m to 50m along tidal influenced water bodies in CRZ-III A on the basis of CZMP approval has no logical outline, except to defeat the purpose of the Notification and assist profit seeking short term interests that are destroying the CRZ environment and displacing local sustainable economies and communities.

The Draft has attempted to include the sea bed area in definition of CRZ-IV. Assessment of coastal ecosystem change can be effectively monitored using



benthic fauna, as pollutant from any source will ultimately ends in the seabed. The benthic communities play an important role in the transfer of materials from primary production through the detrital pool into higher trophic levels, including commercially exploitable fish (Bryan and Langston, 1992; Ingole, 2006). If the sea bed is also opened up for all kinds of activities that have been permitted in the CRZ-IV area, then that impact on the benthic ecosystem and the entire marine fauna will be disastrous.

- The draft CRZ 2018 effectively makes all coastal stretches within cities, towns, municipalities and other legally designated urban areas as CRZ II, by removing the clause present in the CRZ 2011 that declares areas with low built up area within municipal limits as CRZ III. Definition of CRZ has also been expanded to define "Substantially Built up Areas" as areas where the ratio between built up plots to number of plots being more than 50%. This calculation and/or definition does not explain what they mean by "Plots". Coastal areas have witnessed a boom in illegal "Plots" being sold as real estate. With no estimate of total number of legal, regularized plots, defining CRZ areas become all the more ambiguous.

  With ever expanding cities and municipal limits, this could be a way to promote get-rich-quick coastal real estate schemes even while home-buyers and other buyers of such developed realty will be harmed by natural disasters. This will also be an economic disaster for the country.

- The rationale behind demarcating CRZ III A and III B areas based on population density has also not been explained.

- The methodology to be used for deriving coastal population density from overall density as enumerated in the 2011 census has also not been revealed, raising suspicions about the scientific validity of such provisions and the very real risk of mischief by subjective interpretation of such terms.

15. PERMITS ACTIVITIES PROHIBITED AT PRESENT: The CRZ Notification was originally envisaged to protect the coastal ecology and the unique features of the coast, protect coastal livelihoods and to prohibit detrimental activities to the same. However, the Draft 2018 Notification brings in

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a number of changes which dilute or remove the prohibitions/protections provided under the CRZ 2011, such as:

- CRZ 2011 prohibits the "Reclamation for commercial activities such as shopping and housing complexes, hotels and entertainment activities". This has now been deleted, making reclamation of CRZ areas for commercial activities a permissible activity.
- CRZ 2011 Prohibits the "Dressing or altering sand dunes, hills and other natural features including landscape changes for beautification and recreational purposes" This has been edited to only include "Active" sand dunes. However, no definition has been provided for what are considered "Active" Sand dunes. This change also means that the protection offered to hills and other natural features of the coast have now been removed, giving legality to constructions on these ecologically fragile areas. Considering that the entire stretches of the western coastline are not sandy, but hilly, the removal of protection indicates an intent to open up these areas for real estate and other constructions. Further, even sand dunes can be destroyed now by classifying them as not being active.
- CRZ 2011 also laid a mandate on local authorities to prepare a phase out plan for discharge of untreated effluents and disposal of city wastes in CRZ Areas. However, until today untreated effluents and disposal of city wastes continue to pollute CRZ Areas. The 2018 notification does away with the responsibility of officers within the government to prepare this plan and stop such discharges/disposals in a timely manner.
- CRZ 2011's provisions regarding "Setting up and expansion of units or mechanisms for disposal of wastes and effluents" has been deleted, making it a permissible activity under the new 2018 notification. The 2011 notification only permitted the discharge of treated effluents, storm water and facilities for discharge of such effluents. It permitted treatment facilities for wastewater arising from facilities within the CRZ only. Now, the 2018 notification does away with this clause, permitting even facilities not within the CRZ areas to have treatment facilities for waste and effluents within the CRZ.

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- Restrictions on withdrawal of groundwater within 200-500 m from HTL have also been relaxed in the 2018 notification, making it a permissible activity through manual wells for agriculture, horticulture, fisheries, drinking purposes, etc. However, no definition of any of these words has been given. Further, no restriction on quantity of groundwater that can be drawn is put in place. Drawl of groundwater will lead to salinity ingress and destruction of the coastal freshwater aquifers.

16. GIVES CARTE BANCHE FOR DESTRUCTION IN THE NAME OF STRATEGY, DEFENCE, SECURITY, PUNLIC UTILITY: The 2018 draft CRZ notification provides a lot of scope for permitting projects that fall within the "Defence" "Strategic", "Security" and "Public Utilities" categories. However, no definition for any of these words have been provided. This ambiguity will allow a range of exceptions and loopholes for projects detrimental to the coastal environment and communities under the guise of "Defence", "Strategic", "Security" and "Public Utilities". Even worse, Strategic, Defence-related, Security and Atomic Energy projects have been given carte blanche to obliterate even ecologically sensitive CRZ I Areas. These exceptions could also be used as a loophole and any project can be termed strategic or of public-utility in order to avail of exemption from the restrictions of the Notification, defeating the spirit and purpose of the CRZ notification.

There should be no such exceptions allowed at all in the CRZ areas and these special considerations and exceptions must be dropped fully.

17. FAVOURS TOURISM OVER SUSTAINABLE LIVELIHOODS – The draft CRZ 2018 notification plays into the coastal tourism agenda of the government by permitting the development of year-round tourism facilities in all coastal states. The intent of the government to shift coastal areas from being livelihood spaces of the fishers and safety buffers for the inland to recreational space for the rich is evident and ill-advised.

- With Government of India promoting its "Swadesh Dharshan" scheme through the Ministry of Tourism, the real intention behind revamping the CRZ notification from being a protection plan to a destruction plan is brought to light.

- CRZ I areas like mangroves have been opened up for tourism as the draft permits the setting up for eco-tourism trails like mangrove walks, tree walks etc. within mangroves identified in the CZMP.
- Mangrove areas are considered important bird habitats and flood buffer, allowing tourism and increasing human presence can drastically change the nesting and resting patterns of migratory birds.
- Mangroves are also important fish breeding areas, increase in built up space, and garbage and footfalls will hamper fish breeding, leading to a decline in overall fish resource.
- Increasing built up spaces so close to the sea will also greatly harm the nesting patterns of sea turtles that are dependent on isolated beach stretches for laying eggs.
- In CRZ II areas, provisions for developing tourism facilities on "Vacant" land has been permitted given the guidelines in Annexure III of the draft notification 2018. "Vacant" coastal areas are almost always areas being traditionally used by small-scale fishing communities for traditional livelihood uses. Instead of recognizing these uses and securing these areas for the fishing community, the 2018 notification treats the coast as areas waiting to be converted into real estate.



- In CRZ III Areas, the draft 2018 notification allows for the construction of temporary tourism facilities on the seaward side - i.e. the "No Development Zone" of the CRZ Area – if a state or national highway passes through the area. The spirit of creating NDZs was to preserve the environmental integrity of the coastal areas. Allowing tourism activities, albeit temporary, will increase garbage & sewage in the area. The CRZ notification does not call for any management plan for garbage in these areas. Commercial establishments and tourism facilities change the nature of land use in these areas. Fisher land use and livelihood uses shall be destroyed by these provisions.
- The guidelines in Annexure III do not lay out any consultative process with fishing communities before allowing any tourism facilities. In urban areas, where the fishers are already reeling under the pressures of a seaward moving city and a landward moving sea, the pressures that arise from tourism will be the last nail in the coffin.

All of the changes described above must be dropped and the new law must strengthen the protection accorded to sustainable of the fisher folk and other residents, while further restricting and prohibiting the tourism activities that are presently destroying the coast and the sustainable livelihoods of the locals.

18. FAVOURS INDUSTRIAL ACTIVITIES AT THE COST OF COASTAL ECOLOGY AND BIO-DIVERSITY: The draft CRZ 2018 notification relaxes a number of restrictions on the setting up of coastal industries such as Thermal Power Plants, Desalination Plants, Waste Treatment Plants, Non-Conventional Energy Generation etc, that were rightly regulated by the CRZ notification 2011. Some examples are:

- The 2018 draft notification opens up for construction and non-traditional activities the ecologically sensitive "Intertidal Areas" i.e - the area between the low tide line and high tide line in the case of the sea/ocean and the areas that tidal influenced water bodies expand and contract according to the season. The 2011 Notification gave the highest level of protection to intertidal areas like Salt Pans, Mudflats etc.



- Pipelines, conveyance facilities and transmissions lines to and from these industries are permitted through CRZ I-A Areas (like mangroves, salt marshes, sand dunes, mudflats, coral reefs etc.) in the draft 2018.
- Ancillary facilities for industries like storage terminals for oil and other substances, power generation through non-conventional sources, manual mining of atomic minerals etc. have been permitted in Intertidal areas.
- Port projects, especially those falling within the "strategic" definition are set being set up by through this notification. Pipelines, conveyor systems like belts, pipelines, roads, breakwaters, storage terminals, and facilities for thermal power plants have all been marked as permissible activities. As CRZ I-B includes Salt Pans the notification effectively permits the conversion of intertidal saltpans into real estate for industries.
- Construction of roads and roads on stilts by way of reclamation of CRZ I areas (like mangroves, sand dunes, turtle nesting sites, salt marshes, coral reefs etc.). Such activities will severely affect endemic

flora and fauna of such ecologically sensitive areas going against the sprit of the coastal regulatory zone notification.

- Land reclamation and bunding for the construction for Defence, Strategic and Security project facilities in intertidal areas i.e - the area between the low tide line and high tide line in the case of the sea/ocean and the areas that tidal influenced water bodies expand and contract according to the season..

- Mega flagship projects like "Sagarmala" and "Smart Cities" have been touted to be multi-million dollar strategic projects of GoI. Allowing facilities of such projects to come up unregulated in CRZ Areas is hazardous and is bound to degrade the marine ecology, coastal environment and the aesthetic uses of the sea coast.

It is essential that all industrial and infrastructure uses be totally prohibited in the CRZ areas in the new law, since these activities have been found to be totally detrimental to the coastal ecology, bio-diversity and National Interest.

19. PROMOTES UNSUSTAINABLE CONSTRUCTIONS & LAND USE CHANGES BY DESTROYING SUSTAINABLE FISHERIES: The water and bed area of the sea and tidal influenced water bodies and coastal commons serve as the primary livelihood and food security for over 14 million people in India, as enumerated by the National Livestock Census, 2003. The Draft Notification proposes to allow unsustainable building constructions and land use changes which will destroy the fisheries as follows:

- The attempt by the GoI to promote coastal industries, coastal tourism and coastal real estate turns a blind eye to the fate of millions of fisher workers dependent on the sea and the coast for their life and livelihoods.

- The 2018 notification allows for reclamation of water and bed areas in CRZ IV for construction of industries, ports, memorials, monuments etc. The protection measures that were mandated by the CRZ 2011 including restrictions on constructions and non-traditional activities, and mapping of livelihood spaces, fishing grounds, land use and community infrastructure etc have been done away with.

- The environmental impact of the draft CRZ Notification will be significantly negative, especially since the draft permits encroachment

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of water areas and intertidal areas along the sea and in estuaries and creek without any understanding of its overall impact on coastal surface water or groundwater hydrologies, biodiversity, fishery habitats and resources or the fisheries economy. Reclamation of coastal wetlands for "strategic" projects will catalyse the collapse of the small scale fisheries economy, leading to widespread social disharmony.



Instead of strengthening the law and securing the life and livelihood spaces of the fisherfolk, the MoEF&CC is partaking in large scale Ocean Grabbing, promoting the blue economy by bringing in legislative changes, such as the draft 2018 notification that redefine the primary user of the seas.

20. NOT NCSCM, BUT UNBIASED, SCIENTIFIC INSTITUTES TO DEMARCATE TIDE LINES IN CONSULTATION WITH LOCAL COMMUNITIES: CRZ Notification 2011 authorises seven agencies to carry out tidal demarcation that is used as a reference line to demarcate the area under the jurisdiction of CRZ. However, the draft Notification 2018 authorises National Centre for Sustainable Coastal Management (NCSCM) to carry out tidal demarcation for the Indian coastline. Firstly, this implies that only NCSCM and no other agency can carry out tidal demarcation that is used as a reference line to demarcate the area under the jurisdiction of CRZ. The dilution from a healthy choice of seven agencies, the process is now made a monopoly, making the entire process vulnerable to bias and corruption. Most importantly, we have found proof of serious corruption on behalf of NCSCM as is clearly evident from their role in making blatantly false and misguiding reports to favour M/s Triumph Realty, who have constructed a totally illegal large hotel on a sand dune and in the No Development Zone at sy no 336/1-A, Benaulim village, Salcete Taluka, Goa with impunity. This evidence can be shared with you, if requested. It is urged that all the documents from the Goa CZMA and other relevant authorities be studied by the Ministry before any further work is allotted to this corrupt organization. NCSCM must be removed from the list and as many as possible other sincere and scientific organizations with necessary capacities may be listed instead. The local communities must be consulted and involved in this important process to ensure transparency and justice.

21. DECENTRALIZING CLEARANCE PROCEDURES: The 2018 draft notification has overturned the entire clearance procedure by granting powers to

the state CZMAs and other local authorities, which were till now only a clearance appraising authority at the district and state levels to grant CRZ Clearances.

- This is being pushed by doing away with the requirement for both state and central government permissions for carrying out any activity (with exceptions in CRZ II) in the coastal regulatory zone.
- It states that only activities that attract clearance under CRZ I or CRZ IV (with or without CRZ II and III in the project) will attract clearance from the MOEF. All other projects falling squarely within CRZ III or II can be accorded clearance by the CZMAs.
- It also grant local authorities like Tahsilars, municipalities and local corporation to accord clearance for CRZ projects without the appraisal of even the state CZMA if the total project site is less that 300 Sq Mts/~3000 Sq Ft, potentially leading to a boom in real estate/townships on the coast. Revenue authorities are not equipped to perform the function of environmental protection.
- This responsibility of being a clearance granting authority is given to local bodies/agencies who have not, till date taken any steps in the implementation of the CRZ Notification. It is these same agencies that have been empowered to take cognizance of violations under the CRZ 2011. However, not a single violation has been acted upon till date, destroying large tracts of the coastline
- Decentralizing the entire clearance procedures will only lead to a complete collapse in the administration and implementation of the CRZ notification
- It is most essential that the Clearance procedure for each project is placed before the Gram Sabha of the concerned village panchayat, or the ward sabha of Municipal areas, before any such project is considered by the authorities. The Gram Sabha approval must be a pre-requisite for considering any proposal.

22. REMOVES SPECIAL CONSIDERATIONS: The CRZ 2011 provided special considerations to the CRZ Areas like Goa and Kerala, including provisions that restricted setting up structures on the beach; the coastal areas of Kerala and Goa have been opened up for construction and non-traditional activities. The khazans lands of Goa are also protected by CRZ Notification 2011, a much needed provision for the survival of Goa's coastal ecology and

environment. These considerations were put in place keeping in mind the unique coastal ecosystems in these areas. By removing these special considerations, the responsibility of the government to prepare special protection plans has been lifted. The special considerations given to khazan lands of Goa need to be strengthened by any new law/ notification in view of the severe pressures and accelerated destruction of these ecologically and socio-economically sensitive areas.

23. EXPRESSES INTENT TO DISSOLVE STATE CZMAs BY NON-APPOINTMENT: The 2018 draft also expresses intent to dilute the powers of the CZMAs by including a clause that accords powers to the Department of Environment within the state government to control CRZ clearance procedures in case the CZMAs are not under operation. The 2011 notification requires the CZMA to be active and constituted for appraisal of any proposals, and does not give the state environment department any administrative powers under the CRZ Notification 2011. This will also hamper comprehensive decision-making and appraisal of projects.

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24. FAILS TO CONSIDER DEMANDS TO DEMARCATE LIVELIHOOD SPACES: Public hearings announced by the government for the CZMP under CRZ 2011 was opposed vehemently on the basis of non-demarcation of livelihood spaces in states like Tamilnadu. In Goa, there has been no communication with communities regarding drafting of the CZMP at all. In this climate, introducing a notification that completely strips fisher folk and other coastal inhabitants of their right to live and livelihood, rights over coastal commons and protection of coastal ecology is totally and completely condemned.

25. FAILS TO RESPOND TO ENVIRONMENTAL CRISIS: It is not clear why the Ministry of Environment, Forest & Climate Change is attempting to relax the CRZ Notification of 2011 to benefit builders and industrialists, given the fact that the environmental crisis facing our planet and our country is increasing. With climate change and sea level rise, it is evident that the problems facing the eco-sensitive and fragile coastal areas will increase even further. It is therefore in the

national interest that the CRZ regime be strengthened further rather than it be diluted to benefit private interests at public cost.

> Considering the fact that all scientific data available seems to indicate that the rate of increase in sea levels has been underestimated, and it is evident that both the frequency and intensity of extreme climatic events has been increasing, there is a need to ensure that our coastal areas are given increased protection rather than further diluting the protection that existed as on 19th February 1991.

26. STORAGE OF MONOETHYLENE GLYCOL AND ACETIC ACID: The Draft Notification further dilutes the CRZ Notification 2011 by permitting the receipt and storage of the said chemicals in CRZ IB. This will cause a huge risk to the sensitive ecology, habitat and biodiversity of the coastal areas and hence must be dropped.

27. EXPANSION OF FISH PROCESSING UNITS IN CRZ I: While CRZ Notification 2011 prohibits expansion of fish processing units in the CRZ I areas, the draft Notification proposes to allow 25% expansion of plinth area for existing fish processing units in CRZ IB. Expansion of fish processing units will mean less open inter-tidal spaces and therefore less protection against natural hazards and hence must be dropped.

28. WASTE TREATMENT PLANTS: CRZ Notification 2011 prohibits waste and effluent treatment plants in CRZ I, but the draft Notification proposes to allow treatment of waste and effluents and transportation of the treated effluents in CRZ IB. These dilutions are completely against the need of the hour, and it is necessary that the new law prohibits all waste treatment plants in the entire CRZ which may be located inland, far away from the water bodies and the sea.

29. ALLOWS COMMERCIAL SALT PRODUCTION IN LIEU OF TRADITIONAL SALT PRODUCTION: CRZ Notification allowed salt production in CRZ I only by solar evaporation, while the draft proposes to delete the restriction, thus opening up the salt pans to commercial giants for private profit, and displacing the local traditional salt farmers. The restriction



that salt may be produced only by solar evaporation must be applied to all the CRZ areas.

30. CONSTRUCTION NORMS FOR CRZ II: CRZ Notifcation 2011 restricted the Town & Country Planning norms for CRZ II and the FSI and FAR to 1991 levels. However, the draft proposes to apply the town and country planning norms as changed from time to time and FSI and FAR as on the date of the notification of the new law. This will allow more built up areas and more constructions in the CRZ, thus devastating the coastline further.

31. VALIDITY OF CLEARANCES: The CRZ Notification 2011 allowed only 5 years validity for CRZ Clearances, while the draft proposes to increase it to 7 years. This dilution is also without any reasoning or logic, since the coastal environment is fast deteriorating today and the destruction could be so rapid that the project permitted earlier may not be feasible after 5 years.

C) RECOMMENDED CHANGES THAT SHOULD REFLECT IN ANY NEW CRZ NOTIFICATION/ LAW

32. 19TH FEBRUARY 1991 TO REMAIN THE BASELINE: The draft notification should make it absolutely clear that the base line date should remain as 19th February 1991 for the purpose of determining the various categories of CRZ I, II, III & IV.

33. VIOLATIONS OF CRZ 1991 AND 2011 TO BE PROSECUTED: The draft notification should make it absolutely clear that all activities that have been carried out in violation of the CRZ Notification of 1991 and the CRZ Notification of 2011 (as amended from time to time) will continue to be treated as violations under this notification as well, and that the letter dated 12.12.12 issued by the MoEF would continue to be in force.

34. RESTORATION OF AREAS DESTROYED BY VIOLATIONS: In case of violations, in addition to the fines and criminal action that would be applicable as per the provisions of the Environment Protection Act, 1986, the CRZ notification should stipulate that the land/sea interface that has been adversely impacted should be restored to its original condition by the Coastal Zone Management Authorities at the cost of the land owner. As per the precedent set

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by the Supreme Court of India in the case of Krishnadevi Malchand Kamathia Vs. Bombay Environmental Action Group, the costs should be recovered from the land owner as arrears of land revenue.

35. DEMARCATION OF LIVELIHOOD SPACES OF FISHER FOLK: In order to safeguard the traditional fisher folk settlements and dwelling units, these settlements and dwelling units should be demarcated in the CZMPs and mapped using satellite imagery, drones and geo-tagged photographs. Areas used for livelihood and lives of fisher folk such as for parking their boats and canoes, fish drying, repairs and drying of nets, recreational and other traditional purposes should also be similarly demarcated and reserved for these communities in the CZMPs for these purposes. This should happen before the new law is drafted.

36. TOTAL PROHIBITION OF WASTE DISCHARGE: The discharge of untreated wastes within the CRZ should be completely prohibited. Public authorities and private entities who have been discharging or dumping partially treated or untreated sewage and solid wastes within the CRZ should be prosecuted under the provisions of the EPA.

37. ENCOURAGE MANGROVES AND NATURAL ECOSYSTEMS, NOT STPs: Natural ecosystems that treat sewage such as mangroves should not be destroyed and replaced with artificial sewage treatment plants. All over the world, constructed wetlands are increasingly being used for sewage treatment and water purification. We are the only country that seems to want to destroy natural wetlands that treat the sewage and replaces them with STPs that are not operated or do not work for a variety of reasons (design flaws, lack of maintenance, cost cutting measures, etc.).

38. BAN VEHICLES, ROADS: Wheeled motor vehicles should not be allowed to enter or drive on beaches or in CRZ I areas. Construction of roads on beaches, No Development Zones and CRZ-I areas should be completely prohibited and any road construction in the rest of the CRZ must also be prohibited, except for minimal access for traditional users.

39. DISCHARGE OF LIQUID EFFLUENTS AT HIGH TEMPERATURES: Discharge of liquid effluents at a temperature of more than 1 degree Celsius over the ambient temperature of the receiving waters should not be permitted. All thermal and nuclear power projects should be required to install cooling towers



within a period of 18 months from the issuance of this notification. Pipelines required for discharge of effluents should be constructed underground using tunnelling methods rather than cut and cover methods. The discharge points should be located at least 5 kms away from corals, mangroves mudflats, salt marshes, sea grass beds, turtle nesting sites, horse shoe crab sites, etc.

40. NO MINING: As per CRZ Notification 2011, no activity is permitted in sand dune and it also has no mention of sand extraction from sandy beaches. However, through an amendment in October 2017, mining of atomic minerals was allowed in CRZ IB. The Draft CRZ Notification 2018 provides that mining of sand in sand dunes and sandy beaches, otherwise prohibited, can be allowed for rare earth minerals. These mining concessions will cause havoc in these ecologically sensitive areas that will cause devastation in the future due to sea level rise and extreme climate events. It is therefore necessary that no mining of any minerals be allowed in the sand dunes, beaches and other sandy areas.

C) PARA-WISE SPECIFIC COMMENTS & RECOMMENDATIONS

41. HTL TO BE CONSIDERED AS ON 19TH FEB 1991: In para (i) of the draft notification, the following words "For the purposes of this Notification, the HTL means the line on the land upto which the highest water line reaches during the spring tide, as demarcated by the National Centre for Sustainable Coastal Management (NCSCM) in accordance with the laid down procedures and made available to various coastal States /UTs" are insufficient. The correct provision would read "For the purposes of this Notification, the HTL means the line on the land up to which the highest water line reaches during the spring tide, as demarcated by an authorized agency in consultation with the local authorities and in accordance with the procedures listed in Annexure to this notification. Due regard would be given to the HTL as on 19th February 1991. In case structures have been built or activities that have been carried out that have impacted the HTL of 1991, it should be determined if such activities have been carried out after obtaining all requisite environmental and CRZ clearances."

42. REINSTATE HAZARD LINE: It is not clear why clause (iii) of the CRZ 2011 notification viz. "iii. the land area falling between the hazard line and 500 mts from HTL on the landward side, in case of seafront and between the hazard

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line and 100 mts line in case of tidal influenced water body the word 'hazard line' denotes the line demarcated by Ministry of Environment and Forests (hereinafter referred to as the MoEF) through the Survey of India (hereinafter referred to as the SoI) taking into account tides, waves, sea level rise and shoreline changes" has been deleted. These words must be reinstated in the new law.

43. DEFINITION OF TIDAL INFLUENCED BODIES: It is not clear why the words "or the creeks and the like" have been excluded from the Explanation: - "For the purposes of this sub-paragraph the expression tidal influenced water bodies means the water bodies influenced by tidal effects from sea in the bays, estuaries, rivers, creeks, backwaters, lagoons and ponds etc. that are connected to the sea." These words must be reinstated in the new law.

44. BAYS TO BE EXCLUDED FROM TIDAL INFLUENCED BODIES: The word "bays" must be excluded from the Explanation clause mentioned in the preceding paragraph. Bays are directly impacted by the tides twice a day and cannot be clubbed with other tidal influenced water bodies such as estuaries, rivers, creeks, backwaters, lagoons and ponds.

45. BIODIVERSITY ASSOCIATED WITH CORALS AND CORAL REEFS: In para 2.1.1, a, ii, the words "and associated biodiversity" must be reinstated in the proposed notification. It should be appreciated that corals and coral reefs form an intricately interconnected ecosystem that is linked to the associated biodiversity, and cannot be compartmentalized. This is another example of violation of the Principle of Non-regression.

46. ALL MUDFLATS TO BE CRZ I: In para 2.1.1, a, iv, the words "biologically active" must be deleted. The draft must provide that if mudflats that should be biologically active have been rendered inactive, they must be restored to host the original biological activity.

47. EMPs AND MAPPING OF ESAs: With regards to para 2.1.1, b it is necessary that not NCSCM, but any other qualified and unbiased agency be given the task of mapping the ESAs, which must be done in consultation with the local Biodiversity Management Committees and Gram Sabhas. The environment management plans must also be prepared in consultation with the local



Biodiversity Management Committees and Gram Sabhas and after public hearings.

48. In para 2.2, we suggest that the words "as on 19th February 1991" be added to the end of this paragraph.

49. We suggest that para 2.3 be replaced with "Areas that are relatively undisturbed and those do not belong to either CRZ-I or II which include coastal zone in the rural areas (developed and undeveloped) and also areas within municipal limits or in other legally designated urban areas, which were not substantially built up as on 19th February 1991".

50. CRZ III A AND CRZ III B CLASSIFICATION TO BE DROPPED: Paras 2.3.1 and 2.3.2 should be deleted. These provisions will make it impossible to demarcate the CZMPs and will create opportunities for further violations.

51. NDZ FOR TIDAL INFLUENCED WATER BODIES: In paragraph 2.3.3, "50 metres" must be replaced with "100 metres", and "whichever is less" must be replaced with "whichever is more". Change "….. within notified port limits" to "….. within constructed port limits", and the following words be added "only if they are not categorized as CRZ IA or CRZ IB" be added thereafter.

52. INCLUSION OF NEW/EXPANSION OF STPS UNDER PROHIBITED ACTIVITIES: In para 4, (v) instead of "Discharge of untreated waste and effluents from industries, cities or towns and other human settlements", the provision must be amended to "Setting up of sewage treatment plants, expansion of footprint of existing STPs and discharge of improperly or incompletely treated waste and effluents from industries, commercial establishment, cities, towns and other human settlements".

53. ALL SAND DUNES TO BE PROTECTED FROM DRESSING OR ALTERING: In para 4, (ix) the words "Dressing or altering active sand dunes" must be replaced by "Dressing or altering the sand dunes, hills, natural features (including landscape changes for beautification, recreation and other such purpose)." It is not clear what "active sand dunes" means since this term has not been defined. It is also not clear why stable sand dunes do not need to be



protected. The phrase 'active' must be deleted to ensure all sand dunes remain protected.

54. DISPOSAL AND MANAGEMENT OF ALL NON-BIODEGRADABLE AND HAZARDOUS WASTES TO BE PROHIBITED: In para 4, (x) we suggest that instead of "In order to safeguard the aquatic system and marine life, disposal of plastic into the coastal waters shall be prohibited. Adequate measures for management and disposal of plastic materials shall be undertaken in the CRZ", the following should be substituted – "In order to safeguard the aquatic system and marine life, disposal of plastic, polystyrene, multi-layered packaging materials, non-biodegradable material and hazardous material into the coastal waters or in the CRZ shall be prohibited. Adequate measures for management and disposal of all non-biodegradable and hazardous materials shall be undertaken outside the CRZ".

55. CRZ-I B – INTERTIDAL AREAS: As per the Draft Notification, maintenance or clearing of waterways, channels and ports, don't require "EIA studies". Similarly, measures to prevent sand bars, installation of tidal regulators, laying of storm water drains or for structure for prevention of salinity ingress and freshwater recharge also don't require "studies carried out by any agency to be specified by MOEFCC".

The intertidal zone is a critical interface between terrestrial and marine ecosystems. This area is crucial to the fishermen as it houses some of the most diverse and important fish species required by the traditional fishermen. Any construction in such a fragile region of the marine ecosystem would undoubtedly prove to be detrimental for not only the fishermen but the marine environment as a whole. The MoEF&CC seem to have been very liberal in allowing activities in the intertidal zone as can be seen in the Draft Notification. In the Draft, projects regarding strategic, defence-related and also those belonging to the Department of Atomic Energy have been allowed. The nature and extent of such projects however, have not been discussed in the Draft. Treatment facilities for effluents and their conveyance into the sea have been allowed to be constructed in the intertidal region. Such construction would not only change the landscape and cause reduction in the fish population of the region, but would also prove disastrous for the marine environment, in case of leakage of raw effluents into the water bodies due to the probability of malfunctioning in such plants.

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Further, the construction of desalination plants and associated facilities in the intertidal region will lead to the discharge of extremely concentrated brine from the desalination plants which have severe environmental implications on the environment of receiving water bodies. These include but are not limited to, substantial increase in salinity and temperature, accumulation of metals, hydrocarbons and toxic anti-fouling compounds, claimed by a study titled "*Impacts of desalination plant discharges on the marine environment*". The brine also adversely impacts the marine environment since marine species are not equipped to adjust to the immediate change in salinity caused by this release of brine into the area, often leading to their suffocation due to reduced oxygen levels in the water.

Allowing facilities like intake of cooling water and outfall for discharge of cooling water from thermal power plants will aggravate the damage to the marine eco-system of the Inter-tidal zone. It is a well established fact that, cooling water intake structure adversely impacts the environment by causing death of fishes through impingement and entrainment. US EPA has also stated the same, as according to them cooling water intake structures cause adverse environmental impact by pulling large numbers of fish and shellfish or their eggs into a power plant's or factory's cooling system. Further the discharge water of cooling tower of any thermal power plant would be significantly warmer when sent back to the receiving water body. The environmental impact of this higher thermal discharge is often adverse and the MoEFCC has simply provided no consideration or analysis of this impact.

56. <u>CRZ-I A AND CRZ-I B SHOULD BE TOTALLY PROTECTED</u>: Sections 5.1.1 and 5.1.2 must be changed to allow only traditional activities of local communities and activities related to scientific studies, conservation and restoration (using soft options only) in CRZ-I A and CRZ-I B. Many of the activities listed under section 5.1.1 and 5.1.2 are either unnecessary or do not need to be within CRZ-I, while those compulsorily requiring water frontage, such as ports, must also be stopped, at least until proper studies of the impact of the anticipated sea level rise and extreme natural events are carried out.

Non-traditional activities in the CRZ such as ports, roads, defence projects, bridges, refineries, cargo storage, waste treatment plants, tourism, power plants and mining have been witnessed to destroy the environment. Precautionary Principle requires that in the absence of

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knowledge of the impact of an activity on the environment and socio-economics, such an activity may not be permitted. In our present state of ignorance regarding the extent and magnitude of sea level rise, extreme natural events and other effects of global warming, and our knowledge of the devastation already caused by our greed driven non-traditional activities, this Principle squarely applies to all activities in CRZ_I areas, except traditional activities of local communities and activities related to scientific studies, conservation and restoration (using soft options only).

57. ACTIVITIES PERMITTED IN CRZ-II: In para 5.2, (ii) the words "fixed structures" must be replaced by "buildings" since fixed structures would include railings, boundary walls, fences, hoardings, etc. Provision must be made to ensure that all attempts are made to locate the proposed project outside the CRZ-II and that no project is allowed in CRZ-II that is driven by private profit, or can be located elsewhere. The words "institutions, offices, public places" must be deleted, and the words "buildings for residential purposes" must be replaced by "buildings for personal residential purposes, limited to 300 sq m plots only".

In para 5.2, (iii) the following changes must be compulsorily included – "Buildings permitted as in (ii) above, shall be subject to the local town and country planning regulations as applicable from time to time, and the norms for the Floor Space Index or Floor Area Ratio should not exceed the FSI as permissible on 19th February 1991. It shall be the responsibility of the concerned Town Planning Authority and the Coastal Zone Management Authority to ensure that all the Solid Wastes are handled as per respective SWM rules and managed and transported outside the CRZ and that no improperly or inadequately treated sewage is discharged within the CRZ".

In para 5.2, (iv), the following changes must be compulsorily included – "Reconstruction of authorized buildings shall be permitted, without change in present land use, subject to the local town and country planning regulations as applicable from time to time, and the norms for the Floor Space Index or Floor Area Ratio, should not exceed the FSI as permissible on 19th February 1991. It shall be the responsibility of the concerned Town Planning Authority and the Coastal Zone Management Authority to ensure that all the Solid Wastes are handled as per respective SWM rules and managed and transported outside the CRZ and that no improperly or inadequately treated sewage is discharged within the CRZ".

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In para 5.2, (vi), the following changes must be made and included – "Temporary tourism facilities shall be permissible in the beaches. Such temporary facilities shall only include shacks without plinths, common toilets/washrooms, change rooms and shower stalls; walk ways created by laying jute carpets, drinking water facilities, temporary seating arrangements without plinths, etc. Such facilities shall however be permitted only subject to the tourism plan featuring in the approved CZMPs as per this Notification, framed with due consultative process/public hearing etc. and further subject to environmental safeguards enlisted in the CZMPs. All these temporary facilities will be permitted for a maximum period of 8 months and would be completely dismantled by 31st May of each year, and permitted to be set up again after 1st October. Such temporary structures must be permitted only to provide livelihood opportunities for locals living in adjacent villages/settlements."

58. ACTIVITIES PERMITTED IN CRZ-III: In para 5.3, (ii), (a), the words "as existing as on 19th February 1991" be added after the words " ..... not exceeding existing Floor Space Index" must be added.

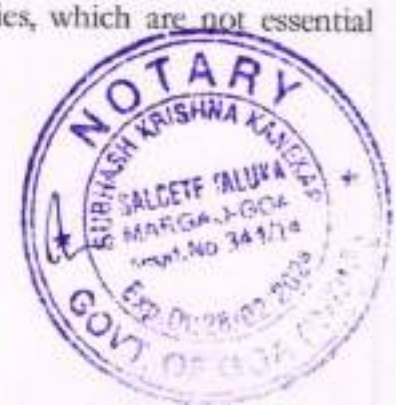
In paragraph 5.3, (ii), (c), bridges, roads and provision of facilities for electric sub-stations must be deleted.

Paragraph 5.3, (ii), (d) must be deleted.

In paragraph 5.3, (ii), (f), the second paragraph stating, "On landward side of such road in the NDZ, Resorts/hotels and associated tourism facilities shall be permitted. Such facilities ..... as applicable" must be deleted.

Paragraph 5.3, (iii), (a) must be deleted. All the so-called vacant plots in the CRZ-III areas are inviolable and hence not available for tourism activities, since these areas are all used by the local communities, or are required to be maintained as pristine or agricultural lands for ecological reasons.

Paragraph 5.3, (iii), (e) must be deleted in order to prevent degradation of the coastal environment due to limestone mining activities, which are not essential activities in the CRZ.



59. ACTIVITIES PERMITTED IN CRZ-IV: The Draft has included the sea bed area in definition of CRZ-IV, impact on benthic biodiversity. Assessment of coastal ecosystem change can be effectively monitored using benthic fauna, as pollutant from any source will ultimately ends in the seabed. The benthic communities play an important role in the transfer of materials from primary production through the detrital pool into higher trophic levels, including commercially exploitable fish (Bryan and Langston, 1992; Ingole, 2006). If the sea bed is also opened up for all kinds of activities that have been permitted in the CRZ-IV area, then that will severely impact the benthic ecosystem. Paragraph 5.4 must be changed to only allow traditional activities, measures for control of erosion and weather radars for cyclone prediction. All other activities listed presently in the draft must be deleted. There is no need to allow any further foreshore facilities for ports, harbours, jetties, etc, or projects for defence, strategic or security purposes, drains, facilities for discharge of effluents, transfer of hazardous substances from ships to ports, storage of non-hazardous cargo, projects of Department of Atomic Energy or non-conventional energy sources, exploration or extraction of oil and natural gas, facilities for thermal power plants, pipelines, transmission lines, or memorials/monuments within CRZ, given the climate change concerns.

60. CRZ CLEARANCE PROCEDURES: There is no logic or reasoning provided for the changes proposed to the procedures and the roles of the authorities in the grant of CRZ Clearances. The most important flaw in the CRZ Notification is the failure to consult with the local communities before any application for CRZ Clearance. The local residents are best aware of the issues related to CRZ and it is essential that the locals must be consulted before any such application is considered. Therefore, the most important part of the procedure for grant of CRZ Clearances is that the local communities, through the Gram Sabha, must be provided all the documents along with the application received and consulted before any application received for CRZ Clearance is considered by the authorities. The final permission must also be given only after obtaining Gram Sabha approval.

61. DOCUMENTS TO ACCOMPANY APPLICATIONS FOR CRZ CLEARANCE: Paragraph 8 (i), (a) should state that Form 1 of the CRZ 2011 Notification should also be submitted in addition to the proposed Annexure V.



Paragraph 8 (i), (b) should be modified to delete any reference to building projects/housing schemes, since the only constructions that may be allowed in the CRZ are houses of traditional dwellers of the coast and the new law must completely ban all building projects, multi-housing complexes and housing schemes in the CRZ. There is no need for commercial buildings to be built within CRZ, and therefore the question of exempting building projects from EIA/CRZ clearances does not arise.

Paragraph 8, (ii) must include the following at its beginning - "The complete documentation should be submitted to the CZMA one month before the next meeting and should be uploaded on the website of the CZMA at least 15 days before it is discussed."

After para 8(ii)(d), the following para should be added – "8(ii)(e) – The recommendations of the CZMA should be uploaded on the website of the CZMA within 1 week of the meeting at which the project was discussed."

After para 8(vii)(b), the following para should be added – "8(vii)(c) – The CRZ clearance shall be automatically suspended after 30 days following the due date in case the compliance reports are not uploaded on the project proponent's website, or if the project proponent's website is not functional for more than a week."

The following should be added at the end of 8(viii) – "The CZMA must ensure that all the agendas, project proposals, must be posted on the website at least 15 days before the meeting, and that minutes, decisions taken, clearance letters, etc are uploaded within 7 days of the meeting. Complaints about violations should be posted within 7 days of receipt of the complaint and the action taken report on the complaint should be uploaded within 30 days of receipt of the complaint. The Action Taken Report uploaded on the website must include site visit reports, geo-tagged photographs taken during the site visit and all other evidences and documents considered."

62. <u>RESIDENCES OF TRADITIONAL COASTAL COMMUNITIES</u>: At the end of 9, (iv), the following words should be added – "Residents of traditional fishing communities who are engaged in their traditional fishing activities should be allowed to add one extra floor on their existing ground floor structure to accommodate a toilet and bathroom and the increase in the size of the family".

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63. INTEGRATED MANAGEMENT PLANS FOR CVACs: After para 10.1, (ii), the following paragraphs should be added –

"10.1, (iii) - The Integrated Management Plans shall be made in consultation with the local residents and the Gram sabha will be provided all the information for its approval at every stage from inception to finalization."

"10.1, (iv) – It should be ensured that all the facilities mentioned in the paras (i) and (ii) above are built in an environmentally friendly manner so as to have the minimum impact on the environment and in a manner that tidal flows are not impeded in any manner".

64. ANNEXURE-I: INTRODUCTION: In the introduction, please add the following words after mangroves –"mudflats, sand dunes,".

65. ANNEXURE-I: GENERAL MEASURES: CRZ-I area has been identified as the areas having Ecologically Sensitive Areas (ESA) and the geo-morphological features which play a vital role in maintaining the functions of the coast. The conservation, protection and management of ESA has been discussed in Annexure-I. As per the Draft, mangroves, beaches, corals, nesting areas and other eco-sensitive areas shall be ESA only if they have been identified by the NCSCM. This is highly problematic. This reduces the scope of actual conservation and protection measures that can be taken under the CRZ Regulation Regime, since most of these eco-sensitive areas lay outside the scope of the identified areas. We also point out that Para 1 (iii) of the Annexure-I should be replaced with the following – "No new construction or new activities shall be permitted within CRZ I zones of the ESZ, except traditional activities of local communities and activities related to scientific studies, conservation and restoration (using soft options only)".

66. ANNEXURE-I: MANGROVES: With reference to para 1.1, please note that Mangroves are declared as forests under the Indian Forest Act, 1927, and the provisions of both the Indian Forest Act and the Forest Conservation Act would automatically be applicable. Also violations of the CRZ notification are punishable under the Environment Protection Act, and cannot, and should not, be exempted through a notification. This is particularly important since in the case of destruction of mangrove habitats, restoration can only be directed by the Authorities using their powers under the EPA.



Mangroves which are declared as forest under the provisions of the Forest (Conservation) Act, 1980 have been exempted from the CRZ Notification's applicability. There is no reason as to why such a dilution has been brought in. The CRZ Notification was earlier applicable to all mangroves irrespective of their legal status. There is no rationale behind such a classification.
Further, removing them from the purview of CRZ Notification and only considering them under Forest Conservation Act, 1980 will pave the way for conversion of mangrove forest for non-forest purposes.

In the mangrove buffer area of upto 50m, laying of pipelines, transmission lines, conveyance systems and roads on stilts are allowed in the Draft. Firstly, no construction in the buffer region of the mangroves should be allowed, considering the ecological importance of mangrove. Secondly, the type and purpose of such pipelines and the impact of any leakage from such pipelines have, however, not been considered in the Draft Notification. Oil spilled from pipelines near the mangroves, tend to have severe long-term impacts on the mangrove areas. The type of conveyance system allowed in the buffer region has also not been elaborated. Without any specification, any type of conveyance system would be allowed in the sensitive buffer region, including the laying and initiation of even railway lines. Further, the increased conveyance system would attract tourists in the future, which would inevitably prove to be disastrous for the vulnerable mangrove areas.

Further, the construction of proper concrete roads which have also been allowed in the mangrove areas in exceptional cases for defense, strategic purposes and public, utilities would lead to the removal or cutting down of the mangrove areas. The Draft Notification though mandates the plantation of minimum three times the mangrove area affected/destroyed during the construction process by means of compensatory plantation of mangroves, it is worth to mention here that compensatory afforestation has a record of proving to be disastrous for the traditional communities in the past.

An example can be cited from the mangroves of the Gulf of Kutch. It shows how industrialisation and the loss of mangroves in lieu of reforestation through compensatory afforestation has led to the privatisation of the mangrove lands and has adversely affected the livelihood of the local people in the coastal regions.

NOTARY
SURESH KRISHNA KAMAT
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dependent on the mangroves and the resources they provide. Not only will the right to access of the mangrove regions be affected by such removal of mangrove forests, but the landscape of the region would be irreversibly affected. As stated in scientific studies, the afforestation of mangroves is difficult as the seeds planted are washed away by tidal movements and hence have to be planted numerous times, in order to ensure that the seeds stay in place.

By proposing these activities through this Draft, MoEFCC had ignored their own recognition of the fact that habitat conversion to other forms of land use (through coastal development for roads, ports, tourist resorts, aquaculture), overexploitation of species and associated destructive harvesting practices (through use of inappropriate fishing gear and methods), and the impacts of agricultural, domestic and industrial sewage and waste are some of the major anthropogenic threat to India's coastal and marine ecosystem.

67. ANNEXURE-I: CORALS, CORAL REEFS AND ASSOCIATED BIODIVERSITY: Paragraph 1.2 of Annexure-I must be rewritten as follows -

Corals and coral reefs and associated biodiversity:

(i) All activities that destroy corals and coral reefs and their surroundings are prohibited, including thermal discharges and other pollution.

(ii) All coral and coral reefs shall be protected except for those small quantities required for research and rejuvenation purposes. Prior permission will be taken from MoEF&CC and the State Forest Departments as per provisions of WLPA.

(iii) Coral and coral reefs transplantation activities shall be through recognized research institutions wherever required for regeneration after obtaining necessary approvals under Wildlife (Protection) Act 1972.

(iv) The degraded, dead and/or destroyed coral areas shall be taken up for rejuvenation and rehabilitation.

(v) The conservation and protection of corals and coral reefs shall be taken up as follows:

(a) All corals and coral reefs identified and delineated shall be declared and notified as ESA under E (P) Act 1986.

(b) It shall be ensured that no activities that are detrimental to the health of corals, coral reefs and its associated biodiversity such as blasting, mining, effluent and sewage discharge, dredging or maintenance dredging, ballast water discharge, ship washings, fishing other than traditional non-destructive fisheries, trawling, construction activities and the like are taken up in and around the coral areas.

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68. ANNEXURE-I: NATIONAL PARKS, MARINE PARKS, SANCTUARIES:
We suggest that paragraph 1.3 of Annexure-I be rewritten as follows -
National Parks, Marine parks, Sanctuaries, reserve forests, protected forests, wildlife habitats and other protected areas declared under the provisions of Wild Life (Protection) Act, 1972(53 of 1972), the Indian Forest Act, 1927, or E(P)Act 1986 (29 of 1986); including Biosphere Reserves would be conserved and protected as follows:

(i) Conservation and protection of the above listed areas shall be as per the provisions of the respective Acts/notifications/guidelines.

(ii) Efforts shall be made to increase the forest area in the coastal region in order to prevent loss of life and property from increased storms, tides and floods. However, artificial plantations should not be carried out on mudflats and sandy beaches.

(iii) The concerned State Governments/UT's shall provide for adequate funds for such measures to undertake shelter belt plantation or bio-shields with indigenous planting species suitable to the location.

69. ANNEXURE-I: SALT MARSHES: Paragraph 1.4 must be rewritten as follows –
Salt marshes:
The conservation and protection of salt marshes shall be as follows:
(i) The salt marsh areas shall be conserved and protected and efforts shall be made to promote the endemic biodiversity in the salt marshes. No activities related to construction of overhead conveying/transmission of cables and underground laying of transmission line cables and so on shall be permitted in the CRZ-I. This is because even if the final end product is overhead or underground laying of lines, the interim construction activities and movement of heavy vehicles, equipments and movement of workers will be detrimental to the traditional fishing and endemic biodiversity of the region.
(ii) Traditional fishing is permissible in salt marshes. Trawling would not be permitted.
(iii) Salt marshes which have less biodiversity should be rejuvenated. There shall be no provision in the new law to convert salt marshes into salt pans. Salt marshes, which support unique biodiversity, especially avian population will be turned into commercial salt making areas. This change needs to be seen with the

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draft Wetland Rules issued by the MoEFCC in September 2017, which do not consider salt pans as wetlands any more and thus deny them protection under the rules. This has opened up salt pans for construction. Both changes together will facilitate constructions on salt marshes.

70. ANNEXURE-I: TURTLE NESTING GROUNDS: We suggest that para 1.5 be rewritten as follows –

Turtle nesting grounds shall be protected and conserved as follows:

(i) Turtle nesting grounds identified by the concerned States/UTs shall be protected as per Wildlife (Protection) Act of 1972.

(ii) No activities shall be permitted in and around the turtle nesting ground including those causing light, sound and thermal pollution except for those required for conservation and protection of these sites.

(iii) Strict management plans for protecting the turtle nesting grounds shall be undertaken and implemented by the concerned State/UT Authorities with the active participation of local communities.

(iv) The turtle nesting grounds shall be kept free of animals.

71. ANNEXURE-I: SAND DUNES AND SANDY BEACHES: Paragraphs 1.9,(i) and (ii) must be corrected to prohibit mining completely and prevent any form of constructions on sand dunes and sandy beaches. Temporary structures on sandy beaches and sand dunes must be kept at a minimum and only for livelihood of the local citizens. (d) – "The entry or use of motor vehicles, or construction of roads, whether temporary or permanent, should be completely prohibited".

72. ANNEXURE-I: MUD FLATS: The words "biologically active" must be deleted from para 1.9, (iii).

Paragraph 1.9, (iii), (c) must be added as follows – "The States/UTs shall take steps, including the reduction of pollution, to restore the productivity of mudflats that are degraded and exhibit low biological productivity."

73. ANNEXURE-III: GUIDELINES FOR DEVELOPMENT OF BEACH HOTELS/ RESORTS: No new hotels or resorts must be permitted in the CRZ, hence this Annexure must be deleted entirely.

NOTARY SUBHASH KRISHNA KANEKAR SALCETE TALUKA MARGAO-GOA Regd. NO 344/14 GOVT OF GOA (INDIA)

D) SOME ESSENTIAL PROVISIONS OF NEW CRZ LAW NOT COVERED HEREIN ABOVE

74. TOTAL PROHIBITION OF DESTRUCTIVE PROJECTS: The notification should make it absolutely clear that only those activities that are traditionally carried out shall be permitted within the CRZ. Residential, commercial and industrial activities that do not require the water front shall not be permitted within the CRZ. No further projects of commercial tourism, industries, ports, roads, highways, railways, etc may be allowed within the CRZ in the future. If the Government finds a public interest project to essentially require land within the CRZ, such a project may be allowed only after receiving Free, Prior, Informed Consent from the local communities.

75. TOTAL PROHIBITION OF RECLAMATION: Reclamation shall be totally prohibited within the CRZ. The need for this is obvious from the sea level rise and extreme natural events to come.

76. SPEEDY JUSTICE: Fast track courts must be set up to try offences under the CRZ notification.

77. PRIOR INFORMATION OF PROJECTS TO PUBLIC: No authority or agency should consider projects for CRZ clearance if the agenda, project proposal with all documents, EIA reports, site visit reports, maps, satellite images, drawings and photographs, etc. are not made available to the public 15 days before the meeting at which they are to be discussed. Prior approvals of Gram Sabhas must be mandatory.

78. SPEEDY ACTION BY CZMAs ON COMPLAINTS: Complaints about CRZ violations should be dealt with within a period of 4 weeks of receipt by the Coastal Zone Management Authority, and a written reply should be sent to the complainant clearly stating how the complaint has been resolved. Inspections carried out by the agencies should include geo-tagged photographs of the site visit and inspection undertaken, as well as satellite images and other relevant government records.

Based on the above facts and arguments, we register our total and complete opposition and rejection to this "Draft Coastal Regulation Zone Notification 2018" put out for public comments by MoEF&CC. The Ministry is urged to



revisit its founding principles and take steps to adhere to their mandate in protecting the environment and the people dependent on the environment instead of paving way for short sighted economic gains by promoting destructive construction activities, industries, real estate and tourism on the coast of India.

The Ministry of Environment and Forests, Government of India must set aside this "Draft Coastal Regulation Zone Notification 2018" and take appropriate steps in the lawful implementation of the provisions of the existing CRZ Notification 2011, before preparing a new law in consultation with the local and scientific communities for better protection and sustainable development of our coast.

In anticipation of your favourable response and action,

Yours faithfully,

sd/-

Jeronimo Dias

(President)

NOTARY SUBHASH KRISHNA KANEKAR SALCETE TALUKA MARGAO-GOA

Annexure 1

Names of the Coastal villages and population which are under grave threat in Goa by Tourism & Hotel industries, Casinos and Real Estate developers, River Nationalisation and now Your CRZ notifications and policies:

Sr. no	CRZ Villages	Population
1	Querim - Tirachol	3089
2.	Arambol	2469
3.	Paliem	2853
4	Mandrem	5684
5	Morjim	6227
6	Anjuna	8903
7	Calangute	27647
8	Candolim	12607
9.	Velsao- Pale (Isorxem)	4477
10.	Majorda – Utorda - Calata	7258
11.	Cansaulim – Arossim - Cuelim	5501
12.	Betalbattim	4090
13.	Colva	9973
14.	Cana - Benaulim	4090
15.	Varca	6654
16	Cavellossim	2509



17.	Cola	5955
18.	Agonda	4210
19	Nagorcem-Chaudi	15444
20.	Poinguinim	7452
21.	Loliem - Pollem	3853
22.	Corgao	8389
23.	Pernem	7059
24.	Casne – Amberem - Porosconem	14728
25.	Uguem – Mopa - Tamboxem	2640
26.	Torxem	3159
27.	Agarwada - Chopdem	14728
28	Parcem	4555
29	Tuem	4705
30	Dhargalli	5743
31	Ozorim	1898
32	Alorna	4396
33	Ibrampur	1252
34	Assagao	5004
35	Siolim	13012
36	Oxel	3264
37	Camurlim (north)	3243
38	Colvale	5004

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39	Revora	2877
40	Nadora	1440
41	Pirna	3195
42	Nerul	6775
43	Reis Magos	11727
44	Penha de Franca	27274
45	Salvador de Mundo	6637
46	Pomburpa - Olaulim	3894
47	Aldona	9990
48	Narao	1919
49	Pilgao	2754
50	Amona	5151
51	Navelim (North)	2754
52	Surla	4651
53	Pale - Cotombi	4833
54	Merces	18649
55	Chimbel	28943
56	Goltim - Navelim	2658
57	Sao Mathias	2076
58	Batim	4428
59	Se Old Goa	27087
60	St. Estevam	3376
61	Betqui -Candola	5453

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62	Volvoi	1352
63	Savoi Verem	3726
64	Cumbarjuia	5363
65	Corlim	10516
66	Carambolim	5864
67	Assosim – Mandur	4522
68.	Neura	2086
69.	Tivrem - Orgao	16577
70.	Boma - Adcolna	5453
71.	Kundaim	3607
72.	Santa Cruz	19398
73.	Curca- Bambolim	12143
74.	Siridao - Pale	3316
75.	St. Andre	6187
76.	St. Lawrence	6047
77.	Marcaim	6436
78.	Bandora	19474
79.	Durbhat	3639
80.	Wadi - Talaulim	3332
81.	Borim	9874
82.	Shiroda	16737
83.	Panchwadi	4014
84.	Savordem	3870



85.	Cortalim - Quelossim	9526
86.	Loutolim	6125
87.	Camurlim Salcete	2519
88.	Rachol	1712
89.	Curtorim	14459
90.	Guirdolim	4090
91.	Macazana	2997
92.	Chandor	4090
93.	Assolna	3033
94.	Carmona	4090
95.	Chinchinim	4090
96.	Velim	6302
97.	Orlim	1641
98.	Telaulim	4796
99.	Navelim Salcete	21854
100.	Seraulim	8873
101.	Nuvem	10373
102.	Raia	11213
103.	Panjim	
104.	Caranzalem	
105.	Taleigao	
106.	Donapaula	
107.	Vasco	



108.	Baina	
109.	Bogmalo	
110.	Chicolna	
111.	Cabuderam	
112.	Sernabatim	
113.	Fatrade	
114.	Ponda	
115.	Mormugao	
116.	Chicalim	
117.	Dabolim	
118.	Sancoale	
119.	Chodan -Madel	
120.	Capao	
121.	Margao	
122.	Usgao - Ganjem	
123.	Deusua	
124.	Xelvona	
125.	Odar	
126.	Curchodem	
127.	Ambelim	
128.	Chapora	
129.	Gadaulim	
130.	Betul	



131.	Naquerim	
132.	Quitol	
133.	Nuem	
134.	Canaguinim	
135.	Palolem	



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Gmail arvind.nautiyal@gov.in

Public Notice dated 18.4.2018 - Draft CRZ Notification 2018

Rainbow Warriors <rainbowwarriors2014@gmail.com>
to arvind.nautiyal

Thu, Jun 14, 2018, 7:01 PM

Dear Sir,

Federation of Rainbow Warriors, Margao is a registered society dedicated to the environment and sustainable economy of Goa and our country.

Please find attached our submission in response to the subject Public Notice.

We are certain that our submissions will convince you and the authorities concerned to reject the Draft CRZ Notification 2018 and start a lawful and people-friendly procedure for the preparation of a new CRZ Law that will facilitate sustainable development and conservation of our coasts. However, you are welcome to consult us on any of the issues we have raised, or for further details.

Thanking you,

sd/-

Jeronimo Dias
President
Federation of Rainbow Warriors, Margao

NOTARY
SUBHASH KRISHNA KANSWAR
SALCETE TALUKA
MARGAO-GOA
Regd. No 344/14
Exp. Dt: 20/02/2024
GOVT. OF GOA (INDIA)

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OUR RIVERS OUR RIGHTS

Shop CSH-1, Block C-2, Leandra Heritage,
Madel, Margao, Goa – 403601
Tel: 9657651796

Ref: ORORG-09-2018

Date: 16.06.2018

To

Shri Arvind Nautiyal, Director,

Ministry of Environment, Forest and Climate Change,

J-615, Jal Block, Indira Paryavaran Bhawan,

Jor Bagh Road, New Delhi – 110003

DRAFT COASTAL REGULATION ZONE NOTIFICATION 2018

Dear Sir,

Our Rivers Our Rights strongly objects to all aspects of the Draft Coastal Regulation Zone Notification 2018 - the legislative changes, the procedures adopted for the preparation of the draft, and the intentions behind the changes.

We bring to your notice the following important facts and arguments regarding the Draft CRZ Notification 2018 in the context of Goa:

A. OUR KHAZANS, OUR RIVERS, OUR COASTS

Goa has a unique relationship with its amazing coastline, which once hugged the base of the western ghats. The indigenous communities, civilizations living for over 12,000 years (scientific dating of carvings at

NOTARY SUBHASH KRISHNA KANEKAR SALCETE TALUKA MARGAO-GOA Exp. On: 28/02/2024 GOVT. OF GOA (INDIA)

Ponsamoll, Rivona and artefacts at Chicalim caves) along the rivers and coasts, have always been the children and caretakers of these riverine and coastal ecosystems. It is through outstanding understanding, skills and labour that the indigenous communities created an incomparable engineering marvel – the sustainable khazan systems of Goa.

In a gigantic endeavour spanning hundreds of years, a massive system of multiple earthern bunds was constructed across the State. Primary bunds restrained the saline coastal waters to channels, which are now recognized as the rivers of Goa. The fresh water springs at the base of the western ghats were bunded to create fresh water lakes, and the huge expanses of lands in between, which were wetlands before, became the khazans – lands that can be used alternatively for paddy cultivation, fish farming, salt cultivation, etc, thanks to the automatic sluice gate systems in the primary bunds that allowed the saline waters of the tidal-influenced rivers to flow in and out of the khazans. These highly productive lands and water bodies, have been nurtured and used by the local communities, in communion with extremely rich biodiversity and abundance of life, for thousands of years – proof enough of the sustainability and sophistication of these man-made marvels that are unique to Goa.

Similarly, the coastal communities of Goa have evolved as the children and guardians of the coast of Goa. The entire coastline has been looked after by the local communities, who understand the coast and the sea as a part of themselves. Fishing communities, who until very recently used unique community nets called ramponns, toddy tappers, agriculturists, herdsmen, traditional craftsmen and others have conserved and occupied the entire coast of Goa since times immemorial.

NOTARY SUBHASH KRISHNA KANEKAR SALCETE TALUKA GOA GOVT OF INDIA

B. GAUNKARIS (COMMUNIDADES) AND THE UNIQUE COMMONS OF GOA

The indigenous communities of Goa have lived in the self-reliant, self-governing socio-political system called Gaunkari, where every villager is called a Gaunkar, every village is self-reliant, every person is involved in the decision making, and all lands are owned by the community as a whole. There is no provision for alienation of the Gaunkari land, or for creation of any other rights, except the temporary right of use. Under Portuguese rule, the Gaunkaris were renamed as 'Communidades', but the land tenure and land use was allowed to continue by the Portuguese, based on an agreement signed by the Portuguese with the Gaunkaris in early 16th century, who even codified the common law of the Gaunakris as 'Code of Communidade'.

The khazan lands, the rivers and the coasts of Goa are mostly owned by the respective communidades even today. However, the failure of the Indo-British legal system, which was imposed on Goa post-liberation, to recognize and honour the existing land tenure and land use laws, and the imposition of British laws to forcibly change the use of these coastal and khazan lands, has created unprecedented environmental and socio-economic havoc in Goa, including within the fragile CRZ.

NOTARY SUBHASH KRISHNA KANEKAR SALGETE 'ALINA' MARGAO-GOA Regd.No 344/14 Exp Dt 29/03/2024 INDIA

C. WHY CRZ LAWS?

Sustainable economic activities of traditional agriculture, fishing, homes of local communities, etc in coastal areas do not require any CRZ laws. CRZ laws are required only to curb unsustainable economic activities such as real estate speculation, mass tourism, industries and

modern infrastructure. However, the CRZ laws have not only failed to achieve or pursue their objectives, but have facilitated excatly the opposite. The CRZ law has been blatantly misused to enable construction of hotels, resorts, multi-housing builings/gated complexes, industries, roads, highways, STPs, Ports, power plants, etc, while displacing the local communities directly by demolition of their homes and structures using the same CRZ law that was supposed to protect them, and inderectly by grabbing their lands for the unsustainable uses of hotels, real estate, industries, etc. Despite CRZ Notification 1991 and 2011, the destruction of the coast has intensified every year. Further, new and extremely worrying threats of sea level rise and global warming, created by our policies notwithstanding the laws in place, have placed the entire planet in crisis, and our civilization under mortal threat.

Undeterred by the imminent dangers to our survival, private corporations Jindal, Adanai and Vedanta are looking at making Goa a coal hub, for which our CRZ areas including the rivers, khazans and coasts are being brought within the ambit of the National Waterways Act, 2016. This act aims at turning our rivers into navigation channels for coal handling vessels, our estuaries and fishing jetties into coal ports, river banks into coal jetties, khazans into coal storage yards and our village roads into coal transportation networks.

The obvious objective of the CRZ law is to prevent such destruction of the CRZ as described above.

D. WHY THE DRAFT CRZ NOTIFICATION 2018 MUST BE WITHDRAWN

We have studied the Draft CRZ Notification 2018 and are shocked to see that the proposed law completely fails to respond to the needs of the society, humanity and our planet, which are so clearly evident to



all, except the blind legislators. In particular, the Notification completely fails to address the destruction suffered and threats faced by the rivers and coast of Goa, and the local communities living in these areas.

We are submitted to you separately, along with other voluntary organizations of Goa, a number of important facts and arguments supporting our demand for the withdrawal of the Draft Notification. In addition, we hereby submit the following with reference to the specific threat from the proposed nationalization of our rivers for coal handling/other non-traditional uses, which is the biggest threat to the CRZ in Goa:

1. FAILURE TO RECOGNIZE AND PROTECT THE COMMONS: The rivers, khazans and coasts of Goa are held in common by the local communities and form the basis of the environmental stability, ecological health, economic and social development of Goa. The uses of these areas must be restricted by the CRZ law to the traditional occupations of fishing, farming, salt farming and allied sustainable activities only. The CRZ laws have failed to recognize and protect the ancient institutions of self-reliant, self governing village republics of Goa, the right to life of the poorest of the poor who depend on these commons for their survival, the rights of the local communities over the rivers, khazans and coasts of Goa and the community knowledge that is the greatest protection that the CRZ can be provided with.
2. FAILURE TO PROHIBIT COAL HANDLING IN ECOLOGICALLY SENSITIVE RIVERS AND COAST OF GOA: Coal handling plans of private profit seeking corporations are the most obvious threat to Goa's CRZ. The Draft CRZ Notification 2018 has failed to

NOTARY SUBHASH KRISHNA KANEKAR SALCETE GOA (INDIA)

prohibit the handling of dirty cargoes like coal in the ecologically sensitive areas coastal areas of Goa. The effects of coal handling on the environment and people in the context of the Goan rivers and coast is catastrophic beyond imagination.

3. FAILURE TO DEAL WITH THE PROVISIONS OF THE NATIONAL WATERWAYS ACT THAT PROPOSE CONCRETIZATION OF RIVER BANKS, DISPLACEMENT OF FISHER FOLK, FARMERS AND LOCAL COMMUNITIES AND DESTRUCTION OF CRZ

The Draft CRZ Notification 2018 fails to deal with the provisions of the National Waterway Act 2016 that are contrary to the objectives of the CRZ law. For example, the obvious intent under the clauses of 'training' of rivers is to concretize rthe bunds, and thus to destroy the environment and ecology of the rivers and khazans of Goa. Similarly, the provisions in the National Waterways Act 2016 for capital dredging, storage of cargoes in the CRZ, transportation links, displacement of fisher folk and other destructive activities, which are only for private profits, defeat the purpose of the CRZ laws. The CRZ Notification must include provisions to ensure the enactment of necessary changes to the National Waterways Act 2016 to comply with CRZ protection requirements and also provisions to protect the CRZ from the consequences of the National Waterways Act 2016, until the necessary changes are made.

NOTARY SUBHASH KRISHNA KANEKAR MARGAO-GOA GOVT. OF GOA (INDIA)

E. THE WAY FORWARD

We therefore demand that:

1. The Draft CRZ Notification 2018 be withdrawn without any delay and a new CRZ Law be prepared -

a. in consultation with local communities and Gram Sabhas following Free, Prior and Informed Consent (FPIC) principles and the Constitutional mandate for greater participation of the people in planning and decision-making,

b. only after the completion of preparation of CZMPs under CRZ Notification 2011,

c. only after collection and analysis of all pertinent data, in consultation with local communities, including the failures and successes in the implementation of CRZ Notification 1991 and 2011, the environmental status and trends since 1991, sea level rise and global warming, displacement of local communities, loss of fisheries and mapping of all relevant physical attributes such as all areas used by fishing communities, ecologically sensitive areas, new high tide line and high flood line after 100 years and all CRZ violations

2. Expansion and construction of ports, jetties and related infrastructure in the CRZ be prohibited completely, unless for local transport, especially since most of the ports in the country are underutilized, and expansions in Goa are being planned only for dirty and polluting coal, with far-reaching dire consequences to both man and his environment

3. All ongoing coal handling at Ports located in heavily inhabited areas, such as MPT, Goa, which is surrounded by thickly populated Vasco City and neighbouring settlements, be stopped

4. Vasco Bay, Vasco Beach and Baina Beach be restored through beach nourishment and facilitating natural regeneration of the

NOTARY SUBHASH KRISHNA VELIP SALCETE TALUKA MARGAO-GOA Regd. No 344/14 EXP. DT. 28/02/2024 GOVT OF GOA (INDIA)

bay, the fisher folk of Vasco Bay (Khariwada) and Baina Beach be reinstated on their lands and all CRZ violation cases be dropped against the genuine fisher folk and local residents, which are only due to mischievous intentions of MPT to usurp these coastal areas for their anti-people coal expansion programmes

5. Use of the rivers of Goa for transportation of cargoes of private corporations such as coal be prohibited and the detrimental activities for creation of shipping infrastructure and operations, such as capital dredging, training (hardening of the river bunds), which are provided for in the National Waterways Act 2016, also be prohibited

Thanking you in anticipation of your positive action,

Yours faithfully,

Adv Ohm Stanley Rodrigues

Convenor



Gmail arvind.naudiyal@gov.in

CRZ - 2018

stanley rodrigues <ohmstanley@gmail.com>
to arvind.naudiyal.me

Dear Sir,
Please see attached file in which Our Rivers Our Rights strongly objects to all aspects of the Draft Coastal Regulation Zone Notification 2018
Thanks
Adv Ohm Stanley
Convenor
Our Rivers Our Rights

CRZ 2018 OOR.W...

NOTARY SUBHASH KRUSHNA KANEKAR SALCETE TALUKA MARGAO-GOA Regd. NO 344/14 Exp Dt:29/02/2024 GOVT OF INDIA

Rainbow Warriors <rainbowwarriors2014@gmail.com>
to advocatatlive

BEFORE THE NATIONAL GREEN TRIBUNAL SITTING AT

PUNE

MEMORANDUM OF APPLICATION

(Under Section 18(*1*) read with Sections 14 and 20 of the National Green Tribunal Act, 2010)

Application No. _____ of 2023

1. **FEDERATION OF RAINBOW WARRIORS,**)

A society Registered under the Societies Registration Act, 1860,)

under Registration No. 190/Goa/2014,)

With its address at CSH-1, Block C-2,)

Leandra Heritage, Madel, Margao, Goa - 403601)

Through its Secretary, Mr. David Rodrigues)

Phone No.: 9527477367)

Email: rainbowwarriors2014@gmail.com)

2. OUR RIVER OUR RIGHTS)

With its address at Baboy Commerce Center,

SO22 B Building, Behind Big G Mall,

Pajifond, Margao, Goa - 403601





Through its Convenor, Mr. Ohm Stanley Rodrigues)

Phone No.: 96457651796)

Email: ohmstanley@gmail.com).. Applicants

VERSUS

1.UNION OF INDIA,)

Through the Joint Secretary,)

Ministry of Environment, Forests and Climate Change,)

2nd Floor, Agni Block, Indira Paryavaran Bhawan,)

Jorbagh Road, New Delhi – 110 003)

Contact Number: 91-11-20819220)

Email address: secy-moef@nic.in)

2. **GOA COASTAL ZONE MANAGEMENT AUTHORITY)**

Through its Member Secretary,)

Department of Science, Technology,)

and Environment, Opp. Saligao Seminary,)

Saligao, Bardez, Goa - 403511)

Ph: 0832-2407189)

Email: dir-ste.goa@nic.in)

3.STATE OF GOA)

Through the Director)

NOTARY GOVT. OF GOA (INDIA)

The Department of Environment and Climate Change)

4th Floor, Dempo Towers, Panaji Goa 403 001.)

Ph: 0832-2407189)

Email address: dir-env.goa@nic.in)...**RESPONDENTS**

VAKALATNAMA

KNOW ALL to whom these presents shall come that We, David Rodrigues, the Applicant No. 1 above named, age 56 years, r/o House No 1053/B/4, Ulandi, Gandhi Road, Bacbhat, Raia, Salcete, Goa, and Mr. Ohm Stanley Rodrigues, Convenor of the Applicant No.2, having its office at Baboy Commerce Center, SO22 B Building, Behind Big G Mall,Pajifond, Margao, Goa - 403601 do hereby appoint:

Ronita Bhattacharya, Advocate, High Court of Bombay to be our Advocate in the above noted case & authorise them:-

To act, appear and plead in the above-noted case in this Court or in any other Court in which the same may be tried or heard and also in the Appellate Court including High Courts and the Supreme Court.

NOTARY

To sign, file, verify and present pleadings, appeals, cross-objections or petitions fee executions review, revision, withdraw compromise or other petitions or affidavits or other documents as may be deemed necessary or proper for the execution of the said case in all its stages subject to payment for fees for each stage.

To file and take back documents, to admit &/or deny the documents of the opposite party.

And we, the undersigned do hereby agree not to hold the advocates or their substitute responsible for the result of the said case. The adjournment costs whatever ordered by the Court shall be of the Advocates that they shall receive and retain for themselves.

IN WITNESS WHEREOF we do hereunto set my hand to these presents the contents of which have been understood by me on this day of January 2023

Accepted



RONITA BHATTACHARYA
Advocate for the Appellants
1st Floor, Masjid Manor Building
16 Homi Modi Street

Fort, Mumbai -400023
Email: ronita.b6@gmail.com
Mobile No. 9920097464
Advocate Code No. I20386

Applicant No. 1

(Mr. David Rodrigues)

(Secretary, Federation of RainbowWarriors)

Applicant No 2

(Adv. Ohm Stanley Rodrigues)

(Convenor, Our River Our Rights)



BEFORE THE NATIONAL GREEN TRIBUNAL

SITTING AT PUNE

MEMORANDUM OF APPLICATION

(Under Section 18(*l*) read with Sections 14 and 20 of the National Green Tribunal Act, 2010)

Application No. _____ of 2023

Federation of Rainbow Warriors and Anr)...Applicants

Versus

Union of India and Ors) ...Respondent

RONITA BHATTACHARYA
Advocate for the Appellants

1st Floor, Masjid Manor Building

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Email: ronita.b6@gmail.com

Mobile No. 9920097464

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