

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL PRINCIPAL
BENCH, NEW DELHI

Original Application No. 361 of 2018

IN THE MATTER OF

Narmada Pradushan Nivaran

Samiti & Ors

...APPLICANT

V/S

Ministry of Environment, Forest &

Climent Change & Ors.

...RESPONDENTS

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Through



Place: 19.04.2023

Gigi.C.George, Advocate

Standing Counsel(UOI)

Dated: New Delhi

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**BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL
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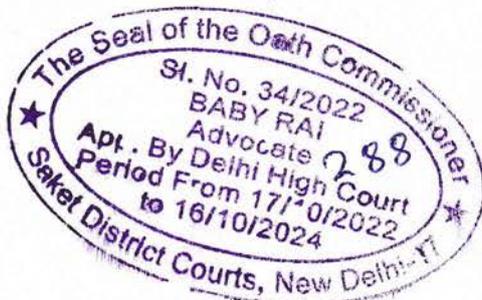
... Respondents

**ADDITIONAL REPLY ON BEHALF OF RESPONDENT NO.2/NARMADA
CONTROL AUTHORITY AND RESPONDENT NO.3/MINISTRY OF
JALSHAKTI, DEPARTMENT OF WATER REOURCES, RIVER
DEVELOPMENT AND GANGA REJUVENATION**

MOST RESPECTFULLY SHOWETH:

I, R Vasudevan, S/o. Late Sh.P.M.Ramasamy aged about 54 years working as Director (Civil), Narmada Control Authority, Ministry of Jal shakti, DoWR, RD & GR, Govt, of India is filing the present additional reply on behalf of Respondent No.2 and 3. I am well versed with the issue involved in the present O.A. and authorized to file the additional reply.

1. That the Respondent No.2 and 3 has filed reply by way affidavit dt.30.07.2018 before this Hon'ble Tribunal which is on record (Paper Book Page No.482 to 627)

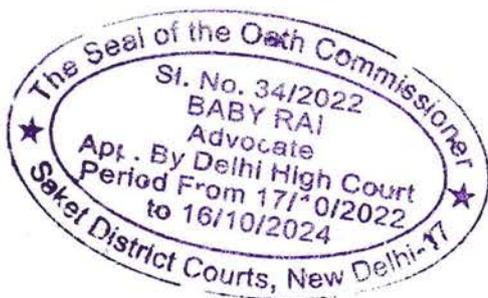


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2. That the Respondent Nos. 2 and 3 have filed Additional documents by way of affidavit before the Hon'ble Supreme Court in Civil Appeal No.4550/2019, which is on record (Paper Book Page No.1 to 18)
3. That the present additional reply is being filed to bring on record some facts and latest developments pertaining to the issue in the Original Application.
4. That Clause III of the NWDT Award orders that, out of the 28 MAF utilizable quantum of Narmada water in the Sardar Sarovar Reservoir, (a) Madhya Pradesh is entitled to a share of 18.25 Million Acre Feet (MAF), (b) Gujarat is entitled to a share of 9.0 MAF, (c) Rajasthan is entitled to a share of 0.5 MAF and (d) Maharashtra is entitled to a share of 0.25 MAF.
5. That Clause IX of the NWDT Award has also defined the Regulated Releases to be made by Madhya Pradesh for the requirement of Sardar Sarovar Project. The same is reproduced below:

“With Regard to the quantum and pattern of regulated releases, the Tribunal makes the following order:-

It has been agreed by the party States and decided by the Tribunal in its Order dt.8th Oct. 1974, that the utilizable quantity of water of 75 percent dependability in the Narmada at Sardar Sarovar Dam site should be assessed at 28 MAF(34,537.44 M.cu.m.). The actual inflow of 75 percent dependability, however, is only 33,316.29 M.cu.m (27.01 MAF) and this is



brought upto utilizable quantity of 28 MAF(34,537.44 M.cu.m.) by means of carry over in various reservoirs allowing for evaporation losses and regeneration. Out of 28 MAF (34,537.44 M.cu.m); 11,101.32 M.cu.m (9 MAF) has to be provided for Gujarat and 0.5 MAF (616.74 M.cu.m.) for Rajasthan at Sardar Sarovar. The requirements at Sardar Sarovar have to be met by releases by Madhya Pradesh and by inflows from the intermediate catchment, surplus to the requirements of Madhya Pradesh below Narmada Sagar and Maharashtra. The releases from Maheshwar work out to 10,015.86 M.cu.m. (8.12 MAF). Making uniform monthly releases the amount of water to be released by Madhya Pradesh per month would be 834.65 M.cu.m. (0.677 MAF). The actual inflow in the river system, however, would vary from year to year and therefore, the releases by Madhya Pradesh would also vary.

The inflow during the filling period, July to October, cannot be predicted at the beginning of the season. It is only in October that it would be fully known whether the particular year is a normal year or the extent to which it is a surplus or deficit year. Normally the releases by Madhya Pradesh during the filling period, therefore, would have to be more or less on the basis of the year yielding 28 MAF (34,537.44 M.cu.m.) utilizable quantity. The month of July and early part of August are crucial for Kharif



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sowing. It is important that during this period regulatory arrangements should ensure that due share of water is made available to all parties.

Having regard to the facts mentioned in the preceding two paragraphs, we order that detailed rules of regulation and water accounting shall be framed by Narmada Control Authority in accordance with the guidelines given below. **These guidelines may, however, be altered, amended or modified by agreement between the States concerned.**"

The said Clause IX further states,

- i. The 28 MAF (34, 537.44 M.cu.m.) utilizable supplies of 75 percent dependability in a water year (1st July to 30th June next year) shall be shared by the party States as under:-

Madhya Pradesh	-	18.25 MAF (22,511.01 M.cu.m.)
Gujarat	-	9.00 MAF (11,101.32 M.cu.m.)
Rajasthan	-	0.50 MAF (616.74 M.cu.m.)
Maharashtra	-	0.25 MAF (308.37 M.cu.m.)
		<hr/>
		28.00 MAF (34,537.44 M.cu.m.)

- ii. Surplus or deficit utilizable supplies in a water year shall be shared to the extent feasible by the party States in the same proportion as their allotted shares in (i) above. The surplus water shall first be utilized for filling up the



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reservoirs to capacity and surplus water shall be utilized for irrigation and other purposes only after that has been ensured.

- iii. The water available in the live storages of the various reservoirs on 30th June shall be reckoned as an inflow to be shared in the next water year.
- iv. The releases necessary to ensure Gujarat and Rajasthan's share of water in a water year shall be let down by Madhya Pradesh at a reasonably uniform rate, permitting only such variation as the Authority may direct or approve and keeping in view the directions for regulated releases.
- v. The Authority shall ensure by so directing the releases by Madhya Pradesh that there is at all times sufficient utilizable water in Sardar Sarovar to meet the requirements of the next ten days, subject to water being available in the storages in Madhya Pradesh after taking into account the proportionate requirements of Madhya Pradesh. For this purpose, Gujarat and Rajasthan would intimate their requirements of the 10 daily period well in advance.
- vi. Utilization in a water year by each party State shall be figured out on the basis of actual daily discharge at canal head on every major and medium project. For minor works, it shall be on the basis of area irrigated under different crops, the delta for each crop being approved by the Authority. For pumping schemes, drawing directly from the river, its tributaries or reservoirs, whether for irrigation, domestic or industrial use, water drawn



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shall be reckoned on the basis of the rated capacity of pumps and the number of hours they run. For a cross check, the seasonwise and cropwise area irrigated by each pumping scheme shall also be recorded, and if the figures of water drawn as worked out by the two aforesaid methods differ, the decision of the Authority as regards water, drawn shall be final.

- vii. Withdrawals from Sardar Sarovar for Navagam Canal for Gujarat and Rajasthan shall be measured at the head of Navagam Canal. The supply to Rajasthan shall be measured at Gujarat-Rajasthan border. The loss in the canal in carrying the supply for Rajasthan shall be determined by the Authority after the canal has been constructed and shall reckon against the share of Rajasthan.

Water let down into the river from Sardar Sarovar through power house turbines shall be measured on the basis of power generated by it and that escaped through the spillway measurement at the spillway.

- viii. For major and medium projects, water account shall be kept by 10 daily period. The last 10 daily period of a month may have 11 days, 10 days or less, depending upon the number of days in the month. For minor scheme water account shall be kept by crop season, Kharif (July to October) rabi (November to March) and hot weather (April to June). For pumping schemes and domestic and industrial uses it shall be monthly”.



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The said Clause IX of the NWDT Award nowhere mentions about maintaining the minimum downstream E-Flow. A copy of the NWDT Award is annexed as **Annexure-R/4**.

6. That during the 41st Environment Sub-Group Meeting of NCA, held on 6th January, 2005, Govt. of Gujarat intimated that their study report have indicated that 600 cusecs of flow would be adequate for maintaining environmental downstream of Sardar Sarovar Dam. Therefore during 45th ESG Meeting approval was accorded to release 600 cusecs as Environmental flow which was ratified in the 80th Meeting of NCA on 12.08.2008. Accordingly a minimum constant discharge of 600 cusecs of water is being maintained through Godbole Gate in Dyke No. 3 of Sardar Sarovar Project in order to maintain River Narmada's ecological health and prevent flora, fauna, pollution level etc.
7. In the Agenda of the 51st Environment Sub-Group (ESG) Meeting of NCA, it is mentioned that this 600 cusecs of water, when supplemented by 7000 cusecs of water released after generation of power from the River Bed Power House (RBPH), as well as releases through Karjan and Orsang tributaries of River Narmada downstream of Sardar Sarovar Dam was found adequate to maintain the ecology and environment in the downstream reach of Sardar Sarovar Dam. But due to drought/deficient river yield, River Bed



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Power House could not be operated and this 600 cusec water was found insufficient. As a result there have been a number of representations received from local groups and political leaders to increase this quantum of downstream environment flow.

8. That the issue with respect to the downstream environment flow was discussed during the 49th and 50th meeting of ESG. As per the discussions held in the aforesaid meetings, it was decided to carry out an assessment of downstream environmental flow for sustaining riverine ecology, downstream to Sardar Sarovar Dam/Garudeshwar weir. The State of Gujarat, vide letter dt.11.06.2018, entrusted the task of assessment of Environmental Flow to Central Inland Fisheries Research Institute (CIFRI), Barrackpore, Kolkata.
9. That CIFRI submitted its final report on "*Environmental flows for river ecology with focus on downstream fisheries of Sardar Sarovar Dam (SSD) in Narmada river*" to SSNNL, GoG in June, 2022.



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10. That the E-flow recommendation of CIFRI, for three seasons, is presented below:

Period	Months	E-Flow (Cusecs)	E-flow Percentage of average seasonal flow
Monsoon	June to September	14401	100%
Post-monsoon	October to January	5753	100%
Lean period	February to May	1875	100%

It is observed that the values given by CIFRI are very high and coming to 100% of the seasonal average flow in 90% dependable year, which defeats the purpose of a storage project to meet drinking and irrigation requirement of beneficiary states along with power generation.

11. That the objective of CIFRI's study was to estimate the environmental flows (E-flow) in the downstream of Sardar Sarovar Dam (SSD) at Garudeshwar for sustainable fisheries in River Narmada. So, although the study was supposed to encompass the downstream stretch of River Narmada, from Garudeshwar Weir, till the sea or upto the next intervention on River Narmada, which is Bhadbhut Barrage, coming up near village Bhadbhut at District Bharuch, the study by CIFRI has only been confined upto Garudeshwar weir, between



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Kevadia (Sardar Sarovar Dam site) and Garudeshwar weir, which, actually has now lost its free-flowing water and has become a pool. Line diagram of SSD to Garudeshwar weir is enclosed at **Annexure-R/5**.

12. That it may be noted that NWDT Award did not envisage Garudeshwar weir or reversible turbine operation. However, NWDT Award envisaged that during the initial years of dam construction, there will be sufficient water left for passing through the River Bed Power House (RBPH), thus generating a larger amount of electricity. However, during the later phase, when the beneficiary States completes developing their command area, most of the water in the reservoir would be utilized for drinking and irrigation and there would not be sufficient water left to pass through the RBPH. In view of the same, with the consensus of the party States, the project design was slightly modified during the initial years, 1982-84, by proposing reversible turbines at RBPH and construction of Garudeshwar weir, downstream to Sardar Sarovar Dam (SSD), so that water stored in the weir can be pumped back into Sardar Sarovar Reservoir and used again for energy generation through RBPH. Thus the idea of Sardar Sarovar Pumped Storage Scheme (SSPSS) was conceived and statutory clearances were obtained by SSNNL. So it is imperative that the quantum of E-flow be assessed, maintained and



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measured at Garudeshwar weir to preserve the ecological quality of River Narmada downstream to Garudeshwar weir.

13. That it is also pertinent to mention that Sardar Sarovar Reservoir Regulatory Committee (SSRRC), a Sub-Committee of Narmada Control Authority (NCA) has been setup under Narmada Water Disputes Tribunal (NWDT) as machinery for implementation of its directions and decision. The NCA issues Reservoir Operation Table (ROT) having details of Ex-OSPS (Omkareshwar Power Station) release as ExMP releases, reservoir level of Indira Sagar Power Station (ISPS), Sardar Sarovar Project (SSP) etc. with the consensus of the party States. The water releases from Ex-OSPS and Reservoir level of Indira Sagar Dam is finalized by this SSRRC. Further, the Ex-OSPS releases in ROT are made after considering all aspect of water utilization/ uses, like, irrigation, drinking water, industrial, environmental (e-flow), etc. Water for irrigation, drinking and power from Sardar Sarovar Reservoir is being allocated by SSRRC since March, 2007. And it has been observed that allocation of water to run the RBPH has been declining over the years for the lean and post-monsoon seasons, which means there is insufficient downstream water available through the turbines of RBPH for 24 hours. Even if the water is allocated by the SSRRC, the quantum of water is rarely sufficient to run atleast one out of six 200 MW turbines of RBPH



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for 24 hours. Thus, this case of Sardar Sarovar and its associated environmental flow is unlike any normal hydropower project where water is available to run a turbine for 24 hours. As envisaged during the 51st ESG meeting, 600 cusecs, supplemented by 7000 cusecs from RBPH, as well as releases through Karjan and Orsang tributaries of River Narmada downstream of Sardar Sarovar Dam, was found to be sufficient for maintaining the downstream environment. This 7000 cusecs is actually the average discharge from a 200 MW turbine of RBPH, when it runs for 24 hours.

In view of the above, determining the right quantum of environmental flow, taking into consideration that there would be insufficient or even “nil” discharge from the RBPH turbines during the lean and post-monsoon seasons, and maintaining the same for protecting the downstream riverine ecology from Garudeshwar Weir is very crucial and has to be taken based on robust, scientific and technical parameters. It is also important to consider at this point the water allocation, which has already been done by the NWDT, for four beneficiary States, mentioned earlier.

14. That the Kalpasar Project or the Gulf of Khambhat Development Project envisages building a 60 km dyke across the Gulf of Khambhat for establishing a huge fresh water coastal reservoir for irrigation, drinking and



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industrial purposes essentially to meet the water demands of the drought prone Saurashtra region of Gujarat. That **Bhadbhut Barrage Project** on river Narmada, 125 km downstream to Garudeshwar weir, is a part of this Kalpasar Project and is under construction by Govt. of Gujarat since 2020. The Project is located near village Bhadbhut in Bharuch District. It is being constructed 25 km upstream of the river mouth where it enters the Gulf of Khambhat in Arabian sea. It is a 1.663 km long causeway-cum-weir barrage and will form a reservoir to hold 599 MCM of fresh water. The barrage will have 90 gates. A six-lane bridge will also be constructed on the barrage, which will connect Dahej and Hazira with reduced distance of 18 km. The barrage aims to provide fresh water for drinking, agriculture and industries in the region. It will also stop ingress of seawater and protect the upstream areas. This barrage has also planned for a separate channel for fishing activities. Line diagram of SSD to Bhadbhut barrage is enclosed at **Annexure-R/6**. Layout plan of Bhadbhut Barrage is enclosed as **Annexure R/7**. Layout of Kalpasar Project is enclosed as **Annexure R/8**.

15. That therefore, it was suggested, by the Experts of the E-flow Committee to review the study taking into consideration the stretch of the Narmada river downstream of Garudeshwar weir till the upcoming Badhbhut Barrage and its associated fish pass, fish species and other relevant details, like, discharge



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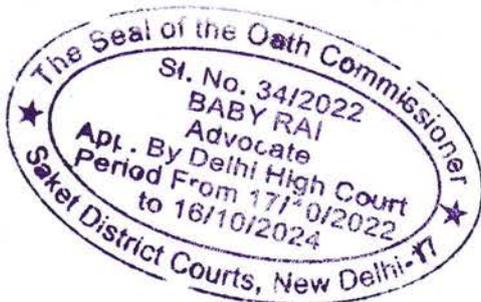
expected from tributaries (River Orsang and River Karjan), pollution load and carrying capacity in the downstream stretch, loss of livelihood of the fishermen, pumping operation of SSP, etc., so as to arrive at a realistic figure without overlooking the water share of the party States as per the NWDT Award.

16. That the E-flow issue was discussed during the 94th NCA Meeting, held on 8th May, 2023, wherein it was decided that a Committee shall be constituted under the Chairmanship of Executive Member, NCA. Other Members would include Independent Member (E&R) & Member (Civil) from NCA, Executive Director (Technical) from National Mission for Clean Ganga (NMCG), Members and representatives from party States, officers from State Water Resources Department (WRD), Fisheries Departments, Experts on e-flow from reputed organization/ institutes, like, Central Water Commission & IIT, Biologists, Biodiversity Experts from Central Inland Fisheries Research Institute (CIFRI) and National Mission for Clean Ganga, Director (Fisheries) from Ministry of Fisheries, Animal Husbandry & Dairying, etc who will contribute to this Committee for finalizing the e-flow quantum. The Minutes of the 94th NCA Meeting is annexed as **Annexure-R/9**.



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17. That the Committee constituted to review the E-flow d/s of SSD held its first meeting on 21st September, 2023. The decisions taken in the said meeting is annexed as **Annexure-R/10**.
18. That the 2nd meeting of the Committee on e-flow was held on 17th January, 2024, and its Minutes of the Meeting is annexed as **Annexure-R/11** wherein it was decided that CIFRI would prepare scope of work/Terms of Reference(ToR), along with names of partner institutions and financial implications, for the re-assessment study of e-flow and submit to NCA.
19. That the CIFRI has submitted its draft scope of work/ ToR on 08.02.2023. The same was circulated to the Committee Members, which is annexed as **Annexure-R/12** with a request to submit their views/comments.
20. That the 3rd Meeting of E-flow Committee was convened on 19th March, 2024 to finalize the proposal and Award of study to CIFRI through SSNNL. The award of study is yet to be finalised.
21. That the Respondent Nos.2 & 3 are conscious of the fact that this Hon'ble Tribunal has already decided the issue of E-Flow in O.A.No.498/2015 and O.A.No.425/2019. It is pertinent to mention here that in O.A.No.498/2015 this Hon'ble Tribunal granted the liberty to the State Governments to move to the Secretary, Ministry of Environment, Forest & Climate Change, who shall in consultation with the Ministry of Water Resources examine



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representation received from the State Governments and decide the E-Flow which is lower than the percentage decided by the Hon'ble Tribunal.

As the issue in the present O.A. involves an Award passed with the consent of four beneficiary States and as per Clause V of the said Award, review of its clauses can be done at any time after a period of 45 years from the date of publication of the Award on 12.12.1979. NCA is working for deciding the downstream E-Flow with the consent of all the four States because the States of Madhya Pradesh, Maharashtra, and Rajasthan are concerned that their share of water might get affected if the quantum of E-flow is enhanced from the present 600 cusecs, which is being released from the Godbole Gate and Garudeshwar Weir throughout the year, in all season.

22. That the Respondent Nos. 2 & 3 in consultation and assistance with all the stakeholders are taking every measure to determine the downstream E-Flow of river Narmada so that downstream ecology of the river Narmada is restored and maintained.

23. That the Respondent Nos. 2 & 3 will take appropriate decision after the CIFRI submits its fresh report with three season e-flow values, taking into consideration all the aspects discussed earlier here, including allocated water by the NWDT Award and almost negligible discharge (in 24 hours) from the RBPH turbines during lean and post-monsoon seasons.



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24. That the Committee formed by the Respondent Nos. 2 & 3, to find a solution for the issue of downstream E-Flow of River Narmada, is consisting of experts from different fields and are capable of taking the right decision for maintaining the ecology of the River Narmada.

25. That the Respondent Nos. 2 & 3 will abide by whatever direction/order passed by this Hon'ble Tribunal.

J. V. M. L.
Deponent

Director (Civil)
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Verification

Geeta Vasudevan, Adv.
I Identify the Deponent Who Has Signed/Put In His Presence

Verified at New Delhi on 18 APR 2024 April, 2024 that the contents of above affidavit are true and correct to the best of my knowledge and belief and derived from the official records.

18 APR 2024

J. V. M. L.
Deponent

Director (Civil)
Narmada Control Authority
(MoJS, DoWR, RD & GR)
INDORE (M.P.)



CERTIFIED THAT THE DEPONENT
Shri / Smt. / Km. ... *R. Vasudevan*
R/o ...
Identified by Shri / Smt. ...
has solemnly affirmed to me at
Delhi ...
That the contents ...
have been & explained to him are
true and correct to the Knowledge

Adv. Geeta Vasudevan

B. Rai
Oath Commissioner, Delhi
BABY RAI
New Delhi



भारत का राजपत्र The Gazette of India

असाधारण

EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (ii)

PART II—Section 3—Sub-Section (ii)

प्राधिकार से प्रकाशित

PUBLISHED BY AUTHORITY

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No. 524] NEW DELHI, WEDNESDAY, DECEMBER 12, 1979/AGRAHAYANA 21, 1901

इस भाग में भिन्न पृष्ठ संख्या दी जाती है जिससे कि यह अलग संकलन के रूप में रखा जा सके।

Separate paging is given to this Part in order that it may be filed as a separate compilation

कृषि और सिंचाई मंत्रालय

(सिंचाई विभाग)

अधिसूचना

नई दिल्ली, 12 दिसम्बर, 1979

का.जा. 792(अ).—केंद्रीय सरकार ने अन्तर्राज्यिक जल विवाद अधिनियम, 1956 (1956 का 33) की धारा 4 के अधीन जारी की गई अधिसूचना सं. का. आ. 4055, तारीख 6 अक्टूबर, 1969 द्वारा, अन्तर्राज्यिक नदी नर्मदा और उसकी नदी घाटी की बाबत जल विवाद का अधिनियम करने के लिए नर्मदा जल विवाद अधिकरण का गठन किया था ;

और उक्त अधिकरण ने उसे निर्दिष्ट विषयों के संबंध में अन्वेषण किया तथा अपनी एक रिपोर्ट, उक्त अधिनियम की धारा 5 की उपधारा (2) के अधीन, केंद्रीय सरकार की अप्रीति की थी जिसमें, वे तथ्य दर्शाते हैं जो उसके समक्ष आए थे और उसे निर्दिष्ट विषयों पर उसका विनिश्चय भी दिया गया है ;

और उक्त विनिश्चय पर विचार करके, केंद्रीय सरकार तथा गुजरात, मध्य प्रदेश, महाराष्ट्र और राजस्थान, की सरकारों ने, उक्त अधिनियम की धारा 5 की उपधारा (3) के अधीन, उक्त अधिकरण को कतिपय विषय निर्दिष्ट किए थे और इस प्रकार निर्दिष्ट विषयों पर अधिकरण ने केंद्रीय सरकार को उक्त उपधारा के अधीन एक और रिपोर्ट अप्रीति की है जिसमें ऐसे स्पष्टीकरण और मार्गदर्शन दिए गए हैं जो उसने ठीक समझे हैं।

अतः, अब, उक्त अधिनियम की धारा 6 द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए, केंद्रीय सरकार, अधिकरण द्वारा उसकी अतिरिक्त रिपोर्ट में दिए गए स्पष्टीकरण और मार्गदर्शनों के संदर्भ में यथा उपान्तरित उक्त अधिकरण के विनिश्चय को प्रकाशित करती है।

अपनी अतिरिक्त रिपोर्ट में दिए गए स्पष्टीकरण और मार्गदर्शनों द्वारा उपान्तरित रूप में नर्मदा जल विवाद अधिकरण का विनिश्चय

अधिकरण का अन्तिम आदेश और विनिश्चय

खण्ड 1: आदेश के प्रवर्तन की तारीख

यह आदेश उक्त तारीख को प्रवृत्त होगा, जिसको इस अधिकरण के विनिश्चय अन्तर्राज्यिक जल विवाद अधिनियम, 1956 की धारा 6 के अधीन, राजपत्र में प्रकाशित होते हैं।

खण्ड 2: सरदार सरोवर बांध स्थल पर नर्मदा जल को उपयोग्य मात्रा का प्रयत्न

अधिकरण यह प्रवर्तित करता है कि 75 प्रतिशत निर्भरता के आधार पर सरदार सरोवर बांध स्थल पर नर्मदा के जल की उपयोग्य मात्रा 28 मिलियन एकड़ फुट (34,537.44 एम०क्यू०एम०) पर निर्धारित की जानी चाहिए।

खण्ड 3: नर्मदा जल की उपयोग्य मात्रा का प्रभाजन

(1) अधिकरण यह आदेश करता है कि नर्मदा जल को उपयोग्य मात्रा में से, (क) मध्य प्रदेश 18.25 मि०ए०फु० (22,511.01 मि०क्यू०) अंश का हकदार है, (ख) गुजरात 9 मि०ए०फु० (11,101.32

MINISTRY OF AGRICULTURE AND IRRIGATION

(Department of Irrigation)

NOTIFICATION

New Delhi, the 12th December, 1979

S.O. 792(E).—Whereas the Central Government had constituted by notification No. S.O. 4054, dated the 6th October, 1969, issued under section 4 of the Inter-State Water Disputes Act, 1956 (33 of 1956), the Narmada Water Disputes Tribunal to adjudicate upon the water dispute regarding the inter-State river, Narmada and the river valley thereof;

And whereas the said Tribunal investigated the matters referred to it and forwarded to the Central Government, under sub-section (2) of section 5 of the said Act, a report setting out the facts as found by it and giving its decision on the matters referred to it;

And whereas upon consideration of the said decision, the Central Government and the Governments of Gujarat, Madhya Pradesh, Maharashtra and Rajasthan made references to the said Tribunal under sub-section (3) of section 5 of the said Act and the Tribunal has, on such references, forwarded to the Central Government under that sub-section a further report giving such explanations and guidance as it deemed fit;

Now, therefore, in exercise of the powers conferred by section 6 of the said Act, the Central Government hereby publishes the decision of the said Tribunal as modified by the Tribunal with reference to the explanations and guidance given in its further report.

DECISION OF THE NARMADA WATER DISPUTES TRIBUNAL AS MODIFIED BY THE EXPLANATIONS AND GUIDANCE GIVEN IN ITS FURTHER REPORT**"Final Order And Decision of the Tribunal****Clause I : Date of Coming Into Operation Of the Order**

This Order shall come into operation on the date of publication of the Decision of this Tribunal in the Official Gazette under Section 6 of the Inter-State Water Disputes Act, 1956.

Clause II : Determination Of The Utilisable Quantum Of Narmada Waters At Sardar Sarovar Dam Site

The Tribunal hereby determines that the utilisable quantum of waters of the Narmada at Sardar Sarovar Dam Site on the basis of 75 per cent dependability should be assessed at 28 Million Acre Feet (34,537.44 M. cu. m).

Clause III : Apportionment Of The Utilisable Quantum Of Narmada Waters

(1) The Tribunal hereby orders that out of the utilisable quantum of Narmada waters, (a) Madhya Pradesh is entitled to a share of 18.25 Million Acre Feet (22,511.01 M. cu. m.), (b) Gujarat is entitled to a share of 9 Million Acre Feet (11,101.32 M. cu. m.), (c) Rajasthan is entitled to a share of 0.5 Million Acre Feet (616.74 M. cu. m.) and (d) Maharashtra is entitled to a share of 0.25 Million Acre Feet (308.37 M. cu. m.);

(2) Further, it is clarified that the apportionment relates to actual withdrawals and not consumptive use;

(3) Within its share of water, each party State is free to make such changes in the pattern of water use and in the areas to be benefited within or outside the Narmada basin in its territory as it may consider necessary.

Clause IV : Order With Regard To Excess Waters And Sharing Of Distress

(1) The utilisable flow of Narmada in excess of the 28 Million Acre Feet (34,537.44 M. cu. m.) of utilisable flow in

any water year, i.e., from 1st of July to 30th of June of next calendar year is apportioned in the following ratios of allocation i.e., 73 for Madhya Pradesh, 36 for Gujarat, 1 for Maharashtra and 2 for Rajasthan;

(2) In the event of the available utilisable waters for allocation in any water year from 1st of July to 30th June of the next calendar year falling short of 28 Million Acre Feet (34,537.44 M.cu.m.) the shortage should be shared between the various States in the ratio of 73 for Madhya Pradesh, 36 for Gujarat, 1 for Maharashtra and 2 for Rajasthan;

(3) The available utilisable waters in a water year will include the waters carried over from the previous water year as assessed on the 1st of July on the basis of stored waters available on that date;

(4) The available utilisable waters on any date will be inclusive of return flows and exclusive of losses due to evaporation of the various reservoirs;

(5) It may be mentioned that in many years there will be surplus water in the filling period after meeting the storage requirements and withdrawals during the period. This will flow down to sea. Only a portion of it will be utilisable for generating power at Sardar Sarovar river-bed power-house, and the rest will go waste. It is desirable that water, which would go waste without even generating power at the last river-bed power-house, should be allowed to be utilised by the party States to the extent they can.

Gujarat is, therefore, directed that whenever water starts going waste to sea without generating power, or based on the information received from upstream gauging stations, it anticipates that water would so go waste, it shall inform the Narmada Control Authority (hereinafter referred to as the Authority) and designated representatives of all the concerned States. Gujarat shall also inform them when such flows cease. During the period of such flows, the party States, whose reservoirs are spilling and the spill water cannot be stored elsewhere, may utilise such flows from the said reservoirs as they like and such utilisation by the party States will not count towards allotment of supplies to them, but use of such water will not establish any prescriptive rights.

Clause V : Period of Operation of The Order of Apportionment

Our Orders with regard to the equitable allocation in Clauses III and IV are made subject to review at any time after a period of 45 years from the date of publication of the Decision of the Tribunal in the Official Gazette.

Clause VI : Full Supply Level of The Navagam Canal

The Tribunal hereby determines that the Full Supply Level of Navagam Canal offtaking from Sardar Sarovar should be fixed at 91.44 m., (+300') at its head regulator with a bed gradient of 1 in 12,000 from head to 290 km. (mile 180), that is, upto the offtake of Saurashtra branch. From that point to Rajasthan border the bed gradient should be 1 in 10,000. These bed gradients may be changed by Gujarat and Rajasthan by mutual agreement. Gujarat and Rajasthan shall be at liberty to decide the canal capacity required by each in the light of water which would be expected to be available within their share.

Clause VII : Full Reservoir Level And Maximum Water Level Of The Sardar Sarovar Dam

The Tribunal hereby determines that the height of the Sardar Sarovar Dam should be fixed for Full Reservoir Level +138.68 m., (+455') and Maximum Water Level at +140.21 m., (+460'). Gujarat shall take up and complete the construction of the dam accordingly.

Clause VIII : Sharing Of Costs and Benefits.

(1) (i) The Tribunal hereby determines that out of the net power produced at Navagam at canal head and river

bed power houses on any day the share of Madhya Pradesh will be 57 per cent; Maharashtra's share will be 27 per cent and Gujarat's share will be 16 per cent.

(ii) The party States shall make available in annual instalments their share of funds required according to approved construction programme and take all the necessary steps to complete the Sardar Sarovar Dam within ten years of the date of publication of the Final Order and Decision of the Tribunal in the Official Gazette.

(2) The Tribunal makes the following further Orders:—

- (i) The power generated in the River Bed and Canal Power Houses at Navagam will be integrated in a common switchyard.
- (ii) Madhya Pradesh and Maharashtra will be entitled to get 57 per cent and 27 per cent respectively of the power available at bus bar in the switchyard after allowing for station auxiliaries.
- (iii) The above entitlement applies both to availability of machine capacity for peak loads, and to the total energy produced in any day.
- (iv) The entitlement of power and energy for any day can be utilised fully or partly by the concerned States or sold to another participating State under mutual agreement. It cannot, however, be carried forward except under a separate agreement or working arrangement entered into among the affected parties.
- (v) Gujarat will construct and maintain the transmission lines needed to supply the allotted quantum of power to Madhya Pradesh and Maharashtra upto Gujarat State border, along an alignment as agreed to between the parties and if there is no agreement, along such alignment as may be decided by the Narmada Control Authority. The transmission lines beyond Gujarat State border shall be constructed and maintained by Madhya Pradesh and Maharashtra in their respective States.
- (vi) The power houses and appurtenant works including the machinery and all installations as well as the transmission lines in Gujarat State will be constructed, maintained and operated by Gujarat State or an authority nominated by the State.
- (vii) The authority in control of the Power Houses shall follow the directions of the Narmada Control Authority in so far as use of water is concerned.
- (viii) The scheme of operation of the Power Houses including the power required and the load to be catered for the different party States during different parts of the day shall be settled between the States at least one week before the commencement of every month and shall not be altered during the month except under agreement among the States or under emergencies.

If and when Sardar Sarovar Power Complex gets linked with the Regional or National Power Grid, the operation of the Sardar Sarovar Power Complex will be governed by such altered system conditions. But in that event the Narmada Control Authority should arrange to take such steps as are necessary to enable the three States of Gujarat, Madhya Pradesh and Maharashtra to get their entitlement of power and energy from the Sardar Sarovar Power Complex according to these orders.

- (ix) The capital cost of the power portion of Navagam Complex shall comprise the following:—
 - (a) Full cost of Unit III electrical works and control works pertaining thereto, upto and including the switchyard.
 - (b) Full cost of transmission lines in Gujarat State constructed for supplying power to Madhya Pradesh and Maharashtra.

(c) 56.1 per cent of the net cost of common facilities such as Dam and Appurtenant Works i.e. Unit I of Sardar Sarovar Project, after allowing for credits, if any;

(d) 56.1 per cent of the credit given to Madhya Pradesh for the downstream benefits derived from Narmadasagar Dam.

(x) Madhya Pradesh and Maharashtra shall respectively pay to Gujarat 57 per cent and 27 per cent of the capital cost of the power portion of the Sardar Sarovar headworks worked out vide (ix) above. This amount shall be paid in annual instalments until the capital works are completed. Each instalment will be worked out on the basis of the budgeted figures of the concerned works at the commencement of each financial year and shall be set off and adjusted against actual figures at the end of the financial year.

(xi) In addition to the payments vide (x) above, Madhya Pradesh and Maharashtra shall also pay to Gujarat 57 per cent and 27 per cent respectively of the operation and maintenance costs of the Sardar Sarovar Power Complex each year. These payments are also to be based on budgeted figures at the commencement of each financial year and adjusted against actual cost at the end of the year.

(xii) Notwithstanding the directions contained hereinabove, the party States may, by mutual agreement, alter, amend, or modify any of the directions in respect of sharing of power and payment for it.

Clause IX : Regulated Releases to be made by Madhya Pradesh for the requirement of Sardar Sarovar Project

With regard to the quantum and pattern of regulated releases, the Tribunal makes the following Order:—

It has been agreed by the party States and decided by the Tribunal in its Order dated 8th October, 1974, that the utilisable quantity of water of 75 per cent dependability in the Narmada at Sardar Sarovar dam site should be assessed at 28 MAF (34, 537.44 M.c.u.m.). The actual inflow of 75 per cent dependability, however, is only 33, 316.29 M.c.u.m. (27.01 MAF) and this is brought up to utilisable quantity of 28 MAF (34, 537.44 M.c.u.m.) by means of carryover in various reservoirs allowing for evaporation losses and regeneration. Out of 28 MAF (34, 537.44 M.c.u.m.), 11, 101.32 M.c.u.m. (9 MAF) has to be provided for Gujarat and 0.5 MAF (616.74 M.c.u.m.) for Rajasthan at Sardar Sarovar. The requirements at Sardar Sarovar have to be met by releases by Madhya Pradesh and by inflows from the intermediate catchment, surplus to the requirements of Madhya Pradesh below Narmadasagar and Maharashtra. The releases from Maheshwar work out to 10,015.86 M.c.u.m. (8.12 MAF). Making uniform monthly releases the amount of water to be released by Madhya Pradesh per month would be 834.65 M.c.u.m. (0.677 MAF). The actual inflow in the river system, however, would vary from year to year and, therefore, the releases by Madhya Pradesh would also vary.

The inflow during the filling period, July to October, cannot be predicted at the beginning of the season. It is only in October that it would be fully known whether the particular year is a normal year or the extent to which it is a surplus or deficit year. Normally the releases by Madhya Pradesh during the filling period, therefore, would have to be more or less on the basis of the year yielding 28 MAF (34,537.44 M.c.u.m.) utilisable quantity. The month of July and early part of August are crucial for Kharif sowing. It is important that during this period regulatory arrangements should ensure that due share of water is made available to all parties.

Having regard to the facts mentioned in the preceding two paragraphs, we order that detailed rules of regulation and water accounting shall be framed by Narmada Control Authority in accordance with the guidelines given below. These guidelines may, however, be altered, amended or modified by agreement between the States concerned.

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(i) The 28 MAF (34,537.44 M.cu.m.) utilisable supplies of 75 per cent dependability in a water year (1st July to 30th June next year) shall be shared by the party States as under :-

Madhya Pradesh	—	18.25 MAF	(22,511.01 M.cu.m.)
Gujarat	—	9.00 MAF	(11,101.32 M.cu.m.)
Rajasthan	—	0.50 MAF	(616.74 M.cu.m.)
Maharashtra	—	0.25 MAF	(308.37 M.cu.m.)
		28.00 MAF	(34,537.44 M.cu.m.)

- (ii) Surplus or deficit utilisable supplies in a water year shall be shared to the extent feasible by the party States in the same proportion as their allotted shares in (i) above. The surplus water shall first be utilised for filling up the reservoirs to capacity and surplus water shall be utilised for irrigation and other purposes only after that has been ensured.
- (iii) The water available in the live storages of the various reservoirs on 30th June shall be reckoned as an inflow to be shared in the next water year.
- (iv) The releases necessary to ensure Gujarat and Rajasthan's share of water in a water year shall be let down by Madhya Pradesh at a reasonably uniform rate, permitting only such variation as the Authority may direct or approve and keeping in view the directions for regulated releases.
- (v) The Authority shall ensure by so directing the releases by Madhya Pradesh that there is at all times sufficient utilisable water in Sardar Sarovar to meet the requirements of the next ten days, subject to water being available in the storages in Madhya Pradesh after taking into account the proportionate requirements of Madhya Pradesh. For this purpose, Gujarat and Rajasthan would intimate their requirements of the 10 daily period well in advance.
- (vi) Utilisation in a water year by each party State shall be figured out on the basis of actual daily discharge at canal head on every major and medium project. For minor works, it shall be on the basis of area irrigated under different crops, the delta for each crop being approved by the Authority. For pumping schemes, drawing directly from the river, its tributaries or reservoirs, whether for irrigation, domestic or industrial use, water drawn shall be reckoned on the basis of the rated capacity of pumps and the number of hours they run. For a cross check, the seasonwise and cropwise area irrigated by each pumping scheme shall also be recorded, and if the figures of water drawn as worked out by the two aforesaid methods differ, the decision of the Authority as regards water drawn shall be final.
- (vii) Withdrawals from Sardar Sarovar for Navagam Canal for Gujarat and Rajasthan shall be measured at the head of Navagam Canal. The supply to Rajasthan shall be measured at Gujarat-Rajasthan border. The loss in the canal in carrying the supply for Rajasthan shall be determined by the Authority after the canal has been constructed and shall reckon against the share of Rajasthan.

Water let down into the river from Sardar Sarovar through power house turbines shall be measured on the basis of power generated by it and that escaped through the spillway measurement at the spillway.

Gujarat may let down water from Sardar Sarovar for its downstream use by making specific indent for it and such release shall reckon against its share. Such releases for downstream use shall be made through the turbines and the power so generated shared between Madhya Pradesh, Maharashtra and Gujarat in the prescribed ratio. Water let down into the river from Sardar Sarovar except at the

specific indent of Gujarat shall not reckon against the share of Gujarat.

The water drawn from Sardar Sarovar for use in Madhya Pradesh and Maharashtra, as the case may be, shall reckon against the share of water of that State.

- (viii) For major and medium projects, water account shall be kept by 10 daily period. The last 10 daily period of a month may have 11 days, 10 days or less, depending upon the number of days in the month. For minor schemes water accounts shall be kept by crop season, kharif (July to October) rabi (November to March) and hot weather (April to June). For pumping schemes and domestic and industrial uses it shall be monthly.
- (ix) The water use by minor and pumping schemes in any ten daily period may provisionally be taken to be the same as in the corresponding period in the previous year on the basis of average use during the crop period. For final water account, however, it will be determined as in (vi) above.
- (x) Each State shall furnish to the Authority and make available to any party State desiring the same, such data and information as the Authority may require and ask for.
- (xi) The Authority shall arrange the review of the ten day releases made by Madhya Pradesh at least once a month and oftener as considered necessary for directing any change in the releases. It may designate a person for doing so.
- (xii) The Authority shall direct final adjustment to be made in the following water year of the use in excess of the authorised use, if any, by any State or States during the preceding water year by curtailing the share(s) of the State or States concerned which have used water in excess and make over the same to the State or States which have received short supplies. Water supplied to Rajasthan on any day in excess of 10 per cent over and above its indent shall reckon against use by Gujarat.
- (xiii) The Authority shall furnish the annual water account for the water year to the Government of the party States by the end of August of the next water year. Each State may make any observation on the account and/or point out corrections in it, if any, within one month of its receipt. After making the necessary modifications, the Authority shall furnish to each party State the final annual water account for the water year by 31st October. The Authority shall cause the annual water account to be published each year.

Clause X : Payment to be made by Gujarat to Madhya Pradesh for such regulated releases.

(1) Madhya Pradesh shall take up and complete the construction of Narmadasagar dam with FRL 262.13 m (860 ft.) concurrently with or earlier than the construction of Sardar Sarovar dam.

(2) The Tribunal further orders that Gujarat should credit to Madhya Pradesh each year 17.63 per cent of the expenditure on account of Narmadasagar dam in the financial year commencing from the year of taking up of the construction of Narmadasagar dam. This will be initially credited on the basis of budget allotment to be adjusted at the end of the year on actual expenditure. The post construction expenditure on maintenance is not to be considered as cost of construction.

Clause XI : Directions Regarding Submergence, Land Acquisition and Rehabilitation of Displaced Persons.

Sub-clause 1 : Definitions.

(1) "Land".—The expression "land" shall have the same meaning as defined in the Land Acquisition Act, 1894 (hereinafter referred to as the Act) which states "the expression 'land' includes benefits to arise out of land, and things attached to the earth or permanently fastened to anything attached to the earth."

(12) "Onstee".—An 'oustees' shall mean any person who since at least one year prior to the date of publication of

the notification under the Act, has been ordinarily residing or carrying on any trade, occupation, or calling or working for gain in the area likely to be submerged permanently or temporarily.

1(3) : "Family".—(i) A family shall include husband, wife and minor children and other persons dependent on the head of the family, e.g., widowed mother.

(ii) Every major son will be treated as a separate family.

Sub-clause II.—Lands which are to be compulsorily acquired.

II(1) : Madhya Pradesh and Maharashtra shall acquire for Sardar Sarovar Project under the provisions of the Land Acquisition Act, 1894, all lands of private ownership situated below the FRL + 138.68 m (455') of Sardar Sarovar and all interests therein not belonging to the respective States. If on the basis aforesaid, 75 per cent or more land of a contiguous holding of any person is required to be compulsorily acquired, such person shall have the option to compel compulsory acquisition of the entire contiguous holding.

II(2) : Madhya Pradesh and Maharashtra shall also acquire for Sardar Sarovar Project under the provisions of the Land Acquisition Act, 1894, all buildings with their appurtenant land situated between FRL + 138.68 m (455') and MWL + 141.21 m (460') as also those affected by the backwater effect resulting from MWL + 141.21 m (460').

II(3) : The backwater level at the highest flood level in Sardar Sarovar shall be worked out by the Central Water Commission in consultation with Madhya Pradesh and Gujarat.

Sub-clause III.—Liability of Gujarat to pay compensation for Land Acquisition and Rehabilitation etc.

III(1) : Gujarat shall pay to Madhya Pradesh and Maharashtra all costs including compensation charges and expenses incurred by them for or in respect of the compulsory acquisition of lands required to be acquired as aforesaid.

III(2) : Gujarat shall pay to Madhya Pradesh and Maharashtra and the Union of India compensation for the respective Government lands and structures on principles similar to those underlying the Land Acquisition Act, 1894. Where any dispute or difference arises between Gujarat, Madhya Pradesh, Maharashtra and the Union of India with respect to the compensation payable as aforesaid, any of the three States of Gujarat, Madhya Pradesh and Maharashtra or the Union of India may refer the matter in dispute to arbitration. The State of Gujarat on the one hand and the States of Madhya Pradesh, Maharashtra or the Union of India (as the case may be) on the other hand shall respectively nominate one Arbitrator each. In the event of disagreement between the Arbitrators, such dispute or difference shall be referred to an Umpire who shall be a person appointed in that behalf by the Chief Justice of India from among persons who are, or have been Judges of the Supreme Court. The decision of the Arbitrators, or, as the case may be, of the Umpire shall be final and binding on the parties and shall be given effect to by them.

III(3) : Gujarat shall pay to Madhya Pradesh and Maharashtra land revenue in accordance with the respective Land Revenue Codes of Madhya Pradesh and Maharashtra in respect of all lands in their respective territories acquired for Gujarat or conveyed to it.

III(4) : Gujarat shall pay to Madhya Pradesh and Maharashtra all costs, charges and expenses incurred by Madhya Pradesh and Maharashtra for the purpose of removal and reinstallation of any ancient or historical monuments, archaeological remains, religious place of worship or idols likely to be affected by submergence under Sardar Sarovar and that in the event of such payment being made, no separate compensation as hereinbefore provided shall be required to be paid in respect of the same having been affected by the submergence.

III(5) : Gujarat shall pay to Madhya Pradesh and Maharashtra all costs, charges and expenses required to be incurred by them for rehabilitation of oustees and oustee families in their respective territories in accordance with the directions hereinafter contained.

III(6) : Gujarat shall pay to Madhya Pradesh and Maharashtra costs on account of establishment charges for land

acquisition and rehabilitation and other departmental staff which Madhya Pradesh and Maharashtra may consider necessary for the purpose of such acquisition and rehabilitation.

Sub-clause IV.—Provision for Rehabilitation.

IV(1) : According to the present estimates the number of oustee families would be 6147 spread over 158 villages in Madhya Pradesh, 456 families spread over 27 villages in Maharashtra. Gujarat shall establish rehabilitation villages in Gujarat in the irrigation command of the Sardar Sarovar Project on the norms hereinafter mentioned for rehabilitation of the families who are willing to migrate to Gujarat. For oustee families who are unwilling to migrate to Gujarat, Gujarat shall pay to Madhya Pradesh and Maharashtra the cost, charges and expenses for establishment of such villages in their respective territories on the norms as hereinafter provided.

IV(2)(i) : According to the present estimates the number of oustee families below RL 106.68 metres (RL 350') would be 30 spread over 20 villages in Madhya Pradesh and 250 families spread over 20 villages in Maharashtra. Within six months of the publication of the decision of the Tribunal in the Official Gazette, Gujarat, Madhya Pradesh and Maharashtra shall determine by mutual consultation the location of one or two rehabilitation villages in Gujarat to rehabilitate oustees from areas below RL 106.68 metres (RL + 350'). Gujarat shall acquire necessary lands for the rehabilitation villages and make available the same within two years of the decision of the Tribunal. Within six months of the decision of the location of the rehabilitation villages in Gujarat, Madhya Pradesh and Maharashtra shall intimate to Gujarat the number of oustee families from areas below RL 106.68 metres (RL 350') willing to migrate to Gujarat. For the remaining oustee families, Madhya Pradesh and Maharashtra shall arrange to acquire lands for rehabilitation within the respective States.

IV(2)(ii) : Madhya Pradesh and Maharashtra shall set up adequate establishments for land acquisition and rehabilitation of oustee families. Gujarat shall deposit within three months of the decision of the Tribunal Rupees ten lakhs each with Madhya Pradesh and Maharashtra in advance towards cost of establishment and rehabilitation in these States to be adjusted after actual costs are determined. Madhya Pradesh and Maharashtra shall start land acquisition proceedings for areas below RL 106.68 metres (RL + 350'), within six months of the decision of the Tribunal and convey the lands to Gujarat for project purposes within three years of the decision of the Tribunal. Within 18 months of the decision of the Tribunal, Gujarat shall make an advance payment of Rs. 70 lakhs to Madhya Pradesh and Rs. 100 lakhs to Maharashtra towards the compensation of land, to be adjusted after actual costs are determined.

IV(2)(iii) : Regarding the oustee families from areas above RL 106.68 metres (RL + 350'), Gujarat shall intimate to Madhya Pradesh and Maharashtra within six months of publication of the decision of the Tribunal in the Official Gazette the number and general location of rehabilitation villages proposed to be established by Gujarat in accordance with the decision of the Tribunal. Within one year of the receipt of proposal of Gujarat, both Madhya Pradesh and Maharashtra shall intimate to Gujarat the number of oustee families willing to migrate to Gujarat. The three States by mutual consultation shall determine within two years of the decision of the Tribunal, the number and general location of rehabilitation villages required to be established by Gujarat in its own territory. Madhya Pradesh and Maharashtra shall intimate to Gujarat the number of such villages to be established in Madhya Pradesh and Maharashtra and for which Gujarat would be required to make payments to Madhya Pradesh and Maharashtra respectively.

IV(2)(iv) : Gujarat shall acquire and make available year in advance of the submergence before each successive stage, irrigable lands and house sites for rehabilitation of the oustee families from Madhya Pradesh and Maharashtra who are willing to migrate to Gujarat. Gujarat shall in the first instance offer to rehabilitate the oustees in its own territory.

IV(3) : Gujarat shall also provide the following grants and amenities to the oustees :—

(a) Resettlement Grants (Rehabilitation Grant)—Gujarat shall pay per family a sum of Rs. 750 inclusive of transportation charges as resettlement grant.

(b) Grant-in-aid.

In addition, Gujarat shall pay per family grant-in-aid in the following scale :—

Where total compensation is received	Grant-in-aid
Above Rs. 2000/-	Nil.
Between Rs. 2000/- and Rs. 500/-	Rs. 500/- less an amount equal to one-third of the compensation in excess of Rs. 500/-.
Less than Rs. 500/-	Rs. 500/-.

(c) Civic amenities :

1. One primary school (3 rooms) for 100 families.
2. One Panchayat Ghar for every 500 families.
3. One Dispensary for every 500 families.
4. One seed store for every 500 families.
5. One children's park for every 500 families.
6. One village pond for every 500 families.
7. Drinking water well with trough for every 50 families.
8. Each colony should be linked to main road by roads of appropriate standard.
9. One platform for every 50 families.
10. Every oustee family shall be entitled to and allotted a house site i.e., a plot of land measuring 18.29 × 27.43m. (60' × 90') free of cost. In addition, a provision of 30 per cent additional area for roads, Government buildings, open space etc. shall be made by Gujarat under civic amenities.

11. The State of Gujarat shall make the following provision for rehabilitation in Madhya Pradesh and Maharashtra :

	Rs.
(a) Resettlement	750 per family.
(b) Grant-in-aid	500 per family.
(c) Acquisition of land for resettlement of families affected @ 0.40 hectares (one acre) for 6 families	1500 per acre.

(d) Civic amenities:

1. One primary school @ 100 families 30000 each.
2. One Community Hall-cum-Panchayat Bhavan @ 500 families 20000 each.
3. One Dispensary @ 500 families 25000 each.
4. One seed store @ 500 families 10000 each.
5. One Children's Park @ 500 families 6000 each.

6. One Well with trough @ 50 families 10000 each.
7. One pond @ 500 families 20000 each.
8. One tree platform @ 50 families 1500 each.
9. One religious place of worship @ 100 families 1000 each.
10. Construction of approach roads and link roads for Abadies 3 km per every new Abadi 30000 per km.
11. Electrical distribution lines and street lights 2 km per 100 families 11000 per km.
12. Social amenities for each municipal town going under submergence, viz., water supply and sanitary arrangements layout, levelling of site etc. 5,00,000 each town

IV (4)(i) : Gujarat is directed to provide for rehabilitation and civic amenities as per directions contained hereinafore in Sub-clause IV(3) in its estimate for B-Land compensation and rehabilitation.

IV(4)(ii) : Notwithstanding the provisions hereinbefore contained, Gujarat shall not be liable to pay any compensation for the loss of public properties, facilities or amenities such as drinking water wells, primary school buildings, internal roads, village sites, approach roads, dispensaries, Panchayat buildings, rural electrification, highway bridges, telegraph lines, power lines, etc., if corresponding alternative properties, facilities or amenities are to be provided at the cost of the Sardar Sarovar Project. The party owning the facility shall have the option to accept compensation for utilities as existing or ask for their replacement or relocation at the cost of Gujarat.

IV(5) : It is made clear that the monetary values in Clause IV(3)(c) are liable to be changed at the time of actual rehabilitation. Where any dispute or difference arises as regards the changed valuation, the matter shall be determined by Arbitration in the manner provided in Clause III(2) above and Gujarat's liability shall stand altered accordingly.

IV(6)(i) : In the event of Gujarat being unable to resettle the oustees or the oustees being unwilling to occupy the area offered by Gujarat, Madhya Pradesh and Maharashtra shall make such provisions for rehabilitation, civic amenities etc. on the lines mentioned in Clauses IV(1) to (4) above. Gujarat shall, in that event, be liable to pay all such expenses, costs etc., arising out of or in connection with rehabilitation and provision of civic amenities for the oustees including the cost of all acquisition proceedings and payment of compensation etc., as per the Land Acquisition Act, for the land allotted to oustees for cultivation and habitation.

IV(6)(ii) : In no event shall any areas in Madhya Pradesh and Maharashtra be submerged under the Sardar Sarovar unless all payment of compensation, expenses and costs as aforesaid is made for acquisition of land and properties and arrangements are made for the rehabilitation of the oustees the reform in accordance with these directions and intimated to the oustees.

IV(7) : Allotment of Agricultural Lands.—Every displaced family from whom more than 25 per cent of its land holding is acquired shall be entitled to and be allotted irrigable land to the extent of land acquired from it subject to the prescribed ceiling in the State concerned and a minimum of 2 hectares (5 acres) per family. The irrigation facilities being provided by the State in whose territory the allotted land is situated. This land shall be transferred to the oustee family if it agrees to take it. The price charged for it

would be as mutually agreed between Gujarat and the concerned State. Of the price to be paid for the land a sum equal to 50 per cent of the compensation payable to the oustee family for the land acquired from it will be set off as an initial instalment of payment. The balance cost of the allotted land shall be recovered from the allottee in 20 yearly instalments free of interest. Where land is allotted in Madhya Pradesh or Maharashtra, Gujarat having paid for it vide Clause IV(6)(i) supra, all recoveries for the allotted land shall be credited to Gujarat.

IV(8): Any dispute between the State in respect of Clauses IV(1) to (7) of these directions shall be referred to and determined by arbitration in the manner provided in Clause III(2) of these directions.

Sub-clause V. Programme for Payment to be made by Gujarat to Madhya Pradesh and Maharashtra

V(1): As soon as practicable after the publication of the decision of the Tribunal in the Official Gazette, Gujarat shall prepare and furnish to the other party States, a fresh estimate of sub-head B-Land for the Sardar Sarovar Project as permitted by the Tribunal including in particular, costs of acquisition of lands in Madhya Pradesh and Maharashtra and of rehabilitation of oustee families in Madhya Pradesh and Maharashtra.

V(x)(i): As soon as practicable after the publication of the decision of the Tribunal in the Official Gazette and in any case before expiry of three months thereafter, both Madhya Pradesh and Maharashtra shall furnish to Gujarat three sets of Majmuli/Taluka maps of all talukas in their respective territories likely to be submerged wholly or partly under Sardar Sarovar. These maps shall indicate village boundaries. Within three months after the receipt of the Majmuli/Taluka maps Gujarat shall mark thereon the boundary of the area situated below the FRL as also that between FRL and MWL including the area affected by back water resulting from MWL and shall return one respective set so marked to Madhya Pradesh and Maharashtra.

V(2)(ii): As soon as practicable after the receipt of one set of the Majmuli/Taluka maps marked as aforesaid and in any case within six months thereof, the Governments of Madhya Pradesh and Maharashtra shall publish notifications under Sub-section (1) of Section 4 of the Act notifying that the lands in their respective territories situated below the FRL and buildings with their appurtenant lands between FRL and MWL, as also those affected by the back water effect resulting from MWL (to be specified in the notification) are likely to be needed for the Sardar Sarovar Project.

V(2)(iii): As soon as practicable after publication of the decision of the Tribunal in the Official Gazette as hereinbefore referred to and in any case within one year thereof, Gujarat shall intimate to Madhya Pradesh and Maharashtra yearwise programme of construction of the dam.

V(2)(iv): Objections, if any, received against the proposed acquisition of lands as notified under Section 4 of the Act shall be heard and disposed of and any reports to the State Governments as contemplated by Sub-section (2) of Section 5A of the Act shall be made with utmost expedition. The Governments of Madhya Pradesh and Maharashtra shall issue requisite notifications under Section 6 of the Act with utmost expedition and in any case before the expiry of three years from the dates of publication of the respective notifications under Sub-section (1) of Section 4 of the Act.

V(2)(v): As soon as practicable, after receipt of the yearwise programme of construction of the Sardar Sarovar Dam from Gujarat both Madhya Pradesh and Maharashtra in consultation with Gujarat shall finalise their respective yearwise programme of completing the proceedings for compulsory acquisition of lands in their respective territories upto the stages of making awards under Section 11 of the Act and of taking possession of the lands under Section 16 of the Act.

V(3)(i): Gujarat is required to pay to Madhya Pradesh and Maharashtra compensation for compulsory acquisition of lands, market value of Government lands to be conveyed to Gujarat and expenditure to be incurred in connection with

the rehabilitation of oustee families to be rehabilitated in Madhya Pradesh and Maharashtra as hereinbefore provided. Madhya Pradesh and Maharashtra shall on or before 30th September of each year intimate to Gujarat the amounts required to be paid by Gujarat to Madhya Pradesh and Maharashtra respectively having regard to (a) the extent of lands in Madhya Pradesh and Maharashtra in respect of which awards are likely to be made under Section 11 of the Act (b) the extent of Government lands likely to be conveyed by Madhya Pradesh and Maharashtra to Gujarat during the next financial year and (c) the expenditure likely to be incurred by Madhya Pradesh and Maharashtra in connection with rehabilitation of oustee families in Madhya Pradesh and Maharashtra during the next financial year. In arriving at these estimates for the next financial year, Madhya Pradesh and Maharashtra shall also take into account the differences, if any, between the payments made by Gujarat in pursuance of this clause for the current financial year and the amount actually payable during the said financial year.

V(3)(ii): On the basis of these estimates, Gujarat shall on or before the 31st May of the following financial year make payments to Madhya Pradesh and Maharashtra of the amounts estimated as provided in Clause V(3)(i) above.

V(3)(iii): Gujarat shall at each successive stage of submergence intimate to Madhya Pradesh and Maharashtra the area coming under submergence at least 18 months in advance. The inhabitants of the area coming under the respective stages of submergence will be entitled to occupy or use their properties without being required to pay anything for such occupation and use till a date to be notified by the State concerned which date shall not be less than six months before submergence. They must vacate the area by the notified date.

V(4)(i): On payment of the amounts to be paid each year by Gujarat as compensation for compulsory acquisition of lands as aforesaid, Madhya Pradesh and Maharashtra shall, as expeditiously as possible, complete the acquisition and transfer such lands to Gujarat so as to vest the lands in Gujarat to be used only for the purpose of submergence and subject to Clauses V(5) to (8) of these directions.

V(4)(ii): On payment of the market value of Government lands by Gujarat as hereinbefore provided Madhya Pradesh and Maharashtra and the Union of India shall convey such lands to Gujarat so as to vest in Gujarat to be used only for the purpose of submergence and subject to Clauses V(5) to (8) of these directions.

V(5): Gujarat shall pay to Madhya Pradesh and Maharashtra in accordance with the respective Land Revenue Codes, the amount of land revenue payable every year for the lands in their respective territories acquired for Gujarat or conveyed to it, at the rates prevailing in Madhya Pradesh and Maharashtra respectively from time to time.

V(6): Madhya Pradesh and Maharashtra, as the case may be, shall remit each year to Gujarat any revenue which they may derive from the cultivation of lands which get periodically exposed in Sardar Sarovar, after deducting collection charges for the same.

V(7): Notwithstanding vesting in Gujarat of the lands coming under submergence, Madhya Pradesh and Maharashtra shall continue to enjoy all rights of sovereignty intact over the submerged area in the respective States.

V(8): Madhya Pradesh and Maharashtra respectively shall be exclusively entitled to all rights of fishing, boating and water transportation over the part of lake over the submerged land within Madhya Pradesh and Maharashtra respectively, provided, however, that such right is not exercised to the prejudice of any utilities of the Sardar Sarovar Project or cause hindrance in the legitimate performance of their duties by the project personnel.

V(9): All residual rights not specifically transferred to Gujarat in respect of the lands coming under submergence shall continue to vest in the Government in whose territory they are situated.

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V(10) : In the event of the said lands not being used for the purpose of submergence for which it is acquired, the State of Gujarat shall retransfer such land to Madhya Pradesh or Maharashtra as the case may be, subject to the condition that Madhya Pradesh and Maharashtra refund to Gujarat the amount of compensation received from Gujarat in respect of such land.

V(11) : In the event of any land acquired for rehabilitation of oustee families is not used for the purpose, it shall be returned to the original owner on payment, where feasible or otherwise disposed of and due credit given to Gujarat.

V(12) : All costs incurred by Gujarat on acquisition of land and rehabilitation of oustees in respect of Sardar Sarovar shall be charged to Sardar Sarovar Project estimate, Unit I—Dam and Appurtenant Works.

Sub-clause VI :

Nothing contained in Clause XI shall prevent the alteration, amendment and modification of all or any of the foregoing clauses by agreement between all the party States.

Clause XII: Allocation of Cost of Sardar Sarovar Project between Irrigation and Power.

We determine that the cost of Unit I—Dam and Appurtenant Works—should be apportioned between Irrigation and Power as follows :—

Irrigation	—	43.9 per cent
Power	—	56.1 per cent

Clause XIII : Allocation of Irrigation Component of Cost Sardar Sarovar Project and between Gujarat and Rajasthan.

(a)(i) The irrigation component of the cost of Unit I of Sardar Sarovar Project (Dam and Appurtenant Works) should be shared by Gujarat and Rajasthan in the ratio of 18 : 1.

(a)(ii) Madhya Pradesh and Maharashtra shall contribute a pro rata share to the irrigation component of the cost of Sardar Sarovar Dam as also towards its operation and annual maintenance, for water drawn from Sardar Sarovar for use in their territory. The pro rata share shall be in proportion of the quantity of water so drawn to 9.5 MAF. The amount so contributed shall be credited to Gujarat and Rajasthan in the ratio of 18 : 1.

(b) The cost of Navagam Canal with its design approved by Narmada Control Authority shall be shared by the two States as under :—

- (i) The cost differential in respect of land, earth work and lining for the gradients proposed by Gujarat and that now prescribed, to be borne by Rajasthan in full.
- (ii) The actual cost of the canal less (i) above to be shared on cusec mile basis.

The actual cost should be shared by Gujarat and Rajasthan on cusec-mile basis in the first instance and on completion of the work the share cost shall be adjusted as indicated above. Rajasthan shall credit its share cost each year initially on the basis of budget allotment. This should then be adjusted at the end of the year to actual expenditure. The post-construction expenditure on maintenance is not to be considered as cost of construction.

Should any difference arise between Rajasthan and Gujarat on figures of cost in respect of Navagam Main Canal for purposes of sharing the cost, the matter shall be referred to the Narmada Control Authority and on such a reference its decision shall be final and binding.

Clause XIV : Setting up of Machinery for Implementing The Decision of the Tribunal

We make the following orders with regard to setting up of machinery for implementing the decision of the Tribunal :

Sub-Clause 1 : Constitution of the Authority.

1(1) : An inter-State administrative authority to be called Narmada Control Authority (hereinafter referred to as the 'Authority') shall be established for the purpose of securing compliance with and implementation of the decision and directions of the Narmada Water Disputes Tribunal (herein referred to as the 'Orders').

1(2) : The Authority shall consist of seven high-ranking Engineer Members, of whom one each shall be of the rank of Engineer-in-Chief, Chief Engineer, or Additional Chief Engineer of the Irrigation Department, Power Department or the State Electricity Board appointed by the Government of each of the States of Madhya Pradesh, Gujarat, Maharashtra and Rajasthan and three other eminent Engineers of a rank not less than that of a Chief Engineer to be appointed by the Central Government in consultation with the party States. One of the three Independent Members shall be nominated by the Central Government, as the Chairman of the Authority with a deliberative vote at meetings where decisions are taken on any matter affecting the interest of more than one State and he will be in charge of the administrative work of the Authority. The Central or State Government, as the case may be, shall have the power to remove or suspend from the Authority any Member who, in its opinion, is not suitable to continue as Member.

1(3) : Each Independent Member shall be a full-time Member and be appointed for a term not exceeding five years. The Members appointed by the State Governments shall be part-time Members. The appointing authority for Independent Member or that for part-time Member, as the case may be, shall determine the terms and conditions of appointment in each case. As far as practicable, the first appointment of the seven members of the Authority shall be made within three months from the date of publication of the decision of the Tribunal in the Official Gazette.

1(4) : Vacancies of Members.

On any vacancy occurring in the offices of the three independent Members, the Central Government shall appoint a person to such vacant office, and on any vacancy occurring in the office of the four Members other than the independent Members, the State Government by whom the Member whose office falls vacant was appointed shall appoint a person to the vacant office.

In case of illness or absence for any cause whatever of a Member, the Central Government or State Government by whom he was appointed (as the case may be) may appoint a person as an acting Member during such illness or absence and such acting Member shall, while so acting, have all the powers and perform all the duties and be entitled to the indemnities of the Member (vide Sub-clause 5) in whose stead he so acts, save and except that the next senior independent Member appointed by the Central Government and not the acting Member shall act as Chairman at business meeting of the Authority or as the Chairman of the Authority in the event of illness or absence of the Chairman of the Authority.

Sub-clause 2 : Secretary of the Authority :

The Authority shall employ a Secretary, who shall be an Engineer. He shall not be a Member of the Authority.

Sub-clause 3 : Quorum and Voting :

Five Members shall be a quorum and the concurrence of the majority shall be necessary for the transaction of the business of the Authority except such business as the Authority may from time to time prescribe as routine. The Authority shall not prescribe as routine any business in which the interests of any two of the States are likely to be in conflict. For the transaction of routine business three Members shall be a quorum and in the absence of the Chairman of the Authority, the Chairman elected at the meeting shall have a deliberative vote and in the event of an equality of votes a casting vote also.

Subject as aforesaid the Members shall have equal powers.

Sub-clause 4 : Disposal of Business by the Authority.

4(1) : Subject to the provisions of Sub-clause 4(2), below, the Authority may dispose of any matter before it either by

circulation or by holding a meeting. However, it will be open to any Member of the Authority to require that a matter shall not be disposed of by circulation but at a meeting.

4(2) : On the following matters the Authority shall record its decision by a Resolution at a meeting in which the Chairman and all the Members from the party States are present :

- (i) Framing of Rules of Business;
- (ii) Delegation of functions to a Member or Secretary or any official of the Authority;
- (iii) Categorising any part of the business of the Authority as of a formal or routine nature ;
- (iv) Any other matter which any of the four party States require that it shall be decided at a meeting where all the members from the party States are present.

However, if any particular item under this Sub-clause cannot be disposed of at two successive meetings owing to the absence of one or more Members from the party States, it shall be disposed of under Sub-clause 3 of Clause XIV.

4(3) : Subject to the foregoing provisions, the Authority shall frame its own Rules for the conduct of its business.

4(4) : The Authority shall cause proper minutes or records of all its proceedings to be kept as a permanent record.

Sub-clause 5 : Indemnity of Members :

No Member, officer or employee of the Authority shall be liable for loss, injury or damages resulting from (a) action taken by such Member, officer or employee in good faith and without malice under the apparent authority of the Orders, even though such action is later determined to be unauthorised, or (b) the negligent or wrongful act of omission of any other person, employed by the Authority and serving under such Member, officer or employee unless such Member, officer or employee failed to exercise due care in the appointment of such other person or the supervision of his work.

Sub-clause 6 : Officers and Servants of the Authority.

The Authority may from time to time appoint or employ such and so many officers and servants as it thinks fit and remove or dismiss them, under the rules and regulations applicable to the appointment, removal and dismissal of the Central Government officers and servants. All such officers and servants shall as such be subject to the sole control of the Authority. The scales of pay and other service conditions shall be as applicable to Central Government employees.

Persons employed in the services of the four States may be appointed or employed by the Authority in such proportions as the Authority may deem fit. The Authority shall arrange with the State Governments to spare the services of the persons employed in the State Governments for whole-time employment with the Authority, or for the performance of any work or services for the Authority. The Authority may also make direct recruitment of any personnel or obtain the same from the Centre or other source as considered appropriate.

Sub-clause 7 : Administrative & Field Organisation Costs.

(1) : All expenses of the Authority (including the salary and expenses of the independent Members) shall be borne by the State Governments of Madhya Pradesh, Gujarat, Maharashtra and Rajasthan in equal shares. The expenses pertaining to a Member representing a State shall be borne by the State concerned. The cost of maintaining, operating and controlling the gauging and other hydrological stations in each State and the telecommunication systems for communicating the data shall be borne by the State concerned.

(2) The costs of construction of the storages power installations, diversion works, headworks and canal networks

shall be borne wholly by the State Government in which territory the work is located except for works whose cost been ordered by the Tribunal to be shared between two more party States. Where the capital cost is thus shared, operation and maintenance cost shall also be shared in same proportion.

Sub-clause 8 : Powers, Functions & Duties of the Authority

8(1) : The role of the Authority will mainly comprise ordination and direction. Normally all bilateral matters should be dealt with mutually by the States concerned and referred to the Authority only if there is a dispute.

8(2) : The Authority shall be charged with the power and shall be under a duty to do any or all things necessary, sufficient and expedient for the implementation of the Order with respect to :

- (i) the storage, apportionment, regulation and control of the Narmada waters ;
- (ii) sharing of power benefits from Sardar Sarovar project;
- (iii) regulated releases by Madhya Pradesh;
- (iv) acquisition by the concerned State for Sardar Sarovar project of lands and properties likely to be submerged under Sardar Sarovar ;
- (v) compensation and rehabilitation and settlement of oustees ; and
- (vi) sharing of costs.

8(3) : In particular and without prejudice to the generalia the following functions, the Authority shall perform in addition the following functions :—

- (i) Madhya Pradesh or Gujarat, as the case may be, shall submit to the Authority the Sardar Sarovar Project Report, the Narmadasagar Project Report, the Omkareshwar Project Report and the Maheshwar Project Report. The Authority shall point out to the States concerned, the Central Water Commission, the Central Electricity Authority and Planning Commission any features of these projects which conflict with the implementation of the Orders of the Tribunal. Any subsequent changes in the scales of features or substantial increase in cost in respect of dams, power houses and canal headworks shall be reported to the Authority for taking appropriate action in the matter.
- (ii) The Authority shall decide the phasing and co-ordinate construction programmes of the Narmadasagar project and Sardar Sarovar Unit II—Canal with a view to obtaining expeditiously optimum benefits during and after the completion of the construction of the projects, having due regard to availability of funds.
- (iii) The Authority shall obtain from the concerned States periodical progress reports both as to work and expenditure, and shall on receipt of such reports review the progress of construction of different units of the projects and whenever necessary advise the State concerned on the steps to be taken to expedite the work, except in respect of Unit I—Dam Appurtenant Works and Unit III—Power Component of Sardar Sarovar Project. The States shall submit in respect of projects in Sub-clause 8(3)(i), completion reports to the Authority.
- (iv) The Authority shall issue appropriate directions whenever necessary for timely and full compliance by the concerned States with the Orders of the Tribunal in the matter of acquisition for and maintenance of available to Gujarat lands and properties likely to be submerged under the Sardar Sarovar Project in the matter of compensation and rehabilitation of oustees thereunder.
- (v) The Authority shall cause to be established, maintained, and operated by the State Governments

corned or any one or more of them, such stream and other gauging stations, equipped with automatic recorders where necessary, discharge, silt and evaporation observation stations and measuring devices as may be necessary from time to time for securing the records required for carrying out the provisions of the Orders. If deemed necessary, the Authority may require the installation, maintenance and operation by the State concerned of measuring devices of approved type at the head of main canals as also at the offtake of the canal for Rajasthan for measuring amount of water diverted from Narmada river system.

- (vi) Concurrent records shall be kept of the flow of the Narmada at all stations considered necessary by the Authority and the records correlated.
- (vii) The Authority shall frame rules of regulation and water accounting as per guidelines given in Clause IX. It shall determine the share of water of each State for every ten-day period for purposes of regulation and water accounting.
- (viii) The Authority shall ensure implementation of the Orders of the Tribunal in respect of (a) quantum and pattern of regulated releases by Madhya Pradesh; (b) payment for such regulated releases/sharing of costs.
- (ix) The Authority shall collect from the State concerned data of the areas irrigated by Narmada waters in each season, of power generated at each hydro-electric power station at and downstream of Narmadasagar, of withdrawals for domestic, municipal and industrial or any other purposes and of waters going down the river from Sardar Sarovar Project.
- (x) The Authority shall determine the volume of water flowing in the river Narmada and its tributaries in a water year (1st July to 30th June next year).
- (xi) The Authority shall determine from time to time the volume of water stored by each State in reservoirs and other storages and may for that purpose adopt any device or method.
- (xii) The Authority shall determine at appropriate periodic intervals the use of Narmada waters made by the States, or such of them as necessary, at any place or in any area at any time and for that purpose it may take note of all diversions or obstructions, whether natural or artificial or partly natural and partly artificial, from the river Narmada and its Tributaries and measure such use by any method as it deems fit.
- (xiii) The Authority or any of its duly authorised representative shall have power to enter upon any land and property upon which any project or development of any project, or any work of gauging evaporation or other hydrological station or measuring device has been or is being constructed, operated or maintained by any State for the use of Narmada water. Each State through its appropriate departments shall render all co-operation and assistance to the Authority and its authorised representatives in this behalf.
- (xiv) The Authority shall meet as often as necessary and decide on a proper management of waters including in particular the manner and details of withdrawals of waters from the storages on the Narmada river system in accordance with the Orders. In particular, the Authority shall meet at the end of filling season, and review the availability of waters in the storages on the Narmada river system and decide upon the pattern of their regulation for the next irrigation season, taking into account the carryover storages.
- (xv) The Authority shall give directions for a phased programme of construction for generation and transmission of power in fulfilment of the shares of power allocated to the three States of Madhya Pradesh, Maharashtra and Gujarat from Sardar Sarovar and for payments therefor in accordance with the

Orders of the Tribunal. The Authority shall also ensure that generation and transmission of power from Sardar Sarovar complex are in accordance with the Orders.

- (xvi) The Authority shall issue appropriate directions for the establishment, maintenance and operation of an effective system of flood forecasting and flood control, including reporting of heavy precipitation, and telecommunication systems. The safety of a structure shall primarily be the responsibility of the Chief Engineer in charge of the structure and no decision or order shall be binding on him if in his opinion the safety of the structure will be endangered thereby. The Authority shall publish annually and make available to party States the data regarding operation of reservoirs during floods.

8(4) : In the light of its experience, the Authority may modify or add to the functions enumerated hereinabove in Sub-clauses 8(3)(i) to (xvi) by a resolution.

8(5) : All the concerned States shall submit to the Authority all the relevant information called for by the Authority in connection with the Narmada Valley Development expeditiously.

Sub-clause 9 : Annual Report of the Authority.

The Authority shall prepare and transmit to each of the four States as early as possible and in any case before the end of the current Water Year (1st July to 30th June) an Annual Report covering the activities of the Authority for the preceding year and to make available to each State on its request any information within its possession any time and always provide access to its record to the States and their representatives.

Sub-clause 10 : Records of the Authority and their Location.

The Authority shall keep a record of all meetings and proceedings, maintain regular accounts, and have a suitable office where documents, records, accounts and gauging data shall be kept open for inspection by the four States or their representatives at such times and under such regulations as the Authority may determine.

The location of the Central, Regional and Sub-regional offices of the Narmada Control Authority shall be determined by the Authority.

The headquarters of the Authority shall be at New Delhi till such time as it decides on its permanent location.

Sub-clause 11 : Contracts and Agreements.

The Authority shall enter into such contracts and agreements as may be necessary and essential for the full and proper performance of the functions and duties conferred or imposed on it.

Sub-clause 12 : Financial Provisions.

(1) All the capital and revenue expenditure required to be incurred by the Authority shall be borne by the four States of Madhya Pradesh, Gujarat, Maharashtra and Rajasthan equally. The Governments of the four States shall provide the necessary funds to the Authority to meet all capital and revenue expenditure required to be incurred by the Authority for the discharge of its functions.

(2) On the constitution of the Authority each of the Governments of the four States shall contribute Rs. 5,00,000 (Rupees five lakhs) to the fund of the Authority in the first instance.

(3) The Authority shall in the month of September of each year prepare detailed estimate of the amounts of money required during the twelve months from the first day of April of the ensuing year, showing the manner in which it is proposed to expend such money. The Authority shall on or before the fifteenth of October forward a copy of such detailed estimate to the concerned Chief Engineers of the four States and indicate the amount required to be contributed by each State for the ensuing financial year. Each of the State Governments

shall pay to the Authority its contribution as indicated by the Authority on or before the 30th day of April of the ensuing year.

(4) The Authority shall maintain detailed and accurate accounts of all receipts and disbursements and shall after the close of each financial year prepare an Annual Statement of Accounts and send copies thereof to the Accountants General as well as the concerned Chief Engineers of the four States. The form of the Annual Statement of Accounts shall be such as may be prescribed by rules. The Accounts maintained by the Authority shall be open for inspection at all reasonable times by the four States through their duly authorised representative or representatives.

(5) Disbursement shall be made from the fund of the Authority only in such manner as may be prescribed by the Authority. The Authority may incur such expenditure as it may think fit to meet any emergency in the discharge of its functions.

(6) The accounts maintained by the Authority shall be audited by the Comptroller & Auditor General of India or his nominee, who shall certify subject to such observations as he may wish to make on the annual accounts of the Authority. The Authority shall forward to the Accountants General and the concerned Chief Engineers of the four States copies of the Report of the Comptroller & Auditor General of India and shall include the same in its Annual Report.

Sub-clause 13 : Decision of the Authority.

The decisions of the Authority on all matters covered under Sub-clause 8 shall be final and binding on the four party States. However, there shall be a Review Committee which may suo motu or on the application of any party State review any decision of the Authority. In urgent cases the Chairman of the Review Committee may, on the application of the party State, grant stay of any order of the Authority pending final decision on review.

Sub-clause 14 : Review Committee.

14(1) : The Review Committee shall consist of five members including a Chairman as under :—

(i) Union Minister for Irrigation as the :	Chairman
(ii) Chief Minister of Madhya Pradesh :	Member
(iii) Chief Minister of Gujarat :	Member
(iv) Chief Minister of Maharashtra :	Member
(v) Chief Minister of Rajasthan :	Member

The Secretary of the Union Ministry of Agriculture and Irrigation, Department of Irrigation, shall be the Convenor of the Review Committee but shall not have any voting right.

In case there is President's rule in any of the States, the Governor of that State or his authorised representative will act as Member of the Review Committee.

14(2) : The Chief Ministers of the four States may nominate the respective Irrigation Ministers either generally or specially as the alternate Member with full powers of voting, taking decisions etc.

14(3) : The Review Committee may review the decision of the Authority at a meeting at which the Chairman and all the Members of the Review Committee are present. It is expected that the decisions of the Review Committee will be by consensus. Failing consensus it shall be by majority of votes of Members including the Chairman.

14(4) : Advance notice of the proposed meeting of the Review Committee, its agenda and agenda notes will be forwarded by the Convenor to the party States.

14(5) : The decision of the Review Committee shall be recorded in writing and shall be final and binding on all the States.

Sub-clause 15 : Construction Outside Jurisdiction Of Authority.

The planning and construction of the projects will be carried out by each State through its own agencies, save and except to the extent prescribed in Sub-clause 16 of Clause XIV.

Sub-clause 16 : Supervisory Function Of The Authority Of Construction of Sardar Sarovar Project.

(1) The four party States have financial commitment respect of Unit I—Dam and Appurtenant Works of the Sardar Sarovar Project and three of them, namely, Gujarat, Maharashtra and Madhya Pradesh have such commitment respect of Unit III—Power Complex of the Project. With a view to ensuring efficient, economical and early execution of these Units of the Project, and taking into account the financial commitments of the party States, it is desirable and necessary that a Construction Advisory Committee should be constituted for the purpose. We, therefore, order that such Advisory Committee to be called Sardar Sarovar Construction Advisory Committee should be set up within three months from the date of publication of the Decision of the Tribunal in the Official Gazette.

(2) The Construction Advisory Committee shall have a whole-time Secretary of the rank of Chief Engineer to be appointed by Union of India and such other staff as may be necessary.

(3) The Committee shall comprise.

(i) The Secretary to the Government of India, in charge of Irrigation—Chairman.

(ii) Chairman, Central Water Commission (CWC), or a Member of the CWC representing him in case the Chairman is unable to attend a meeting.

(iii) Chairman, Central Electricity Authority (CEA), or a Member of the CEA representing him in case the Chairman is unable to attend a meeting.

(iv) Chairman, Narmada Control Authority (NCA) or an Independent Member of NCA representing him in case the Chairman is unable to attend a meeting.

(v) Joint Secretary (Financial Adviser) in the Union Ministry of Agriculture & Irrigation (Department of Irrigation).

(vi) Secretaries in charge of Finance Department of Governments of Madhya Pradesh, Gujarat, Maharashtra and Rajasthan.

(vii) Secretaries in charge of Irrigation Department of Governments of Gujarat and Rajasthan.

(viii) Secretaries in charge of Power Department of Madhya Pradesh, Maharashtra and Gujarat.

(ix) Secretaries in charge of Revenue Department or other Department concerned with land acquisition of Madhya Pradesh, Maharashtra and Gujarat.

(x) General Manager or Chief Engineers of Gujarat in charge of the project and Chief Engineers of Madhya Pradesh, Maharashtra and Rajasthan concerned with the Project.

(xi) Chairman, State Electricity Boards of Madhya Pradesh, Maharashtra and Gujarat.

(xii) Financial Adviser, Sardar Sarovar Project.

The Chairman may co-opt any other Member for any particular meeting.

(4) The Sardar Sarovar Construction Advisory Committee shall :—

(i) scrutinise the project estimates prepared for the works, advise necessary modifications and recommend the estimates for the administrative approval of the concerned Governments ;

(ii) examine and make recommendation on all proposals pertaining to technical features and designs as they be referred to it by any of the party States where necessary consult experts for the purpose.

- (iii) examine and make recommendation on the programme of construction of different parts of the project in a co-ordinated manner, keeping in view the funds available, the economics of the project and the desirability of obtaining quick results ;
- (iv) examine the requirement of funds for the construction of works and other purposes according to the approved programme and make necessary recommendations ;
- (v) examine and recommend, from time to time, the delegation of such powers, both technical and financial, as it may deem necessary for the efficient execution of the project, to the General Manager/Chief Engineers, Superintending Engineers, Executive Engineers and Sub-Divisional Officers engaged in the execution of the project ;
- (vi) examine and, where necessary, recommend specifications for various classes of work;
- (vii) examine and make recommendation on all sub-estimates and contracts, the cost of which exceeds the powers of sanction of the General Manager/Chief Engineers ;
- (viii) review progress reports, both for works and expenditure from the General Manager/Chief Engineers and recommend, where necessary, steps to be taken to expedite the work.
- (5) The headquarters of the Construction Advisory Committee will be fixed by the Committee.
- (6) The Construction Advisory Committee will frame rules regarding procedure and delegation of power for the purpose of carrying out its business.
- (7) The recommendations of the Construction Advisory Committee shall be conveyed to the Governments concerned by the Committee and copies sent to the Review Committee and Narmada Control Authority for information.
- (8) The recommendations of the Construction Advisory Committee shall normally be accepted by the State Governments concerned. In the event of any disagreement, the matter shall be referred to the Review Committee and the decision of the Review Committee shall be final and binding on all the concerned States
- In all matters relating to the construction of the Sardar Sarovar Dam and appurtenant works (Unit I), Power House and generating machinery (Unit III) and Transmission lines to feed power to Madhya Pradesh, Maharashtra and Gujarat upto the next sub-station in each case, the Narmada Control Authority will carry out only such functions as do not specifically devolve upon the Construction Advisory Committee, set up under Sub-Clause 16, Clause XIV.
- (9) The Construction Advisory Committee will be dissolved after three years of the completion of construction of Units I and III of the Sardar Sarovar Project. The post-construction management of Units I and III will be by Gujarat under the supervision of the Narmada Control Authority.
- (10) The expenditure of the Construction Advisory Committee will be borne by the four States of Madhya Pradesh, Gujarat, Maharashtra and Rajasthan equally.

Sub-clause 17

Nothing contained in this Order shall prevent the alteration, amendment or modification of all or any of the foregoing clauses by agreement between all the States concerned.

Sub-clause 18 :

The Union of India has consented to participate in the Machinery to be established by the Order of the Tribunal, if so directed and to do its best to implement the decision of the Tribunal.

Accordingly, we direct the Union of India to participate in the Machinery set up by the Order of the Tribunal to implement the directions of the Tribunal specifically under Clauses 1(2), 4, 12(6), 13, 14 and generally to implement all the other directions so far as the Union of India is concerned.

Clause XV : Order As To Costs Of Proceedings.

- (i) The States of Gujarat, Madhya Pradesh, Maharashtra and Rajasthan shall bear their own costs of appearing before the Tribunal. The expenses of the Tribunal shall be borne and paid by the aforesaid four State in equal shares. These directions relate to the references under Section 5(1) of the Inter-State Water Disputes Act, 1956.
- (ii) The States of Gujarat, Madhya Pradesh, Maharashtra and Rajasthan shall bear their own costs of appearing before the Tribunal in the references under Section 5(3) of the said Act. The expenses of the Tribunal in respect of the aforesaid reference shall be borne and paid by the States of Gujarat, Madhya Pradesh, Maharashtra and Rajasthan in equal shares.

Clause XVI : Period Of Operation Of Certain Clauses Of The Final Order.

In addition to Clauses III and IV (mentioned in Clause V), our Orders in Clause VII with regard to Full Reservoir Level and Maximum Water Level of the Sardar Sarovar Dam, Clause VIII with regard to Sharing of Costs and Benefits, Clause IX with regard to Regulated Releases to be made by Madhya Pradesh for the Requirement of Sardar Sarovar Project, Clause X with regard to Payment to be made by Gujarat to Madhya Pradesh for such Regulated Releases, Clause XII with regard to Allocation of Costs of Sardar Sarovar Project between Irrigation and Power, Clause XIII with regard to Allocation of Irrigation Component of Cost of Sardar Sarovar Project between Gujarat and Rajasthan and Clause XIV as regards Machinery are all made subject to review at any time after a period of 45 years from the date of publication of the Decision of the Tribunal in the Official Gazette.

December 7, 1979.

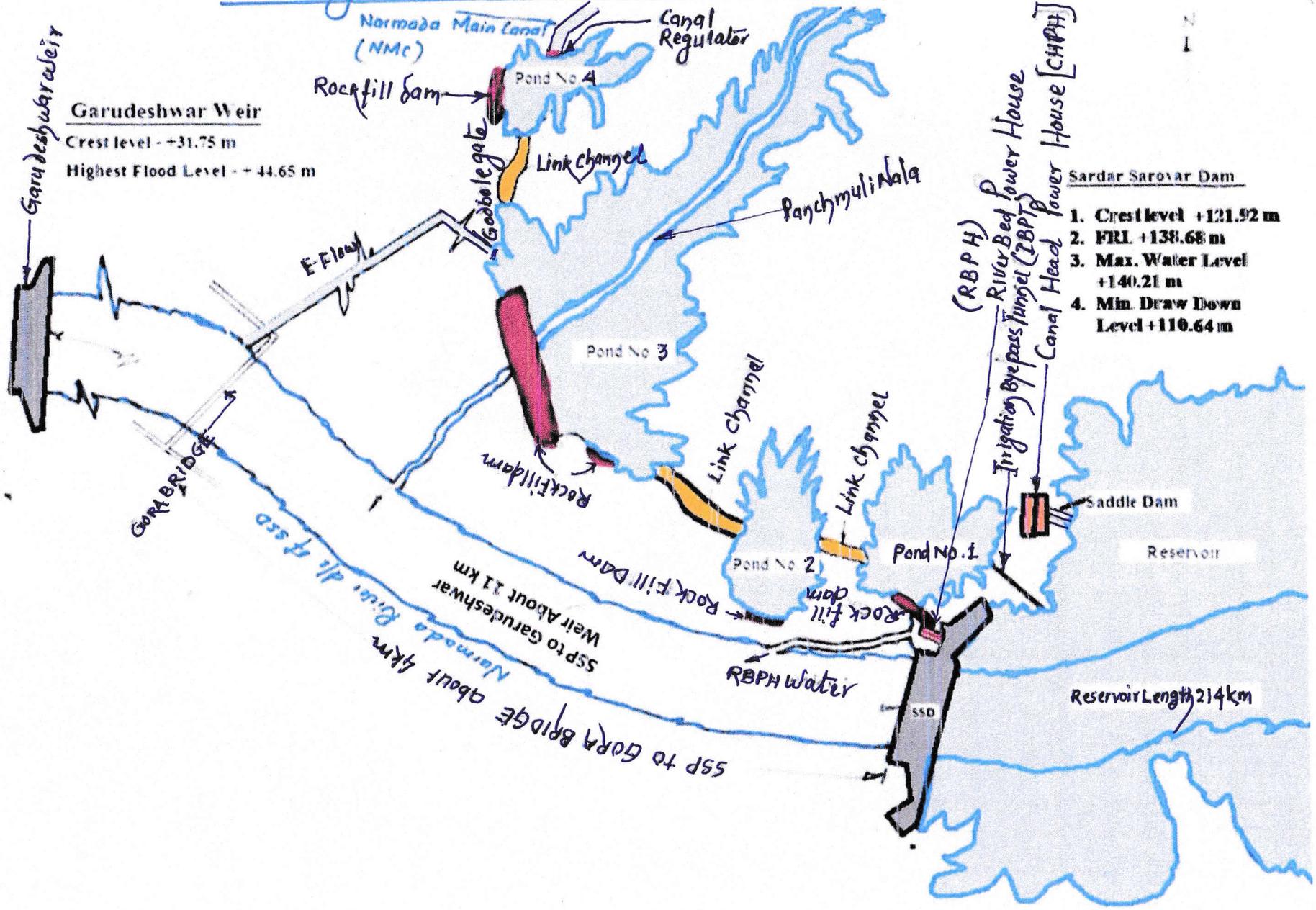
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V. RAMASWAMI, Chairman

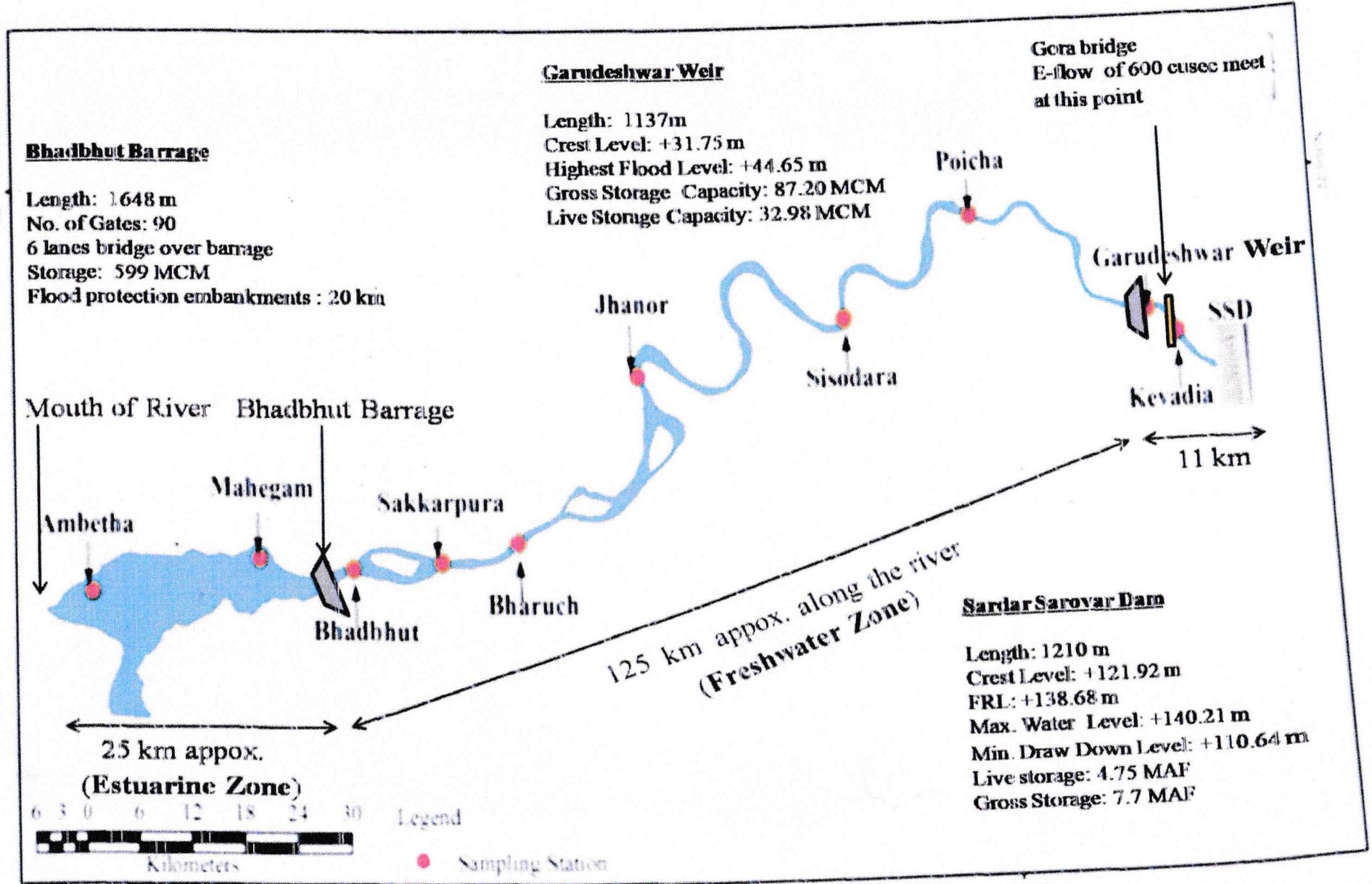
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A. K. SINHA, Member

Sd/-
M. R. A. ANSARI, Member"

[F. 3/3/79-WD]
C. C. PATEL, Secy.

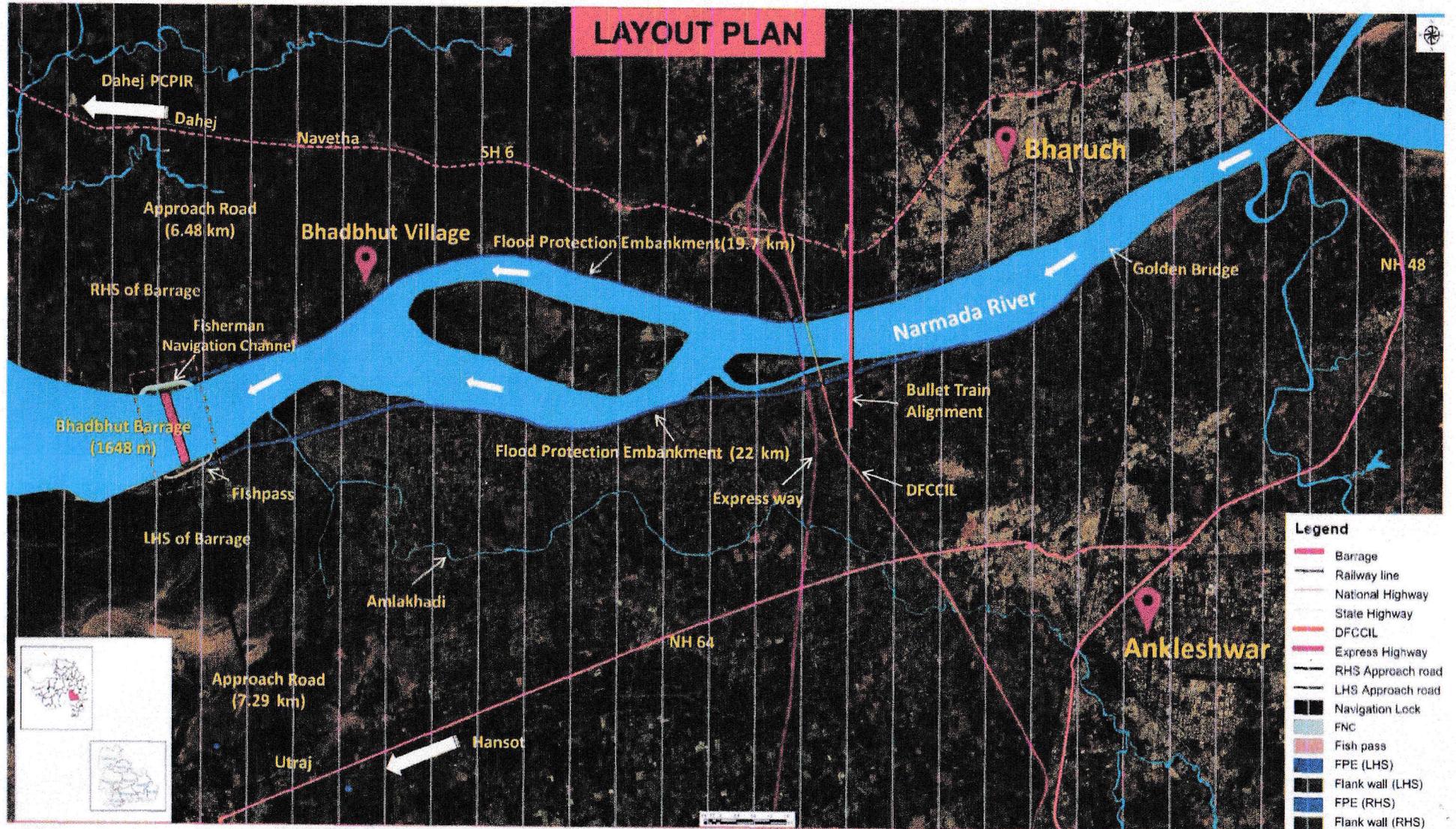
Line Diagram of SSD to Garudeshwar Weir

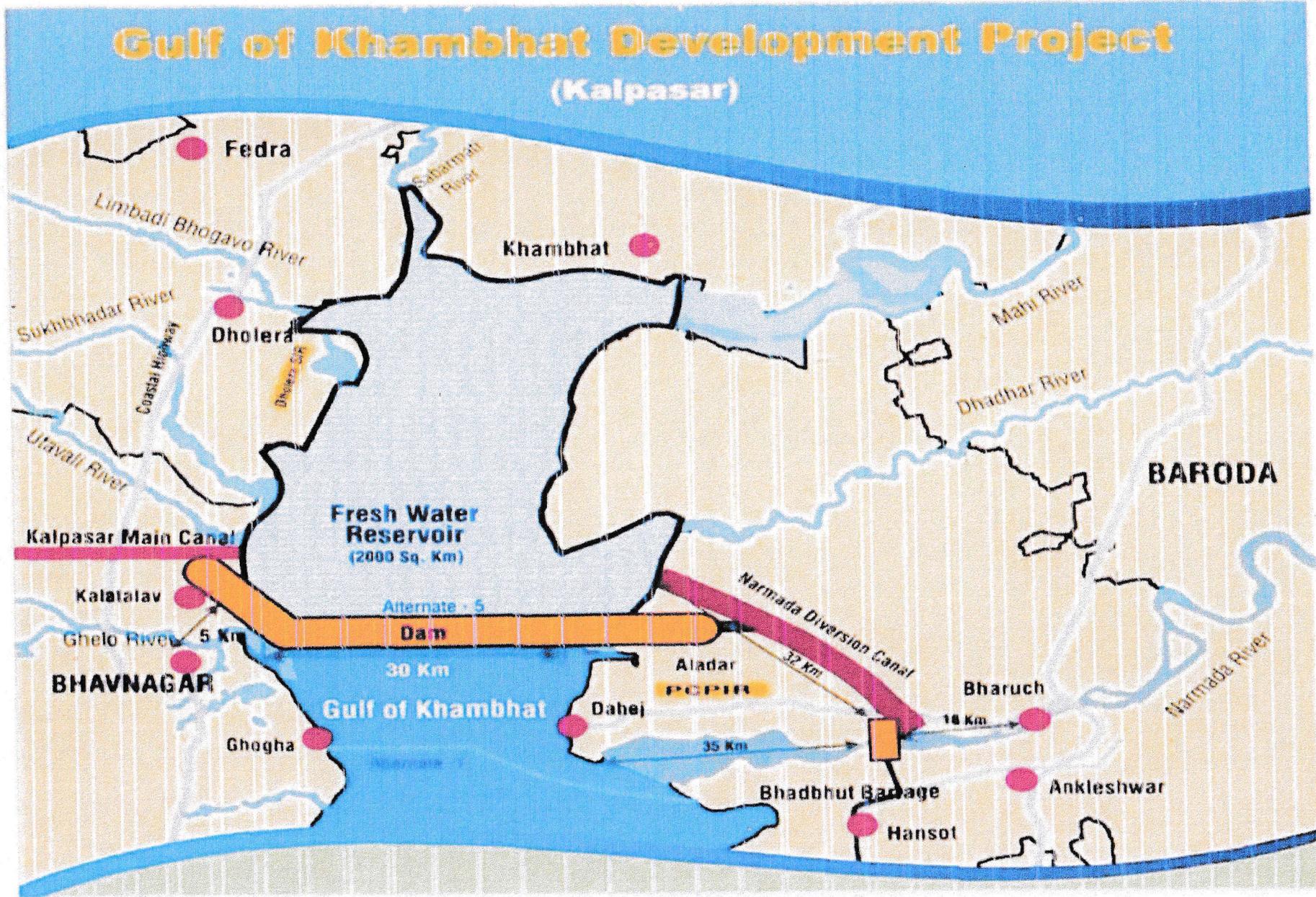




Annexure - x/b

(51)





Anexure - R/g
53

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नर्मदा नियंत्रण प्राधिकरण NARMADA CONTROL AUTHORITY

नर्मदा नियंत्रण प्राधिकरण की चौरानवे बैठक का कार्यवृत्त MINUTES OF THE NINETY-FOURTH MEETING OF NARMADA CONTROL AUTHORITY

स्थान : सिविल सेवा अधिकारी संस्थान,
कस्तूरबा गांधी मार्ग, नई दिल्ली

दिनांक : 8 मई, 2023
Date: 8th May, 2023

Venue: Civil Services Officers Institute (CSOI),
Kasturba Gandhi Marg, New Delhi

समय : 11.00 बजे
Time : 11.00 Hrs.

इन्दौर
जुलाई, 2023

Indore
July, 2023

Fisheries Management in the reservoir. She also informed that the Joint Secretary, MoA, AH&D had invited proposal from the party States for stocking in the reservoir and enhancing livelihood of the affected population through market linkages, etc. However, there has been no response from the States so far.

Senior Scientist from CIFRI suggested that once the reports from all the three States are compiled, both stocking of the reservoir and increasing the fishery potential for livelihood enhancement shall have to be deliberated upon, analysing various pros and cons, in view of crocodile threat.

Director (Fisheries), MoA, AH & D, informed that they usually face conflicts with the State Irrigation Departments for implementing fishery related schemes in the reservoir. MD, SSNNL stated that we will examine handing over / allowing fisheries Deptt.

After detailed discussion, Chairman, NCA suggested that the crocodile studies and mapping may be carried out through WII /Forest Department and their opinion regarding fisheries conservation/livelihood restoration in SSR may be obtained. He also directed GoM that the study for Maharashtra portion of the reservoir be completed at the earliest so that integrated plan can be prepared for implementation. He directed that a committee be constituted comprising Member (E&R), NCA, CIFRI, NMCG, representatives from the State Fisheries Department and Water Resources Department, officers from the Ministry of Fisheries, Animal Husbandry and Dairying and other concerned members, as nominated by the party States, for framing and implementing the integrated management plan. For taking any decision on these issues, even for framing a common body for integrated fishery, the Committee can always approach NCA for deliberation and direction.

All the concerned States agreed to the views of the Chairman, NCA.

ITEM NO. 94-12 (948): TO REVIEW THE ENVIRONMENTAL FLOW OF RIVER NARMADA IN THE DOWNSTREAM OF SARDAR SAROVAR DAM

Executive Member, NCA informed that as decided in 93rd NCA Meeting, held on 12th April, 2022, CIFRI has completed their e-flow study and submitted its final report in June, 2022 and suggested e-flow for 3 seasons as follows:

1. Monsoon (June – September) - 14,401 cusecs,
2. Post- monsoon (October – January) - 5,753 cusecs
3. Lean period (February – May) - 1,875 cusecs

Based on the recommendation of CIFRI, the e-flow was calculated and arrived to 5.334 MAF (3.485 MAF in Monsoon, 1.403 MAF in Post Monsoon & 0.446 MAF in Lean period/Pre-Monsoon).

However, after going through the report, it has been observed by NCA that:

- The study was confined to a stretch of 11 km only (SSD to Garudeshwar), ignoring the rest 151 km. River cross sections taken were limited.
- Restricted in calculating e-flow for only one fish species i.e., *Tor tor* (Mahaseer) which defeats the objective of the study - sustainable fisheries.
- E-flow values are 100% of seasonal average flow.

Executive Member, NCA further stated that in view of identified observations, SSNNL, vide letter dated 26th September, 2022 agreed that the study needs to be reviewed but requested to enhance the e-flow from 600 cusecs to 1,500 cusecs as an interim measure.

Further, NCA requested the party States, vide letter dated 11.11.2022 and 20.12.2022 to submit their observations and suggestions on CIFRI's recommendation and SSNNL's request for enhanced interim e-flow. GoMP and GoR have submitted their observations which has been duly forwarded to GoG, vide letters dated 13.01.2023 & 30.01.2023. However, there has been no response from GoM. The major observations of GoMP and the view of GoR are as follows:

GoMP

1. As per the earlier decision, 600 cusecs of water is being released for e-flow.
2. The NWDT Award is due for review in the year 2024 and this matter can be referred to the Tribunal.
3. Views or opinion of GoMP has not been sought/included in the study.

GoR

1. Agreed over CIFRI's recommendations w.r.t. mandatory downstream e-flow with condition that share of Rajasthan State should not be reduced.

Further, Executive Member, NCA informed that case has been filed in NGT and then in Hon'ble Supreme Court, which is pending. Chairman, NCA also accorded approval to constitute a committee with multi-disciplinary experts from reputed institutions, including engineers and biologists and also include National Mission for Clean Ganga (NMCG) as Committee Member, to come out with the realistic value for e-flow.

Executive Member, NCA requested the Authority for deliberation and to take decision on:

- Interim e-flow of 1,500 cusecs until the final values of e-flow gets finalized
- Composition of the Committee
- Study duration and final report date.

Vice Chairman, NVDA, GoMP stated that due to the large number of members of the proposed Committee it may become difficult to take any decision. Therefore, there is a need to change the composition comprising Members and officers from NCA, Party States and expert members from various institutions. The Committee can study the report and submit its proposal.

Chairman, NCA directed that the committee be headed by Executive Member, NCA. Other members would include independent members from NCA, ED (Technical) from NMCG, members and representatives from the Party States, officers from the State WRD, State Fishery Department, experts on e-flow from reputed organizations /institutes like CWC and IIT,

biologists/biodiversity experts from CIFRI & NMCG, etc. He also requested Director (Fisheries) from the Ministry of Fisheries, AH&D to contribute in this committee and join during the field visit.

Chairman, NCA directed that a site visit may be conducted by all members at an early date to assess the real situation in the downstream areas. The committee will go through the reports of CIFRI and submit its recommendation after a thorough study, based on which final decision on the quantum of downstream environmental flow can be taken up with the consensus of all the beneficiary States.

All the party States agreed to the directions of the Chairman, NCA.

ITEM NO. 94-13 (949): ONGOING RESETTLEMENT & REHABILITATION (R&R) WORKS

Executive Member, NCA informed that so far about 32,552 families affected due to construction of SSR have been successfully resettled and rehabilitated by the three States with their co-operation and support. However, during the meeting held with party States under the chairmanship of the then Secretary, Ministry of Social Justice and Empowerment on 17th February, 2020, GoMP was directed to prepare an action plan for completing the remaining R&R works and strengthen their grievance redressal mechanism.

Executive Member, NCA further stated that in the 37th Task Force Meeting, held on 26th November, 2020 with the party States, it was observed that there were areas, which still requires attention in Maharashtra & Gujarat. Since then, NCA officers have been carrying out field visits and communicating regularly with the party States to expedite completion of the balance R&R works. Executive Member, NCA requested GoMP, GoG and GoM to apprise the Authority on the latest status and steps taken to expedite balance R&R works.

Govt. of Madhya Pradesh

Commissioner (R & Field), NVDA, GoMP stated that so far, 23,603 families have been resettled in MP and they have been given compensation as per NWDT Award and State's liberalized policy, including, major son considered as separate family. He further stated that, GoMP is in the process of appointing Judges in GRA and the proposal has been sent for approval.

Member (E&R), NCA stated that according to the liberalized policy of MP, there should have been an Industrial Training Institute and Fisheries Research & Training Institute to impart training to the PAFs and to the fishermen. She also mentioned that the situation at Chikhaldia, where few families have been left behind, without access to civic amenities, may be reviewed and a decision may be taken as to whether they are eligible to get any further benefit or if they can be shifted.

Chairman, NCA stated that there are 7,538 pending cases in the GRA in M.P. Vice Chairman, NVDA, GoMP stated that all the cases pending in GRA have been disposed by NVDA, GoMP. However, people have again appealed before GRA, MP.

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नर्मदा नियंत्रण प्राधिकरण
NARMADA CONTROL AUTHORITY

**सरदार सरोवर बाँध (एस.एस.डी.) पर नर्मदा नदी के
डाउनस्ट्रीम ई-फ्लो पर समिति की पहली बैठक का
कार्यवृत्त**

**MINUTES OF THE 1ST MEETING OF THE COMMITTEE ON
DOWNSTREAM E- FLOW OF RIVER NARMADA AT SARDAR
SAROVAR DAM (SSD)**

स्थान : सायाजी होटल, इन्दौर
Venue : Sayaji Hotel, Indore

दिनांक : 21 सितम्बर, 2023
Date : 21st September, 2023

समय : 11:30 बजे
Time : 11:30 Hrs.

इन्दौर

नवम्बर, 2023

INDORE
NOVEMBER, 2023

Shri Ashok Kumar Thakur, EM, NCA and Chairman of the Committee thanked everyone for their views and deliberations on this important topic. He concluded the meeting with the following decisions/observations made by all expert members and the party States:

- i. As there are massive exercises being done for rejuvenation of rivers in the country, rejuvenation of river Narmada should also be taken up in line with the five pillars of Namami Gange Mission - *Nirmalta*, *Aviralta*, *Jan Ganga* (People's Participation), *Gyan Ganga* (Knowledge and research based interventions) and *Arth Ganga* (People-river connect through the bridge of economy).
- ii. All States have principally agreed that there is a need for re-assessment of d/s E-Flow to be carried out by CIFRI, Barrackpore. It was also agreed that if the study suggests enhancement of the quantum of E-Flow, the same should be implemented, in line with the directions of the Hon'ble NGT & MoEF&CC (GoI) for protection of riverine ecology. However, until there is any final decision on the upward revision of e-flow, the same shall continue to be 600 cusecs.
- iii. The final decision on implementation of revised three seasons E-Flow shall be taken up at the appropriate level as per NWDT Award, taking into consideration water share of the party States.
- iv. Review of existing E-Flow to be undertaken for its upward revision based on three different seasons, taking into consideration Bhadbhut barrage and its fish pass, target fish species, releases from Karjan & Orsang rivers, 90% or 95% dependable 10 daily discharge series, capturing virgin flow data, real-time observed data, **critical river cross section values upto the High Flood Level (HFL)** from the total stretch of 162 kms or atleast upto Bhadbhut barrage.
- v. It is to be taken into account that after pumping mode operation, water between Dam and Weir is going to be a dead zone.
- vi. SSNNL, GoG to entrust re-assessment of E-Flow study to CIFRI, Barrackpore, as decided with the consent of all the party States. All critical river cross section data upto HFL, d/s to G.W. to be obtained and furnished to CIFRI alongwith any other data required, including real time hydrological data/virgin flow data, so that the study gets completed within 8 months' time from the date of award of work under the guidance/consultation with the E-Flow Committee. SSNNL also to assist CIFRI in capturing requisite data from the field w.r.t. habitat, river health, geomorphology, etc.
- vii. For assessing E-Flow requirements, different methodologies, like hydraulic rating methodologies, habitat simulations or micro-habitat modeling methodologies along with desktop methods, based on hydrological data, like Environmental Management Class (EMC), etc. are available. The choice of methodology depends upon the objective, availability of data, including surveyed river cross-sections and the timeframe available for the study. FDC is not suitable in the Indian context, as has been adopted by CIFRI. The hydraulic rating cum habitat simulation methodology can be considered to quantify the E-Flows. Virgin flow should be captured in the computation process.
- viii. E-Flow quantum should be able to mimic the natural flow of the river.

- ix. The whole assessment process of E-Flow shall be transparent and participatory in nature. While this re-assessment of three season E-Flow shall be carried out by CIFRI after obtaining requisite technical inputs and logistical support from SSNNL, expert members of the E-Flow Committee (NMCG, CWC, IIT Roorkee), scientists from CIFRI and members of E-Flow Committee from the party States, shall also be meeting from time to time for deliberation and finalization of this report on E-Flow, so that views/opinion of the party States do not get overlooked.
- x. The pumping mode operation is still not in place and might take a few more years. Till then, and until a final decision on revised E-Flow is taken, SSNNL should explore possibility of increasing the E-Flow by regulating this large quantum of water released from RBPH through the G.W. and taking advantage of the pondage made available due to G.W.
- xi. There should be an agency/organization, which would monitor and take responsibility to maintain the E-Flow at various stretches of river Narmada before any diversion. Anything should not be prescribed which is not implementable and monitorable. NCA will monitor the E-Flow in the Narmada basin, especially d/s to SSD.
- xii. E-Flows should not be used to dilute pollution problems, which should be dealt with at source by treatment and reuse and to be taken care of by the State Pollution Control Boards. However, while assessing E-Flow, river health and pollution load should also be taken into account because life in water can only survive when the quality of water is conducive to it.
- xiii. As per the decision of the Hon'ble NGT, all States have to maintain a minimum E-Flow in their rivers to protect riverine ecology and meet the societal needs. **The intervening engineering structures on river Narmada cannot be exempted from the regime of E-Flow.** Therefore, it is the responsibility of every State to maintain the E-Flow in their territory. GoMP has also to ensure that minimum prescribed E-Flow gets released from their diversion structures erected on river Narmada. Integrated E-Flow study, upstream of SSP, shall be carried out by GoMP in their territory in view of direction of Hon'ble NGT and the findings to be shared with the E-Flow Committee.
- xiv. More studies are required on breeding and migration behaviors of Hilsa fish for implementing sound management measures to sustain its population along the d/s stretch of the River Narmada. Along with the upward revision of e-flow, artificial breeding and larval rearing of hilsa need to be initiated for the river ranching programme in river Narmada below SSD to augment hilsa population and improve the livelihood of fishermen.
- xv. Protected areas for conservation of spawning grounds of Hilsa should be considered on a long-term basis.
- xvi. The giant freshwater prawn resources d/s of SSD should be exploited at optimum level without hampering the natural recruitment process.
- xvii. Awareness and sensitization programmes may be organised for the local community for protection of juveniles of threatened fishes.
- xviii. While the assessment of E-Flow is in process, GoG should take up interim measures for restoration of livelihood of fishermen, as suggested by CIFRI, SSNNL & HR Wallingford

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in their reports and agreed/accepted by SSNNL, in principle, during various meetings. Provisions for the alternate and diversified livelihood for fishermen need to be addressed along the d/s stretch of the Narmada River during the off-seasons for their betterment. Assistance from the Ministry of Fisheries, Animal Husbandry and Dairying may be taken wherever needed for expediting implementation of these measures. Moreover, as per CIFRI, there should be an Integrated Watershed Management Plan vis-à-vis enhanced e-flow, biodiversity and fisheries at selected stretches of the river on pilot mode.

- xix. Frequent interaction with fishers' community is the need of the hour. Stakeholder consultation should be organized from time to time and their suggestions may be recorded for holistic management approach that will take care of sustainable development and conservation needs of River Narmada.
- xx. GoG to arrange a joint field visit to assess the real situation in the field w.r.t. deterioration of the d/s stretch and needs of the impacted fishermen and start addressing the problems in a time bound manner.
- xxi. Augmenting river water and groundwater recharge through scientifically developed forestry intervention programmes and development of flood plains are need of the hour. The riparian States of Madhya Pradesh, Maharashtra and Gujarat should look into the DPR prepared by ICFRE, Dehradun for implementation in association with other line departments. For plantation along both the banks of river Narmada, State Forest Departments of GoG, GoM & GoMP may coordinate with MoEF&CC (GoI) for assistance. Moreover, river Narmada is 'Life Line of the State of Gujarat'. It is a life line not only for humans, but also for varied flora and animals. Since the d/s stretch of Gujarat is severely affected, State Forest Department of Gujarat and SSNNL are requested to take a proactive role and take up various forestry intervention programmes proposed in this DPR prepared by the ICFRE. Further, proper utilization of flood plains is very crucial. Flood plains are waste land which gets encroached, if not utilised. Creation of Biodiversity Parks for conservation of local habitat, along the basin and eco-tourism for rejuvenation of river ecosystem, may also be looked into.

Meeting ended with a vote of thanks to the Chair.

केवल सरकारी प्रयोग के लिए
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नर्मदा नियंत्रण प्राधिकरण
NARMADA CONTROL AUTHORITY

**MINUTES OF 2ND MEETING OF COMMITTEE TO REVIEW
THE ENVIRONMENTAL FLOW OF RIVER NARMADA IN
THE DOWNSTREAM OF SARDAR SAROVAR DAM (SSD)
HELD ON 17TH JANUARY, 2024 THROUGH VIRTUAL
PLATFORM**

इन्दौर
जनवरी, 2024

INDORE
JANUARY, 2024

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MINUTES OF THE 2ND MEETING OF THE COMMITTEE TO REVIEW THE ENVIRONMENTAL FLOW OF RIVER NARMADA DOWNSTREAM OF SARDAR SAROVAR DAM (SSD), HELD ON 17TH JANUARY, 2024 AT 16.00 HRS THROUGH VIRTUAL PLATFORM

The 2nd Meeting of the Committee, to review the Environmental Flow (E-Flow) of river Narmada downstream of SSD, was held on 17th January, 2024 through virtual platform, under the Chairmanship of Shri Ashok Kumar Thakur, Executive Member, NCA. The focus of the meeting was to discuss the points raised by Sardar Sarovar Narmada Nigam Limited (SSNGL), GoG, vide letters dated 14.12.2023, 03.01.2024 & 12.01.2024, with respect to the re-assessment study of E-Flow for upward revision in order to protect the downstream riverine environment of river Narmada. List of Officers participated in the meeting is enclosed at **Annex-I**.

At the outset, Executive Member, NCA and Chairman of the Committee welcomed all the participants. Chairman, in his introductory remark stated that during the first meeting of the Committee held on 21st September, 2023 in Indore, decision was taken for re-assessment of seasonal E-flows to be carried out by GoG through CIFRI, by considering various parameters. By this time GoG should have prepared the scope of work, ToR, methodology and parameters to be included so that the same could have been discussed in this meeting.

He further stated that during the 1st Meeting of the Committee, as all the party States in principle agreed to get the study done through CIFRI, there may not be any objection from party States. With respect to scope of work, methodology and parameter to be included, let GoG, in consultation with CIFRI, submit its proposal to the Committee for its views and vetting, following which the work can be awarded to CIFRI by GoG.

Further, EM, NCA and Chairman of the Committee mentioned that as per the decision taken in 94th NCA meeting, the responsibility of Committee is to take further course of action with respect to re-assessment of downstream e-flow. The quantum, thus arrived at, by CIFRI, shall be deliberated upon in the E-flow Committee and the final decision on implementation of revised 3 seasonal e-flow shall be taken up at the appropriate level as per NWDT Award.

He then requested Member (E&R), NCA to take up the agenda for further deliberation.

Before taking up the Agenda items for deliberation, Member (E&R), NCA intimated that Narmada Pradushan Nivaran Samiti, NGO had filed a case before the Hon'ble NGT during 2018. In January, 2019, Hon'ble NGT directed the applicant to approach the Narmada Tribunal/NCA. But instead of approaching NCA, they filed a case bearing C.A. No. 4550/2019 before the Hon'ble Supreme Court in 2019. NCA has submitted the affidavit in February, 2021 based on the decision taken on 51st ESG meeting held on 21st August, 2019, wherein it was decided that since Govt. of Gujarat has entrusted a Study, any decision must be consistent with the Study's findings. It would therefore be appropriate to consider the issue after receipt of the Study Report when representatives of Govt. of Gujarat be also present to consider the issue in totality.

After hearing on 12-01-2024, the case got disposed: Counsel, representing NCA/GoI conveyed that the Hon'ble Supreme Court is very annoyed about this delay in determining a suitable downstream e-flow, and have allowed the petitioner to approach the Hon'ble NGT.

In this regard, Member (E&R) stated that Hon'ble NGT has already given direction for release of **minimum 15 % to 20% of the average lean season flow** as e-flow in O.A. No. 498/2015 (M.A. No. 628/2016) dated 9th August, 2017.

Therefore, in view of the above, it is important that the Committee takes appropriate action to re-assess the e-flow at the earliest and submit its recommendation to the Authority for decision as per NWDT Award. Further, the decision of the Authority could be submitted to the Hon'ble NGT without any further delay.

Then Member (E&R), NCA submitted the following agenda items of GoG before the Committee for deliberation and taking decision:-

1. Whether the re-assessment of the d/s E-flow study conducted by CIFRI is acceptable to all party States and if it suggests an increase in the quantum of E-flow, it should be implemented at the relevant level as stipulated by the NWDT Award, considering the **water share of the party States**.
2. Finalization of the scope of **work, objectives and methodologies** for the re-assessment study by CIFRI.
3. The re-assessment study would encompass different **parameters**, such as, biological surveys, social surveys, geomorphological surveys, water quality analysis, hydrological analysis, hydraulics surveys, and assessments of ecological and social importance and sensitivity (considering livelihoods and socio-cultural aspects of the people residing there).
4. Considering the aforementioned parameters mentioned in Agenda No. 3, does the E-flow Committee reckon that CIFRI has the necessary expertise to carry out these tasks, or may the Committee suggest other appropriate Institutions/Organizations that can carry out these tasks?
5. Brief discussion on GoMP's & GoM's views in accordance with Minutes of the 1st Meeting of E-flow Committee.

Member (E&R), NCA requested the party States to give their views/suggestion on these issues.

Views of party States:-

1. Govt. of Madhya Pradesh:-

Shri Vinod Kumar Dewada, Chief Engineer, LNP, NVDA intimated that as discussed in the 94th NCA meeting held on 8th May, 2023 and in 1st Committee meeting held on 21st

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September, 2023, there is no change in the stand of GoMP. At present 600 cusecs of water is being released as e-flow d/s to SSP. NWDT Award is due for review in the year 2024 and this matter on upward revision of e-flow can be referred to the Tribunal. Moreover, the matter of e-flow of SSP is out of the territorial boundary of Madhya Pradesh, for which GoMP is not willing to share any releases of water

He further stated that GoMP has no objection to carry out the further study for re-assessment of E-flow through CIFRI. But for upward revision of e-flow, they will give consent only after obtaining approval from the higher/competent Authority.

2. Govt. of Maharashtra:-

Shri S. S. Khandekar, SE, WRD stated that GoM has no objection to carry out the further study for re-assessment of E-flow through CIFRI. But for upward revision of e-flow, approval of the higher/competent Authority, GoM is required. He also stated that the quantum of E-flow should be released through River Bed Power House (RBPH) so that the power can be generated.

Shri Abhay Pimparkar, Director (Environment) stated that as CIFRI has to carry out the study, they may be asked to submit the draft scope of work, objectives including Terms of Reference (ToR), Methodology to be adopted, etc., to the Committee. After obtaining the views and vetted by the Committee, GoG may take further course of action for award of work to CIFRI, Barrackpore.

3. Govt. of Rajasthan:-

Shri Anil Khaital, EE, WRD stated that 0.50 MAF water is allocated to Rajasthan under NWDT Award. Due to upward revision of E-flow, about 120 MCM of water will be reduced from the share of Rajasthan because of which 30,000 ha. Command area will lose the irrigation facilities. As Rajasthan is dependent on 0.50MAF of water share from Narmada basin, the upward revision of e-flow should not affect the share of water to Rajasthan. He further stated that GoR has no objection, if CIFRI carries out this re-assessment study.

4. Govt. of Gujarat:-

Shri Ramana Murthy, APCCF stated that as per the decision taken in the 1st Meeting of the Committee, GoG requires acceptance from all the party States before award of the work for re-assessment of the d/s E-flow study to CIFRI. He further stated that as so many parameters have been considered during the 1st meeting of the Committee held on 21st September, 2023 for the re-assessment study, NCA is requested to finalize the scope of work, objectives and methodology as GoG has no expertise in the area.

Shri K. A. Keshvani, CGM (T&C) stated that GoG is willing to carry out the study and the upward revision of E-flow should be accepted by all the party States.

Member (E&R), NCA requested the Expert Members to give their views/suggestion on these issues.

Views of Expert Members:-

1. **Shri N. N. Rai, Director (Hydrology), Central Water Commission (CWC)** stated that Mahadei Water Dispute Tribunal (MWDT) has passed direction that in absence of any E-flow study carried out by the States of Karnataka, Maharashtra and Goa, MoEF&CC's "Standard Terms of Reference (ToR) for Environmental Impact Assessment (EIA)/Environment Management Plan (EMP) Report for Project/Activities requiring Environmental Clearance under EIA Notification, 2006" revised in 2015, should be followed wherein it has been mandated that environmental flow releases should be 20% of the average of the 4 lean months of 90% dependable year during the lean season and 30% of Monsoon flow during Monsoon season and for remaining months, the flow shall be decided by the Committee based on the Hydrology and available discharge.

Thus utilization permitted by MWDT for all three basin States of Maharashtra, Karnataka and Goa has been done after taking into consideration the environmental flow in accordance with MoEF&CC's above mentioned ToR.

He further stated that the choice of methodology depends upon the objective, availability of data including the critical cross section of the river. The hydraulic rating curve cum habitat simulation methodology can be considered, as one of the scientific approaches to quantify the E-flow.

At the time of review of NWDT Award, in absence of study and figures, Tribunal might give direction for e-flow in line with Mahadei Tribunal Award, then party States will have to abide by the direction on quantum of e-flow to be released and may lose their share of water. So it is in the interest of everyone that this re-assessment study is done at the earliest so that figure/quantum of release are ready for discussion during the review.

2. **Dr. Sandeep Behera, Consultant (Biodiversity), NMCG** endorsed the views of Director (Hydrology), CWC. He further emphasized that E-flow study is required to be carried out in whole Narmada basin stretch wise. The proposal may be submitted by the concerned party States to carry out the studies in their territory.
3. **Prof. Dr. Arun Kumar, IIT, Roorkee** also endorsed the views of Director (Hydrology), CWC and stated that as already pointed out there was a study carried out in which it was decided that there will be release of 25 cumecs of water from the upstream of SSD. Whether the same is being released or not needs to be verified. He also further stated that,

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as discussed in the 1st Meeting of Committee, held on 21.09.2023, there is a necessity to carry out the E-flow study for downstream of Narmada Basin and the quantum of e-flow so calculated should be released for the survival of aquatic species and to keep the river alive as per the law.

4. **Dr. B. K. Das, Director, CIFRI** stated that the parameters mentioned in the SSNNL, GoG's letter dated 14.12.2023 & 03.01.2024 can be considered in this study. GoG has to decide first whether all the parameters are required to be considered in this particular study. CIFRI has done e-flow study earlier for GoG on the basis of data provided by them and on the basis of actual ground situation. The concerned department should ensure the authenticity of the data before those are provided to CIFRI for re-assessment of e-flow.

With respect to preparation and submission of scope of work, objectives including Terms of Reference (ToR), Methodology to be adopted, etc., to the Committee, he agreed to submit the same by **25th January, 2024** for the views and vetting of the Committee. But he requested that the study should be awarded at the earliest and payments should be made on time so that CIFRI does not face audit objections.

5. **Dr. Amiya Sahoo, Scientist, CIFRI** also endorsed the views of Director (Hydrology), CWC. With respect to the study to be carried out for re-assessment of E-flow by CIFRI, he stated that the earlier study was carried out based on the data provided by GoG. Further, during the 1st of meeting of the Committee held on 21.09.2023, it was decided by the Committee to re-assess the E-Flow with various parameters. If all the parameters are to be considered during the re-assessment, the quantum of E-flow to be released will be on higher side.

He further stated that in case of expertise related to the parameters, like, hydrological analysis & hydraulics survey which are to be considered, CIFRI shall work in collaboration with experts from CWC & IIT.

Member (E&R), NCA stated that in view of NGT's direction all dams upstream of SSD should also be releasing d/s E-flow. The data needs to be captured.

After detailed deliberation, it was decided that CIFRI would prepare scope of work/ToR, alongwith names of partner institutions and financial implications, for the re-assessment study of e-flow and submit to NCA till **25th January, 2024**. NCA will circulate the draft scope of work/ToR alongwith other details to the party States and expert members for seeking their opinion by **29th February, 2024**. Subsequently the tentative date for the 3rd Meeting of the Committee is fixed for **8th March, 2024** to finalize the draft scope of work/ToR and award of study by SSNNL/GoG to CIFRI.

Meeting ended with a vote of thanks to the chair.

**LIST OF OFFICERS ATTENDED THE 2ND MEETING OF E-FLOW COMMITTEE
HELD ON 17TH JANUARY, 2024 THROUGH VIRTUAL PLATFORM**

NARMADA CONTROL AUTHORITY

1. Shri Ashok Kumar Thakur, Executive Member & Chairman of the Committee
2. Dr. Tejram Nayak, Member (Civil)
3. Ms. Devjani Patra, Member (E&R)
4. Shri Ilanchezian, Chief Engineer
5. Shri R. Vasudevan, Director (Civil)
6. Shri Deepak Malviya, Dy. Director (Civil)
7. Dr. Nihal Gujre, Project Coordinator
8. Ms. Anjali Singh, J.R.F.

NATIONAL MISSION FOR CLEAN GANGA (NMCG), DELHI

9. Shri Sandeep Behera, Consultant (Biodiversity)

CENTRAL WATER COMMISSION (CWC), DELHI

10. Shri N. N. Rai, Director (Hydrology)

CIFRI, BARRACKPORE

11. Dr B. K. Das, Director
12. Dr Amiya K. Sahoo, Senior Scientist

IIT, ROORKEE

13. Dr. Arun Kumar, NEEPCO Chair Professor, Hydro & Renewable Energy Dept.

GOVT. OF MADHYA PRADESH

14. Shri Vinod Kumar Dewada, Chief Engineer (LNP), NVDA
15. Shri Vikram Singh Solarki, Dy. Forest Officer, NVDA
16. Shri Maheshwar Dhote, Executive Engineer, NVDA
17. Shri R. L. Bhanwariya, Executive Engineer, NVDA

GOVT. OF GUJARAT

18. Shri G. Ramana Murthy, APCCF, SSNNL
19. Shri K. A. Keshvani, CGM (T&C), SSNNL
20. Shri Kanango, Chief Engineer, SSP
21. Shri Sameer Adresana, Dy. Director (Fisheries), SSNNL
22. Shri Das, Superintending Engineer, SSNNL
23. Shri R. J. Shah, Executive Engineer, SSNNL

GOVT. OF MAHARASHTRA

24. Shri S. S. Khandekar, Superintending Engineer, WRD
25. Shri Abhay Pimparkar, Director (Environment)
26. Shri S.P. Wategaonkar, Regional Dy. Commissioner Fisheries, Nashik Division, Nashik
27. Shri Sanjay Khairnar, Executive Engineer, NDD, Nandurbar
28. Shri Kiran Padvi, Asstt. Commissioner (Fisheries), Nandurbar

GOVT. OF RAJASTHAN

29. Shri Anil Kumar Kaithal, Executive Engineer, WRD, Sanchore
30. Shri Raj Bhanwarayal, Executive Engineer, WRD
31. Shri Harish Koli, Asstt. Engineer, WRD
32. Shri Naresh Jatav, Asstt. Engineer, WRD
33. Shri Heeraram Choudhary, Accountant



भाकृअनुप-केन्द्रीय अंतर्स्थलीय मात्स्यकी अनुसंधान संस्थान

आई एस ओ 9001:2015 प्रमाणित संगठन
(भारतीय कृषि अनुसंधान परिषद)
बैरकपुर, कोलकाता - 700120 (पश्चिम बंगाल)

ICAR-Central Inland Fisheries Research Institute

An ISO 9001:2015 Certified Organization
(Indian Council of Agricultural Research)
Barrackpore, Kolkata -700120, West Bengal



डा. बसंत कुमार दास, निदेशक
Dr. Basanta Kumar Das, Director

F. No. CIFRI (Proj.) - 51/NCA(1)/2024 - D. Cell

Dated 08th February, 2024

To,

The Member (Env. & Reh.)
Narmada Control Authority,
Narmada, Sadan, Sector-B, Vijay Nagar, Indore, (M.P.), 452010

Sub.: Submission of project proposal on E-flows in the downstream of SSD.

Ref. no. NCA/Env/2023/23 dated 19th January 2024

Madam,

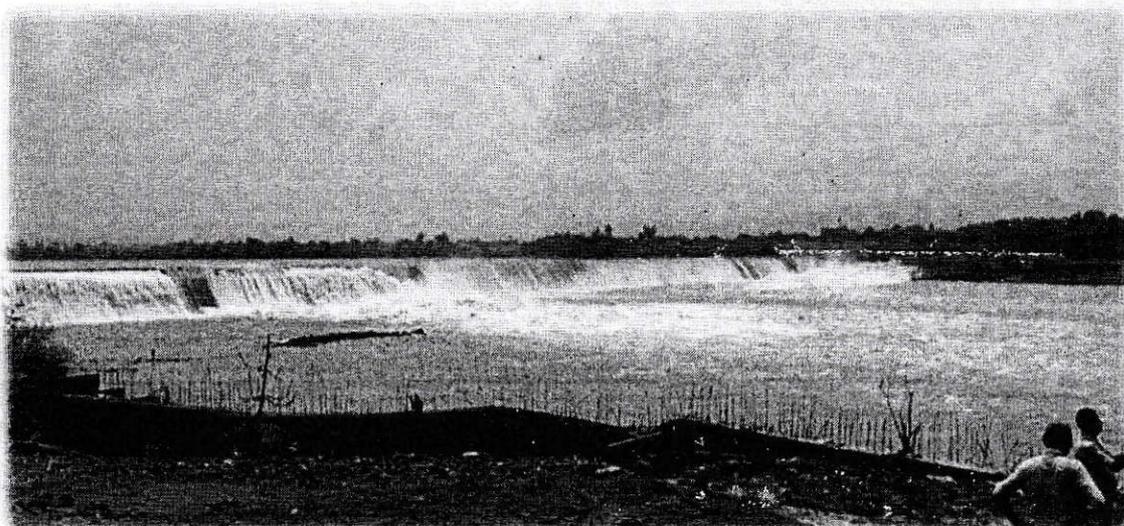
Inviting reference to the above, I am enclosing herewith the project proposal on "Assessment of environmental flows towards river habitat and ecological requirement with a focus on downstream fish species of Sardar Sarovar Dam (SSD) in Narmada river". The project proposal includes the scope of the work, methodology and budget for carrying out the study between SSD and Bhadbhud stations. The proposal was prepared considering the expert opinions from CWC, IITR and NMCG. This is for your review and necessary actions.

Yours sincerely,


(B. K. Das)

Project Proposal on

Assessment of Environmental flows towards river habitat and ecological requirement with a focus on downstream fish species of Sardar Sarovar Dam (SSD) in Narmada river



Submitted by



ICAR-CENTRAL INLAND FISHERIES RESEARCH INSTITUTE
(Indian Council of Agricultural Research)
BARRACKPORE, KOLKATA -700120, West Bengal

Title:

Assessment of Environmental flows towards river habitat and ecological requirement with a focus on downstream fish species of SardarSarovar Dam (SSD) in Narmada river

Project Duration:

9 months (March-November 2024) (Lean/Pre-monsoon and Post-monsoon)

Project Details:***1.0 Background:***

SardarSarovar Dam (SSD), a multipurpose Dam is on the mainstream of river Narmada and is about 162 km from the estuarine mouth. This Dam has FRL 138.68 m with a large network of canals. The dam attracts greater ecological concern since the downstream stretch of the Dam has vast fisheries potential which is liable to be impacted owing to prioritized use of stored water upstream, leading to freshwater crunch at downstream. Furthermore, the Kalpasar Department, Government of Gujarat has proposed to construct a barrage across the river Narmada near Bhadbhut village, Gujarat, which is planned at 25 km upstream of the river mouth. Therefore, the downstream of SSD is now restricted to 137km only freshwater.

Environmental flows in rivers has been considered as one of the top priorities towards river biodiversity and habitat conservation. In addition, depending on the societal needs the environmental flows becomes more challenging. Looking into the river morphology, few studies on the environmental flows assessment have been made on river Narmada below the SSD. The M.S. University, Vadodara estimated 45 cumecs (1590 cusecs); CWPRS, Pune estimated 30 cumecs (1060 cusecs) and HR Wallingford, London has estimated as 28.30 cumecs (1000 cusecs) of minimum environmental flow to be released d/s to the dam so that salinity ingress is checked, riverine ecology and societal needs are protected. However, these estimates are not directly addressed to the fish species, which is considered as the indicators of river health and biodiversity conservation. During the 41st Environment Sub Group (ESG) meeting held in 2005, Govt. of Gujarat specified that their studies indicate that 600 cusecs would be adequate for maintaining environment flow downstream of SSD. Hence this Sub-Group decided that a minimum constant discharge of 600 cusecs of water be maintained downstream of SSD, which is being maintained through Godbole Weir in Dyke No. 3 of Sardar Sarovar Project. These 600 cusecs of water, when supplemented by the water released after generation of power from the River Bed Power House, was found sufficient to maintain the

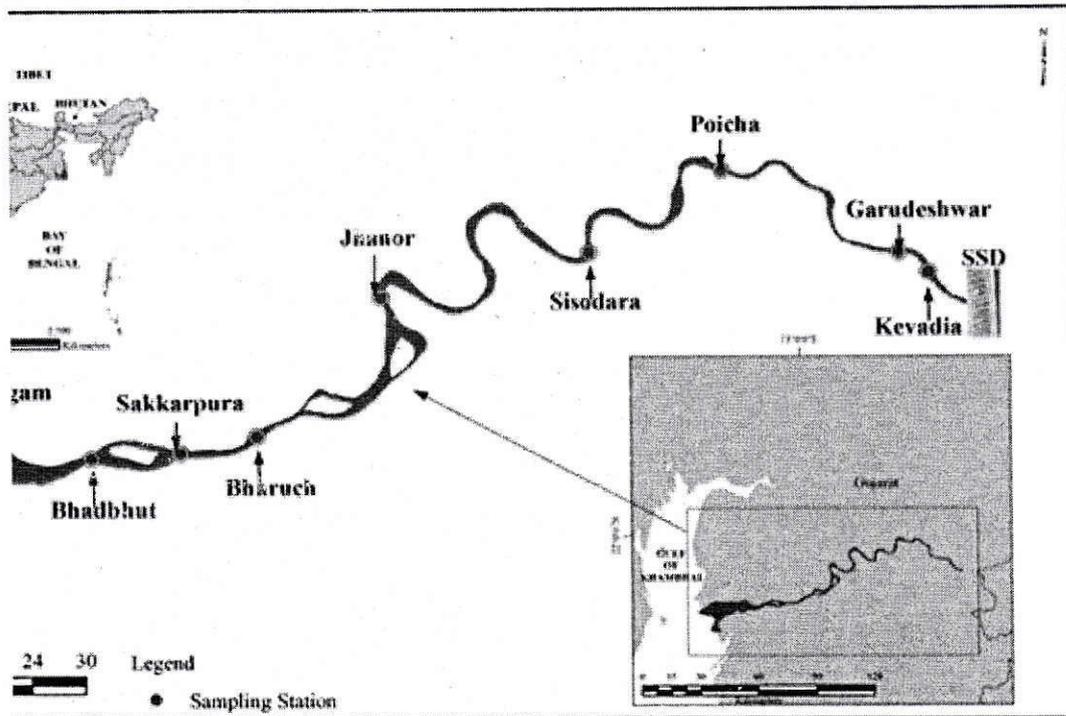


ecology and environment in the downstream reach of Sardar Sarovar Dam. But due to drought/deficient river yield during 2017-2018, River bed Power House could not be operated and this 600cusec water was found insufficient and there have been a number of representations to increase this environment flow quantum. For instance, a petition was also filed before the Hon'ble NGT for enhancing the quantum of e-flow. Hon'ble NGT directed the petitioners to approach Narmada Control Authority, however, instead of doing so, the petitioners had filed a Writ Petition before the Hon'ble Supreme Court. As a result, it was decided to assess the environmental flow, downstream to SSD. On request of SSNNL, ICAR-CIFRI submitted a study report titled "Environmental flows for river ecology with focus on d/s fisheries of SSD in Narmada River" and estimated E-Flow of 1875 cusecs during the lean period (February to May), 14401 cusecs during Monsoon (June to September) and 5753 cusecs during Post-Monsoon (October to January) in the stretch between SSD and Garudeswar weir. Furthermore, ICAR-CIFRI also mentioned that due to Garudeshwar weir, the upstream will be a lentic (stagnant) ecosystem in nature. Thus, the E-Flow requirement between d/s of SSD and Garudeshwar weir is not essential as it has already become a pool due to obstruction created by this weir. However, it is highly essential to estimate the E-Flows below Garudeshwar weir and therefore, during 1st and 2nd E-flow Meetings, held on 21st September 2023 and 17th January, 2024, NCA with consent from the all the party states and expert opinions from CWC, IIT Roorkee and NMCG, has decided to re-assess the environmental flow below SSD to Bhadbhut in the river Narmada. With this backdrop, the proposal is planned to work on the following objectives

2.0 Objectives:

1. To assess the seasonal hydrological and hydraulics dynamic in the study area.
2. To assess the seasonal habitat requirement (ecology) of the key stone fish *species* and major fish diversity
3. To estimate E-flow for fish diversity employing hydraulic rating cum habitat simulation method.

3.0 Study area



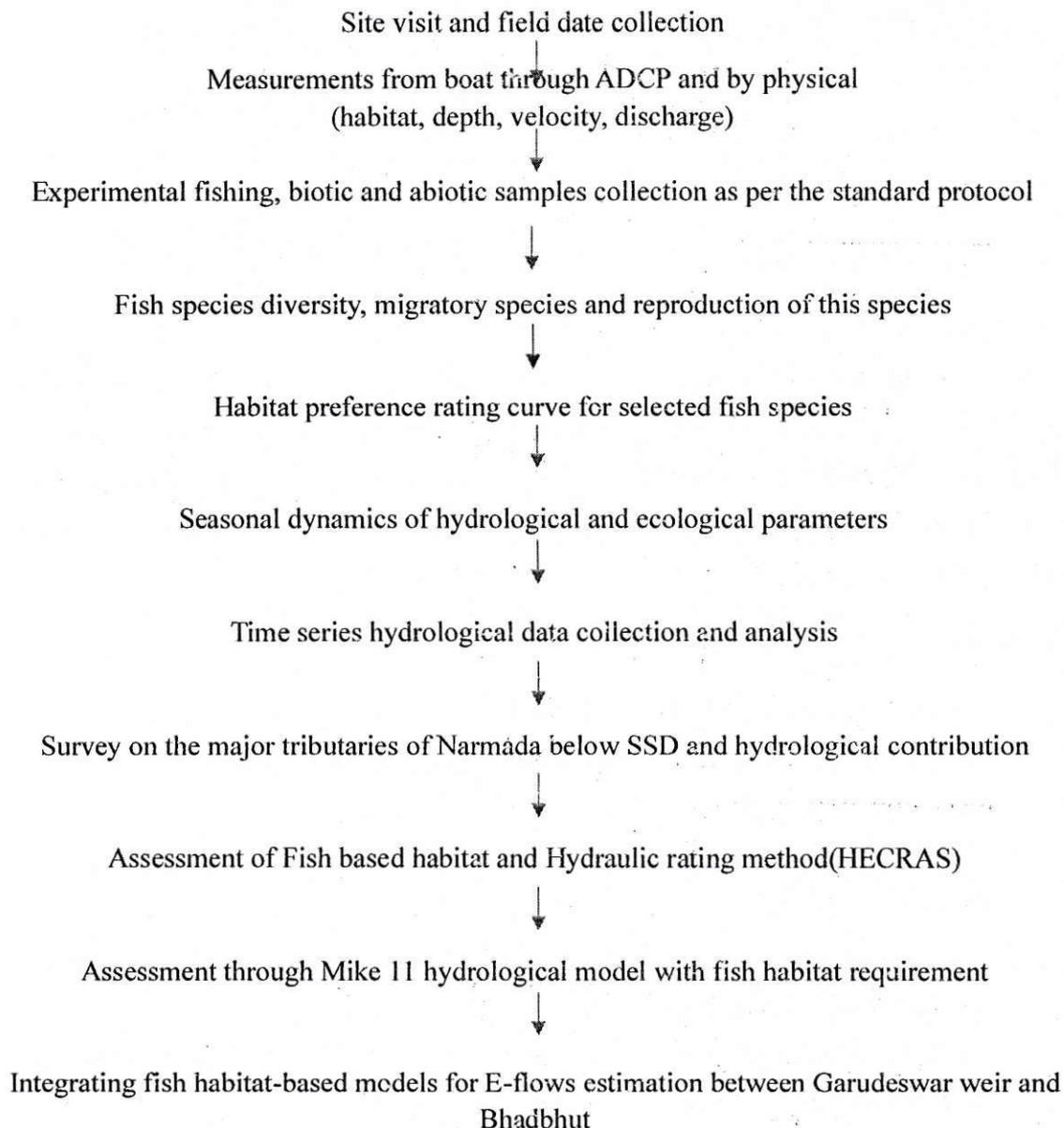
The study will be carried out between the Garudeswar weir to Bhadbhut stretch in river Narmada (162 km). Total -9 stations (Garudeswar, Poicha, Sisodara, Jhanor, Bharuch, Sakarpura and Bhadbhut and additional one site between Sisodara and Jhanor and one site between Jhanor and Bharuch) will be selected to study on different hydro-biological parameters representing different seasons.

4.0 Work plan

1. River cross sections at the selected sites at different seasons, river discharge, depth and water velocity will be surveyed through ADCP to understand the current hydrological discharge, and river habitat.
2. Seasonal hydrological and biological/ecological parameters assessment and data analysis will be made.
3. Focus on identification of key fish species i.e migratory indigenous fish species and studies on their migratory pattern with reproduction.
4. Developing fish species specific criteria for e-flows estimation including the depth and velocity requirement.
5. Analysis of the 10 daily historical time series of stream-flow in the selected stretches.

6. Hydrologic characteristics will be identified for the preliminary E-Flows reaches. Annual hydrographs were constructed, for both naturalized (near-natural) and present-day conditions, through hydrological modelling process, to show changes in flow over the year at a specific location.
7. Hydraulic rating cum habitat simulation method (HECRAS model), and the fish biology (e.g., adaptable water depth and velocity for its migration, spawning) will be accessed for e-flows estimation.

4.0 Methodology:



5.0 Activities and Time line

Objectives	Activities	Mar/Apr (Lean)	May/Jun (Pre- monsoon)	Sep/Oct (Post- monsoon)	Nov/Dec
To investigate on current seasonal dynamics of hydrological, hydraulics and ecological including fish diversity in the selected stretches from downstream of SSD to Bhadbhut.	1.Survey on hydrology, river cross sections				
	2.Fish diversity and reproductive study				
	3.River habitat and ecological assessment				
	4.Collection of secondary data from the respective states Departments/SSNNL				
	5.Seasonal data compilation and analysis for inferring the life stages and migratory period and water requirement				
To estimate the fish habitat based environmental flows requirement in the downstream of the Garudeswar weir to Bhadbhut.	1.Time series hydrological data collection and analysis				
	2.Habitat preference curve for the key fish species				
	3.HECRAS model based simulation considering the selected fish depth				
	4.MIKE11 hydrological model with considering desired fish depth and velocity				
	5.Integrating the fish based models for the environmental flows analysis				
Analysis and Report preparation			First site visit report		Final

6.0 Project Cost and Budget

The costing of project implementation is based on the standard rules and guidelines laid down by ICAR for consultancy services:

Sl. No	Particulars	Unit Rate	Total Amount	
A) Recurring Cost				
1	Cost of Man days of staff deployed			
	Institution Head (Coordinator)	15 days @ Rs. 6000/-	90,000	
	Scientist/Senior Scientist	30 days @ Rs. 4000/- x 3 No	3,60,000	
	Technical staff	50 man days @ 2000/- x 1 No	1,00,000	
				5,50,000
2	External Payments			
	Young Professional II (1 No)	Rs. 42000 x 9 months	3,78,000	
	Young Professional I (1 No)	Rs. 35000 x 9	3,15,000	
	Skilled Technical (2 no)	Rs.25,000 x9	4,50,000	
				11,43,000
	External payment in terms of hiring Subject based professionals with Bachelor's and Masters degree as YPI and YPII is highly essential for seasonal sample collection, analysis of biological and hydrological data, ADCP operation on field,			
4	TA & DA		3,50,000	3,50,000
5	Contingencies (Operational)		3,00,000	
	Outsourcing/Data designing		2,00,000	
	Vehicle hiring		3,00,000	
	Experimental fishing/Fish/Hiring boat (9 sites)		2,00,000	
	Consumables (chemicals, glass wares, plastic wares, etc.)		1,00,000	
				11,00,000
6	Intellectual fee (as per ICAR guideline)			5,50,000
				36,93,000
B) Cost of physical inputs/Capital cost				
1	Equipment (Field data recorder/Camera/Biochemical analyser)			7,00,000
C	Overhead Cost @ 20 % on A + B			8,78,600
D	GST @ 18% on Consultancy cost (A+C)			8,22,888
Total Cost (A + B + C + D)				60,94,488

(58)

7.0 Deliverables:

Three season E-flow data for survival and propagation of keystone fish species and maintaining downstream ecology along with justifications and modelling for e-flow calculations.

8.0 Project Team:

Project Co-ordinator: Dr.B.K.Das, Director
Project Investigator: Dr.A.K.Sahoo, Senior Scientist, ICAR-CIFRI, Barrackpore
Project Co-Investigators: Dr. S. Kamble, Senior Scientist, Vadodara ICAR-CIFRI Centre
Dr.D.K.Meena, Senior Scientist, ICAR-CIFRI, Barrackpore
Dr. Ajoy Saha, Senior Scientist, ICAR-CIFRI, Barrackpore