

BEFORE THE NATIONAL GREEN TRIBUNAL SITTING AT

PUNE

APPLICATION NO. 100 OF 2024

BETWEEN :

Vanashakti and Anr)... Applicants

Versus

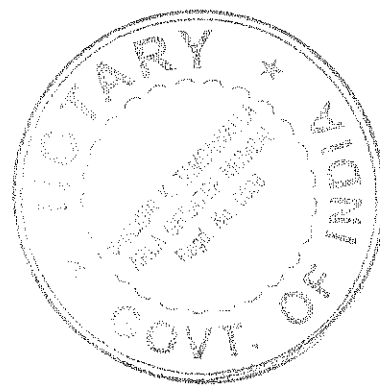
State of Maharashtra and Ors)... Respondents

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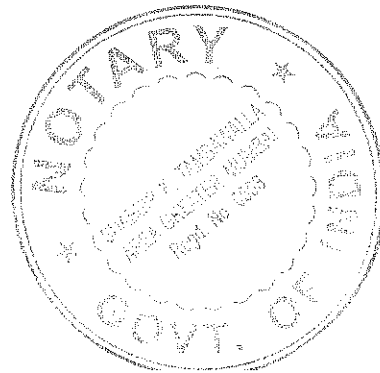
Versus

State of Maharashtra and Ors)... Respondents

**ADDITIONAL AFFIDAVIT IN REJOINDER ON BEHALF OF
THE RESPONDENTS**

1. I, Mr Stalin Dayanand the Authorised representative of the Applicant No. 1 and the Applicant No. 2, having my office address at Second Floor, Nandkumar Pawar House, Opposite Jagnath Darshan, MD Keni Marg, Bhandup (East), Mumbai - 400042, do hereby state on solemn affirmation:

2. I say that I have read the present Application and am conversant with its contents. I have also read a copy of the Affidavits in Reply of the Respondent No. 11 dated 1st August 2024 and 23rd September 2024 as well as the Report of the Joint Committee appointed by this

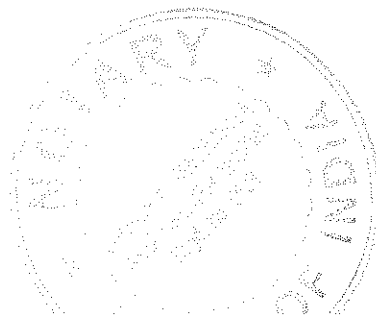


Hon'ble Tribunal, thus I am competent to depose on behalf of the Applicants in the present Additional Affidavit in Rejoinder.

3. At the outset I say that I am filing the present Affidavit to deny the unfounded, baseless and entirely false allegations raised by the Respondent No. 11 in its Additional Affidavit in Reply dated 23rd September 2024 as well to bring on record additional information to support the findings of the Joint Committee and my prayer for interim reliefs.

ALLEGATIONS REGARDING THE BONAFIDES OF THE APPLICANT

4. I say that I emphatically and categorically deny each of the allegations made by the Respondent No. 11 at paras 17(a) 19, 20,23,24,25,26 of its Additional Affidavit in Reply dated 23rd September 2024. I say that the allegations made by the Respondent No.11 in its Additional Affidavit in Reply are blatantly false and do not deserve to be dignified with a response. The bonafides of the Applicant Trust and its Director are well-known and do not require elaboration. The Applicant Trust and its Director are litigants before this Hon'ble Tribunal in various environmental matters as well as before the Hon'ble Bombay High Court and Hon'ble Supreme Court for more than



14 years. The conduct and sincerity of the Applicant Trust is therefore known to this Hon'ble Tribunal, and the Applicant therefore is refraining from wasting the precious time of this Hon'ble Tribunal in elaborating further on the prima facie false, concocted, fictitious, malafide, bad faith, perverse and unconscionable claims of the Respondent No. 11 which are being made to deflect attention away from the illegal actions in breach of various laws to preserve and protect the environment that the Respondents have committed.

5. I say that it is already on record through previous orders of this Hon'ble Tribunal that the Applicant Trust has been working to protect and preserve the eco-sensitive and densely forested regions bordering the Sanjay Gandhi National Park including Yeeor and Dindoshi hills from illegal destruction since 2015. The Applicant is not concerned with any legal dispute between the Respondent No.. 11 and the F.E Dinshaw Trust. As per the Applicant's knowledge the present land forming the subject matter of the present Original Application was sold to the Respondent No. 11 several years ago. It is only through the pleadings of the Respondent No. 11, and the filing of the Application before this Hon'ble Tribunal by the F.E Dinshaw



Trust that the Applicant has come to learn of an alleged pending dispute of the Respondent No. 11 and the F.E Dinshaw Trust. I say that the Applicant Trust has no concern about the said dispute, and is only interested in preserving the entirety of the Dindoshi hills from destruction, particularly the areas forming the Eco-Sensitive Zone of Sanjay Gandhi National Park. I say that the Applicant Trust wants to ensure that the ecology of the Dindoshi hills be restored and scrupulously preserved, that no illegal construction be permitted on the Dindoshi Hills and that any and all parties responsible for the illegal destruction of Dindoshi Hills be held liable for their illegal actions to the maximum extent of the law. Further, it was only through the joint inspection and the report prepared by the Committee appointed by this Hon'ble Court that the Applicant has even learnt of the presence of another private builder D.B Realty in the affected area of Dindoshi Hills. The Applicants have no hesitation in making appropriate steps to implead the said parties and anyone who plans to engage in the destruction of the Dindoshi Hill landscape to the present Application, as deemed appropriate by this Hon'ble Tribunal.

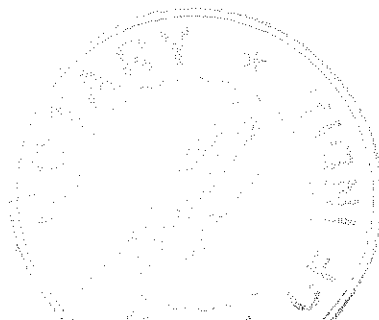


6. I say that there is ongoing destruction on the Dindoshi hills on the part of the Respondent No. 10/11 is well camouflaged by the buildings that are at the base of the hills and by virtue of smaller hills blocking the view where the excavation is happening. The fact that relentless stripping of vegetation and tampering of the water courses is happening on the site, this fact has been well documented by the Joint Committee.
7. I say that I wish to bring on record that despite the fact that this Hon'ble Tribunal is seized of the matter and the Joint Committee has confirmed the ongoing destruction, the Respondents were brazenly clearing the vegetation on the slopes of Dindoshi hills by spraying chemicals on the vegetation that has began to regrow on the hills subsequent to them being burnt down in order to ensure that no new saplings grow and hasten the death of the existing saplings, I say that the Applicant learnt of this and immediately complained to the relevant authorities by email and using X (formerly known as "Twitter"). The difference in the tampered section of the hills and the natural forests on the same mountain which is in the custody of the national park is a stark reminder and proof of how ruthlessly the deforestation is taking place at the site of Dindoshi hills. Copies



of my complaints dated 29.09.2024 have been annexed hereto and marked as **Annexure A-1** .

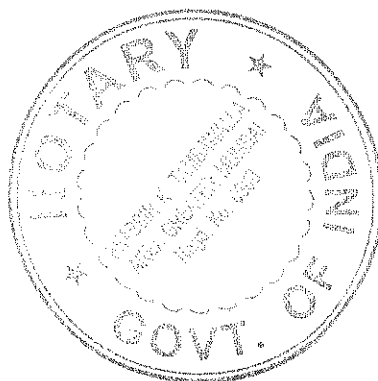
8. I further say that by accessing the top floors of a tall building on the foothills of the Dindoshi hills, I have observed the movement and grazing of wildlife such as *sambhar* deer on the property. A copy of a photograph of the said sighting of Sambar Deer within the parcel of land in the possession of Respondent No. 11 on 28.09.2024 has been annexed hereto and marked as **Annexure A-2**. The Applicants crave leave to produce videos of the same when called upon. I further say that vide an RTI reply dated 12.08.2024, the office of the Chief Conservator of Forests and Director, Sanjay Gandhi National Park has supplied a copy of the witness statements recorded by the Mumbai Fire Brigade of the Municipal Corporation of Greater Mumbai in its Fire Investigation Report of Level III Fire dated 03.12.2018. I say that the said witness statements of the security guards confirms the frequent presence of wild animals like leopards, deers, snakes on the plot of land bearing Survey No. 239/1(part) and CTS No 827A/4A/2. I further say that the report also noted that chopped tree trunks had been burnt in the fire. A copy of the RTI reply dated 12.08.2024 annexing the witness statements



recorded by the Mumbai Fire Brigade of the Municipal Corporation of Greater Mumbai in its Fire Investigation Report of Level III Fire dated 03.12.2018 has been annexed hereto and marked as **Annexure A-3**.

PRESENCE OF WATER BODIES

9. I also wish to repeat that during the course of the site visit with the Joint Committee, I discovered that while most of the streams were emptying into the Walbut Oshiwara River, one major tributary of the Poisar river was also originating from the same site. This river is located on the backside of the mountain and can be located only by traversing the terrain on foot after entering the heavily guarded and barricaded section of the hills under the possession of the respondents. No human being is allowed to enter the land except by the consent of the bouncers/guards manning the boundaries. To sum it up the site is home to the origin of two rivers and not one as previously thought. Both Oshiwara and Poisar rivers originate from this watershed.



10. I say that the river has admittedly been walled in and turned into a nullah / drain by the Respondent No. 11. The width of the river has been narrowed to less than 5 feet at the origin. This is completely illegal and has resulted in the dense forests being deprived of interaction with the river. It is prayed that the walls be removed immediately where the forests exist and not on the side where buildings exist. There have been instances of landslides happening and this will get aggravated if water is not allowed to flow freely into the forests. The hill will be soaking too much rain water which will eventually loosen the soil and cause massive landslides. I say that I have also attached photographs of the said walls which have been made at the outfall and origin of the river. Alongside the wall, it was seen that a section of the hill was being freshly denuded. This section of the hill range was not visited by the Joint Committee and hence these facts have not been brought into the report. The Applicant craves leave to produce videos before this Hon'ble Tribunal that show these facts.

CARRYING CAPACITY STUDY OF SGNP

11. In addition to the pleadings put forth in the present Application as well as the Joint Committee report filed in the present



Application, the Applicant has also come across a carrying capacity study report for Sanjay Gandhi National Park, prepared as the directions of the Principal Bench of this Hon'ble Tribunal in its order dated 19.03.2020 in OA 462/2018 and OA 76/2015(SZ).

12.I say that the report dated 03.12.2021 titled "*Final Report on 'Assessment of Environmental Carrying Capacity of Eco-sensitive Zone: Sanjay Gandhi National Park, Mumbai, Maharashtra'*" was evidently prepared by the CSIR - National Environmental Engineering Research Institute, Nagpur and NEERI and was submitted to the Principal Bench of this Hon'ble Tribunal by the CPCB.

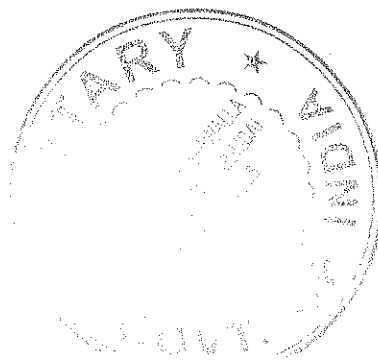
13.The said report makes, inter alia, the following recommendations:

"Eco-Sensitive Zones (ESZs) or Ecologically Fragile Places (EFAs) are areas around Protected Areas, National Parks, and Wildlife Sanctuaries in India that have been recognised by the Ministry of Environment, Forests, and Climate Change (MoEFCC), Government of India. Declaring ESZS has the goal of creating "shock

absorbers" for protected areas by regulating and supervising activities in and around them. These zones are indispensable for a nation as they preserve biologically and ecologically rich areas and potentially valuable and unique natural resources that would be difficult to replace once annihilated. The ecosystem is quite delicate around these areas and needs to be protected against human intervention. They are of immense importance to human society as they are ecologically and economically important, maintain ecological stability and preserve the rarity of the ecosystems they harbor.

...Ecosystems and populations have a limited capacity to cope with environmental stress; stress above a certain threshold may be detrimental for the ecosystem. Hence carrying capacity assessment, which is a tool to determine "the growth limits that an area can accommodate without violating environmental capacity goals", are a need of the hour to protect such ESZs....

...The total calculated footfall, in terms of tourists, shows that it is in a critical stage and has exceeded the maximum footfall possible when compared with the carbon



sequestration potential of the area and hence that can affect the wildlife and its carrying capacity.

...Mangroves and water body areas, within the SGNP and buffer area, analysed through remote sensing data, are decreasing year by year. Human settlements are increasing year by year till 2000 in the SGNP area, while the increase is noted till date in the area including buffer, indicating a threat to the balance of the environment. This indicates that construction in the area should be avoided, as it might disturb the balance of ecological systems in the area [emphasis supplied] ...

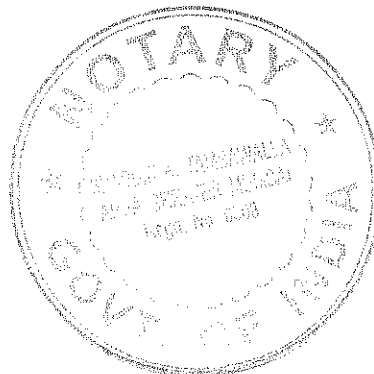
The preliminary conclusion based on secondary data analysis concludes the following points:

1. Construction within the premises of the SGNP should be discouraged as it will affect the fragile ecosystem of the area. This will also put pressure on other environmental attributes such as water, air and noise which will affect the overall environmental carrying capacity."[emphasis supplied]



14. I say that in light of the aforementioned findings recorded in the report dated 03.12.2021 titled "*Final Report on 'Assessment of Environmental Carrying Capacity of Eco-sensitive Zone: Sanjay Gandhi National Park, Mumbai, Maharashtra'*", it is evident that construction and development in and around the ESZ area of SGNP should not be permitted, and at any rate cannot be permitted in the absence of a Zonal Master Plan. A copy of the report dated 03.12.2021 titled "*Final Report on 'Assessment of Environmental Carrying Capacity of Eco-sensitive Zone: Sanjay Gandhi National Park, Mumbai, Maharashtra'*" has been annexed hereto and marked as **Annexure A-4**.

15. I say that as pointed out by the Joint Committee, the Zonal Master Plan for the ESZ has not been prepared even 8 years after the issuance of the ESZ Notification in 2016, for reasons that are not difficult to deduce. I say that a prohibition on construction and development of the Region in the absence of the Zonal Master plan has even been recommended by the Joint Committee in Recommendation No. 1 at page 268-269 of its Report. I say the ESZ Committee of the Sanjay Gandhi National Park should not be permitted to issue "NoCs" or permissions to any development



related project in the ESZ of Sanjay Gandhi National Park in the absence of a Zonal Master Plan being prepared.

16.I therefore repeat and reiterate my submission that the report of the Joint Committee constituted by this Hon'ble Tribunal has unequivocally confirmed the extent and scale of the ecological destruction in the sensitive Dindoshi Hills. It has also issued several crucial recommendations. In light of the findings, it is respectfully submitted that these recommendations should be made binding upon the Respondent Authorities, particularly the Respondent Nos. 10 and 11.

17.I therefore say that this Application deserves to be allowed and the prayers sought herein deserve to be made absolute.

Solemnly affirmed at Mumbai)

Dated this 28th day of November 2024)

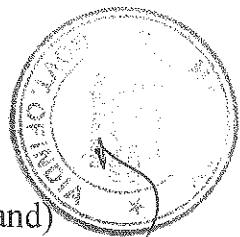
Identified by me

RONITA BHATTACHARYA

Advocate for the Applicant

Stalin Dayanand

Applicant
(Stalin Dayanand)



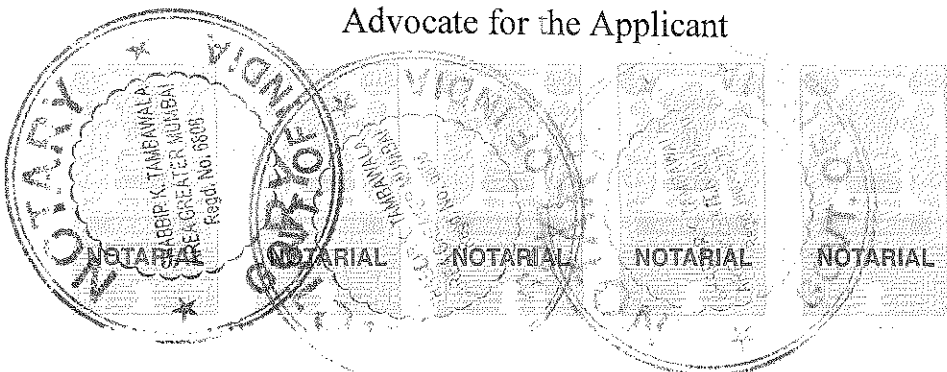
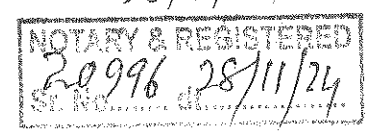
Ronita Bhattacharya

BEFORE ME
S. K. Tambawalla

S. K. TAMBAWALLA
ADVOCATE, HIGH COURT
B-23, Taheri Manzil
Nesbit Road, Mazgaon
Mumbai - 400 010

BEFORE ME

28/11/24



ANNEXURE - A.1

531

12:18

100



Post



Stalin
@GreenStalin

Follow

@mpcb_official @MahaForest @mybmc please stop this cutting of forests and spraying of chemicals that is killing the vegetation . Location behind IT park Malad Dindoshi.



12:57 · 29/09/24 · 2.8K Views

Post your reply





Ronita Bhattacharya <ronita.b6@gmail.com>

Fwd: Action Requested against chopping of trees and spraying of chemicals to kill vegetation in Dindohsi hills.

1 message

Stalin D <stalin.vanashakti@gmail.com>

29 September 2024 at 18:22

To: Ronita Bhattacharya <ronita.b6@gmail.com>



----- Forwarded message -----

From: Stalin D <stalin.vanashakti@gmail.com>

Date: Sun, Sep 29, 2024 at 6:19 PM

Subject: Fwd: Action Requested against chopping of trees and spraying of chemicals to kill vegetation in Dindohsi hills.

To: <Sg.gardens@mcgm.gov.in>

Respected Sir

Kindly take action against destruction of trees and vegetation.

Yours Sincerely

Stalin D



----- Forwarded message -----

From: Stalin D <stalin.vanashakti@gmail.com>

Date: Sun, Sep 29, 2024 at 6:14 PM

Subject: Action Requested against chopping of trees and spraying of chemicals to kill vegetation in Dindohsi hills.

To: <psec.env@maharashtra.gov.in>, <psec.forest@maharashtra.gov.in>, <apccfwlmumbai@mahaforest.gov.in>, Sanjay Gandhi National Park <sgnpsmumbai@gmail.com>, <ccfsgnp@mahaforest.gov.in>, RO Mumbai <romumbai@mpcb.gov.in>, psec ud2 <psec.ud2@maharashtra.gov.in>, <mc@mcgm.gov.in>, Collector mumbai suburban <collectormsd@gmail.com>, <ms@mpcb.gov.in>

Cc: Ms Leena Nandan <secy-moef@nic.in>, <mscb.cpcr@nic.in>

VANASHAKTI

Respected Officials

We wish to seek your urgent intervention to protect the forests and rivers of Mumbai particularly the Oshiwara and Poisar rivers that originate from Dindoshi mountain range. The entire range is under severe degradation due to relentless chopping burning of natural forests, excavation, flattening of hills, alteration of water courses. Even saplings are chopped when they sprout and chemicals are sprayed to kill the vegetation. See the link below

<https://youtu.be/5ZT0Nh4SRNY>

The land in question maybe privately owned but it is our firm conviction that rivers and forests cannot be privately owned and much less destroyed for construction of buildings. Mumbai is blessed with beautiful forests and rivers. We do not make any baseless claims, please see the video links that we have attached to this email. After seeing the videos we are sure you cannot disagree. The Govt does make errors at times but there is always room for correction of a mistake. The mistake in this case is that this beautiful land filled with forests, river streams and wildlife is being plundered for real estate development. Some of the wildlife on the site can be seen on the link below.

533

https://youtu.be/5r9OwQv_WXI

The land needs to be in the custody of the Govt to be preserved for future and present generations as a natural heritage of Mumbai and Maharashtra. The land was previously in no Development Zone (NDZ) but now it has been opened for construction.

We have taken the issue of environmental degradation to the Hon`ble National Green Tribunal which was pleased to issue a ban on tree felling. Copy of the order has been attached to this email .Even after passing of the order, the developer Ferrani Hotels has cut down trees on a forested slope and also sprayed it with dangerous chemicals that burn the vegetation. Please see the video to understand better. **We request the BMC officials and Forest department officials to visit the site and take cognisance of the offence and contempt of court orders.**

There is a history of documented environmental violations on this land. FIRs and reports have been made by Govt departments confirming burning and chopping of trees. There have been instances of landslides which have damaged life and property of human settlements below the hills and mountains.

Any construction on these hills will cause a massive landslide and surely cause huge loss to life and property. That aside , it is the duty of the Govt to protect existing forests and wildlife. Rivers cannot become private property and cannot be walled in on the originating upper reaches. Why was this wall made and why was the forest cut off from the river?

<https://youtu.be/WehlioACcfU>

We are attaching enough videos for your understanding and we earnestly hope that you will find the time to see it on a proper laptop or big screen if possible. We hope your conscience will awaken and force you to act immediately to conserve these beautiful areas of Mumbai.

The Hon`ble Supreme court has ordered that existing forests need to be notified and protected. Please acquire this land and preserve it. If acquisition is not possible, then the least that can be done is to prevent any kind of destructive activity to happen on the land.

The land owner may be compensated to the extent of the constructions that were permitted in NDZ by giving TDR or some other non financial method . Please do not let the reason of upcoming "State elections" stop you from doing your duty. With hope and expectations we remain

Yours Sincerely

Stalin D

Director

i

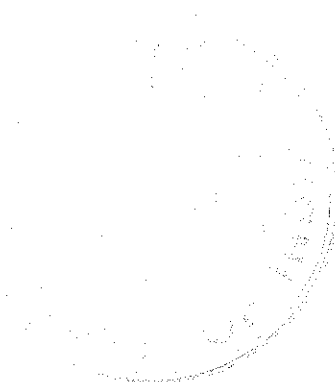
Nandakumar Pawar House, Second floor, Opp Jaganath Darshan, MD Keni Marg ,Bhandup village East. Mumbai 400042. Tel 9820232302
www.vanashakti.org



4 attachments



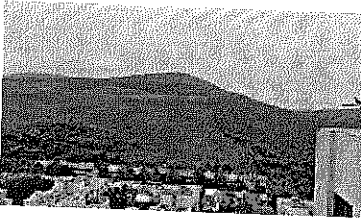
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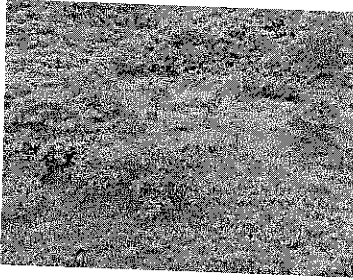
27/11/2024, 12:47

Gmail - Fwd: Action Requested against chopping of trees and spraying of chemicals to kill vegetation in Dindohsi hills.


534



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20240928_030555(pm)__[org].jpg
4644K

 Fresh Chopping and Chemical spraying 29th Sept 2024.mp4
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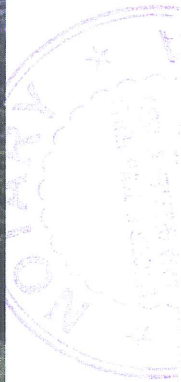
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PHOTOGRAPHY

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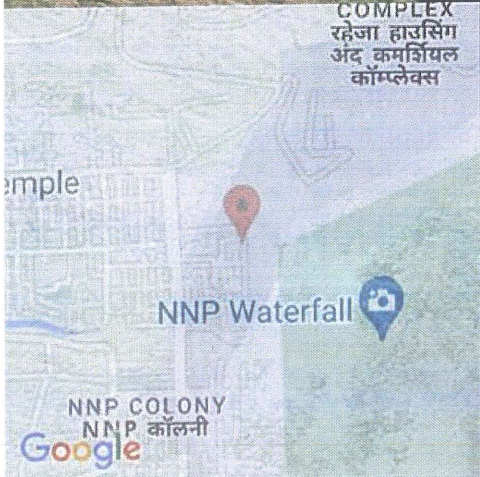
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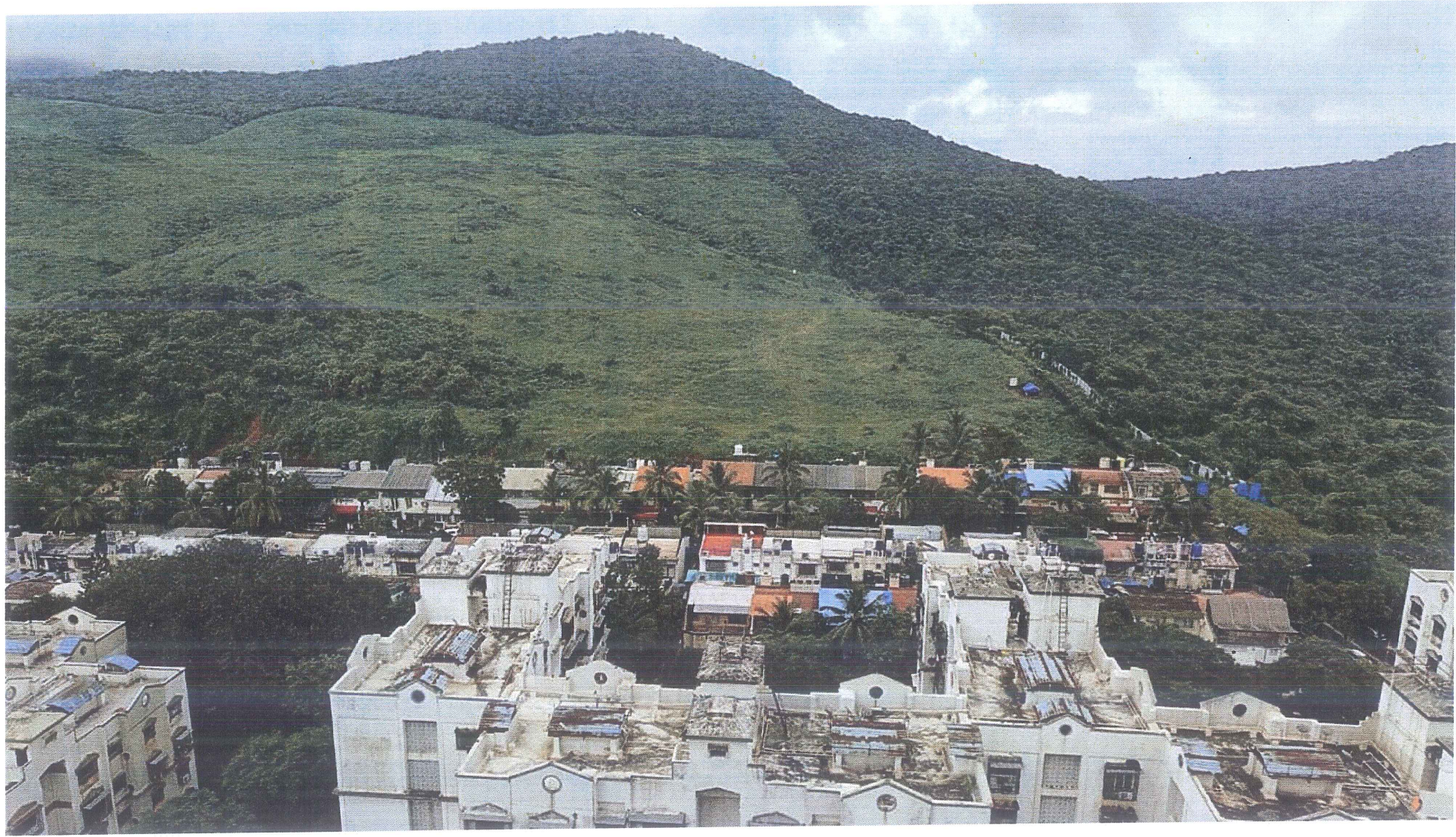
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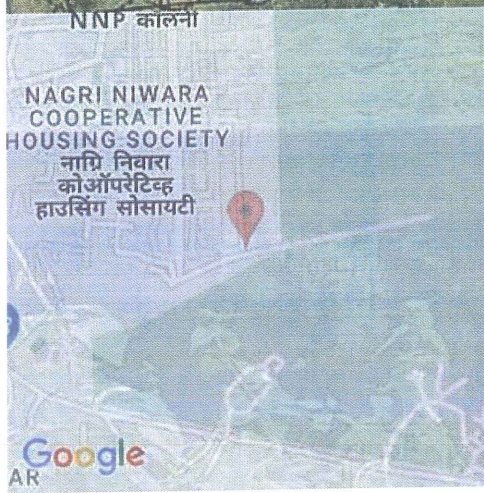


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2024-09-28(Sat) 02:49(pm)





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Longitude	72.882808	72°52'58" E
2024-09-28(Sat) 03:20(pm)		

True com
[Signature]

 <p>म.व. महाराष्ट्र वन विभाग</p>	 <p>महाराष्ट्र शासन वनविभाग</p> <p>मुख्य वनसंरक्षक व संचालक, संजय गांधी राष्ट्रीय उद्यान, बोरीवली (पूर्व), मुंबई - ६६ यांचे कार्यालय Tel. No. 022 28850364 E-mail - 1.sgnpmumbai@gmail.com 2.ccfsgnp@mahaforest.gov.in</p>
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जा.क्र. कक्ष-12 /मा.अ./ 30 /2024-25

दिनांक: 12 ऑगस्ट, 2024

राजि.पोस्टाने

प्रति,

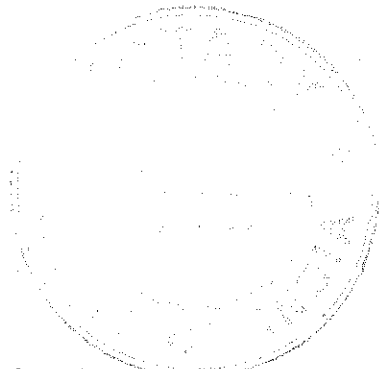
Mr. Stalin D.,
2nd Floor, Nandkumar Pawar House, opp.
Jagannath Darshan, MD Keni Road, Bhandup (E),
Mumbai 400042, Mobile No. 9820232302.


संदर्भ :- माहिती अधिकार अधिनियम 2005 अंतर्गत आपला दि. 13.03.2024 रोजीचा अर्ज प्राप्त दिनांक 24.07.2024

आपला दि. 13.03.2024 रोजी माहिती अधिकार अधिनियम, 2005 अन्वये माहिती मिळण्याबाबतचा अर्ज या कार्यालयास दिनांक 24.07.2024 रोजी प्राप्त झाला आहे. त्याअनुषंगाने माहिती कलम 7(1) मधील तरतुदीनुसार मानीव जन माहिती अधिकारी यांचेकडून प्राप्त माहिती आपणास खालीलप्रमाणे उपलब्ध करून देण्यात येत आहे.

अ.क्र.	माहितीचा संक्षिप्त तपशील	पृष्ठसंख्या	मागितलेली व पुरविण्यात येत असलेली माहितीची यादी.
1.	Copy of action taken on complaint filled by me on cutting of hills and alteration of natural water courses near Sanjay Gandhi National Park		सदरची माहितीशी संबंधित उपलब्ध नाही. सन 2017 मध्ये संजय गांधी राष्ट्रीय उद्यान, बोरीवली येथे झालेल्या अतिवृष्टी मध्ये वन्यजीव / गुन्हे कक्षाकडील नस्तीची नासधुस झाल्याची शक्यता आहे.
2.	Copy of complaint has been attached. Copy of action taken on complaints of forest fires in the same spot (Dindoshi).	1 ते 17	वन्यजीव / गुन्हे कक्षाकडील उपलब्ध असलेल्या अभिलेखानुसार विचारणा करण्यात आलेल्या माहितीच्या उपलब्ध झालेल्या प्रती यासोबत जोडण्यात आल्या आहेत.
3.	Copy of site visits done to investigate the environmental laws violations at the site		

आपणास वरील माहिती मान्य नसल्यास हे पत्र मिळाल्यापासून 30 दिवसांच्या आत प्रथम अपिलीय अधिकारी तथा सहायक वनसंरक्षक (तांत्रिक सहायक), संजय गांधी राष्ट्रीय उद्यान बोरीवली यांच्याकडे अपील करू शकाल.




 (डि. परमेकर)
 कार्यालय अधिक्षक
 तथा
 जनमाहिती अधिकारी
 मुख्य वनसंरक्षक व संचालक
 संजय गांधी राष्ट्रीय उद्यान,
 बोरीवली

पत्तिलिपी :- प्रथम अपिली अधिकारी तथा सहा. वनसंरक्षक (ता.स.) यांना माहिलीरतव सादर.

Translation/2 COPY OF PAGE NO. 540

English translation of original document in Marathi

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Government of Maharashtra
Forest Department
Chief Conservator of Forests & Director, Sanjay Gandhi
National Park, Borivali (East), Mumbai 66
Tel: 022 28850364

Out. No. R.12/M.A./30/2024-25

Date: 12th August 2024

By Regd. post

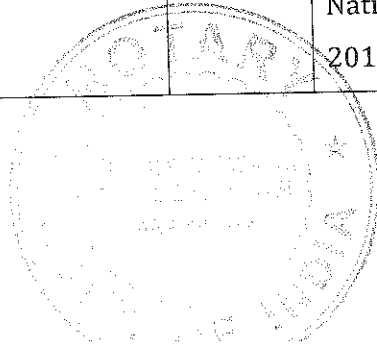
To,

Mr. Stalin D.
2nd Floor, Nandkumar Pawar House
Opp. Jagannath Darshan, MD Keni Road, Bhandup (E)
Mumbai 400042. Mob. 9820232302.

Reference: Your application under Right to Information Act
2005, dt. 24.07.2024.

Your application under Right to Information Act dt.
13.03.2024 has been received by this office on 24.07.2024.
Accordingly, the information received from the Deemed Public
Information Officer is being made available to you as follows under
the provision of Sect. 7(1) of the Act.

Sr. No.	Brief Details of the Information	Page Numbers	List of information provided
1	Copy of action taken on complaint filed by me on cutting of hills and alteration of natural watercourses near Sanjay Gandhi National Park		File relating to the said information is not available. The file with Wildlife / Crime Section may have been damaged in the heavy rains at Sanjay Gandhi National Park, Bovivali in the year 2017.



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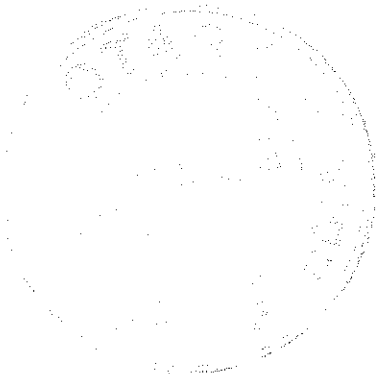
English translation of original document in Marathi

2	Copy of complaint has been attached. Copy of action taken on complaints of forest fires in the same spot (Dindoshi).	1 to 17	Copies available in records with wildlife / Crime Section in respect of the information sought for, are enclosed herewith.
3	Copy of site visits done to investigate the environmental laws violations at the site.		

If the above information is not acceptable, you may prefer an appeal before the First Appellate Authority & Asst. Conservator of Forests (Technical Assistance), Sanjay Gandhi National Park, Borivali within 30 days from receipt of this letter.

Sd/-
(D.J. Parmekar)
Office Superintendent
&
Public Information Officer
Chief Conservator of Forests & Director
Sanjay Gandhi National Park
Borivali

Copy to: First Appellate Authority & Asst. Conservator of Forests (T.A.) for information.





मुख्य वनसंरक्षक व संचालक, संजय गांधी राष्ट्रीय उद्यान बोरीवली (पुर्व) मुंबई-६६ यांचे कार्यालय
Tel. No.022 28850364 E-mail -sgnpsmbai@gmail.com

विषय : माहिती अधिकार अधिनियम २००५ अंतर्गत
अर्जदार Mr. Stalin D. यांनी मागणी केलेली
माहिती उपलब्ध करून देण्याबाबत.

बोरीवली ४०० ०६६ दिनांक ०९/०८/२०२४

प्रति,

जनमाहिती अधिकारी
तथा लिपीक
वनसंरक्षक व संचालक कार्यालय
संजय गांधी राष्ट्रीय उद्यान
बोरीवली

संदर्भ : आपलेकडील पत्र क्र. कक्ष-१२/मा.अ./६३/दि.२४/०७/२०२४

उपरोक्त प्रकरणी वरील संदर्भिय पत्राच्या अनुषंगाने वन्यजीव/गुन्हे कक्षाकडे उपलब्ध असलेल्या नस्तीचे अवलोकन करून अर्जदाराने मागणी केलेल्या माहितीच्या अनुषंगाने खालील प्रपत्रामध्ये माहितीचा तपशिल दर्शविण्यात येत आहे.

अ. क्र	माहितीचा तपशिल	छायांकित प्रति	शेरा
१	२	३	४
१	1) Copy of action taken on complaint filed by me on cutting of hills and alteration of natural water courses near Sanjay Gandhi National Park.	-	सदरची माहितीशी संबंधित उपलब्ध नाही. सन २०१७ मध्ये संजय गांधी राष्ट्रीय उद्यान, बोरीवली येथे झालेल्या अतिवृष्टी मध्ये वन्यजीव / गुन्हे कक्षाकडील नस्तीची नासधुस झाल्याची शक्यता आहे.
	2) Copy of complaint has been attached. Copy of action taken on complaints of forest fires in the same spot (Dindoshi)	१७	वन्यजीव / गुन्हे कक्षाकडील उपलब्ध असलेल्या अभिलेखानुसार विचारणा करण्यात आलेल्या माहितीच्या उपलब्ध झालेल्या प्रती यासोबत जोडण्यात आल्या आहेत.
	3) Copy of site visits done to investigate the environmental laws violations at the site		

ठिकाण : बोरीवली

दिनांक : ०९/०८/२०२४



लिपीक

(वन्यजीव/गुन्हे कक्ष-८/९)
संजय गांधी राष्ट्रीय उद्यान
बोरीवली.

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मुख्य वनसंरक्षक व संचालक, संजय गांधी राष्ट्रीय उद्यान, बोरीवली यांचे कार्यालय
☎ ०२२-२८८६०३६२, २८८६०३८९, Email : sgnpmumbai@gmail.com

पत्र

विषय : मौजे मालाड, सर्वे क्रमांक २३९/१पे मध्ये
दिनांक ०३.१२.२०१८ रोजी लागलेल्या
आगीबाबत ..

वनक्षेत्रपाल तुळशी
क्र. २१९३
दिनांक ०८/०२/२०१९
संजय गांधी राष्ट्रीय उद्यान

जा.क्र. कक्ष-९/गुन्हे/वणवा/ ३१३६ /२०१८-१९
बोरीवली, मुंबई, दिनांक : ०५ फेब्रुवारी, २०१९

प्रति,

सदस्य सचिव,
महाराष्ट्र प्रदुषण नियंत्रण मंडळ,
कॅम्पलरु पॉइंट, सिनेप्लनेट समोर,
सायन सर्कल, मुंबई - ४०००२२

- संदर्भ :
- १) उप मुख्य अग्निशमन अधिकारी, मुंबई अग्निशमन दल यांचा दिनांक ०३.१२.२०१८ रोजीचा तपासणी अहवाल (सोबत प्रत)
 - २) वनक्षेत्रपाल तुळशी यांच्याकडील पत्र क्र. तुळशी/जमीन/१३६०/२०१८-१९, दि. ०७.१२.२०१८ (सोबत प्रत)
 - ३) कार्यकारी अभियंता (परिजन्यजल वाहिन्या) पश्चिम उपनगरे, बृहन्मुंबई महानगरपालिका यांच्याकडील पत्र क्रमांक Dy.ChE/9133/SWD/W.S. dt. 13.12.2018 (सोबत प्रत)
 - ४) वनक्षेत्रपाल तुळशी यांच्याकडील पत्र क्र. तुळशी/सकिर्ण/३४५२/२०१८-१९, दि. १९.१२.२०१८ (सोबत प्रत)
 - ५) वनक्षेत्रपाल तुळशी यांच्याकडील पत्र क्र. तुळशी/आगा/३४५३, दि. १९.१२.२०१८ (सोबत प्रत)
 - ६) मे. फेरानी हॉटेल्स प्रा. लि., कन्स्ट्रक्शन हाऊस-बी, दुसऱ्या मजला, ६२३, लिक्विड रोड, खार टेलीफोन एक्सचेंज समोर, खार, मुंबई-४०००५२ यांच्याकडील दिनांक ०४.०१.२०१९ (सोबत प्रत)
 - ७) या कार्यालयाचे पत्र क्र. कक्ष-९/गुन्हे/वणवा/२९४६, दिनांक १९.०१.२०१९ (सोबत प्रत)
 - ८) वनक्षेत्रपाल तुळशी यांच्याकडील पत्र क्र. तुळशी/गुन्हे/३८५३, दिनांक ०४.०२.२०१९

मौजे मालाड, सर्वे क्रमांक २३९/१पे मधील संजय गांधी राष्ट्रीय उद्यानाच्या लागत असलेल्या क्षेत्रात दिनांक ०३.१२.२०१८ रोजी सायंकाळी लागलेल्या आगीबाबत संबंधित जमिन विकासाकानेही त्यांचा खुलासा या कार्यालयास सादर केला असून त्यामध्ये विविध विभागांचे चौकशी अहवालही या कार्यालयास उपलब्ध झाले आहेत.

उप मुख्य अग्निशमन अधिकारी, मुंबई अग्निशमन दल यांच्याकडील संदर्भ क्र. १ मध्ये नमूद अहवालांमध्ये उपरोक्त क्षेत्रातील आग पसरण्याची संभाव्य कारणे नमूद केलेली असून त्यामध्ये मुख्यतः संपूर्ण जागा मोठी तसेच मोकळी असून उंचीवर आहे, जागेवर मोठ्या प्रमाणात सुकलेले / वाळलेले गवत असल्याने जोरदार वाऱ्यामुळे आग वेगाने पसरली असण्याची, इत्यादी कारणे नमूद करण्यात आली आहेत. तसेच सादर आगीमुळे कोणाही मनुष्य तसेच वन्यप्राण्यांस इजा पोहोचलेली नाही अथवा प्राणहानी झालेली नाही असे नमूद केले असून माविषयक अशा प्रकारे आग लागण्याच्या घटनेची पुनरावृत्ती होऊ नये यासाठी काही तरतुदांकानेही सुचविण्यात आले.

साहिबीचा अधिकार अधिनियम १९०५ अंतर्गत
उद्यान बाबती साहिबीचा प्रव

1

वनक्षेत्रपाल तुळशी, संजय गांधी राष्ट्रीय उद्यान, बोरीबली यांनी वरिष्ठ पोलीस निरीक्षक, दिंडोशी पोलीस ठाणे, गोरेगाव, मुंबई यांना संदर्भ क्र. २ अन्वये कळवून आगीची दुर्घटना घडलेल्या परिसरात काही अमली पदार्थांचे सेवन करणारे व मद्यपान करणारे समाजकटक अतिक्रमीत झोपडपट्टी क्षेत्रात व राष्ट्रीय उद्यानाच्या वृक्षाच्छादीत व गवताळ वनक्षेत्रात अपप्रवेश करून उपद्रव निर्माण करीत असतात. सदर अमली पदार्थांचे सेवन करणाऱ्यांमध्ये गुन्हेगारी प्रवृत्तीच्या लोकांचा समावेश असण्याची शक्यता नाकारता येत नाही असे नमूद करून पुढे सदर प्रकरणी राष्ट्रीय उद्यान क्षेत्रात गुन्हेगारी प्रवृत्तीच्या लोकांकडून वनांची व वन्यप्राण्यांची हानी टाळणेकामी अशी व्यक्तीचा बंदोबस्त करण्याची विनंती केलेली आहे.

वरिष्ठ पोलीस निरीक्षक यांनी उपमुख्य अभियंता (पर्जन्यजल बाहिन्या) पश्चिम उपनगरे, बृहन्मुंबई महानगरपालिका यांना आगीची दुर्घटना घडलेल्या जागेमध्ये गुन्हेगारी प्रवृत्तीच्या लोकांची तसेच अमली पदार्थांचे सेवन करणाऱ्या लोकांची नाल्यातून होणारी घुसखोरी रोखण्यासाठी आवश्यक ती उपाययोजना करण्याची विनंती केलेली होती. त्यास अनुसरून कार्यकारी अभियंता (पर्जन्यजल बाहिन्या) पश्चिम उपनगरे, बृहन्मुंबई महानगरपालिका यांनी संदर्भ क्र. ३ अन्वये संबंधीत विकासकास, नागरी निवास परिषदेच्या शेजारच्या म्हाडा कॉलनीमधून जाणाऱ्या नाल्यालगत लोखंडी गेट व जाळी बसविण्यासाठी परवानगी दिली आहे.

वनक्षेत्रपाल तुळशी यांनी संदर्भ क्र. ४ मध्ये नमूद पत्रान्वये उप प्रादेशिक अधिकारी, महाराष्ट्र प्रदुषण नियंत्रण मंडळ, मुंबई यांना या आगीच्या दुर्घटनेची माहिती कळवून सदर आग लागलेले क्षेत्र हे खाजगी क्षेत्र असून या आगीमुळे संजय गांधी राष्ट्रीय उद्यानाचे वनक्षेत्र बाधित झालेले नाही तसेच कोणत्याही प्रकारच्या वन्यप्राण्यास हजा झाल्याची बाब निदर्शनास आली नाही असे कळविले आहे.

सदर आगीबाबत खुलासा सादर करण्यास मे. फेरानी हॉटेल्स प्रा. लि. यांना संदर्भ क्र. ५ अन्वये कळविण्यात आले होते. त्यावर मे. फेरानी हॉटेल्स प्रा. लि. यांनी त्यांचा खुलासा संदर्भ क्र. ६ अन्वये या कार्यालयास सादर केला आहे. त्यामध्ये त्यांनी सदर क्षेत्र मोठे असून या क्षेत्रामध्ये सुरक्षारक्षकांची नेमणूक करूनही शेजारील कोरड्या नाल्यामधून विनापरवाना घुसखोरी करून प्रवेश करणाऱ्या समाजविघातक समाजकटकाकडून घुमपान करणे, अमली पदार्थांचे सेवन करणे, इत्यादी कृत्य केली जात असल्याने येथे वारंवार आग लागण्याचे प्रकार घडत असल्याचे कळविले आहे. तसेच आता तेथे नव्याने सुरक्षाव्यवस्था नेमल्याचेही कळविले आहे. त्याचप्रमाणे अग्निशमन दलाने शिफारस केल्याप्रमाणे महानगरपालिकेच्या प्राप्त झालेल्या परवानगीनुसार शेजारील कोरड्या नाल्यांमध्ये घुसखोरी रोखण्यासाठी लोखंडी गेट व जाळी बसविण्याचे काम प्रगतीपथावर असल्याचे या कार्यालयाच्या निदर्शनास आणून दिले आहे.


मे. फेरानी हॉटेल्स प्रा. लि. यांनी सादर केलेल्या खुलाशाच्या अनुषंगाने विषयांकित क्षेत्रामध्ये भविष्यात अशा घटना घडू नयेत यासाठी संदर्भ क्र. ७ अन्वये खालील प्रमाणे उपाययोजना करण्यास निर्देशित करण्यात आले आहे.

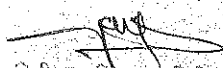
२. उक्त परिसरातील आपल्याकडील क्षेत्र व संजय गांधी राष्ट्रीय उद्यानाचे आग्नेयसूचीत वनक्षेत्र यामध्ये स्वखर्चाने जाळरेषा घ्यावी. जाळरेषा घेण्याची कार्यवाही वनक्षेत्रपाल तुळशी यांच्या उपस्थितीत त्यांच्या मार्गदर्शनाखाली करावी.
३. सदर क्षेत्रास कुंपण घालून सुरक्षारक्षक नेमावेत.
४. कार्यकारी अभियंता (परिजन्यजल बाहिन्या), बृहन्मुंबई महानगरपालिका यांच्याकडील पत्र क्र. Dy ChE/9133/SWD/MS dt. 13.12.2018 अन्वये विहित अटी/शर्ती नुसार विषयांकित क्षेत्रातील नाल्यास Gate/Screen लावण्याची कार्यवाही करावी.

सहपत्र : वरील प्रमाणे.


मुख्य वनसंरक्षक व संचालक,
संजय गांधी राष्ट्रीय उद्यान, बोरीवली

- प्रतिलिपी : उप मुख्य अग्निशमन अधिकारी, बृहन्मुंबई महानगरपालिका यांच्याकडे माहितीसाठी अग्रेषित.
- प्रतिलिपी : सहाय्यक आयुक्त, पी/उत्तर विभाग, बृहन्मुंबई महानगरपालिका यांच्याकडे माहितीसाठी अग्रेषित.
- प्रतिलिपी : वरिष्ठ पोलीस निरीक्षक, दिंडोशी पोलीस ठाणे यांच्याकडे माहितीसाठी अग्रेषित.
- प्रतिलिपी : उद्यान अधीक्षक, बृहन्मुंबई महानगरपालिका, भायखळा, मुंबई यांच्याकडे माहितीसाठी अग्रेषित.
- प्रतिलिपी : वनक्षेत्रपाल तुळशी यांच्याकडे माहिती व आवश्यक कार्यवाहीसाठी रवाना.


मुख्य वनसंरक्षक व संचालक,
संजय गांधी राष्ट्रीय उद्यान, बोरीवली


माहितीचा अधिकार अधिनियम २००५ अंतर्गत
देण्यात आलेली माहितीची प्रत

Office of Chief Conservator of Forests & Director,
Sanjay Gandhi National Park, Borivali

Tel. 022 28860362, 28860389.

Letter

Subject: Regarding the fire that broke in
Survey No. 239/1P., Village Malad, on
03.12.2018.

Out. No. R.9/Crime/ Wildfire/3136/2018
Borivali, Mumbai, Dt. 05th February 2019

To,
Member Secretary
Maharashtra Pollution Control Board
Kalpataru Point, Opp. Cineplanet
Sion Circle, Mumbai 400022.

- Reference: 1) Inspection report of Dy. Chief Fire Officer,
Mumbai Fire Brigade, dt. 03.12.2018 (copy
enclosed)
- 2) Letter from Forest Ranger, Tulshi, No.
Tulshi/ Land/9360/2018-19, dt.
07.12.2018 (copy enclosed)
- 3) Letter from Executive Engineer (Storm
Water Drains) Western Suburbs, Mumbai
Municipal Corporation, No. Dy.ChE/9133/
SWD/ WS, dt. 13.12.2018 (copy enclosed)
- 4) Letter from Forest Ranger, Tulshi, No.
Tulshi/ Misc/ 3452/ 2018-19, dt.
19.12.2018 (copy enclosed)
- 5) Letter from Forest Ranger, No. Tulshi/
Fire/3453 dt. 19.12.2018 (copy enclosed)



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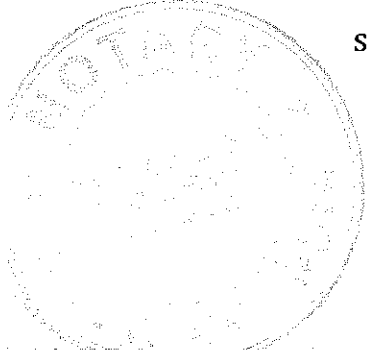
English translation of original document in Marathi

- 6) Letter from M/s Ferani Hotels Pvt. Ltd., Construction House, 2nd Flr., 623, Linking Rod, Opp. Khar Telephone Exchange, Khar, Mumbai 400052, dt. 04.01.2019 (copy enclosed)
- 7) This office letter No. R.9/ Crime/wildfire/ 2106, dt. 19.01.2019 (copy enclosed).
- 8) Letter from Forest Ranger, Tulshi, No. Tulshi/Crime/ 3853, dt. 04.02.2019.

The concerned land developer also has submitted the explanation regarding the fire that broke in the area near Sanjay Gandhi National Park in Survey No. 239/1P, Village Malad and the enquiry reports from various departments also have been made available to this office.

Dy. Chief Fire Officer, Mumbai Fire Brigade has mentioned the probable reasons in the report at Ref.No.1 for the fire in the above area, which includes the main reasons that the entire land is large, open and at higher terrain, there is large widespread dried grass and therefore the fire might have spread due to the strong wind, etc. It is also mentioned that there is no loss of life or wildlife in the fire. Certain remedial measures also have been suggested in it in order to prevent such fire in future.

Forest Ranger, Tulshi, Sanjay Gandhi National Park, Borivali has informed the Senior Inspector of Police, Dindoshi Police Station, Goregaon, Mumbai vide Ref.No.2 above that some anti social persons consuming narcotics and liquor enter the encroach slum area and woody and grassland area of National Park and



English translation of original document in Marathi

create nuisance. The possibility of such addicts involved in the said incident cannot be ruled out. And he has requested to take suitable action against such anti social elements in order to prevent harm to the forests and wildlife.

The Senior Inspector of Police had made a request to the Dy. Chief Engineer (Storm water Drains), Western Suburbs, Mumbai Municipal Corporation to take appropriate measures to prevent the entry of narcotic addicted people trespassing through the canal, pursuant to which the Executive Engineer (Storm Water Drains) Western Suburbs, Mumbai Municipal Corporation has given permission vide letter at Ref.No.3, to the concerned developer to erect iron gate and wire net near the canal passing through the nearby MHADA Colony.

Forest Ranger, Tulshi, vide letter at Ref.No.4 above, has reported the fire incident to the Dy. Regional Officer, Maharashtra Pollution Control Board, Mumbai stating that the area where the fire broke was a private land and that the fire has not affected the forest area of Sanjay Gandhi National Park, nor has there been any harm to wildlife.

M/s Nirani hotels Pvt. Ltd., were informed vide letter at Ref. No.5 above to give explanation about the said fire upon which they have submitted their explanation vide Ref.No.6 above in which they have mentioned that the said area is quite large and in spite of appointing security guards, the anti-social elements enter this area through the dried up adjacent canal for consumption of narcotics

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etc. due to which there are fire incidents in the area. They have also informed that they have made new security arrangements there. They have also informed that as per the recommendations of the Fire Brigade Department, they are in process of erecting iron gate and wire fencing to prevent trespassing through the adjacent dried up canal.

Pursuant to the explanation given by M/s Ferani Hotels Pvt. Ltd., directions have been given to take following measures vide Ref.No. 7 above in order to prevent such incidents in this area.

1. The dried grass / bushes in this area should be trimmed at least twice every year.
2. A fire-line may be drawn between the area under your jurisdiction and the area of Sanjay Gandhi National Park notified forest area at own expenses. The process of drawing fire-line may be done under the presence and guidance of Forest Ranger, Tulshi.
3. Fencing may be erected around the said area and security guards may be appointed.
4. As per letter No.Dy.ChE/9133/ SWD/WS dt.13.12.2018 from Executive Engineer (Storm Water Drains), Mumbai Municipal Corporation, gate / screen should be erected on the canal in this area.

Encl: as above.

Sd/-

Chief Conservator of Forest & Director
Sanjay Gandhi National Park, Borivali

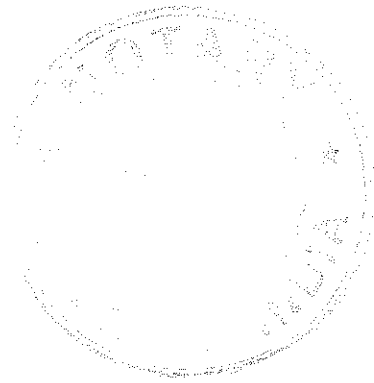


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- Copy to: Dy. Chief Fire Officer, Mumbai Municipal Corporation for information.
- Copy to: Asst. Commissioner, P/North Ward, Mumbai Municipal Corporation, for information.
- Copy to: Sr. Inspector of police, Dindoshi Police Station, for information.
- Copy to: Superintendent of Gardens, Mumbai Municipal Corporation, Byculla, Mumbai, for information.
- Copy to: Forest Ranger, Tulshi, for information and necessary action.

Sd/-
Chief Conservator of Forest & Director
Sanjay Gandhi National Park, Borivali



**MUNICIPAL CORPORATION OF GREATER MUMBAI
MUMBAI FIRE BRIGADE**

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FBIR-100/4150
13/12/2018

FIRE INVESTIGATION REPORT OF LEVEL III FIRE

CR Incident No.- 709
Date- 03/12/2018

Region No.- IV / Stn. No.- 32, Dindoshi

Address of premises involved:	Survey No. 239, Hissa no 1 (pt), CTS No. 827/A4A/1 of village Malad (E) behind new MHADA colony, off Gen. A. K. Vaidya Road, Khadakpada Road, Nagari Nivara, Goregaon (E), Mumbai 400065.
Date & Time of Occurrence :	Call received by Fire Brigade Control Room on 03/12/2018 at 8:21 hrs.
Occupier's Name:	M/S Ferrani Hotels Pvt. Ltd. (M/S Ferrani Developers Pvt. Ltd.)
Business:	Building construction & development.
Owners' Name & address:	Mr. Nusrat Neville Wadia (Administrator of the estate (in India) of the late Edulji E. Dinsshaw)
Insurance (Y/N):	Not known.
Policy No.:	N/A
Water taken From:	Water taken from fire appliance tank, brigade water tankers, jimbo tankers.
How Extinguished:	Fire extinguished by firemen with the help of two first aid lines of ten motor pumps and by smothering with the help of green branches of tree.
Accessibility: Access Road:	The premise is an open land of approximately 250 acres and not directly accessible to fire engines as the plot / land is provided with compound wall having height of approx varying from 03 feet to 12 feet, of which some portions are provided with barbed wire fencing on South and part on East side.

Observation:

The premise is a huge open land in a hilly area & kept for the project of land development. This premise is almost completely barricaded partly by brick / stone walled & partly with metal barbed wire fencing. There is no easy access to the said plot and for any unauthorized person except from one gate which is due to gate-fall.

[Signature]
महानगर मुंबई अग्निशमन दल ३००५ अग्निशमन
अग्निशमन पोलिसी पारितोषिक वग



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located approximately at the centre of the plot) from East to West side and further leads to the local civic drainage systems.

On inquiry with Mr. Rajiv Kalra, Chief Engineer of M/s. Ferani Construction Company, it was learnt that he is the responsible authorized person for the project. Three watch points called as chowky in the premises have been erected by the occupier, to watch and keep vigil in the entire premises. Security staff has been deputed at the premises for 24 X 7 vigilance of the property and the job is for routine patrolling of the complete plot premises to them, although the entire land area is not visible from any one point at a time because of hilly terrain with small valleys / cliffs in the plot area. There is no provision of lights within the premises. The vigilance / watch is done by security guards in the form of patrolling only & standby at one point chowky from where all portion is not visible.

During the course of fire fighting and also inspection it was observed that wild vegetation growth / grass grown in most of the land portion were trimmed but some portion of land was still having long dry grass/wild growth. Due to this dry tall grass, the fire flamed with such ferocity that it was difficult to extinguish the flames by mere smothering with fire beaters due to difficulty in approaching fire / flame from close proximity. The wind velocity was also a contributory factor in rapid spread of the fire.

Also, it was observed that there were three nos. of temporary sheds (Chowkies / Watch points) erected in the premises for shelter of on duty security guards to watch the entire land. The sheds are constructed with bamboo frames, tin sheet walls & roofing. Some utensils, small chulha (small firewood chulha) were seen in the shed erected in the central portion of the open land. On enquiry, it was learnt that sometimes these utensils, chulhas etc. used by the security guards for making tea and cooking food items.

At the time of inspection it was noticed that there was no electric supply in the entire land premises.

**Service
Rendered:**

On arrival at the incident, situation was inspected. Considering the non-availability of proper approach to the premises, vast area of the land with hilly terrain and high wind current contributing in rapid of fire in the open land having dry wild growth, bushes, grass etc level-2 fire message was transmitted to CR by the first arriving officer (ASO G. R. Awhad), which was further elevated to Level 3 fire. Considering the situation presence of Asst. Commissioner, P.N. ward was requested through Control Room. Also, labours are asked for strengthening the fire fighting apparatus.

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	<p>through DMCR.</p> <p>Fire extinguished by firemen with the help of two first aid lines of ten motor pumps and by smothering with the help of green branches of tree.</p> <p>Enquiry was made with the public members, security personnel of the plot and police about any injury to any person or wild life. However, none reported injured.</p>
<p>Factors for spreading of fire:</p>	<ol style="list-style-type: none">1) Presence of large quantity of combustible material such as dry grasses, dry bushes etc on the plot.2) The land / plot is open to sky3) Heavy wind velocity at the time of fire incident4) No easy access to the plot, absence of pathway / road etc to the plot5) The plot was uneven in shape and hilly area6) The plot was barricaded with compound wall, barbed wire etc causing difficulty for making entry to the fire affected area7) There was no electric light on the land and the fire occurred after the sunset causing difficulty for finding access to different locations of fire area / location.8) The fire was noticed late by the security staff when large amount of smoke was oozing out with flames from behind the hillock area. Subsequently, late summoning to the fire brigade department
<p style="text-align: center;"><u>Statement of Witnesses</u></p>	
<p>1) G. R. Avhad Asstt. Station Officer (Dindoshi fire station):</p>	<p>First arriving officer from Mumbai Fire Brigade G. R. Avhad, Assist. Station Officer responded from Dindoshi fire station has stated that he was on duty in second shift (1500 hrs to 2300 hrs) on 03/12/2018. As per CR message MP-36, & L/f Crew led by him and QRV-11 S/Fm crew from Dindoshi fire station were turned out to attend above said fire call at about 1821 hrs. On arrival at the scene of incident it was learnt from Police personnel & member of public and he also noticed that huge flames on hill area were spreading from North East side to South-west side due to gusty wind. Immediately considering the surrounding risk of the Building adjacent to hill area and severity of fire, he transmitted Level II message fire call and asked for the aid of total four motor pumps and JT & simultaneous. If not aided by DFR, was left with 4 motor pumps & JT & simultaneous. If not aided by DFR, was left with 4 motor pumps & JT & simultaneous.</p>

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barbed wire fencing. Entry was gained after cutting these barbed wires & one first aid line of QRV was pressed on to the fire and fire-fighting was also carried out by smothering with the help of green branches of trees in the form of fire beaters to stop further spread of fire. But due to high wind velocity and after judging the rate of spread of fire L-III fire message was transmitted to C.R. asking aid of total ten motor pump and water tankers. He further noticed that fire was confined to dry grass, dry leaves, wild growth bushes, tree trunks, roots of plants, dry herbs, shrubs, etc on the hill in an area about 2 ½ to 3 kms.

On arrival of senior officers further fire fighting operation was carried out under their guidance and direction. Further enquiry was made with the public members and police about any injury but nobody reported as injured.

Fire extinguished by firemen with the help of two first aid lines of ten motor pumps and by smothering with the help of green branches of tree.

**2) Mr. Rajiv Kalra
(Occupier / Chief
Engineer, M/s.
Ferani
Construction Co.)**

He is aged about 52 years, residing at B/43, Manali -4, Evershine Nagar, Malad (W), Mumbai -64. He is working as Chief Engineer from last 24 years in M/s. Ferani Construction Company. He is the responsible authorized person for the project.

He stated that on 03/12/2018 he attended his routine duty from 0945 hrs to 1845 hrs. On that day, in the evening period his security personal Mr. Ashokan Som Sundaram informed him that fire has occurred on hill. He himself and with some other colleagues rushed to the site and saw a huge fire travelling towards the south boundary of the plot near Mantri Park B side. They along with other security personnel tried to extinguish the fire with the help of cutting of bushes, branches. In mean time fire brigade personnel arrived on the incident and started extinguishing the fire.

Further, he stated that total three watch points called as chowky in the premises have been erected by the occupier, to watch and keep vigil in the entire premises. Security staff has been deputed at the premises for 24 X 7 for vigilance of the property and the job is for routine patrolling of the complete project premises, although the entire land area is not visible from any one point at a time because of hilly terrain with small valleys / cliffs in the plot area.

There is no provision of lights within the premises. This open land is next / adjacent forest areas with frequent a group of trees. The premises like landcards, etc. are not visible from any point.

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security guards are deputed in team of three persons each.

At some instances there had been trespassing of unauthorized persons noticed from the nallah side (mid of west side) and crossing over from small compound wall on the North-east side. Further, local tribal people from forest side have also been noticed making unauthorized entry in the premises for collection of firewood, grass etc.

Further, Mr. Rajiv Kalra has further stated that there is one area i.e. the nallah area from where there is possibility to gain entry inside the said plot/land premises apart from the running project area which they are trying to cover by a compound wall. The said occupier / company has tried to erect the a M.S. grill barricade to the nallah portion but were forced to remove the said barricade for want of permission from the local municipal authority. Now, the same is in process and is in correspondence with concerned authorities. In spite of all above precautions and strict vigilance still some times unauthorized persons are entering inside the open plot area through the open nallah & and crossing over from small compound wall on the North-East side. Further, local tribal people from forest side have also been noticed making unauthorized entry in the premises for collection of firewood, grass etc.

On enquiry he stated that on the very day no security guard has carried out any cooking activity or created bon fire. Also, no security personnel allowed to smoke. Further there was no fire works in the nearby vicinity as no celebration noticed.

He also stated that to put / fix barricade over the nallah opening, the occupier has already made corresponding letter to the local police station. Further Dindoshi Police Station have also forwarded a letter to the Asstt. Comm. of P/N ward. Further (u/no 324/2018 dated 11/01/2018 and A.E. (Maintenance) of P/N ward. Further A.E. (Maintenance) forwarded his remarks to E.E (SWD) P/N ward u/no AEPN/53246/AE(MT) dated 10/03/2018 for necessary action.

3) Mr. Shailendra
Yashwant Pawar
(Security Officer,
M/s. Ferani IT
Park)

He is aged about 40 years working with M/s. Ferani Security as Security officer residing at Room No. 118, Kokan Vaibhav, N.M. Joshi Marg, Lower Parel, Mumbai - 400 013. He is recently working at Ferani Park as Security officer for more than 02 years.

He stated that on 03/12/2018 he resumed his duty at 1100 hrs to 2000 hrs and in the evening he went for his routine work at Ferani Office. At about 1800 hrs he was informed by Security Personnel of M/s. Om Shiv Security named Shri. Surendar Singh aged about 45 years on his mobile that a heavy smoke and huge

flames were visible from the east side of nallah. Immediately h, some security guards from his team rushed to the fire incident. He and his guards tried to extinguish the fire but due to heavy wind current fire rapidly spread towards the south side from north side. Further he stated that, as it was sunset time and getting dark, no security guard was there on the inside the land area. Hence delayed in sensing the occurrence of fire, also he stated that the fire was too far in the interior and its size was not visible, due to which he assumed that it was a small fires and can be extinguished with his security persons. Hence, did not summoned fire brigade immediately which also further delayed in summoning the fire brigade.

Further, he stated that in the darkness during night time, continuous watch by security guards on the entire land portion is not possible. He also stated that nobody is smoking or allowed to smoke on the premises.

On enquiry he stated that on the very day no security guard had carried out any cooking activity or created bon fire. There was no fireworks in the nearby vicinity as no celebration noticed.

Due to frequent activities of wild animals (leopards, dears, snakes, etc) in the said land area and non-availability of lighting provision they have assigned 03 security guards in each patrolling team during the daytime i.e. before sunset.

It was observed many times that trespassing is done by the local tribal and unauthorized persons.

Further, he also stated that such type of fires had frequently occurred & were attended by himself from last 30 months which was mostly fire occurred in dry hay / wild bushes etc at monsoon period.

4) Mr. Vitthal
Anand Mundale
(Security Guard,
M/s. SIS Security
Park)

He is aged about 40 years working with M/s. SIS Security at Ferani IT Park, residing at near Nageshwari Temple, beside church lane, M ward, BMC Colony, Opp. Kaveri Society, Nagari Nivara, Goregaon (E). He stated that he is working as security guard from last 03 months at Ferani developers infinity IT Park - Shivshahi Chowky.

He stated that on 03/12/2018 he was on duty since 0700 hrs as usual. In the evening he noticed a heavy smoke and huge fire visible near nallah side. When he reached near the spot he observed a big fire spread and travelling towards south side. During the same time, there was no security guard near the fire affected area in the centre of the hilly land. He informed his seniors on mobile and he also learnt that they were also trying to extinguish the fire from opposite side.

On further enquiry, he stated that on 03/12/2018

Ganesh Vaman Gugankar were patrolling in the land near the middle chowky and came out of the incident premises due to increasing darkness after sunset time. Later on from near the IT park, he noticed the fire from the said hilly area of the land.

Further, he stated that continuous watch is not done after sunset due to the darkness by security guards on the entire land. The lighting arrangement has not been made in the entire land area and many times some of the wild animals are spotted frequently in the land area along with trespassing of local tribal community and unauthorized persons.

5) Mr. Ashokan Som Sundram (Security/admin)

He is aged about 59 years working at M/s. Ferani Security as Security Admin residing at 901/1 Bldg., Palm Court, Malad (W), Link Road, Mumbai with his family from last 10 years.

He stated that from last 25 years he was worked as security in Ferani Construction Company and from last 12 years, he was deputed as a security/admin at this site by M/s Ferani Construction Company. As usual he was present on his duty on 03/12/2018 at about 0827 hrs. As a routine, he was on round up in his jurisdiction area at about 1745 hrs when his colleague informed on his mobile that heavy smoke is visible on the hills on the east side of MHADA colony near nullah in between MHADA building and MHADA row house. Immediately with 8 to 10 numbers of security guards, he rushed to the incident site. When he reached near the incident site, he noticed a big fire had occurred on the hill and that time wind was moving from north to south side with heavy velocity and then further fire was rapidly spreading towards Shivshahi Chowky i.e. on the south side. They all tried to extinguish the fire with help of makeshift fire beaters of green branches, bushes etc.

After some time he observed that fire brigade personnel has arrived at incident by cutting off the metal guard wire of the boundary / compound wall from south side. He further helped the fire personnel in extinguishing the fire.

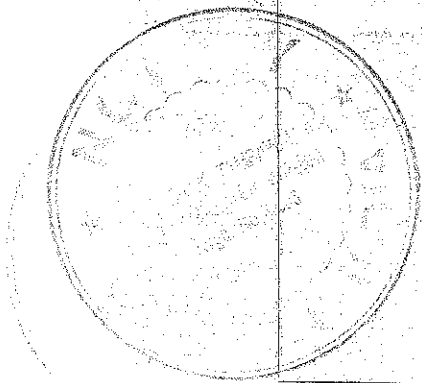
Further, he stated that in some instances many wild animals like leopards, snakes etc have been sighted inside the land area and hence due to non-availability of lights in the said area security guards are instructed not to conduct patrols in the hilly area after sunset.

There had been several reports of trespassing done by the local tribes and some unauthorized persons in the said land area.

He also stated that on the very day no security guard has carried out any cooking activity or created bon fire. Also no security guard was allowed to smoke. Further there was no fire in the

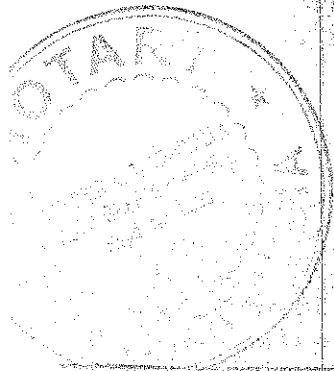
[Signature]
 भारतीय अधिकार अधिनियम २००५ अंतर्गत
 ई-प्रचार आदेशी मामिलीची प्रत

	nearby vicinity as no celebration noticed.
<p>6) Mr. Surendra Singh Chouhan</p> <p>Security Guard of M/s. Omshiv Security (OSF).</p>	<p>He is aged about 45 years working at M/s. Omshiv Security (OSF) Ferani residing at Labour Camp, Opp. Sheela Ferani Camp, Goregaon (E) Mumbai with his friend from last 3 years. He stated that he is working as security guards under M/s. Omshiv Security (OSF).</p> <p>On 3/12/2018 he was present on duty since 0800 hrs in morning at the said site. When he was on his routine round up near the IT park side, at about 1745 hrs he noticed a heavy smoke on hill side of the east side of the nallah. That time he informed his senior Mr. Shalendra Pawar & he himself with other security guards colleagues rushed towards the nallah site & noticed the fire on the hill.</p> <p>They reached the fire site after pressing through wild grow (grasses, bushes etc.) in the darkness which took time more than 20 to 30 minutes.</p> <p>When they reached near fire incident they noticed that a big fire had occurred on the hill side and was rapidly spreading towards south side. They tried to extinguish the fire by cutting off some bushes, branches and using fire beaters.</p> <p>He further stated that they have experienced occurrence of many small fires on the hill-side after monsoon, he also stated that many times fire had occurred on hill side after monsoon during his service tenure of last 03 years of security service at this site and they have extinguished such fires frequently with the help of cutting off the bushes, branches in the form of fire beaters.</p> <p>Further, he stated that security guards are not carrying out patrolling in the darkness during night time as there is no light provision & wild animals are noticed very frequently in the said entire land area. Also many times local tribal people have been noticed to be trespassing for grass, firewood etc in the said land.</p> <p>Further, entry of unauthorized persons was also noticed very often in the said land area.</p> <p>On enquiry he stated that on the very day no security guard has carried out any cooking activity or created bon fire. There was no fire works in the nearby vicinity as no celebration noticed.</p>
<p>7) Mr. Ganesh Vaman Gugankar</p> <p>Security Guard of M/s. SIS</p>	<p>He is aged about 50 years residing at Room No 10, Dhananjay Chawl Committie, M ward, BMC colony, Nagari Nivara, Opp Kaveri Society, Goregaon (E) Mumbai with his family. He is working as a security guards from last 03 months under M/s. SIS security at Ferani IT Park.</p>



	<p>He stated that he was present on duty since 0700 hrs on 03/12/2018 at his duty point i.e. at Shivshahi Chowky. At about 1830 hrs he noticed a heavy smoke visible on hill of nullah side. He and his colleague Mr. Vitthal Anand Mundle rushed towards the incident site and saw a big fire, immediately he informed his senior Mr. Suman Singh on his mobile that a heavy smoke and big fire occurred on hill and flow of wind current was from north to south side and fire also rapidly spread towards south side i.e. towards Shivshahi Chowky and it was getting too dark due to sunset evening time. They tried to extinguish the fire with the help of cutting off some bushes, branches in form of fire beaters. But fire was rapidly spreading towards them then they all came out from the fire incident site.</p>
<p>8) Mr. Shoukat Ali Shah Security Guard of Sankalp Siddhi Soc</p>	<p>He is aged about 30 years working at M/s Sankalp Siddhi Society as Security Guard residing at Shivshahi Sankalp Bldg No. 24 Room No. 306 Goregaon (E) Mumbai. He is working as security guard from last 03 years at Sankalp Siddhi Society.</p> <p>He stated that on 03/12/2018 while he was present on duty (in day shift) at 0800 hrs to 2000 hrs. During his routine work of filling water in the overhead water storage tank, at about 1900 hrs-1930 hrs when the overhead water tank had filled with water, he moved to terrace of the wing C and then he saw huge fire had occurred all over the hill. The fire was rapidly spreading from north-east side to the south-west side along the hill slope. When he came down from the building, he informed his colleagues & society office bearers about fire on the hill at his society's main gate. Lot of public members were requesting to enter in his society premises to see the fire but they did not allow the public to enter in their society premises. He further stated that there were few fire incidents occurred in the same plot. However, these fire incidents were not such big as compared to this incident. There was no fireworks in the nearby vicinity as no celebration noticed.</p>
<p>9) Mr. Shashidharan (Retired person)</p>	<p>He is aged about 68 years residing at 45D, Royal Hill Garden Bungalow, Nagari Nivara, Goregaon (E), Mumbai. He is residing in this bungalow from last 08 years.</p> <p>On 03/12/2018, he was in his bungalow, in the evening at about 1700 hrs, his son came and informed him that a huge fire had occurred behind the hill. He went to terrace of his bungalow and saw that huge fire which was spreading towards his bungalow. He came out from his bungalow and discussed with the people about fires which had been frequently occurring after monsoon season and was concerned about his bungalow's safety from such</p>


	<p>fire brigade personnel had arrived on incident site and started extinguishing the fire. He stated that as there are frequent fires hence he thought that it was normal small controllable fire but after some time fire spread so rapidly that he was worried about whether fire entering in the MHADA residential bungalows or what but mean time it was extinguished by fire brigade personnel.</p> <p>On enquiry he stated that there were no fireworks in the nearby vicinity as no celebration noticed.</p>
<p>10) Mr. Ramesh Rao (Retired employee of M/s. Botly Boy Co. Ltd.)</p>	<p>He is aged about 67 years, residing at 101/B, New Sankalp Siddhi Society, near Mantri Park Bldg, Goregaon (E), Mumbai from last 14 years at above mentioned address.</p> <p>He stated that he is a retired employee of M/s. Botly Boy Co. Ltd. On 03/12/2018 while he was at his home at around 1930 hrs & he noticed from his hall window, a huge volume of flames with heavy smoke on the hill and fire was rapidly spreading from north-east to south-west side. His security guard informed him that a huge mob of public had gathered near the main gate of his society and tried to enter in society premises to see the fire on the hill side. He came down and reached at main entrance gate of the society and instructed the security guards to not allow any person to enter in the society and he himself also tried to control the crowd. He also stated that such fires keep on occurring at least once or twice every year on these hills after monsoon period. He also stated that fire is occurred earlier also but not in such large area. He realized its gravity when saw in the television.</p> <p>On enquiry he stated that there were no fireworks in the nearby vicinity as no celebration noticed.</p>
<p>Circumstantial evidence :</p>	<p>During the course of fire and during the investigation of fire, it was observed that the fire was confined to dry grass, dry leaves, wild growth, bushes, chopped tree trunks, roots of plants, dry shrubs, etc on the hill in an area about 2 ½ to 3 kms area. During the investigation of the fire cause, nobody came forward as an eye witness for the occurrence of the fire.</p> <p>From the statements of the witnesses it was revealed that the origin of the fire was somewhere on the hill near the nallah on the North-east side of the land and fire was travelling rapidly towards the South-west direction.</p> <p>By observing the severity, damages due to fire spread unusual pattern in the said huge open land involved, the seat of the fire could not be confirmed.</p> <p>During the course of inspection some books, papers, glass, plastic, glass etc articles were observed on the hill.</p>



माहितीचा अधिकार अधिनियम २००५ अंतर्गत
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	<p>which indicates happening of the trespassing / unauthorized persons entry in the said land area.</p> <p>Also, in spite of the huge fire there were some unaffected / unburnt portions on the plot / land which further raises possibility of some suspicious activity in the said land area.</p>
<p>Supposed cause of Fire:</p>	<p>After examining the circumstantial evidences and statements of eye witnesses, process of elimination is applied to determine the suppose cause of fire</p> <p>i) <u>Incendiarism, sabotage</u> On going through the statements of witnesses, observations & peacefully maintained Law & Order situation in the locality & in the nearby vicinity as per Police statement, the supposed cause of fire due to incendiarism, sabotage are ruled out</p> <p>ii) <u>Arson</u> The area was too vast, grasses were burnt across the entire premises hence the exact seat of fire (Location of origin of fire) could not be ascertained</p> <p>Moreover none of the witnesses have given any statement regarding the foul play in this incident. Also, Nobody has come forward to give any statement that occurrence of fire is due to arson, hence suppose cause of fire due to arson is ruled out.</p> <p>iii) <u>Careless smoking</u> On going through the statements of witnesses it was revealed that the security guards or the authorized persons on duty were not having the habit of smoking and also smoking was strictly prohibited in the premises as per the statement of the security officer. Hence, the supposed cause of fire due to careless disposal of lighted smoking material is also ruled out.</p> <p>iv) <u>Naked Flame / Light</u> On going through the statement of security officers and security guards in the premises, though there was chulhas found in the security watch point chowky, they have stated that they have not carried out any cooking activity nor they have not lighted any bon fire. Also they have not lighted any candle / agarbatti as it was open land. Hence the suppose cause of the fire due to naked flame / light, hot ashes etc. ruled out.</p> <p>v) <u>Chemical reaction / auto-ignition / spontaneous combustion</u> The premise is an open land appearing as forest land where no process or no any type of storage of the reactive chemicals etc or no any related activity was done. Thereby, there is no possibility of any chemical reaction. As per the statements of the witnesses, there were no oil soaked rags or hay / stracks on the premises, nor any reactive chemicals which can lead to auto-ignition. Hence, the suppose cause of the fire due to</p>


 जलसंचयन अधिकारी, जलविभाग, २००५ अंतर्गत
 देवघर, झारखंड, भारतीय प्रजासत्ताक

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(15)

chemical reaction, auto-ignition and spontaneous combustion ruled out.

vi) Flying fire crackers : As per the statement of the witnesses and local people it was revealed that there were no ceremonial function conducted in nearby area, where fire crackers were used. Hence suppose cause of fire flying crackers is ruled out.

vii) Electric origin fire: During the fire fighting and investigation it was noticed that there was no electric wiring, cables, installations etc present in the entire plot where fire took place. Moreover, absence of electric light has created lot of difficulty during fire fighting. Hence, there is no question of fire origin due to electricity.

Considering the size of open plot, its use / activity, time of occurrence of fire etc. It is not necessary to elaborate the suppose cause of fire due to lightening, static electric, locomotive spark, mechanical spark etc.

Conclusions :

After going through the statement of witnesses, observations, spread of fire pattern, inspection and complying the circumstantial evidences of the fire incident etc. the location of the origin of fire could not be ascertained / confirmed. Also as per the statements of witnesses possibility of trespassing / entry of unauthorized person in the said land / plot could not be denied. Further by eliminating possible suppose cause of fire as above, I derived the suppose cause of fire incident as "Doubtful" (To be investigated by Police)

However, if any clinching evidence/conclusive hard evidence come across in future from the competent investigating agencies the supposed cause will be reviewed accordingly.

Therefore the supposed cause of the fire is kept open for any changes in future if any authorized agency put forth with the reliable evidence, which need to be accepted by fire brigade authority & duly recorded/approved".

Licensed /
Unlicensed / Non
licensable:

N.A.

Detection of any
unauthorized
Trade, structure,
etc., if any:-

N.A.

(15)

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<p>Action/ Recommendation</p>	<ul style="list-style-type: none"> • As the plot is very large in size, uneven shaped, hilly area etc, the occupier / owner shall kept sufficient number of security staff to keep vigil on the entire plot to avoid any fire incident in future. • The wild growth such as dry grasses, bushes shall be cut and disposed off regularly • Necessary arrangement of water sources shall be done to tackle fire situations at incipient stage. • The premises shall be sufficiently barricaded to avoid any entry of trespassers / unauthorized person. • Security staff shall be trained to handle the fire fighting related to forest fire and summoning fire brigade • Smoking, cooking, heating, use of naked flame bon fire shall be strictly prohibited on the premises. • Assist. Commissioner, P/N ward and E E (B.P) WS shall take necessary action for the unauthorized shed / construction erected on the land. • Range Forest Officer shall visit the land and take necessary action as per rules pertaining to their department, if any • Sr. P.I. Dindoshi Police Station shall be asked to carry out necessary investigation for the above said incident.
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[Signature]
 A.D.F.O.
 (Investigating Officer)

[Signature]
 D.F.O.
 (R.C.C. IV)

[Signature]
 Dy. C.F.O.
 (For level 2 & above)

[Signature]
 C.F.O.
 (For level 3/4/5)

- Copy to,
- 1) Asstt. Commissioner, P/North ward.
 - 2) E.E.(B.P.) WS
 - 3) Range Forest Officer (National Park) Borivali
 - 4) Sr. P.I., Dindoshi Police Station

For information and necessary action please.

[Signature]
 दिवाळी महिन्यात अग्निशमन २००५ अंतर्गत
 कृष्ण प्रदेशी महितीची पत्र

[Signature]
 D. Chel Fire Officer
 Mumbai Fire Brigade

[The main body of the page contains several lines of text that are extremely faint and illegible due to heavy noise and low contrast. The text appears to be organized into paragraphs, but no specific words or phrases can be discerned.]

अदखलपात्र गुन्ह्यांचे संबंधातील प्रथम खबरी अहवाल

पोलीस ठाणे - दिंडोशी पो. ठाणे, (कलम १५५ फौजदारी दंड प्रक्रिया संहिता)
 महाराष्ट्र (जागरी क्षेत्र) वृद्धांचे अदखलपात्र गुन्हा नोंदणी क्र. १५२/१९ तारीख २५/३/२०१३
 १) कायदा व वातानु-अधिकारिचम १९७५ कलम : कलम ८ सह २१ अन्वये.
 २) गुन्हा प्रकृत्याचे विषयानुसार तारीख दि. ३/१२/२०१८ चे दि. ३०/०३/२०१९ चे दि. ०२/०३/२०१९ चे



तारीख दि. ३/१२/२०१८ चे दि. ३०/०३/२०१९ चे
 तारीख ०२/०३/२०१९ चे
 वा.द.क्र. - वेळ -

३) तक्रारदाराचे नांव व राहण्याचा पत्ता	३) (ब) विरोधकांची नांवे व पत्ते
श्री. सचिंद्र लताशेठ जोशी, ३० वर्षे, उद्यान विद्या म्हायत्यक, पी. उत्तर विभाग, सामलेंदारावाडी, दिंडोशी पोलीस ठाणे, महाराष्ट्र (प), मुंबई.	फेरानी हॉटेल्स आ. लि. कंपनीचे संचालक, कार्यालय - के. रेखा कन्स्ट्रक्शनस हाऊस, खार, मुंबई.

४) तक्रारीची थोडक्यात माहिती : यातील तक्रारदार हे मुंबईचे म. न. पा. न्वे ची उत्तर विभाग, सामलेंद (प), मुंबई येथे उद्यान विद्या म्हायत्यक पदावर कार्यरत आहेत.
 दि. ०३/१२/२०१८ रोजी के. रेखा कन्स्ट्रक्शन कंपनीच्या अध्यक्षारित फेरानी हॉटेल्स

प्रा. लि. कंपनीकडे चौकसनासाठी ताब्यात असलेल्या म. प्रस. वी. विलिंग ट्रस्ट यांच्या भाविकांच्या असलेल्या सर्व्हे क्र. २३९ रिव्हस नं. १ चे येथील क्षेत्रात अडकाऊ कार्यान्वयन पसरलेल्या नुसलेक नंतर सुरुवात करिसरतील जवळ वनस्पती झाडी सुटवे असलेल्या नैसर्गिक साधन संपत्तीस मोठ्या प्रमाणात आण लाडालेली होती. त्या आधुनिकाने दि. ०६/१२/२०१८ रोजी महाराष्ट्र सुरुवात विभागात जेठान्या दिंडोशी पदाकाने केलेल्या पदाधीन आंदाने ६० हेक्टर जागीन क्षेत्रातील 'मोठ्या स्वरुपाचे' स्फाचे थोड ६५ व इतर १२६, मध्यम स्वरुपाचे १८५ व इतर ७७९ हे सर्व वृक्ष आण लाडाल्यापुढी - जुद्धापासून नोडल्याने तसेच लहान स्वरुपाचे वृक्ष सुद्धे ५२९ आगीपुढी तोंडव्यात आण अस्पून नंतर लहान सुद्धे ४२१६ आगीत गळून गेल्याचे निदर्शनास आले. सधर आडवालागा आधुनिकाने मुंबई म. न. पा. न्वे उद्यान विभागाच्या अधिकार्यांनी केलेल्या प्रथम पदाधीन सधर दिंडोशी झालेली वृक्षतोड व आगीमधे वृक्षान्या झालेल्या हातीतवदळ महाराष्ट्र (जागरी क्षेत्र) वृद्धांचे संरक्षण व नसन अधिकारिचम १९७५ कलम ८ सह २१ अन्वये संस्थापित विकेडर कायदेधीर कायदेदी क्षेत्रास विनंती.

५) साक्षीदारांची नांवे व पूर्ण पत्ते :

(१) महाराष्ट्र प्रकृत्य महामंडळाने यतीने पारशी इत्यान्य स्वरुप करणारे विशेष सधरान्ये अधिकारी.

(२) मुंबई म. न. पा. न्वे उद्यान विभागाचे अधिकारी.

६) अदखलपात्र अहवालाची प्रत मिळाली. या प्रकरणी फौ. द. प्र. सं. कलम १५५ नुसार संबंधीत कोर्टाकडून वाद मिळविण्याची समज मिळाली. खरी नवडव.

गणेश विवार
 पोलीस निरीक्षक (मु-३),
 दिंडोशी पोलीस ठाणे,
 दिंडोशी पोलीस ठाणे,

२५/०३/२०१९ रोजी तक्रारदाराची सही / आण

ठाणे अंमलदार / कार्यवाहीतील अधिकार्याची स्वाक्षरी नांव : आणेश वा. वगार

पोलीस निरीक्षक, दिंडोशी पोलीस ठाणे.

वाणिज्यालीस निरीक्षक,

FIRST INFORMATION REPORT REGARDING NON-COGNIZABLE CRIME
(Sec. 155 of Cr. P.C.)

Police Station : Dindoshi P.Station

Non Cognizable Crime Reg.No. 942/19

Dt. 25.3.2019

1) Act : Maharashtra (Urban Areas)

Sec. 8 r/w 21.

Protection of Trees Act 1975

Date : 3.12.2018 & before TimeHrs.

2) Place of Incident : S.No.339 Hissa No.1
(P), Malad.

a) Information received at Police
Stn.

Date : 02.03.2019

by written letter.

b) Police Station Diary Ref.

3) Complainant's name and residential address :	3) (b) Names of Opponents and addresses :
Shri. Mayuresh Dattatray Bhoir, 30 years, Horticulture Assistant, P-North Ward, Mamledarwadi, Liberty Garden, Malad-W, Mumbai.	Directors of Ferani Hotels Pvt. Ltd. Off. K. Raheja Constructions House, Khar, Mumbai.

4) Brief information of the complaint :

The Complainant herein is working on the post of Horticulture Assistant in Mumbai Municipal Corporation, P-North Ward, Malad-W, Mumbai.

On 03.12.2018, there was a huge fire on the forest-like land having grass and bushes, the hilly area of Survey no.239 Hissa No.1P. near S.B. Dinshaw Trust, which is in possession of Ferani Hotels Pvt. Ltd. under K. Raheja Construction Company. It was found in the inspection carried out by a special squad of Maharashtra Pollution Control Board on 06.12.2018 that big size 65 teakwood trees and other 126, and 185 medium size and other 778 trees were cut from the root of the trees before the fire broke, and also 522 small size trees were cut before the fire broke and also 4216 smaller trees bottoms were burnt in the fire that broke on about 60 Hectares of land. Gardens Department Officials of Mumbai Municipal Corporation had made physical inspection at the site and accordingly, it is requested to take legal action against the concerned under Sec. 8 r/w 21 of Maharashtra (urban Areas) Protection & Preservation of Trees Act 1975, for the tree felling and trees burnt in the fire.

English translation of original document in Marathi

contd....

5) Names and addresses of witnesses :

1) Officials of the Special Squad submitting inspection report on behalf of Maharashtra Pollution Control Boar.

2) Officials of Garden Department, Mumbai Municipal Corporation

6) Received copy of non-cognizable report. I have been made to understand to get justice from the concerned Court of Law, as per Sec. 155 of Cr. P.C.


Sd/- 25.03.2019

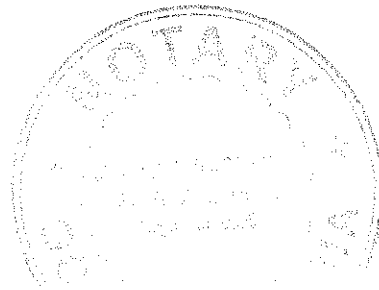
Signature /T.I. of Complainant

sd/-

Signature of Station Incharge / Duty Officer

Name : **Ganesh V. Pawar**Designation : **Police Inspector,
Dindoshi P.Station.**

True copy




ANNEXURE - A.4

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BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL,

Principal Bench, New Delhi

Original Application No. 462/2018

(Earlier O.A. No. 11/2018 (SZ))

With

Original Application No. 76/2015 (SZ)

D. V. Girish

Applicant

Versus

Union of India & Ors.

Respondent(s)

With

D. V. Girish

Applicant

Versus

The Member Secretary National Tiger
Conservation Authority, MoEF & Ors.

Respondent(s)

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2.	Annexure-I: A copy of Hon'ble NGT order dated 19.03.2020.	

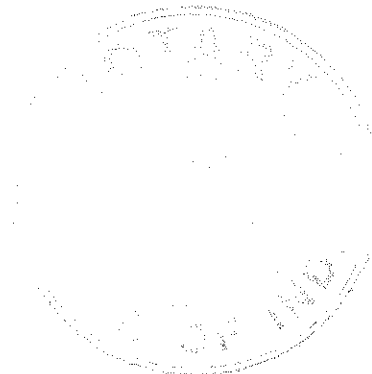
(G. Thirumurthy)

Scientist E

Central Pollution Control Board,
Parivesh Bhawan, East Arjun Nagar,
Delhi- 110032.

Date: 03.12.2021

Place: Delhi



Final Report

**Assessment of Environmental Carrying Capacity of
Eco – sensitive Zone: Sanjay Gandhi National Park,
Mumbai, Maharashtra**



Submitted to:

Central Pollution Control Board (CPCB)



**CSIR-National Environmental Engineering Research Institute, Nagpur
440020**

(July 2021)

570

Project Personnel

Project Team

Er. Alaka Das

Er. Dhanya V B

Er. Sourav Dutta

Principal Investigators

Er. Hemant Bherwani

Er. Sunayana C

Er. Roshan Wathore

Project Coordinator

Director, CSIR - NEERI

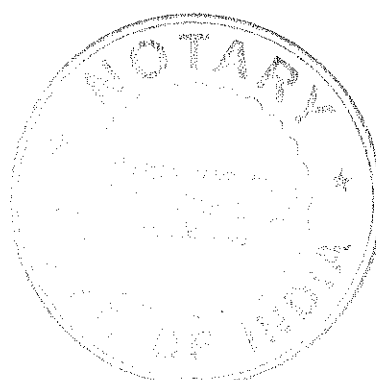
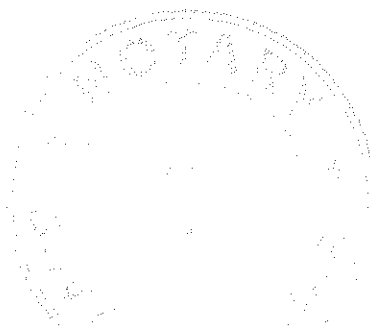


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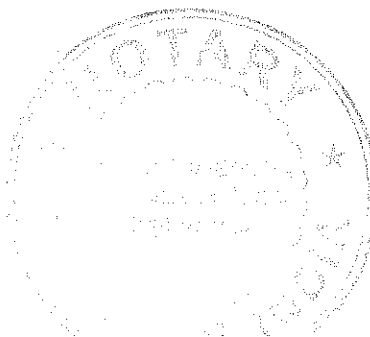
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1.0 Introduction

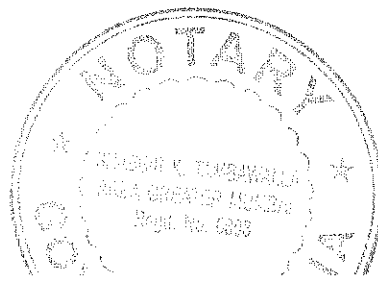
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Among the four national parks within the state of Maharashtra, Sanjay Gandhi National Park (SGNP), which was previously known as Krishnagiri Upawan and later as Borivali National park, is an alluringly protected green desert which is located around 25 km north of Mumbai city and 8 km from the shores of Arabian Sea [1]. It lies between 72° 53' & 72° 50' East longitude and 19° 88' & 19° 21' North latitude [1].

Geographically, the southern boundary of the park is shaped by the Shore of Vihar Lake, the eastern by the townships of Bhandup, Mulund, and Thane, and the western by Goregaon, Malad, Kandivali, and Borivali suburbs of Mumbai. The northern boundary expands past Bassein creek and incorporates the Nagla forest block [1]. The park has a total area of 103.09 square kilometres, of which the recreational sector alone takes up 5.06 sq. km. SGNP is one of the foremost highly visited national parks within the country. The important tourist spots of SGNP include the Krishnagiri Upawan sector, which comprises the recreation zone and over 2000 years old Buddhist caves popularly known as Kanheri caves [1].

The major sources of water in the park are Tulsi and Vihar lakes. These man-made lakes having a combined catchment area of 25.72 sq. km are over 100 years old and are a source of drinking water supply to Mumbai city [1]. Along with these lakes, there are streams and water holes that act as water sources during the monsoon season [2]. The park shows varied terrain qualities from 30 m over sea level to nearly 500 m and exhibits coastal, dry and mixed deciduous and typical Western Ghats plateau habitats. With its seasonal cyclic changes, the SGNP habitat is fascinating at any time of the year. The mean annual temperature is 27°C and over 2000 mm of rainfall is recorded in slightly over 100 days [2]. Due to its proximity to the coast, numerous watercourses, and hilly terrain, the flora too presents a very diverse picture, ranging from dry and moist deciduous to semi-evergreen, open scrub, and halophytes [1]. The studies also reveal that the park is very rich in fauna and has many endangered flora and fauna species. As per Wildlife Institute of India's Bio-geographical classification, SGNP falls in "The Western Ghats Bio-geographic Zone-5 and is considered an Eco-Sensitive Zone.

From literature, it is known that many medium and large-scale chemical and engineering industries are located close to the park boundary, mainly at Malad, Goregaon, Dahisar, and Thane city. Many illicit human activities such as urbanization and encroachment, are hampering the ecological balance of resources in SGNP. Without a doubt, recent researches show that the capacity of the environment to maintain a specific level of movement may as of now have been surpassed in a few zones, and thus, it has become essential to evaluate the



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carrying capacity of SGNP.

In the preliminary report, the environmental attributes such as air, water, habitat, noise, land, flora, and fauna of SGNP were studied along with tourism activities prevailing there and considered as indicators for the assessment of the Environmental Carrying Capacity (ECC) of SGNP. Carrying capacity is a term that has been used to quantify the impact of socioeconomic human activities and the natural environment.. This has been captured through the ability of environment to support the human activities by understanding the relationship that exists. The estimation of ECC helps in identifying the relation with its effect between the existing environment and the growth oriented human activities. This whole system can be described under two major forces, supporting forces and the pressure forces. The supporting forces can be named as the ecological resilience and pressure forces as ecological pressure. The ecological resilience was studied through soil erosion, land cover and climatic factors while ecological pressure has been captured under air pollution and urban heat island effect. This pressure forces are further described through parameters (or evaluation factors) which has been elaborated further. In this study the ECC has been estimated in such a way that the critical parameters affecting environment of Sanjay Gandhi Park has been included. The study uses fuzzy analytic hierarchy process (f-AHP) to estimate the ECC.

1.1 Objectives of the Study

The study's major goal is to perform the carrying capacity assessment of Sanjay Gandhi National Park, Mumbai-Maharashtra. The study is divided into two parts:

Part 1: Demarcation of the study area and collecting basic details from remote sensing and literature such as areal extent, geographical features, flora and fauna, and the tourist activities prevailing there.

Part 2: Carrying capacity assessment with selected methodologies by considering air, water, habitat, biodiversity, land, noise, and tourism as the crucial elements affecting the same of SGNP by using fuzzy comprehensive evaluation method based on secondary data available in the literature.

1.2 Stages of the study

Demarcation of the study area: The study area is analysed in detail to ascertain the geographical features, areal extent, and the watersheds available. Remote sensing tools and techniques with the support of literature are used to finalise the study area.



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Selection of suitable methodologies: The carrying capacity assessment of SGNP can be evaluated by sectioning the environment into several components, which include Land, Air, Water, Habitat, Biodiversity along with Noise, and Tourism. Suitable methodologies are selected by exploring recent research articles in the field of environmental and ecological carrying capacity assessment.

Compilation of details: The basic details for the study area based on selected methodologies are collected and analysed for carrying capacity assessment.

Preparation of maps: Required maps for the study area to aid the carrying capacity assessment are prepared with ArcGIS/QGIS platforms along with Google Earth Pro.

Carrying capacity assessment: With the help of selected methodologies, secondary literature and the data therein and maps, carrying capacity assessment is conducted.

1.3 Details of the study area

Sanjay Gandhi National Park is located in Mumbai city, Maharashtra. The park's boundaries consist of North – Nagla Forest Block, South – Vihar lake, West – Goregaon, Malad, Kandivali & Borivali suburbs, East – Township of Bhandup, Mulund & Thane. The total area of the park is about 103.9 sq.km [2], of which 87 sq. km comes under Mumbai city, as indicated in the literature. The coordinates of the park are 19°24'N 72°68'E. Figure 1.1 shows the location of SGNP, Mumbai-Maharashtra.

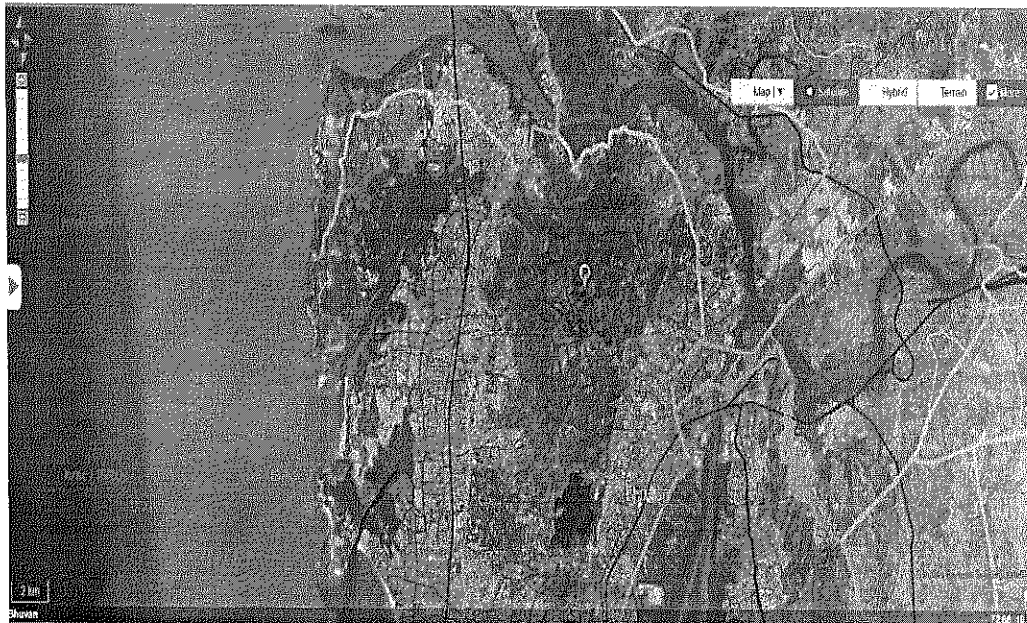


Fig. 1.1: Location of the study area-SGNP, Mumbai-Maharashtra (Bhuvan Map)

2.0 Methodologies for Assessment of Environmental Carrying Capacity

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Environmental Carrying Capacity (ECC), or specifically ecological carrying capacity in this case of eco-sensitive zone, estimation for the region is important to ascertain the limits of development within the sustainable framework. This is especially significant in light of the United Nations' 2030 Sustainable Development Goals. Goal 15: Preserve, recover, and encourage the sustainable usage of terrestrial ecosystems; conserve biodiversity sustainably; prevent desertification; and prevent soil erosion and loss of biodiversity.. The estimations of carrying capacity for the ecosystem identified can be expressed as the relationship between natural resources, environment and human economy to achieve sustainable and overall development. This concept along with maintaining resources includes socio-economic growth of the society and in turn, the public at large. Therefore, estimation of ECC becomes essential for any ecosystem so that inclusive growth can be ascertained. These estimations help in deriving the supporting and pressure forces for the ecosystem.

The methodology to be followed for estimating ECC of study area can be understood and done as per the flowchart:

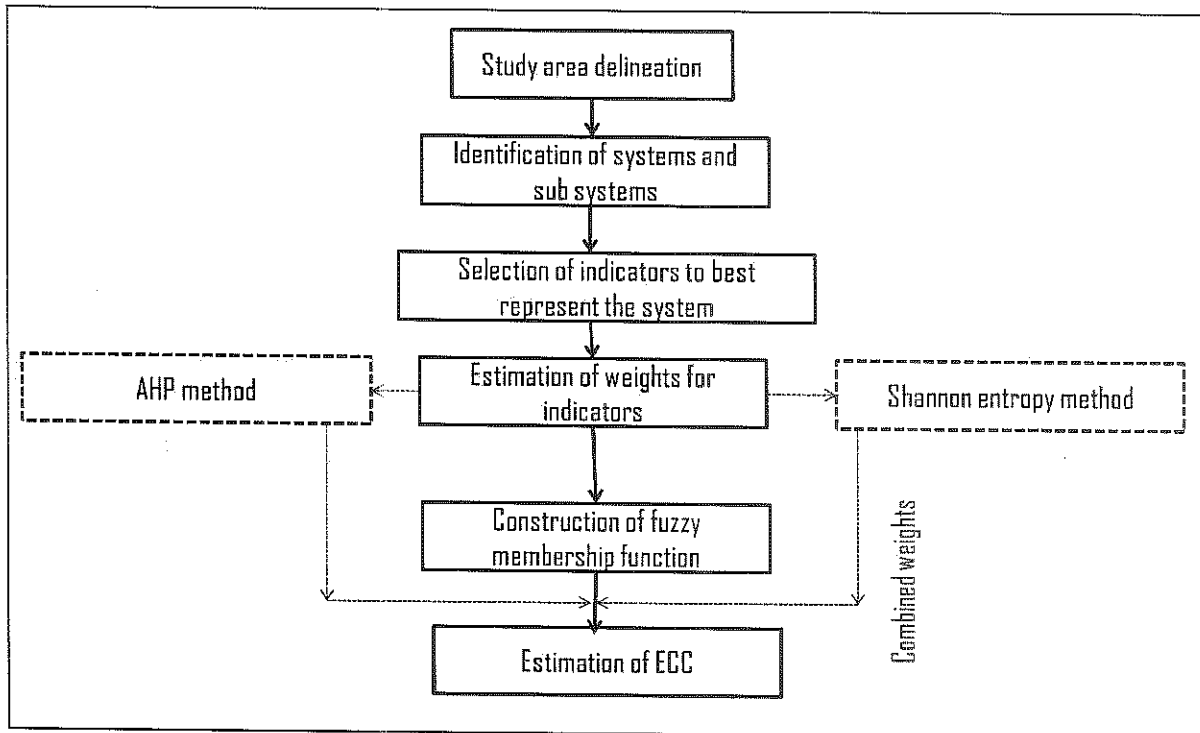


Fig. 2.1: Flowchart Showing methodology for estimating ECC

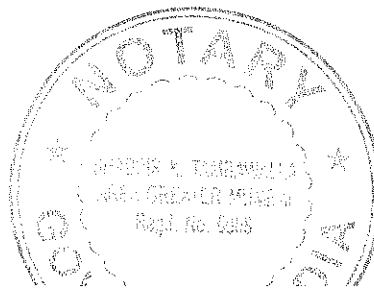
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The above method is detailed and needs varied data points to complete the assessment. Some of the data points are described in the table below. The study area represented by a categorical selection of processes for ecological resilience and ecological pressure needs to be quantified for estimating ECC. This study can use 12 factors that act as an indicator to subsystem to include resilience and pressure of the ecological system. The factors to quantify resilience are slope (R1), Land Use (R2), Land Stress Index (R3), Habitat Quality Index (R4), Water network denseness index (R5), Vegetation Cover (R5), Annual Total Rainfall (R7), Annual Total Temperature (R8), and for pressure, the selected ones are Aerosol Optical Depth (P1), PM_{2.5} (P2), Temperature (P3), Heat Intensity (P4). The selected indicators are those which can capture the interactions existing between subsystems, processes and amongst each other. These 12 indicators are believed to have an impact on the ECC of the study area. These selected indicators can be distributed spatially and temporally for estimations of ECC, and a map representing such variations becomes handy for regional development. [6]

Table 2.1: Select ECC Parameters*:

Criterion Layers	Sub - Criterion Layers	Factor Layers
Ecological Resilience (A ₁)	Soil Erosion (B ₁)	Slope (U ₁)
		Land Use (U ₂)
		Land Stress Index (LSI) (U ₃)
	Land Cover (B ₂)	Habitat Quality Index (HQI) (U ₄)
		Water Network Denseness Index (WNDI) (U ₅)
		Vegetation Cover (VC) (U ₆)
	Climatic Factors (B ₃)	Annual Total Rainfall (U ₇)
		Annual Total Temperature (U ₈)
Ecological Pressure (A ₂)	Air pollution (B ₄)	AOD (U ₉)
		PM _{2.5} (U ₁₀)
	Urban Heat Island (B ₅)	Temperature (U ₁₁)
		Heat Intensity (U ₁₂)

In order to conduct a detailed assessment as above, the study area is to be defined critically. Here a buffer zone is chosen around the SGNP. Buffer Zone is usually an area assumed to fortify the preservation of protected area. For the carrying capacity assessment study we have selected a radius of 5 km as buffer zone around SGNP to control some activities around



national parks and wildlife refuges in order to reduce detrimental impacts on the fragile ecosystem surrounding them. Protected places benefit from Eco Sensitive Zones, which are designed to act as a "shock absorber." In this case, the buffer zone is used to map the environmental attributes in and around the SGNP. The raw area of SGNP and the buffer area should given information for assessment of ECC.

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While assessment of ECC based on above methods is a tedious and complex process, a simplified indicative approach can also be used to get the indicative results. This simplified process is applied for water, noise, air and tourism carrying capacity assessment of SGNP. The AHP, modelling and Fuzzy logic based complex processes can be explored once this simplified approach is applied and ascertained. The detailed methods for each of above environmental attributes for the simplified approach are described in subsequent sections.

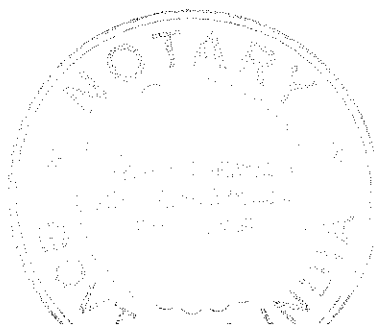
2.1 Water Environment Carrying Capacity (WECC)

Water is essential to all life and plays a vital role in human survival and regional socio-economic development. Water resources are valuable natural resources, such as surface water, groundwater and frozen water. Employment of water incorporates agricultural, industrial, household, recreational and environmental activities. Technologies such as recycling and desalination processes are also used to provide fresh water to society [7]. Contradictions between the environment, population, and social development have become more obvious as a result of rapid population growth and ongoing economic development. As a result, resolving these inconsistencies has become a major topic in water resource studies, and the study of WECC is at the heart of any environmental sustainability and water security policy.

The SGNP consists of lakes, major & minor streams, waterholes, and wells as its water resources. Out of these, the two lakes of SGNP - Tulsi and Vihar are over a 100 years old and are the primary source of drinking water supply to Mumbai city. Since it is feeding water to one of India's most populated cities and wildlife population, its water resource carrying capacity assessment is a necessity of this hour.

Water Environment Carrying Capacity (WECC) Estimation

To evaluate the WECC of SGNP, it is essential to understand and study the available water resources present in the SGNP. The characteristics and data of available water resources such as its catchment area, surface area, maximum & minimum depth, surface elevation and water volume are considered for our study [2]. The available water resources can be defined as the



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maximum water resources that may be exploited without causing harm to the environment. It is defined as the sum of surface water, groundwater, trans-boundary water, and reclaimed water that is locally available. The quantity of accessible water supplies was determined using an estimated total of atmospheric and water source technical conditions, as well as a quota set by higher-level administrations. [7]. It is estimated by using the following equation.

$$E_{ws} (m^3) = W_s + W_g + W_t + W_{uc} \quad [7]$$

Where, E_{ws} = Quantity of available water resources

W_s = Total available surface water

W_g = Quantity of available groundwater

W_t = Total transfer water from cross-boundary regions

W_{uc} = Reclaimed water sources including wastewater recycling

Data related to the quantity of water taken for utilization from the available water resources of SGNP are collected from respective organizations and the total water consumption in a year is calculated.

The Utilization Ratio (UR) was used to investigate how much WECC was used by the economy. The UR of available water resources can be estimated by using the equation given below [7].

$$UR \text{ Available Water Resources} = \frac{\text{Amount of Water Consumed}}{\text{Total Available Water Resources}}$$

If $UR > 100\%$, the resources are overused, or the ecosystem is being overburdened. [7].

2.2 Air Environment Carrying Capacity (AECC)

Air is a critical resource for humans, plants, animals, and all other living organisms within a natural habitat. The oxygen within the air is essential for the creatures to survive since we utilize this oxygen to create energy from the nourishments we eat. The air also plays an essential role in regulating the earth's temperature and causes different weather patterns. Polluting the air environment by discharging hazardous chemicals hence debilitates life and can change climatic patterns. Many air contaminants, including tropospheric O_3 and NO_x , interact with carbon emissions fixation by the tree canopy by affecting the metabolic activity of the plants.. Air pollution can affect wildlife indirectly by changing plant communities. There are two basic ways that destroy animals which are depicted below:



- It has an impact on the ecosystem or habitat where they dwell.
- It has an impact on the food supply's quality and quantity.

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Air Environment Carrying Capacity (AECC) Estimation

For the assessment of AECC of SGNP, details about the sources in the vicinity and within the park are evaluated. The data considered include air pollution sources, type of air pollutant, and the baseline air quality of SGNP [2].

The baseline air quality data of SGNP, which includes the amount of SO₂, NO₂, SPM, and RSPM emitted, is compared with NAAQS values of sensitive regions, and the Utilization Ratio is estimated for each air pollutant.

Utilization Ratio (UR) = Amount of pollutant load/ECC

When the utilization ratio is greater than 100%, the resources are overused, or the environment is overloaded.

2.3 Tourism Carbon Carrying Capacity (TCC)

Tourism has been one of the fastest-growing economic sectors in the world, yet it also has the highest carbon emissions. Tourism is responsible for 5% of global carbon emissions, significantly impacting global warming [3]. Moreover, tourism can cause significant disturbances to animals in their natural habitats. More people engage with wildlife as wildlife tourism grows in a certain location. This can be a serious issue because certain wild animals dislike being around people, and humans frequently leave trash and other things that might harm a species' environment.

Because of such ecological and environmental problems, the TCC value for SGNP must be calculated since it is one of the major national parks within a metropolis limit and is one of the world's most visited parks.

Tourism Carbon Carrying Capacity (TCC) Estimation

For the assessment of TCC of SGNP tourism, details such as tourist spots inside the park premises, tourist inflow rates, etc of SGNP are assorted [2] and the carbon carrying capacity which refers to the quantity of fixed CO₂ engrossed by various vegetation's in a zone each year is used for calculations. [3].



The land-use study of SGNP is conducted and the aggregated details include land use pattern, area, etc.

The TCC is calculated by using the following equation.

$$CC = S \times C_{NEP} \times (44 \div 12) \quad [3]$$

$$TCC = CC \times r \quad [3]$$

Where, CC = Region's carbon carrying capacity,

S = Area of forest,

C_{NEP} = Amount of carbon absorbed by vegetations in one year,

TCC = Tourism carbon carrying capacity,

r = Tourism carbon carrying capacity coefficient, which is the ratio of Gross regional tourism revenue to Gross Regional Product (GDP)

2.4 Noise Carrying Capacity (NCC)

Sound, much like accessibility of building materials or sources of food, is critical to the ecosystem's survival. The auditory environment is critical for activities including identifying desirable habitat and partners, avoiding predators, safeguarding the young, and developing territory.

Sound is what we hear, but noise is the unwanted sound. In general, a rising number of studies show that noisy surroundings stress animals, much as they do humans. Noise pollution makes it more difficult for them to do these duties, which has a negative impact on their ability to survive. Caterpillars' hearts beat quicker and bluebirds have fewer offspring when they hear loud noises, according to studies.. Hence, a detailed study should be conducted to determine the sound pressure levels generated due to visitor noises, vehicles, due to any industries within and near SGNP, to strengthen the existing baseline data for future long term monitoring of the impacts of sound on wildlife since SGNP which is a green oasis with its rich biodiversity, its picturesque landscape, its lakes and stream and act as a respite to millions of inhabitants of Mumbai city from the drudgery of a hectic yet monotonous existence.

Noise Carrying Capacity (NCC) Estimation

Accordingly, it is necessary to figure out the visitor attraction sites within the SGNP where there is maximum visitor footfall. Thereafter, it is essential to record the sound levels in different seasons with (Impact) and without (Control) the presence of visitors in these specific zones [5].

Determination of NCC involves measuring the sound levels existing in high visitor usage sites through a control-impact design check whether the ambient noise level (L_{eq} in dB) [5] remains within the prescribed noise level standard limits as decided by CPCB for Silence Zones.

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The above factors of Noise, Air, Water and Tourism are critical for carrying capacity and above simplified approaches as indicated. The detailed assessment of ECC needs assessment of various factors as described in Table 2.1 of ECC parameters. The assessment method for NDVI, LST, DEM, LSI, ACD, NDWI and HQI is detailed below.

2.5 Normalized Difference Vegetation Index (NDVI)

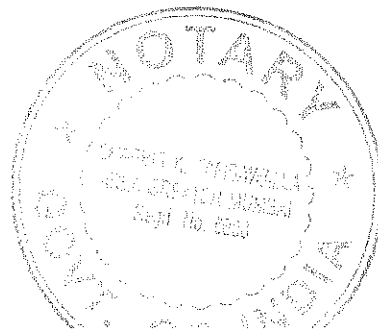
The heat transfer at the earth's surface and within the planetary boundary layer is influenced by greenery, which often mitigates local temperature extremes. Vegetation cover has immense importance in wildlife because it releases oxygen and sequesters carbon, it protects soil from degradation and convert solar energy into biomass which is the foundation of all food chains. For SGNP, with its rich green canopy and existing within a metropolis, it is essential to monitor any changes in its vegetation cover due to human activities. For this purpose, NDVI maps of SGNP for various years can be prepared and are used to study any decrease in its vegetative cover by comparing the maps.

The normalised difference vegetative index (NDVI) is a simple graphical indication used to examine remote sensing measurements, typically from a space platform, to determine if the observed target has live green vegetation. The NDVI scale is used to measure the healthiness of greenery and is useful for determining vegetation density and detecting plant growth and development. NDVI is calculated as the ratio between the RED (R) and NEAR INFRARED (NIR) values. For various studies, satellite images such as Landsat 3, 5, 8 data can be downloaded from USGS Earth Explorer.

After downloading the satellite image raw data, atmospheric correction and pre-processing are done through QGIS software. ArcGIS 10.6.1 platform is used to calculate the Normalized difference vegetation index based on the following equation.

$$NDVI = \frac{NIR - RED}{NIR + RED}$$

Maps are thus prepared for the years 1978, 1987, 2000 & 2020, and the total Vegetative and Non-Vegetative area of SGNP is calculated and compared.



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2.6 Land Surface Temperature (LST):

In this present era of rapid urbanisation, one of the major threats that we are facing is global warming, leading to climatic change and exhibits new challenges for the survival of human beings and wild animals. Another crucial variable in the earth's climate system is land surface temperature. It regulates the rate and timing of plant growth by describing processes such as the exchange of energy and water between the land surface and the atmosphere. Many factors influence land surface temperature, including solar incoming radiation, angle of incidence of solar radiation, surface roughness, moisture content, vegetation extent, and air temperature. LST is also affected by Land use/Land cover changes. By preparing LST maps of SGNP and comparing them we would get an idea about the increase in surface temperature pronounced by any change in land use/land cover.

The Land Surface Temperature can be estimated or calculated using the Landsat 5, 8 thermal bands. It requires applying a set of equations through a raster image calculator in Arc Map, ArcGIS10.6.1 and QGIS. The first step is to download a Landsat 5, 8 images from a particular location, unzip it, and check certain information needed (within the metadata) to execute this procedure and to create Land Surface Temperature (LST) map using the Landsat 8 bands. In particular, band 10 is used as the thermal band, and bands 4 and 5 to calculate the Normal Difference Vegetation Index (NDVI).

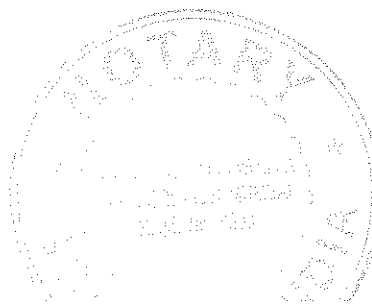
To estimate LST, the different USGS formulas are used to calculate the TOA (Top of Atmospheric) spectral radiance which is converted to brightness temperature conversion, NDVI, proportion of vegetation (Pv), Emissivity (ϵ) and finally LST is calculated.

As a result a map of the Land Surface Temperature will be created and, it should be noted that it is not be equal to the air temperature.

2.7 Digital Elevation Model (DEM):

Cell-based digital elevation models are the most popular digitised data about the geometry of the earth's surface (DEM). This information is used to quantify the land surface's properties. It is mainly used to determine terrain attributes such as elevation at any point, slope and aspect. Dem maps of SGNP are very essential to perform carrying capacity assessment since it gives immense data for the assessment process. SRTM DEM data downloaded from USGS Earth Explorer and processed in ARCGIS 10.6.1 are used for making slope Map of SGNP with 5 km buffer zone area.

The slope of the land must be taken into account in order to reduce building costs, lower the risk of natural disasters such as flooding and landslides, and reduce the negative effects of



proposed development on environmental assets such as soils, plants, and the water system. Hence it is very important to understand the slope of a region and a map indicating the topography of an area along with an analysis of topographic features is a slope map. Slope Maps of SGNP created from DEM data and processed in ARCGIS Software are used to compare and study its effects.

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2.8 Land Use Land Cover Map (LULC):

Land-use and land-cover maps (LULC maps) are useful for addressing environmental issues, supporting planning efforts, and maintaining natural resources such as water. It also refers to man's activity on land and the different purposes to which it is put. By comparing LULC maps of various years, the total area of a region utilised for development activities can be evaluated, and the same procedure is used for SGNP and for Carrying capacity assessment. It can also be used for habitat quality index, land stress index, water denseness index studies of SGNP.

ArcGIS 10.6.1 software platform is used for LULC map creation, and Supervised classification is done for LULC Classification of SGNP with 5 km buffer zone area. Landsat 3, 5, 8 OLI data are used to calculate LULC in SGNP and From LULC Classification areas are measured such as Forest, Vegetation, Settlements, Barren lands, Waterbodies, Agriculture & Mangroves of the Sanjay Gandhi National Park Area, Mumbai with 5 km buffer zone.

2.9 Normalized Difference Water Index (NDWI):

The NDWI is used to track changes in water content in water bodies. It's also utilised to tell the difference between water and dry land, and it's ideal for water body mapping. In the visible infrared wavelength region, water bodies have minimal radiation and high absorbability. It's also a remote sensing-derived indicator that estimates the amount of water in the leaves at the canopy level. Water stress can influence the vegetation canopy during drought episodes, affecting plant development in general and perhaps causing crop failure or lower crop yield in agricultural areas.

Landsat 8 data is downloaded from USGS Earth Explorer. After downloading satellite image raw data, atmospheric correction and pre-processing is done through QGIS software. NDVI is calculated as a ratio between the NEAR INFRARED (NIR) and SHORT-WAVE INFRARED (SWIR) values.

$$NDWI = (NIR - SWIR) / (NIR + SWIR)$$

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2.10 Land Stress Index (LSI):

The LSI is the degree of stress on the land quality in the assessment area and is expressed by the area of the stress type, such as soil erosion, land desertification and land development, per unit area in the assessment area.

For SGNP, land stress index map is created through Soil Loss Equation processing - Rainfall (R), Soil (K), DEM (Process – Slope – LS), LULC (C), and Land Management(P).

Therefore, the Universal Soil Loss Equation, $(A) = R * K * L * S * C * P$ is used.

Throughout the algorithm is processed in Map Algebra Tool and Land Stress Index Map of SGNP is created by ArcGIS 10.6.1 Software.

The formula for LSI is as follows:

$$LSI = A_{ero} * (0.4 * \text{severe erosion area} + 0.2 * \text{mod erosion area} + 0.2 * \text{construction land area} + 0.2 * \text{other land stress}) / \text{area}$$

A_{ero} = Normalization coefficient of LSI, with reference value of 236.0435677948.

2.11 Habitat Quality Index (HQI):

The HQI is primarily used to assess the habitat quality of the most important protected items in green spaces [9,10].

For SGNP Habitat Quality Index map is created by processing the following data - DEM (Process – Slope – LS), LULC (C), and Land Management(P).

Throughout, the algorithm is processed in Map Algebra Tool and Habitat Quality Index Map of SGNP is created by ArcGIS 10.6.1 Software.

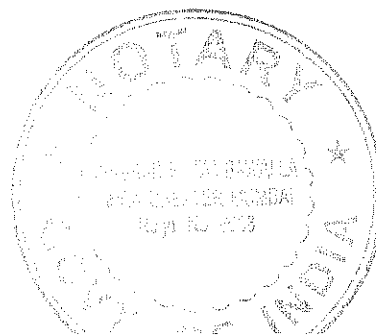
The formula for HQI is as follows:

$$HQI = A_{bio} * (0.35 * \text{forest} + 0.21 * \text{grass} + 0.28 * \text{water} + 0.11 * \text{agricultural land} + 0.04 * \text{construction land} + 0.01 * \text{unused land}) / \text{area}$$

A_{bio} = Normalization coefficient of HQI, and the reference value is 511.2642131067.

2.12 Aerosol Optical Dispersion and PM_{2.5}:

Aerosol Optical Depth is a degree of the extinction of the solar beam by dust and haze. In other words, dust, smoke, and pollution in the atmosphere can obstruct sunlight by absorbing or dispersing light. The value depends mainly upon meteorological conditions and anthropogenic activities in a region. Higher values of AOD denotes poor meteorological



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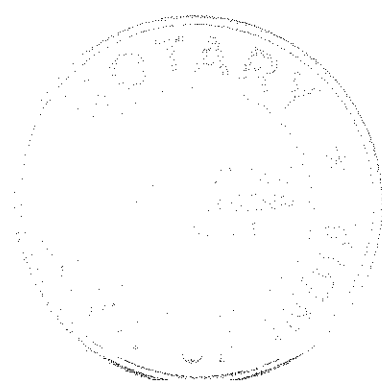
conditions with high anthropogenic activities. Likewise, by comparing $PM_{2.5}$ values of a region with NAAQS, a clear picture of air pollution existing in a region can be understood.

For this purpose, due to the data gapping in MODIS DT-AQUA, AODMODIS derived from DT-TERRA reflection with a spatial resolution of 3 km at $0.55 \mu m$ is used to characterize the spatial variation of aerosol optical depth and $PM_{2.5}$ over our study region. The study area is extracted using ArcGIS tools. In this, each dataset is converted to a point shape file using Arc tools for spatial interpolation. Generated maps are used for analysing spatial distribution patterns of aerosol and $PM_{2.5}$ [8].

Once all above environmental attributes are evaluated, it is possible to use more complex methods including Fuzzy and/or Analytical Hierarchy Process and/or Shannon Entropy Method for evaluation of ECC. In this study f-AHP is used for assessment of ECC. The method is described in brief below.

2.13 A Fuzzy Comprehensive Evaluation method:

The f-AHP method is a two-step process used for estimation of ECC. First, the weights of selected parameters are estimated through AHP process and once the weights are estimated the function is created based on evaluation factors to estimate ECC. The AHP is a multi-criterion and multi-objective decision-making method that combines qualitative and quantitative analysis and is applicable to problems which are difficult to fully quantify. The flowchart indicating the forces and parameters which were selected to comprehensively estimate the ECC for Sanjay Gandhi Park are shown in Figure 2.2.



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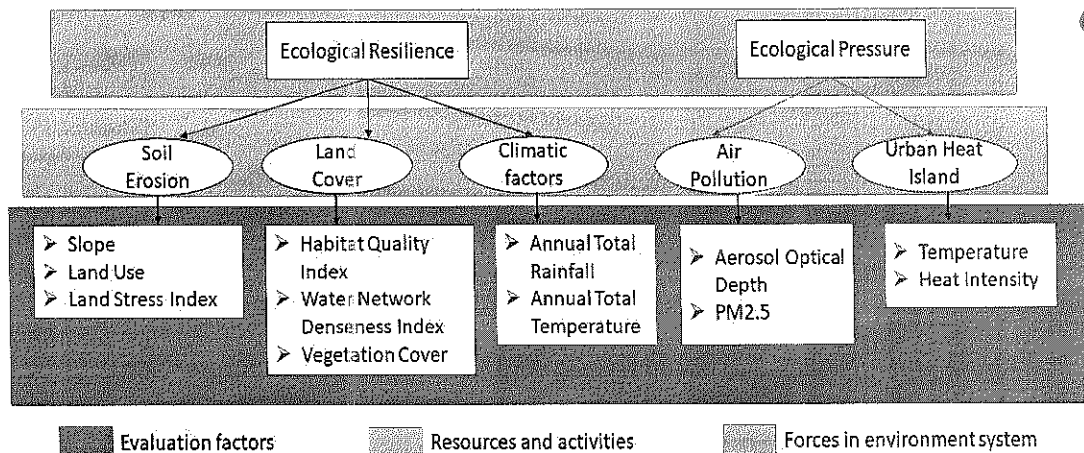


Fig. 2.2: Flowchart representing Evaluation Factors

The hierarchical relations of the evaluation factors for a comprehensive system are constructed through judgement matrix in AHP process. For the judgement matrix, evaluation factors are compared at same level and experts evaluate the importance of these factors according to Saaty’s 9 point scale.

For estimating, the ECC evaluation rating domain was used under a finite group $V = [V_1, V_2, \dots, V_5]$ representing the aggregate of remark grades by the experts considering Saaty’s scale. In this study, V_1 is a very low grade, V_2 is a low grade, V_3 is a moderate grade, V_4 is a high grade, V_5 is a very high grade. Then the membership function was created to describe membership degree of the evaluation factors for estimating ECC. The final matrix representing ECC is shown in equation:

$$ECC = [W_1, W_2, \dots, W_n] \begin{pmatrix} u_1V_1 & \dots & u_1V_n \\ u_mV_1 & \dots & u_mV_n \end{pmatrix}$$

In this study, the ECC for the study area was estimated for year 1987, 2000 and 2020 along with estimation of ECC considering buffer zone for all these years as well.

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3.0 Assessment of Environmental Carrying Capacity and Environmental Attributes:

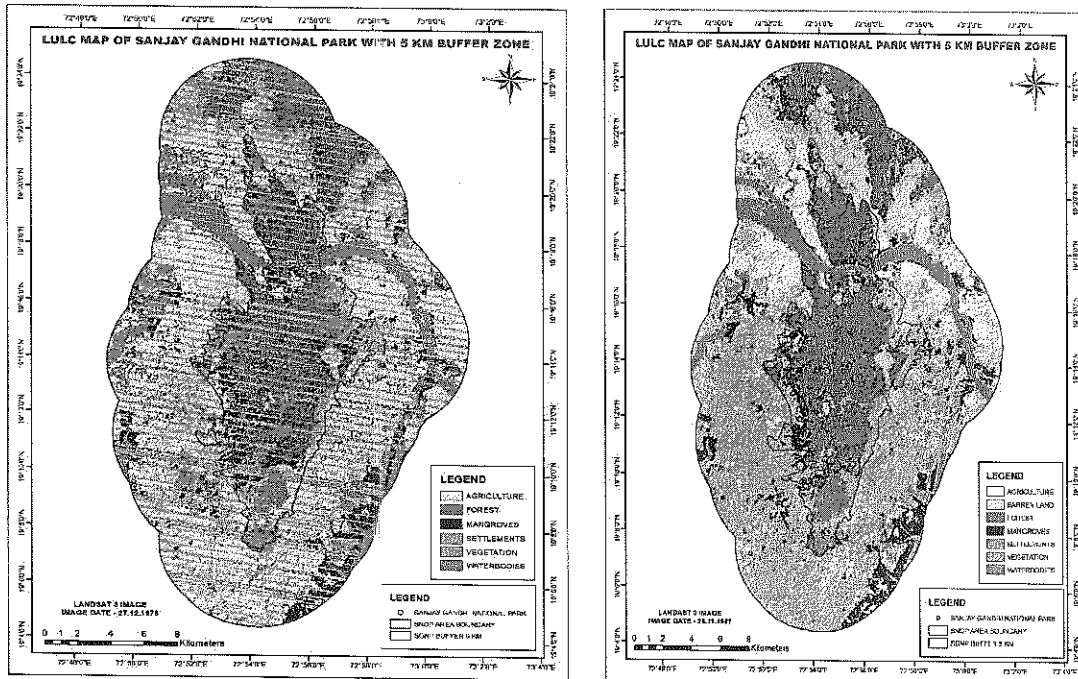
The calculations of the different parameters of the Environmental Carrying Capacity are done with the estimation methods that are discussed above in the methodologies and by considering the data from the Environmental Management Plan for SGNP 2000.

3.1 Calculation of Tourism Carbon Carrying Capacity (TCC)

For the calculation of Tourism Carbon Carrying Capacity, area is considered from the LULC maps created by ArcGIS and tourist inflow details are taken from Environmental Management Plan for SGNP 2000. TCC is estimated by using the CO₂ sequestration method and the calculations are done below as follows:

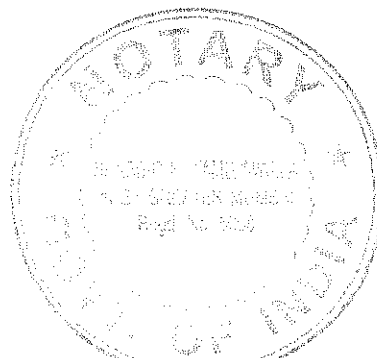
Land Use Land Cover (LULC) of SGNP with Buffer Zone:

The maps of LULC of the study area with buffer zone for the different years are shown below:

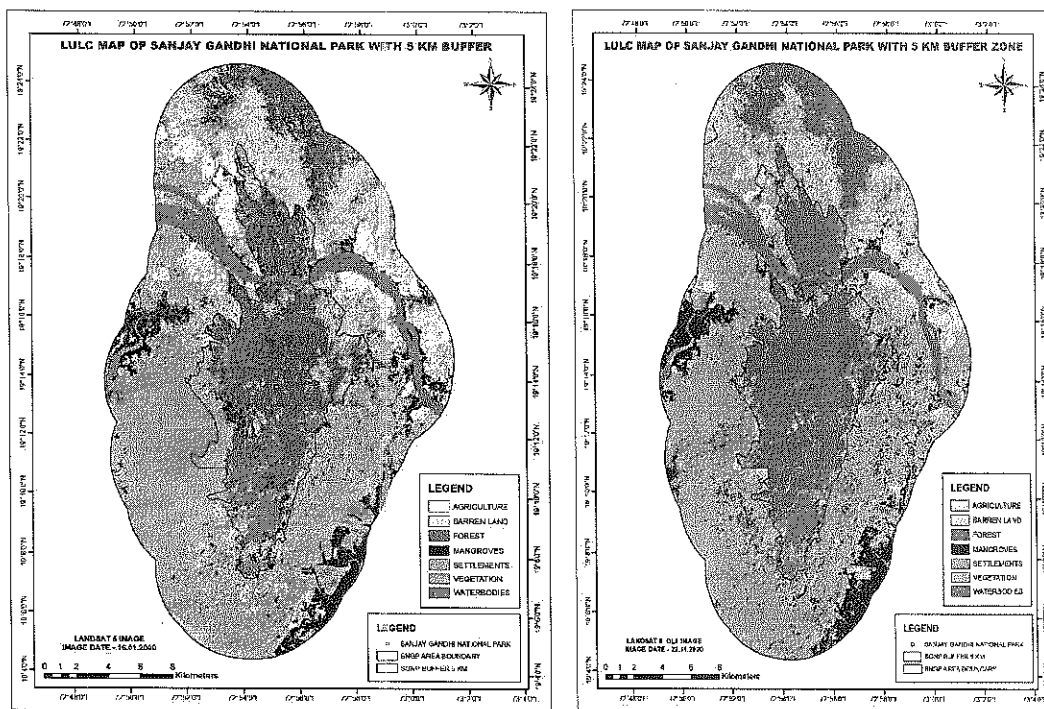


(a)

(b)



591



(c)

(d)

Fig. 3.1(A) Land Use Land Cover (LULC) Map of SGNP with Buffer Zone: (a) 1978, (b) 1987, (c) 2000, (d) 2020

The details of land use land cover for the study area with buffer Zone are as follows:

Table 3.1(A): Details of LULC Map with Buffer:

Category	Year-1978	Year-1987	Year-2000	Year-2020
	Area (Sq.km)	Area (Sq.km)	Area (Sq.km)	Area (Sq.km)
Forest	67.7	88.70	96.93	127.23
Vegetation	110.59	92.30	92.77	124.57
Mangroves	58.78	59.11	43.50	38.52
Water bodies	48.73	36.36	31.76	30.18
Settlements	83.60	136.83	180.96	163.87
Agriculture	181.76	89.13	60.78	32.91
Barren land	--	48.74	44.49	33.89
Total Area	551.19	551.19	551.21	551.21

The LULC classification area for SGNP from 1978–2020 shows a positive increase of forest land which will be beneficial for the wildlife ecosystem. Mangroves and water body areas are however

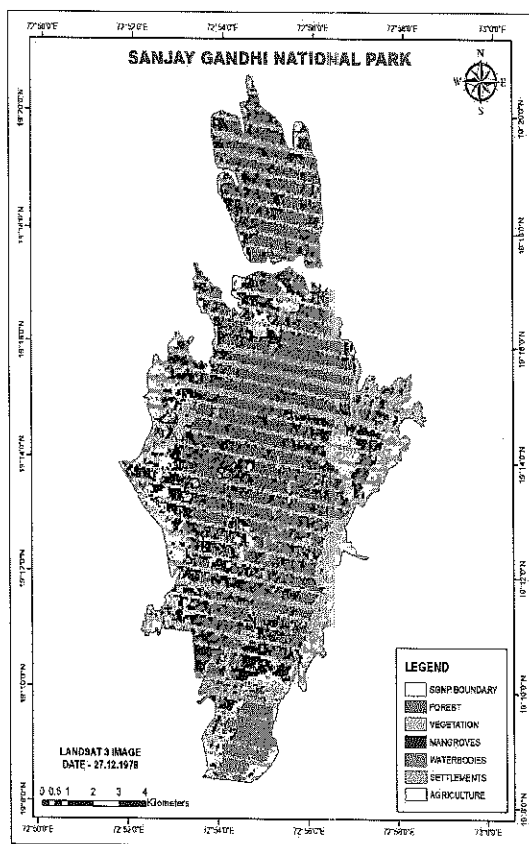


decreasing year by year and indicates a threat to the balance of the environment. Human settlements are also increasing year by year till the year 2000, while showing reduction after that. The remote sensing data should be ground verified to understand the actual status of human settlements in the SGNP. In general terms, encroachments in the ecologically sensitive area should be prevented in order to maintain the balance of fragile ecosystem.

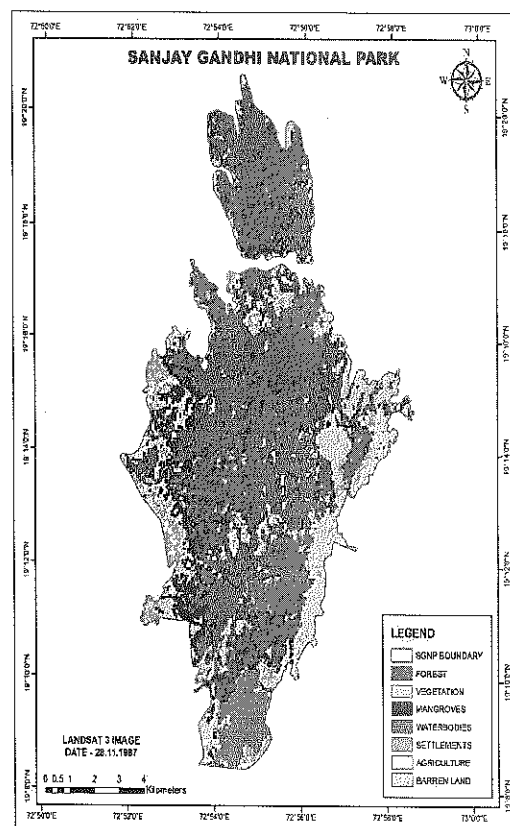
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Land Use Land Cover (LULC) of SGNP:

The maps of LULC of the study area for the different years are shown below:

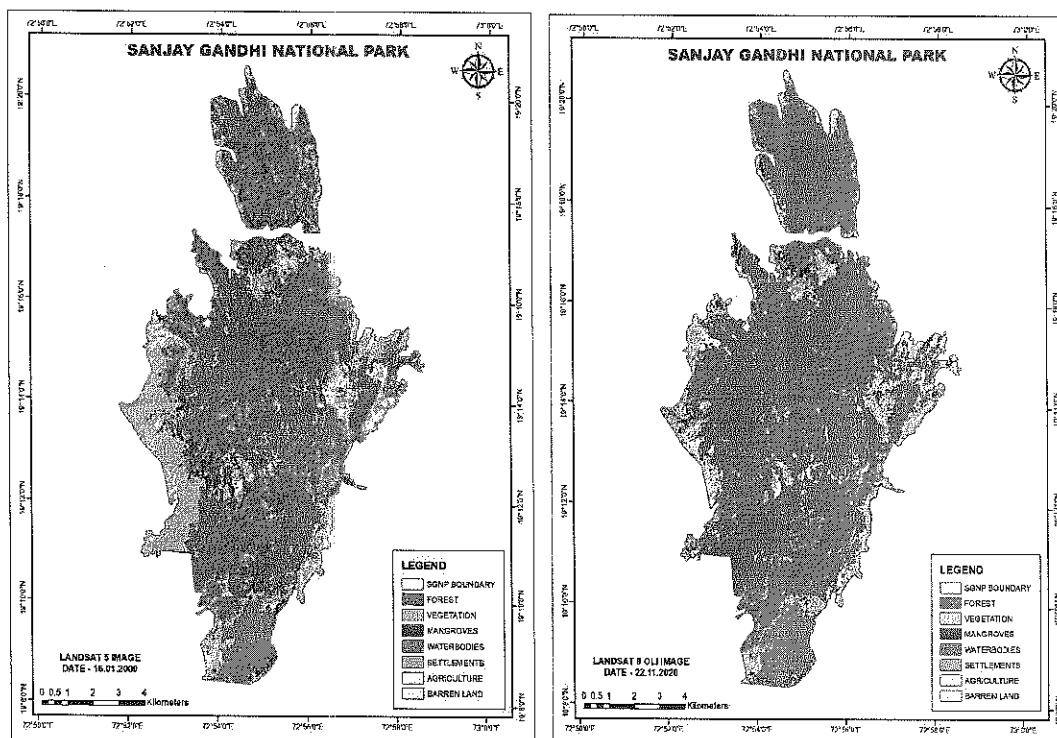


(a)



(b)

593



(c)

(d)

Fig. 3.1(B) Land Use Land Cover (LULC) Map of SGNP: (a) 1978, (b) 1987, (c) 2000, (d) 2020

The details of land use land cover for the study area are as follows:

Table 3.1(B): Details of LULC Map of SGNP:

Category	Year-1978	Year-1987	Year-2000	Year-2020
	Area (Sq.km)	Area (Sq.km)	Area (Sq.km)	Area (Sq.km)
Forest	40.16	59.84	68.35	90.31
Vegetation	26.93	22.09	18.30	15.68
Mangroves	24.67	22.47	11.78	1.89
Water bodies	4.23	5.24	5.17	5.24
Settlements	--	3.98	9.99	2.89
Agriculture	9.28	1.64	1.71	0.67
Barren land	--	4.39	4.34	2.96
Error in Image	14.36			
Total Area	119.67	119.67	119.66	119.66



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Table 3.2(A): Area of SGNP with Buffer: ArcGIS Maps

Name	Area (Hectare)			
	Year - 1978	Year - 1987	Year – 2000	Year - 2020
Forest (Evergreen)	3335	4435	4847	6362
Forest (Deciduous)	3335	4435	4847	6362
Vegetation	11059	9230	9277	12457
Mangroves	5878	5911	4350	3852

Table 3.2(B): Area of SGNP: ArcGIS Maps

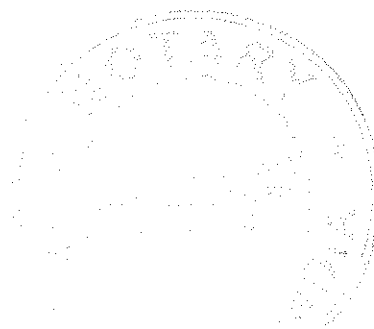
Name	Area (Hectare)			
	Year - 1978	Year - 1987	Year – 2000	Year - 2020
Forest (Evergreen)	2008	2992	3417	4515
Forest (Deciduous)	2008	2992	3417	4515
Vegetation	2693	2209	1830	1568
Mangroves	2467	2247	1178	189

Table 3.3: Calculation of Biomass based on SGNP: [3], [4]

Name	Standing Biomass (t/ha)	Biomass (tonnes) (Standing Biomass * Area)			
		Year - 1978	Year - 1987	Year - 2000	Year - 2020
Forest (Evergreen)	485	974006	1451275	1657696	2190073
Forest (Deciduous)	258	518131	772018	881825	1165028
Vegetation	74.25	199993	164068	135928	116449
Mangroves	213.8	527615	480511	251916	40581
Total		2219746	2867873	2927366	3512132

Table 3.4: Calculation of CO₂ Sequestration and TCC based on SGNP: [3]

Name	YEAR - 1978	YEAR - 1987	YEAR – 2000	YEAR - 2020
Carbon Absorbed (Total biomass * 0.5)	1109873	1433936	1463683	1756066
CO₂ Sequestration (Carbon Absorbed * 3.67)	4073235	5262548	5371718	6444763





Tourism Carrying Capacity (CO ₂ Sequestration * r)	130343	168401	171894	206232
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Sample Calculation: (For Year 2020)

Area of Forest (Evergreen) = 4515 ha

Standing Biomass = 485 t/ha [4]

Biomass = Area * Standing Biomass [3]

$$= 4515 * 485$$

$$= 2190073 \text{ tonnes}$$

Total biomass = 3512132 tonnes

Carbon Absorbed = Total biomass * 0.5 [3]

$$= 3512132 * 0.5 = 1756066 \text{ tonnes}$$

CO₂ Sequestration = Carbon Absorbed * 3.67 [3]

$$= 1756066 * 3.67 = 6444763 \text{ tonnes}$$

TCC = CO₂ Sequestration * r [3]

$$= 6444763 * 0.032$$

$$= 206232 \text{ footfall}$$

The total footfall value observed for the study from Environmental Management Plan of SGNP 2000 was 1466359 while the calculated footfall values by CO₂ sequestration method is found to be 206232. While the value of actual footfall seems to be high, it is necessary to understand the actual number of visitors spending whole day in SGNP, peak time for visitors and related parameters and normalise this value of actual footfall accordingly so that correct comparison with the carrying capacity value can be made.

3.2 Calculation of Water Environment Carrying Capacity (WECC):

The WECC calculations are done below based on data assorted from Environmental Management Plan for SGNP 2000 for Vihar and Tulsi lakes and are based on utilization ratio.

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Table 3.5: Baseline Data of Water: [2]

Lake	Volume of water (m ³)	Consumption of water (MLD)
Vihar Lake	42000000	68
Tulsi Lake	10430000	18

$$UR_{\text{ Available Water Resources}} = \frac{\text{Amount of Water Consumed}}{\text{Total Available Water Resources}}$$

$$\text{Amount of water Consumed} = 18 + 68 = 86 \text{ MLD}$$

$$= 86000 \text{ m}^3/\text{day}$$

$$= 31390000 \text{ m}^3/\text{year}$$

$$\text{Total Available Water Resources (Year)} = (42000000 + 10430000) = 52430000 \text{ m}^3$$

Therefore,

$$UR_{\text{ Available Water Resources}} = \frac{\text{Amount of Water Consumed}}{\text{Total Available Water Resources}}$$

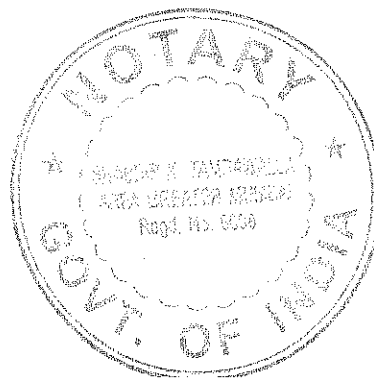
$$= (31390000 / 52430000) * 100$$

$$= 59.87 \%$$

The utilisation ratio of available water resources in SGNP is 59.87% which is less than the reference value of 100%. While 100% indicates that the carrying capacity has reached, the idea is to never reach 100% and sufficient measures should be applied to keep the utilisation ratio within the range of current assessment i.e. 60-65%. This also calls for regular monitoring of WECC, so that if UR is increasing, corrective measures should be applied to restore the balance.

3.3 Calculation of Noise Carrying Capacity (NCC):

For Noise level calculations the following 3 areas are selected and Environmental Management Plan for SGNP 2000 provides noise level ranges of these selected regions for three seasons. The values are compared with CPCB standards for silence zone. The following tables below shows the noise level measured in SGNP and CPCB Noise standards for comparison.



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Table 3.6: Seasonal Baseline Noise Level Data in Study Area [2]

Location	Season	Noise Levels dB (A)		
		Day Time	Night Time	Average
Tulsi lake	Winter	35-36	30-36	36
	Summer	39-47.3	38-39.5	43
	Post Monsoon	41-56	39-47	47
Yeur Village	Winter	33-56	34-47	41
	Summer	39-58	38-41	44
	Post Monsoon	40-58	39-50	50
SGNP Entrance	Winter	35-61	35-46	47
	Summer	39.5-65.3	37-49.5	51
	Post Monsoon	40-60	38-53	49

Table 3.7: CPCB Noise Standards [2]

Category of Area	Limits in dB (A)	
	Day Time	Night Time
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Silence Zone	50	40

The baseline seasonal noise level data in SGNP shows that it is within the limit in some regions while in some regions it exceeds. The maximum noise level measured during daytime near Tulsi lake during post-monsoon, Yeur village and SGNP Entrance gate in all seasons are showing values greater than the day time limits of CPCB for silence zone. Likewise, the maximum noise level measured during night time near Tulsi lake during post-monsoon and in all seasons for Yeur village, SGNP entrance exceeded the night time limits of CPCB for silence zone. However, the average values of noise levels are within the limit except for the SGNP entrance gate due to high traffic flows and other human activities.

While the current NCC assessment is restricted on the basis of standards defined as per human thresholds, it is important that impacts on faunal biodiversity is understood in detail for tailored



understanding of NCC. Similarly impact of illumination should also be explored in detail in order to determine its thresholds.

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3.4 Calculation of Air Carrying Capacity (ACC):

The values of air pollutants such as SO₂, NO₂, SPM and RSPM measured in the SGNP environment, provided in Environmental management plan for SGNP 2000 are considered and compared with NAAQS values of each pollutant to harness the Utilization ratio for AECC calculation and are estimated as follows:

$$UR_{SO_2} = \frac{7.3}{15} * 100 = 48.66 \%$$

$$UR_{NO_2} = \frac{32.7}{30} * 100 = 124 \%$$

$$UR_{SPM} = \frac{162}{100} * 100 = 162 \%$$

$$UR_{RSPM} = \frac{105}{75} * 100 = 140 \%$$

The utilisation ratio for air calculated should be within the reference value of 100% so that the resource is not overused and environment is not overloaded. However, the calculated value is exceeding the reference value for the air pollutants considered in our study except for SO₂. It shows that air pollutants like NO₂, SPM and RSPM are polluting which are mainly due to vehicular emissions and particulate matter due to which the SGNP environment is getting affected very badly.

The calculations done above are based on the selected fundamental methodologies of carrying capacity assessment. But estimation of ECC is critical and should be done precisely as far as possible, advanced tools such as Remote sensing and GIS are being used to assess the environmental attributes like NDVI, LST, LULC, NDWI, LSI and HQI, which are analysed for the SGNP and the buffer area and is explained further in trailing sections.

3.5 Assessment of Environmental Attributes for ECC:

For the study area of SGNP, GIS and Remote Sensing based ecological parameter maps are generated with 5 km buffer Zone and are studied well for the ECC assessment. The study objectives also extend this approach to the core zone in the near future. The different parameters analysed are explained below:

3.5.1 Normalized Difference Vegetation Index (NDVI) of SGNP:

The maps of NDVI of the study area for the different years are shown below:

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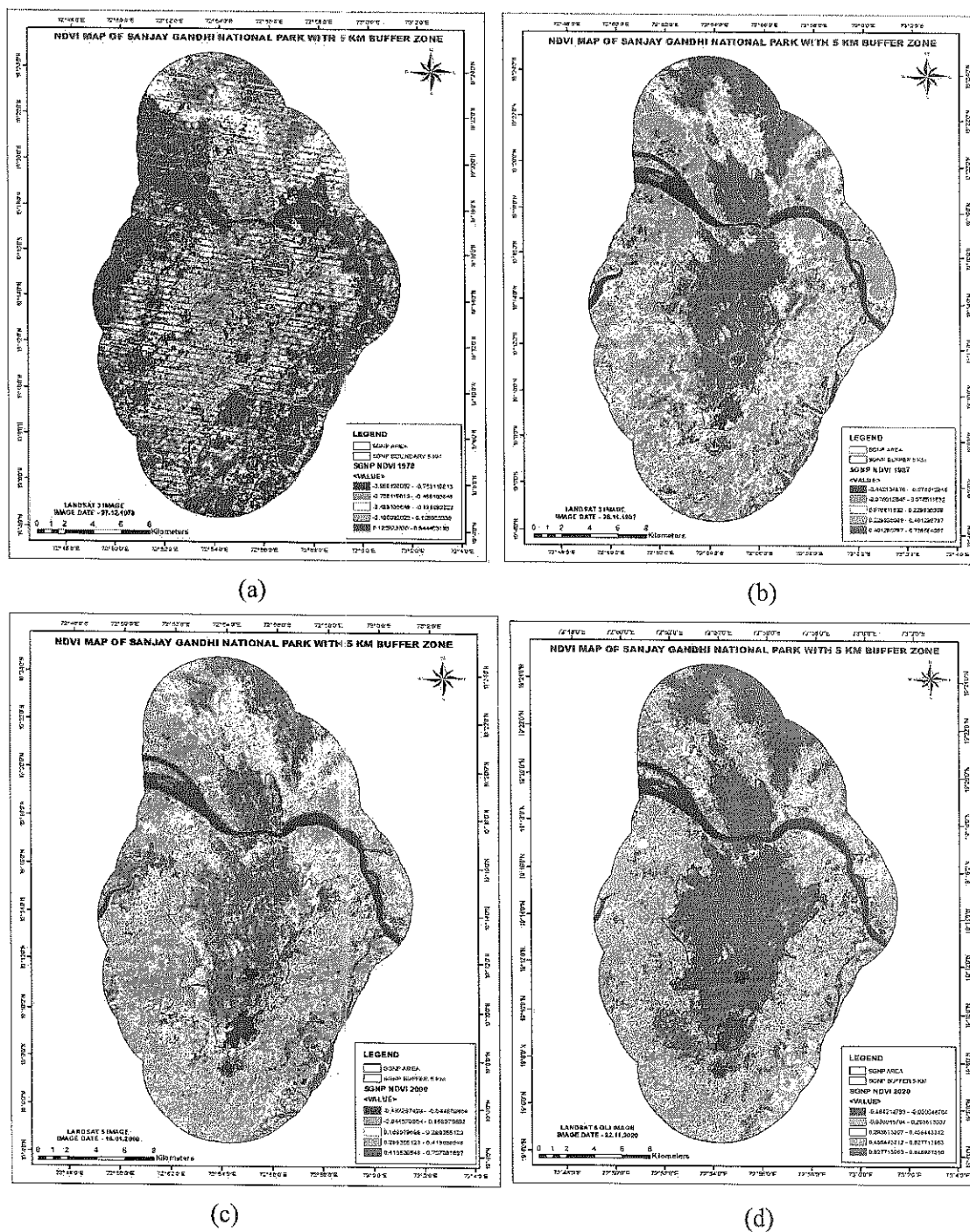


Fig. 3.2 Normalized Difference Vegetation Index (NDVI) of SGNP: (a) 1978, (b) 1987, (c) 2000, (d) 2020

For Landsat 4-7, $NDVI = \frac{\text{Band 4} - \text{Band 3}}{\text{Band 4} + \text{Band 3}}$ and For Landsat 8, $NDVI = \frac{\text{Band 5} - \text{Band 4}}{\text{Band 5} + \text{Band 4}}$ are used.

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The details about the NDVI data for SGNP is as follows:

Table 3.8: Details of NDVI Map:

Data extracted from	Date	Non vegetative area (Sq.km)	Vegetative area (sq.km)
Landsat 8 OLI	22.11.2020	250.88	300.32
Landsat 5	16.01.2000	325.86	225.34
Landsat 3	28.11.1987	331.56	219.63
Landsat 3	27.12.1978	435.16	116.03

The comparison of NDVI values of SGNP from 1978 to 2020 shows a positive increase in vegetation area from 116.03 Sq.km to 300.32 sq.km. It indicates that vegetation cover of SGNP increased over the years which is a good sign for the enhancement of it's carrying capacity.

3.5.2 Normalized Difference Water Index (NDWI) of SGNP:

The map of NDWI of the study area is shown below:

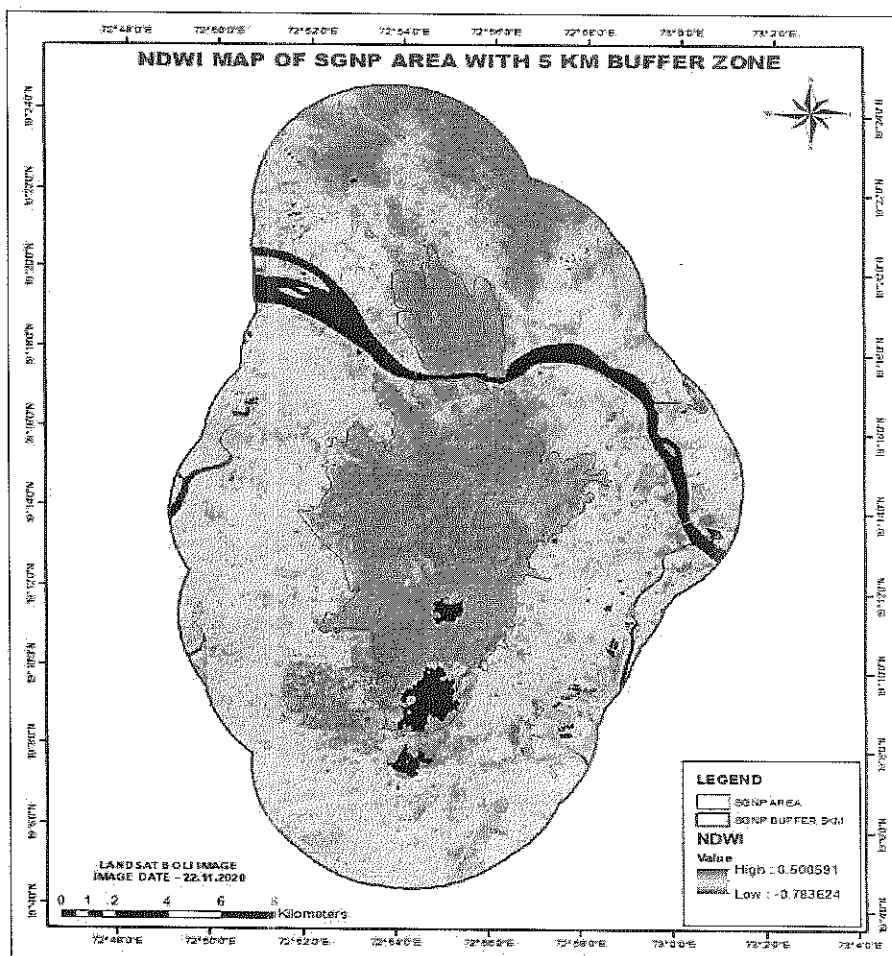


Fig. 3.3 Normalized Difference Water Index (NDWI) Map of SGNP



NDWI value of SGNP area dated 22.11.2020 shows a low value of -0.78 to a high value of 0.5. High values indicate water body while low values indicate dry land.

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3.5.3 Land Stress Index (LSI) of SGNP:

The map of LSI of the study area is shown below:

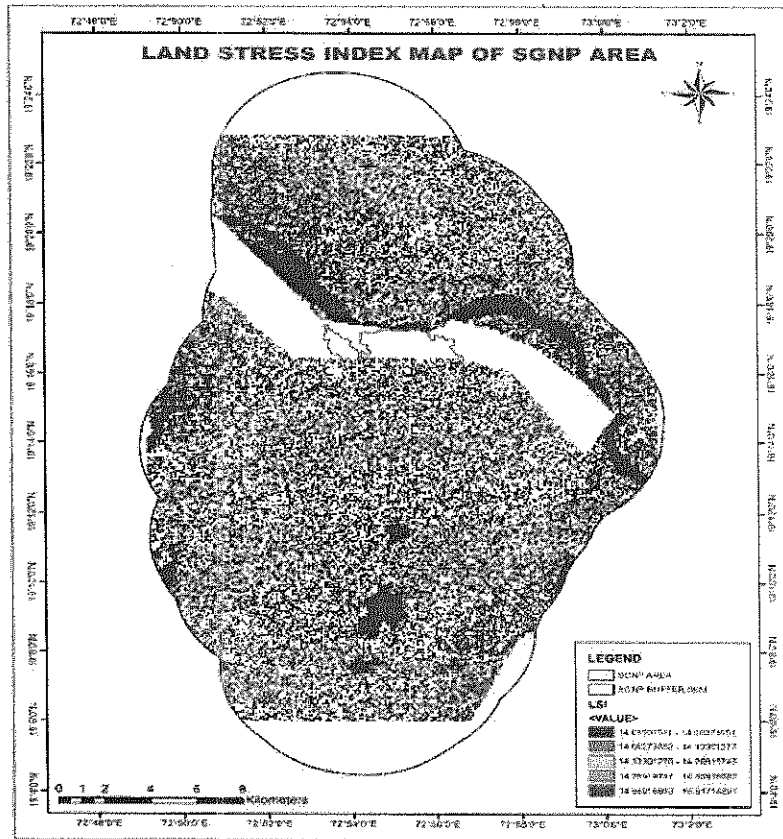


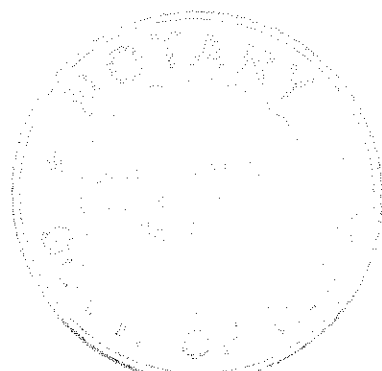
Fig. 3.4 Land Stress Index (LSI) Map of SGNP

The approximate areas of LSI in SGNP (in Sq. Km) are as follows:

Table 3.9: Details of Soil Erosion Classification:

LSI	Very Low	Low	Moderate	High	Very High
Area (Sq.km)	266.16	0.91	0.13	0.03	0.02

The above data depicts that most of the area of SGNP comes under very low land stress index, less chances of erodibility. On ground verification of the remotely sensed data is necessary in this case along with secondary literature.



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3.5.4 Slope Map of SGNP:

The slope map of the study area is shown below:

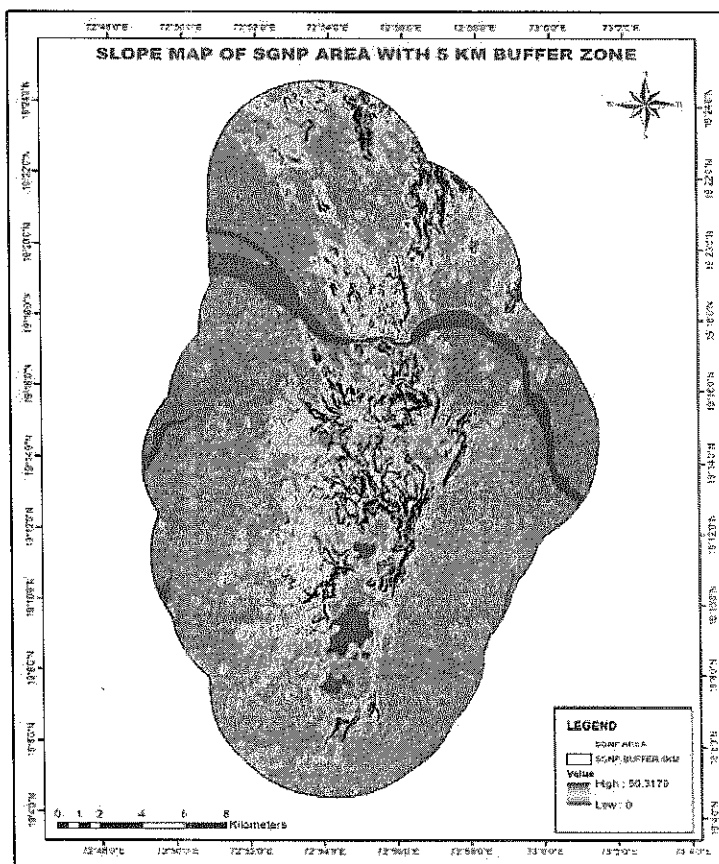


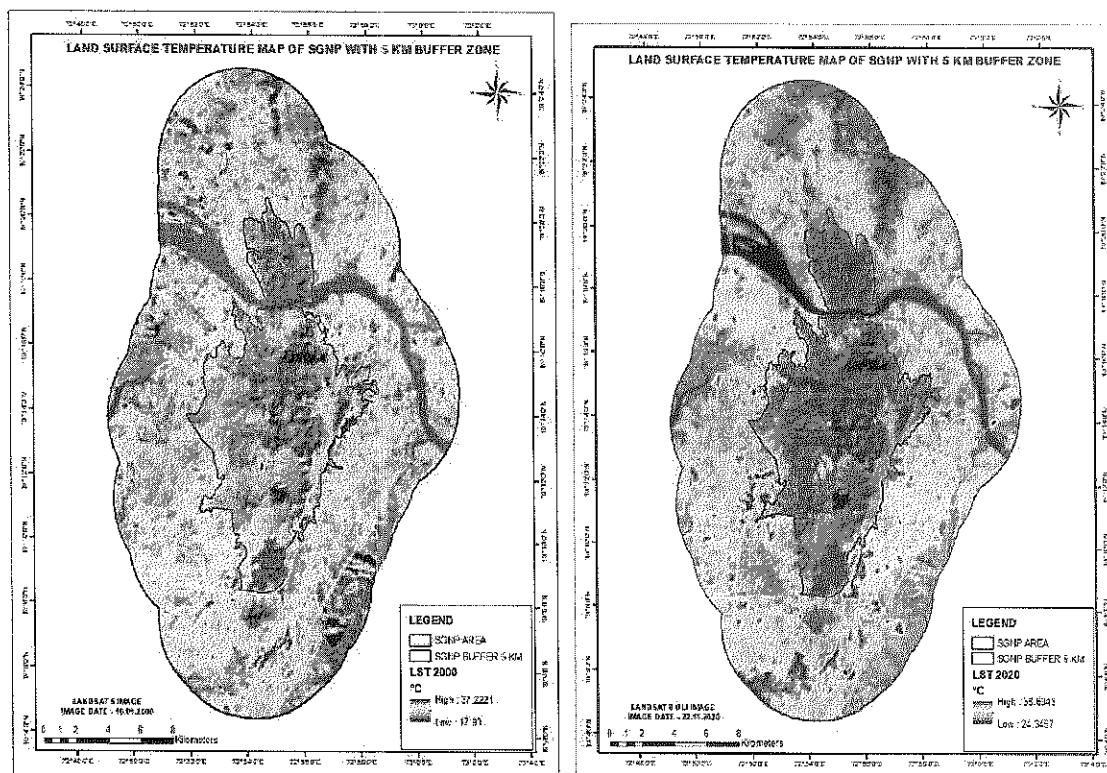
Fig. 3.5 Slope Map of SGNP

Slope values of SGNP ranges from 0 to 56.31. Lower values indicate low altitude area while higher values indicate high altitude areas.

3.5.5 Land Surface Temperature (LST) of SGNP:

Landsat 5, 8 data are used to calculate the Land Surface Temperature of SGNP area and the image dates are 22.11.2020 & 16.01.2000. The LST maps of SGNP displays that Land surface temperature has increased in 2020 when compared to 2000. The lowest temperature reported in 2000 was 17.93°C which has increased to 24.34°C in 2020. This increase needs attention and should be monitored constantly. The LST map of the study area for year 2000 and 2020 is shown below:

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(a)

(b)

Fig. 3.6 Land Surface Temperature (LST) Map of SGNP: (a) 2000, (b) 2020

3.5.6 Habitat Quality Index (HQI) of SGNP:

The Habitat Quality Index (HQI) is primarily used to assess the adequacy of the habitat quality of the most important protected items in natural habitats. The Habitat Quality Index map of SGNP have a higher value of 267.74 and a lower value of 74.28. Higher values indicate high habitat suitability and lower values indicates low habitat suitability based on habitat quality. Most of the area of SGNP have higher HQI values hence greater habitat suitability for wildlife population. The HQI map depicting the study area is shown below. On ground validation of the remotely sensed data is necessary which shall be attempted during the next phase of the project.



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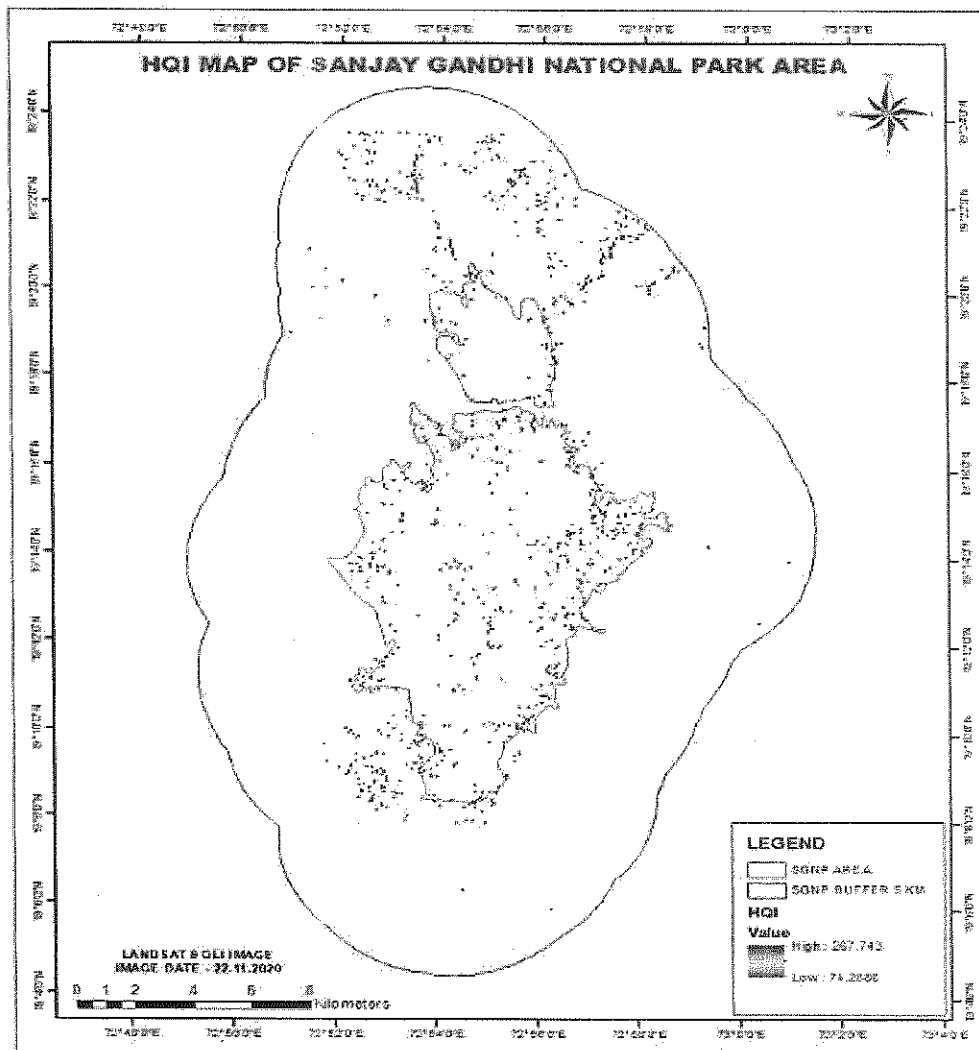


Fig. 3.7 Habitat Quality Index (HQI) Map of SGNP

3.5.7 Aerosol Optical Depth (AOD) and PM_{2.5} of SGNP:

For the analysis of the aerosol optical depth and PM_{2.5} data is extracted from AOD_{MODIS} with a spatial resolution of 3 km. The study area is extracted using ArcGIS tools. The details of the map are shown in the table below:

Table 3.10: AOD and PM_{2.5} at Sanjay Gandhi National Park:

Sr. No	Date	Aerosol Optical Depth (AOD)	Particulate Matter - PM _{2.5} ($\mu\text{g}/\text{m}^3$)
1	01-Mar-19	0.29	45.11
3	04-Dec-19	0.02	14.36

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The mean values of AOD and PM_{2.5} are showing variations. The estimate indicates higher anthropogenic activities and air pollution due to poor meteorological conditions. The map showing the details of aerosol optical depth and PM_{2.5} is shown below. Detailed analysis of AOD and PM_{2.5} with better time resolution and continued monitoring is necessary to conclude this. These parameters form a crucial factor layer in the analytic hierarchy process.

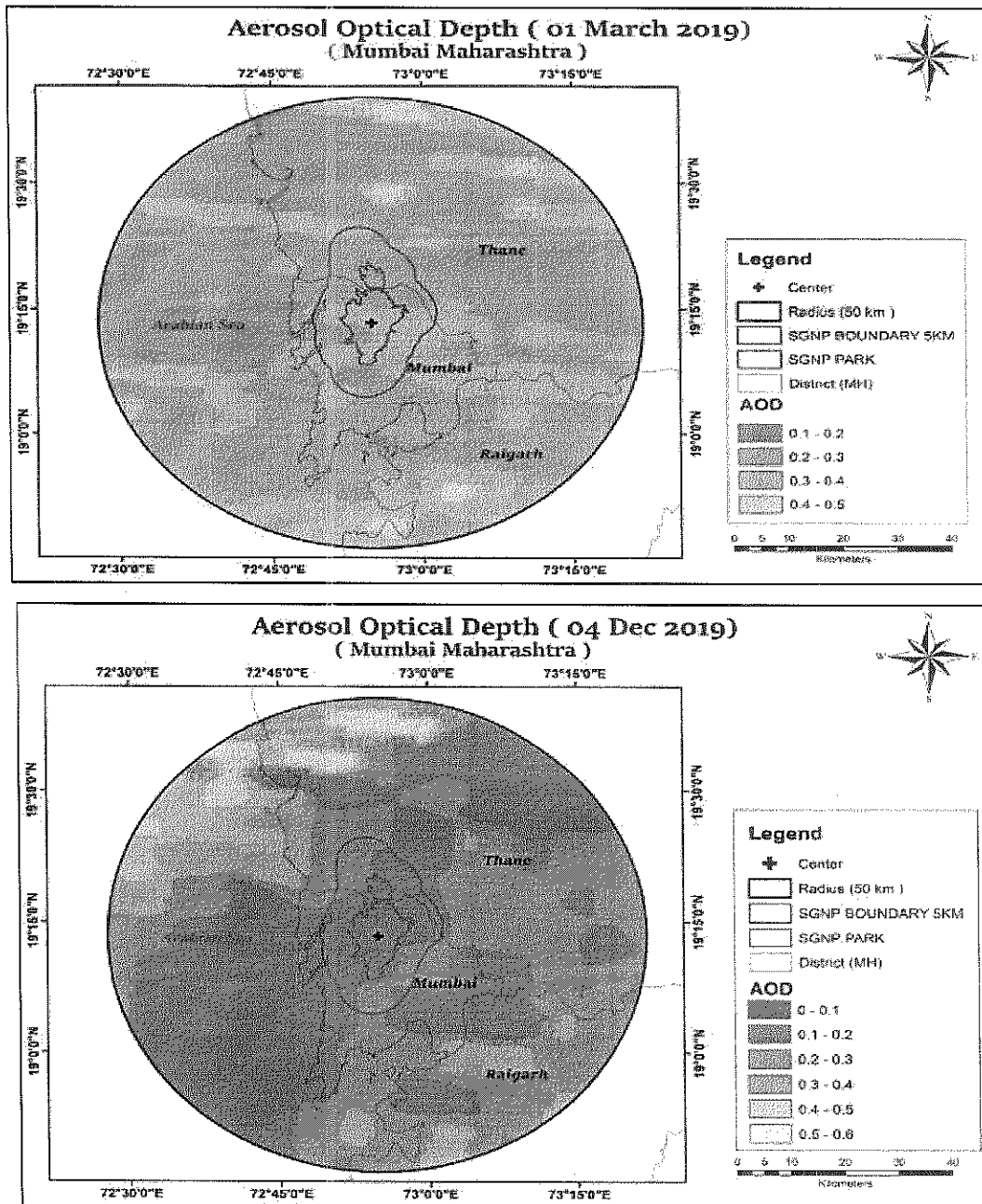
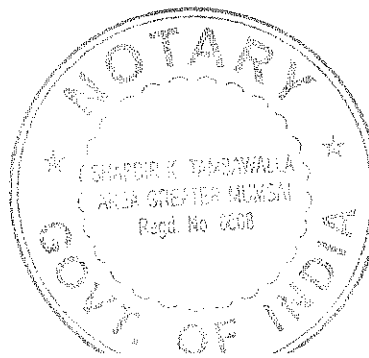


Fig. 3.8 Aerosol Optical Depth Map of SGNP



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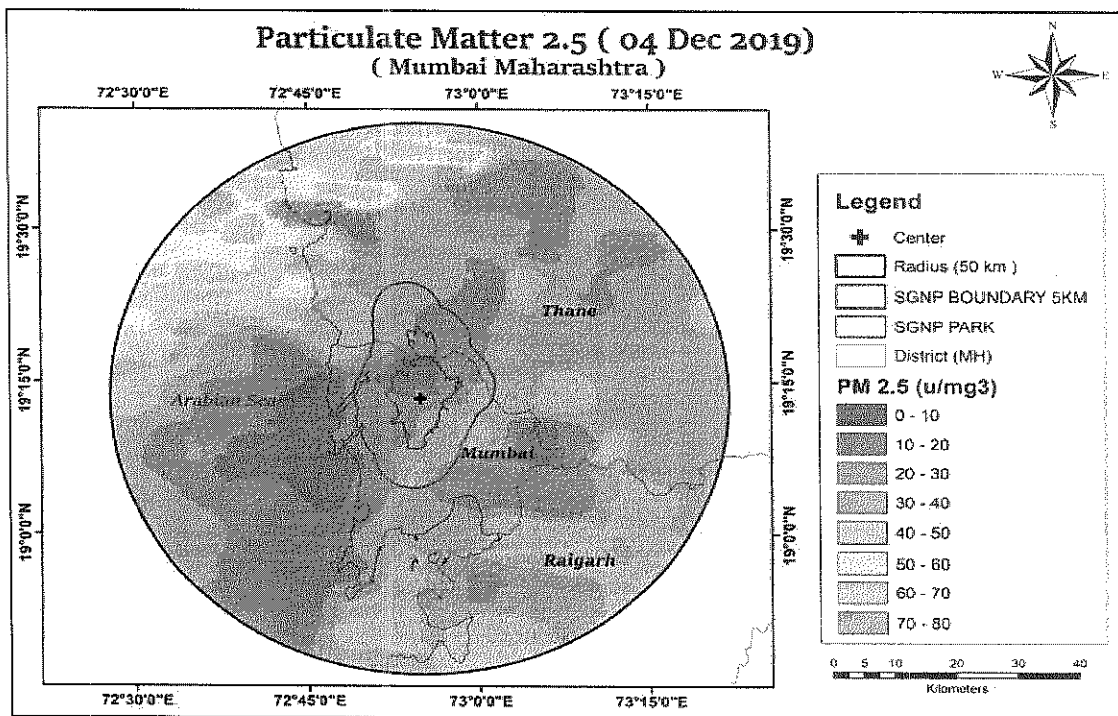
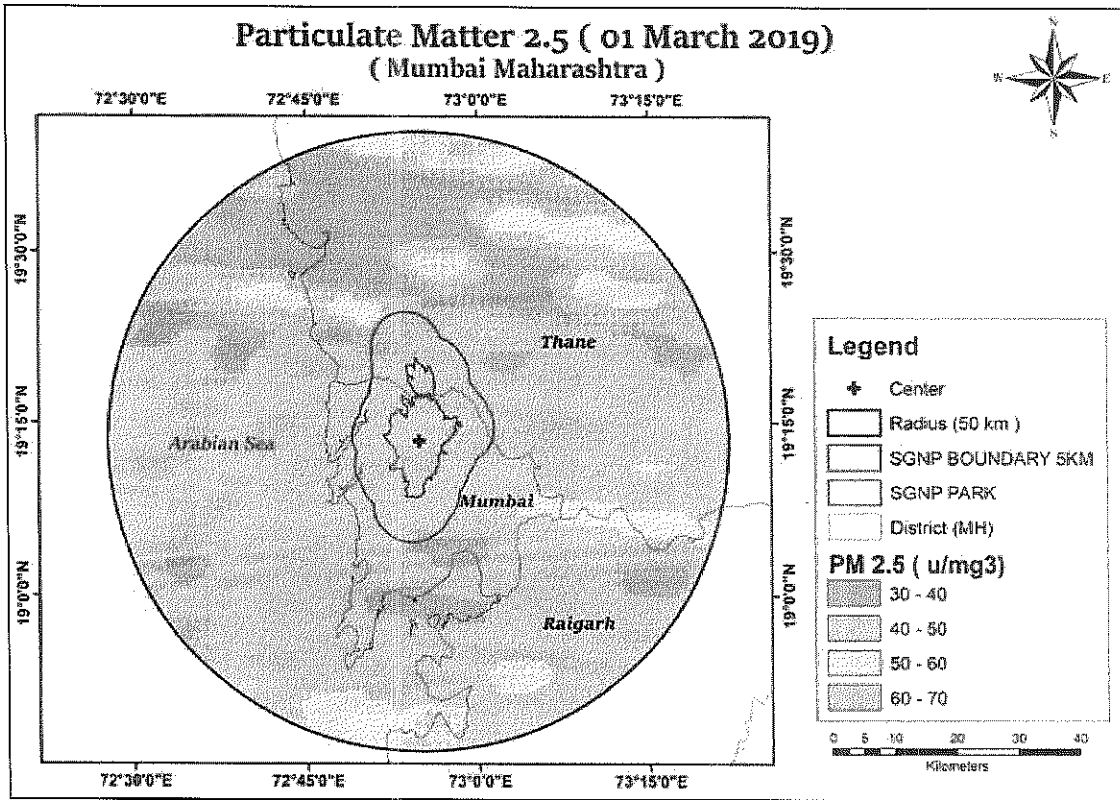


Fig. 3.9 Particulate Matter PM_{2.5} Map of SGNP



From the analysis of above environmental attributes, it has been seen that there are certain parameters which suggest that there is a breach of environmental carrying capacity. Parameters such as land use, air pollution, AOD, PM_{2.5}, Noise, Tourism and so on indicate that the park might be under tremendous environmental pressure while other factors such as biomass, forest, NDVI, NDWI etc indicate that sufficient environmental carrying capacity is maintained. Hence this preliminary analysis is substantiated with more data and further assessment of environmental carrying capacity using f-AHP is done in this study.

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3.6 Assessment of Environmental Carrying Capacity (ECC) using AHP:

Based on described methodology, the ECC was estimated for different years and the weights obtained using AHP process for evaluation factors is shown in Table 3.11.

Table 3.11: Subjective Weights based on Analytical Hierarchy Process Method:

Evaluation factors	Factor type	Weight
Slope	Negative	0.191
Land Use	Negative	0.084
Land Stress Index (LSI)	Negative	0.19
Habitat Quality Index	Positive	0.016
Water Network Denseness Index	Positive	0.066
Vegetation Cover	Positive	0.016
Annual Total Rainfall	Negative	0.034
Annual Total Temperature	Negative	0.05
AOD	Negative	0.097
PM 2.5	Negative	0.103
Temperature	Negative	0.057
Heat Intensity	Negative	0.097



The fuzzy matrix obtained for estimating ECC is shown in Table 3.12 for SGNP without buffer.

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Table 3.12: Fuzzy Matrix for year 2020 for SGNP without buffer:

Evaluation factors	Remark Grades				
	Very Low (V ₁)	Low (V ₂)	Moderate (V ₃)	High (V ₄)	Very High (V ₅)
Slope	0.3427	0.6572	-1.4469	FALSE	0
Land Use (Sq. Km)	0	0	0	0	0
Land Stress Index (LSI)	0.21875	0.7812	-0.7241	FALSE	0
Habitat Quality Index	FALSE	FALSE	0.6379	0.3620	1
Water Network Denseness Index	0	0	0	0	1
Vegetation Cover (Sq. Km)	FALSE	FALSE	FALSE	0.3863	1
Annual Total Rainfall (mm)	0	0.7528	0.2471	FALSE	0
Annual Total Temperature	0	0.3571	0.6428	FALSE	0
AOD	0	0	2.4	0.6363	0.3636
PM 2.5	0	0	0.3636	0.6363	0
Temperature (°C)	0	0.6995	0.3004	FALSE	0
Heat Intensity (°C)	0	0.1428	0.8571	FALSE	0

The fuzzy matrix was constructed for different years i.e. 1987, 2000 and 2020 and then it was multiplied with weights to estimate the ECC. The ECC thus found was for SGNP with and without buffer under different grades. The maximum value of ECC corresponding to grade was selected as final ECC for SGNP and SGNP buffer and corresponding ECC status was estimated.

The estimation of ECC for different years in the study are with and without buffer is shown in Table 3.13.

Table 3.13: Environmental Carrying Capacity (ECC) values for SGNP:

Year	Environmental Carrying Capacity	
	Sanjay Gandhi National Park	Sanjay Gandhi National Park with buffer
1987	1.497 (Moderate)	0.519 (Moderate)





2000	0.2334 (very low)	0.381 (Low)
2020	0.25 (Low)	0.371 (Low)

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The values in Table 3.12, are maximum of the values obtained across V₁ to V₅ grade and corresponding grade in which they were lying is shown in brackets below. From, Table 3.13 it can be inferred that SGNP area was under moderate carrying capacity in year 1987 and after that due to air pollution and urban heat island effect the ECC of the region started deteriorating and in year 2000 it reached to very low stage. After 20 years, the inside of SGNP has improved but still the ECC remains low which is a matter of concern. Therefore, the efforts are required to maintain the area in such a way that it can be taken to its state of year 1987 when it has moderate ECC.

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4.0 Summary:

Eco-Sensitive Zones (ESZs) or Ecologically Fragile Places (EFAs) are areas around Protected Areas, National Parks, and Wildlife Sanctuaries in India that have been recognised by the Ministry of Environment, Forests, and Climate Change (MoEFCC), Government of India. Declaring ESZs has the goal of creating "shock absorbers" for protected areas by regulating and supervising activities in and around them. These zones are indispensable for a nation as they preserve biologically and ecologically rich areas and potentially valuable and unique natural resources that would be difficult to replace once annihilated. The ecosystem is quite delicate around these areas and needs to be protected against human intervention. They are of immense importance to human society as they are ecologically and economically important, maintain ecological stability and preserve the rarity of the ecosystems they harbor.

Ecosystems and populations have a limited capacity to cope with environmental stress; stress above a certain threshold may be detrimental for the ecosystem. Hence carrying capacity assessment, which is a tool to determine "the growth limits that an area can accommodate without violating environmental capacity goals", are a need of the hour to protect such ESZs.

Owing to the limited literature, data availability, selected methodologies, our calculations and findings currently show that some of the environmental attributes are within the permissible limits of carrying capacity while some have exhausted the limits. The utilization ratio of available water resources in SGNP is 59.87%, which is less than the reference value of 100%. However, as indicated in the assessment section, the CC should be evaluated consistently in order to understand the changes in UR and plan for restoration, if needed.

The total calculated footfall, in terms of tourists, shows that it is in a critical stage and has exceeded the maximum footfall possible when compared with the carbon sequestration potential of the area and hence that can affect the wildlife and its carrying capacity. The average values of noise levels are within the limit except for the SGNP entrance gate due to high traffic flows and other human activities, and it should be controlled by suitable measures. The utilization ratio calculations for air pollutants show some of the air pollutants are already beyond the safe limits and it is high time to consider this serious issue. With appropriate air pollution and noise control management measures installed, the values can be maintained within limits without affecting the tourism population and the flora and fauna of the park. Assessment in reference to the impact to faunal diversity of the park is also to be attempted during the detailed planned study as indicated earlier.

The comparison of NDVI values indicates that the vegetation cover of SGNP increased over the years, which is a good sign for the enhancement of its carrying capacity. The LULC classification area for SGNP from 1978-2020 shows a positive increase in forestland, which must be beneficial for the wildlife and overall ecosystem. Mangroves and water body areas, within the SGNP and buffer area, analysed through remote sensing data, are decreasing year by year. Human settlements are increasing year by year till 2000 in the SGNP area, while the increase is noted till date in the area including buffer, indicating a threat to the balance of the environment. This indicates that construction in the area should be avoided, as it might disturb the balance of ecological systems in the area. The LST maps of SGNP displays that surface temperature increased in 2020 when compared to 2000. This increase needs attention and should be continuously monitored. Preliminary analysis of SGNP indicates limited land stress which should be maintained as is for ecological balance to be maintained. The mean values of AOD and PM_{2.5} show variations, and the maximum values of AOD and PM_{2.5} estimated in SGNP in 2019 indicate higher anthropogenic activities and air pollution, which is also confirmed by the ground data given in the literature.

The above environmental attributes are indicating that the eco sensitive zone under consideration is at a critical stage and in order to make a positive intervention and to restore the qualities of the eco-sensitive zone the assessment of carrying capacity is unavoidable and the same is evaluated in this report. Parameters like air and noise might be clearly indicating a pressurized state, however, improvement in vegetation is a positive sign. In order to clearly understand the carrying capacity of the SGNP, these critical environmental attributes are weighed scientifically and f-AHP is used to derive a meaningful conclusion in relation to environmental carrying capacity. The above parameters and the values ascertained using remote sensing and secondary literature forms the baseline scenario and is used for above advanced tool to estimate the overall environmental carrying capacity of the eco-sensitive zone.

The preliminary conclusion based on secondary data analysis concludes the following points:

1. Construction within the premises of the SGNP should be discouraged as it will affect the fragile ecosystem of the area. This will also put pressure on other environmental attributes such as water, air and noise which will affect the overall environmental carrying capacity.
2. Assessment of NCC will need a detailed analysis with biodiversity centric focus, given the impact of species present in the area can be severely affected. This aspect is to be explored in depth and a long term study is needed in this regards.



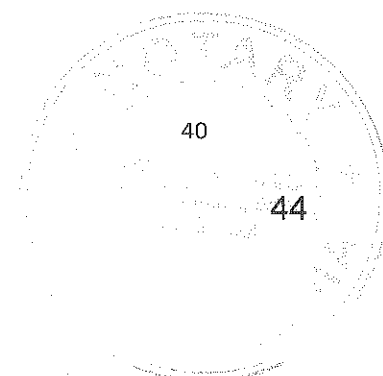
3. Suitable measures to curb the impacts of air and noise pollution in the area should be employed at the earliest to preserve the floral and faunal biodiversity.
4. The slope factors of the area show a reduced stress on land which should be maintained by avoiding construction activities in the area.

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Further evaluation of the ECC for SGNP using f-AHP and considering the ecological parameters selected on a time scale shows that the ecological pressure is increasing in the area in terms of pollution and increasing temperatures. Hence seeing the temporal variation for ECC for SGNP, the following conclusions are made:

- 1) The ecological resilience factors like land cover which can be improved should be done on priority.
- 2) The ecological pressure inducing factors such as air pollution needs to be minimized by controlling the particulate matter.

To summarise, the ECC of the SGNP has deteriorated considerably, and efforts should be made ahead of time to ensure that the present CC is protected and improved upon.



5.0 References:

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Item No. 02 & 03

Court No. 1

**BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI**

Original Application No. 462/2018

(Earlier O.A. No. 11/2018 (SZ))

WITH

Original Application No. 76/2015 (SZ)

D. V. Girish

Applicant(s)

Versus

Union of India & Ors.

Respondent(s)

With

D. V. Girish

Applicant(s)

Versus

The Member Secretary, National Tiger
Conservation Authority, MOEF & Ors.

Respondent(s)

Date of hearing: 19.03.2020

CORAM:

**HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON
HON'BLE MR. JUSTICE SHEO KUMAR SINGH, JUDICIAL MEMBER
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER**

ORDER

1. The issue for consideration is undertaking of carrying capacity assessment of eco-sensitive zones to give effect to the principle of 'Sustainable Development'. This Tribunal issued directions on 30.07.2018 to the Ministry of Urban Development and the MoEF&CC and the corresponding authorities in all the States. Thereafter on 03.04.2019, the Tribunal considered the affidavit filed by the MoEF&CC dated 27.03.2019 and observed:

"3. The MoEF & CC had filed an affidavit dated 27.03.2019 and submitted that they are taking steps to study the matter and also getting views from the States and the concerned Department but the exercise could not be completed and they require 6 months more time for this

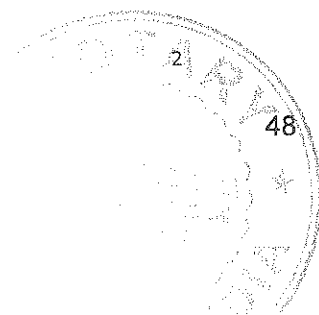
purpose. The order was passed in the month of July, 2018. Nearly more than eight months lapsed after the order but nothing fruitful has been done by them and MoEF & CC has not taken seriousness about the issue as considered by the Tribunal.

4. On going through the affidavit, it is seen that no substantive work has been done for preparing the report as directed by this Tribunal. Considering this aspect, we feel that some time can be granted but same cannot be as requested by them.
 5. We feel that 3 months time can be granted and they are directed to file a report regarding progress of the study taken by them on monthly basis by Email and if the Tribunal is satisfied with work done by them and if they require further time that can be considered after expiry of 3 months fixed by this Tribunal. Reports shall be filed to this Tribunal through email at ngt.filing@gmail.com."
2. Thereafter on 25.09.2019 on further consideration, the Tribunal observed:

"10. In the meantime the MoEF & CC and Ministry of Urban Development may complete the study and prepare national policy as to how this will have regulated as directed by this Tribunal as per order in O.A. No. 462/2018 dated 30.07.2018.

11. The Joint Secretary, MoEF & CC was present today. He explained that a draft template has been prepared for circulation and they need to consult the Ministry of Urban Development for approval of the same and thereafter it will be circulated among the States, then final guidelines will be issued. They are directed to submit a further report on this aspect before the next date of hearing."
3. In pursuance of the above, an affidavit has been filed by the MoEF&CC on 31.01.2020 as follows:

"5. The draft guidelines/template prepared by the Ministry was circulated to G.B Pant National Institute of Himalayan Environment & Sustainable Development, Almora, Uttarakhand, Ministry of Housing Affairs, Town & Country Planner, Town & Country Planning Organization (TCPO), New Delhi and School of Planning and Architecture, New Delhi. Based on the comments received on the template, a meeting was held on 25th November, 2019 in the Ministry of Environment, Forest and Climate Change, wherein the officials from the above



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organizations were present. During the meeting all components/parameters of draft template assessing Carrying Capacity of Town/Hill Station were discussed. Accordingly, the structure of the template was finalized.

6. *The G.B Pant National Institute of Himalayan Environment & Sustainable Development, Almora, Uttarakhand has submitted a report, which was examined in the Ministry and finalized. A copy of guidelines has been circulated to all State Governments and UTs."*

4. In view of the above, further steps need to be taken in the matter. It should be possible to undertake carrying capacity of at least one eco-sensitive area in every State/UT in the first instance within three months. The CPCB may coordinate with the concerned authorities, including the State Administration, for undertaking carrying capacity assessment of at least one eco-sensitive area in the State, which may be thereafter replicated for all the eco-sensitive areas in next three months. The CPCB is at liberty to associate any individual/organization for the purpose and utilize compensation funds available with for this purpose.

5. Let a further report in the matter be filed before the next date by email at judicial-ngt@gov.in.

6. A copy of this order be sent by email to CPCB.

List for further consideration on 14.10.2020.

Adarsh Kumar Goel, CP

Sheo Kumar Singh, JM

Dr. Nagin Nanda, EM

March 19, 2020
Original Application No.462/2018
with Original Application No. 76/2015
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