BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI

ORIGINAL APPLICATION No. 361 OF 2018

IN THE MATTER OF:

NARMADA PRADUSHAN NIVARAN SAMITI AND ANR ...APPLICANTS

VERSUS

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE AND ...RESPONDENTS

AFFIDAVIT ON BEHALF OF THE RESPONDENT NO.4

I, SHUBHAM GOYAL, adult, having my office at EKTA NAGAR do hereby solemnly affirm and state on oath as under:

1. I say that I am conversant with the facts and circumstances of the present case and therefore, I am competent to file this affidavit as under :-

2. I say and submit that I am filing the present affidavit in furtherance of my previous affidavit dated 05.09.2018 and with an objective of placing on record the developments that have taken place in the interregnum period from the date of my filing the first affidavit till today. I reserve my right to file a further detailed affidavit, if required or as required by this Hon'ble Tribunal.

3. At the further outset, I say that the answering respondent is not contesting the present petition in adversarial manner. I say that the answering respondent has been vociferous in its attempts before the respondent No.1 Narmada Control Authority (NCA) and its Sub-committees, demanding increase

in Environmental Flow (E-Flow) of water downstream from Sardar Sarovar Dam to preserve the environment and ecology of the downstream riverine. It is the say of the answering respondent that till a comprehensive and detailed cross sectional study of the entire stretch of 162 kms from SSD, is conducted for quantification of the water to be released downstream, as an interim measure, the answering respondent has been advocating release of 1500 cusecs of water. However, the party States Government of Madhya Pradesh, Government of Maharashtra, Government of Rajasthan could not come to a consensus with respect to the scope of study to be conducted and hence, the issue is still at large before the Respondent No. 1, to be discussed in its next meeting of the NCA.

4. Before adverting to make detailed submissions made by the State of Gujarat before the respondent no.1 Narmada Control Authority, the answering respondent states that on account of normal to above normal rainfall received in the member States, the E-Flow of water downstream at Sardar Sarovar dam has been more than 600 cusecs. It is evident from the above, fortunately, due to excess rainfall from the (August – 2019) there is a consistent overflow in the dam on account of which the River Bed Power House (RBPH) was operational and the excess water from the said RBPH was released downstream. A tabular chart providing the monthly data for overflow, Godbole Gate Discharge and RBPH flow from July-2018 to June-2024 is hereto annexed and marked as **Annexure R-1**.

- **EFFORTS MADE BY THE RESPONDENT NO. 4 AND 6 TO PROTECT THE DOWNSTREAM OF SSD**

5. I further say and submit that the answering respondent is in agreement that the downstream E-Flow of water needs to be increased from 600 cusecs to 1500 cusecs, as an interim measure, till a further detailed study is required to be

conducted to quantify the exact amount of water, which is required for downstream. In this regard, several representations have been made by the answering respondent before the Narmada Control Authority to undertake the study and during the interregnum period, to permit increase the release of 1500 cusecs of water downstream. However, it is the stand of the answering respondent that the said release should not be accounted in the share of water allocated to the State of Gujarat alone. It is the case of the answering respondent that the distribution of quantum of water amongst the Member States of Sardar Sarovar Project should be proportionately reduced after release of 1500 cusecs of water downstream.

6. In this regards, I say that the-then Hon'ble Chief Minister of Gujarat wrote a letter dated 13.03.2019, addressed to the-then Minister of Water Resource, River Development & Ganga Rejuvenation, Government of India, to enhance the quantity of water to be released in downstream from 600 cusecs to 1500 cusecs. In response thereto, the Hon'ble the-then Minister was pleased to inform the answering respondent that a study has been entrusted to the Central Fisheries Research Institute (CIFRI), Kolkata, for determination of the quantity of water required to be released in the downstream of SSD for protecting the environment. Once the report of the study is received, a meeting of the NCA or its sub-committee will be convened to review the study. Copies of the said letters dated 13.03.2019 and 22.05.2019 are annexed herewith and marked as **Annexure R-2** and **Annexure R-3**, respectively.

7. Thereafter, the-then Hon'ble Chief Minister once again issued a letter dated 12.06.2020, highlighting that the observations of CIFRI in its first interim report that *"there is an urgent need to increase the flow of water downstream of SSD"*. Therefore, it was once again requested to issue appropriate directives to the

concerned authorities for expediting the decision. In response thereto, the-then Hon'ble Minister responded vide letter dated 31.08.2020, stating that since the final report of the CIFRI is still awaited, the answering Respondent was directed to request the CIFRI to provide its final report to the NCA, so that an appropriate decision can be taken in this regard, in consultation with the stakeholders. Copies of the letters dated 12.06.2020 and 31.08.2020 are annexed herewith and marked as **Annexure R-4** and **Annexure R-5**, respectively.

8. I say and submit that thereafter Ms. Devjani Patra, Member (Environment and Rehabilitation), NCA, issued a letter to the answering respondent dated 23.08.2022, stating that after having studied the final report of the CIFRI, which came to be submitted in June, 2020, the study report has been confined only to 11kms stretch, between Kevadia and Garudeshwar weir. Member (E & R), NCA said that E-Flow calculation needs to be reviewed taking into consideration the total stretch of the Narmada river (162 km) d/s to SSD, Bhadbhut Barrage and its associated fish pass and other relevant details like discharge expected from tributaries, carrying capacity of the river Narmada, etc, so as to arrive at a realistic figure without overlooking the water share of the party States Therefore, the answering Respondent was requested to get the E-flow estimation reviewed for the entire downstream stretch of the Narmada river, so that an appropriate decision can be taken by the authority. In response thereto, vide letter dated 26.09.2022, the answering whole-heartedly agreed to the suggestion. However, in the interregnum, to avoid further deterioration of the downstream environment, a request was made to increase the downstream flow from 600 cusecs to 1500 cusecs. Copies of letters dated 23.08.2022 and 26.09.2022 are annexed herewith and marked as **Annexure R-6** and **Annexure R-7**, respectively.

9. During the 94th meeting of NCA held on 08.05.2023 ,where it was agreed that a Committee, under the Chairmanship of Executive Member, NCA shall be constituted, involving representatives from Water Resources Department (WRD) & Department of Fisheries of party States, Expert Members from different organization and Director (Fisheries) from Ministry of Fisheries, GoI. 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.

10. I say and submit that the answering respondent has made several requests before the Narmada Control Authority as well as the Sub-Committee set up by the Narmada Control Authority, viz. Committee on Downstream E Flow of River at Narmada at Sardar Sarovar Dam. I say and submit that the State of Gujarat has been proposing a study to be conducted by Central Inland Fisheries Research Institute (CIFRI) for the entire downstream stretch, i.e. 162 Kms. from Sardar Sarovar Dam till the Arabian Sea. In this regard, the Narmada Control Authority in the Minutes of Meeting dated 08.05.2023 directed setting up of a Sub-Committee to undertake a site visit and propose steps to be taken for the purpose of protecting the downstream of Narmada River. In the said Committee meeting held on 21.09.2023, 17.01.2024, 19.03.2024, a consensus could not be reached amongst the Member States regarding the terms of reference to be proposed to the CIFRI for the purpose of conducting a study and eventually, the matter is referred back to the Narmada Control Authority to be discussed in its next meeting. A copy of the 94th Minutes of Meeting of the Narmada Control Authority dated 08.05.2023 and the Minutes of Meeting of the Committee set up to review the Environmental Flow of Narmada river downstream dated 21.09.2023,

17.01.2024 and 19.03.2024 are annexed herewith and marked as **Annexure R-8 Colly**.

- **SUBMISSION OF THE ANSWERING RESPONDENT**

11. I say and submit that, as stated hereinabove, the answering respondent has been actively pursuing the NCA to reconsider its decision and direct release of 1500 cusecs of the water downstream, till a comprehensive study of the entire downstream stretch is conducted, however, such increase should not be accounted in the share of water allocated to the answering respondent alone. I say and submit that in this manner, there will be a negligible decrease in the share of water of each Member States, which would not cause prejudice to anybody. On the contrary, if 1500 cusecs of water is deducted from the allocated share of water to the State of Gujarat, serious prejudice would be caused as the State of Gujarat and its citizens are completely dependent on the water drawn from the Sardar Sarovar Dam. I say that over a period of 6 years from 2018-19, there has been a consistent increase in the demand of water in the State of Gujarat, which is evident from the fact that the water drawn from the Narmada Main Canal (NMC) from the year 2018-19 has increased exponentially. A tabular chart indicating the water drawn from the year 2018-19 to the year 2023-24 is produced herewith for the ready reference of the Hon'ble Tribunal :-

Statement showing utilization in HR from SSP from 2018-19 to 2023-24	
Year	**Observed discharge in NMC in MCM**
2018-19	8749.08
2019-20	10588.39
2020-21	12778.50
2021-22	9917.98
2022-23	13876.36
2023-24	12932.18

12. I, therefore, say and submit that the issue regarding protection of downstream environment of Narmada river is a serious issue. The answering respondent submits that a comprehensive study to determine the quantum of water to be released downstream and other steps, which are required to be taken to protect the ecology of the Narmada River needs to be studied in detail. It is respectfully submitted that the entire downstream river of Narmada is required to be included in the study so as to come out with a comprehensive and wholesome solution to protect the environment.

13. In view thereof, this Hon'ble Tribunal be pleased to entrust the study to CIFRI to assess the entire downstream stretch of 162 kms and thereafter, pass appropriate order/s. As an interim measure to protect the downstream environment of Narmada River from the common pool of Sardar Sarovar Dam and not from the share of State of Gujarat alone.

Shubham
DEPONENT
(SHUBHAM GOYAL)
(SE SSNNL)

VERIFICATION

Verified at ~~Gandhinagar~~ Godhra on this 5th day of August, 2024 that the contents of the above affidavit are true and correct, nothing stated therein is false and nothing material has been concealed therefrom.

Solemnly Affirmed & Signed & Sworn before me by shubham goyal whom I know personally

Date :05/08/2024

V. A. SHAH
NOTARY

Shubham
(SHUBHAM GOYAL)
DEPONENT

Regd. No.:- 11/2024
Date :- 05/08/2024

Annexure – R1

Annexure – R1

Monthly data for overflow, Godbole Gate Discharge and RBPH flow from July-2018 to June-2024 are as under for ready reference of this Hon'ble Tribunal :-

MONTHLY DATA FOR OVERFLOW, GODBOLE DISCHARGE AND RBPH FLOW JULY 2018 TO JUNE 2024									
MONTH	OVERFLOW		GODBOLE		RBPH		TOTAL		AVERAGE
	MCM	MAF	MCM	MAF	MCM	MAF	MCM	MAF	CUSEC
Jul-18	0.00	0.00	46.81	0.04	0.00	0.00	46.81	0.04	617
Aug-18	0.00	0.00	46.46	0.04	0.00	0.00	46.46	0.04	613
Sep-18	0.00	0.00	45.07	0.04	0.00	0.00	45.07	0.04	614
Oct-18	0.00	0.00	46.78	0.04	0.00	0.00	46.78	0.04	617
Nov-18	0.00	0.00	45.95	0.04	0.00	0.00	45.95	0.04	626
Dec-18	0.00	0.00	48.05	0.04	0.00	0.00	48.05	0.04	634
Jan-19	0.00	0.00	48.38	0.04	0.00	0.00	48.38	0.04	638
Feb-19	0.00	0.00	43.25	0.04	0.00	0.00	43.25	0.04	631
Mar-19	0.00	0.00	47.13	0.04	0.00	0.00	47.13	0.04	621
Apr-19	0.00	0.00	45.78	0.04	0.00	0.00	45.78	0.04	624
May-19	0.00	0.00	51.92	0.04	0.00	0.00	51.92	0.04	685
Jun-19	0.00	0.00	66.54	0.05	0.00	0.00	66.54	0.05	907
TOTAL	0.00	0.00	582.10	0.47	0.00	0.00	582.10	0.47	652
Jul-19	0.00	0.00	45.21	0.04	0.00	0.00	45.21	0.04	596
Aug-19	9115.47	7.39	6.57	0.01	2377.92	1.93	11499.96	9.32	151628
Sep-19	20991.85	17.02	26.72	0.02	3039.60	2.46	24058.16	19.50	327783
Oct-19	2065.71	1.67	14.22	0.01	1834.97	1.49	3914.90	3.17	51618
Nov-19	0.00	0.00	16.00	0.01	821.75	0.67	837.76	0.68	11414
Dec-19	0.00	0.00	6.96	0.01	915.72	0.74	922.68	0.75	12166
Jan-20	0.00	0.00	9.62	0.01	781.26	0.63	790.88	0.64	10428
Feb-20	0.00	0.00	8.79	0.01	783.44	0.64	792.23	0.64	11166
Mar-20	0.00	0.00	6.20	0.01	524.78	0.43	530.98	0.43	7001
Apr-20	0.00	0.00	0.00	0.00	531.54	0.43	531.54	0.43	7242
May-20	0.00	0.00	5.48	0.00	406.21	0.33	411.69	0.33	5428
Jun-20	0.00	0.00	6.82	0.01	1622.75	1.32	1629.57	1.32	22202
TOTAL	32173.03	26.08	152.59	0.12	13639.94	11.06	45965.57	37.26	51556
Jul-20	0.00	0.00	20.16	0.02	344.68	0.28	364.83	0.30	4810
Aug-20	6304.90	5.11	26.98	0.02	506.17	0.41	6838.05	5.54	90160
Sep-20	5126.47	4.16	19.60	0.02	2773.73	2.25	7919.80	6.42	107904
Oct-20	10.14	0.01	10.43	0.01	232.00	0.19	252.57	0.20	3330
Nov-20	0.00	0.00	21.78	0.02	0.00	0.00	21.78	0.02	297
Dec-20	0.00	0.00	12.64	0.01	365.11	0.30	377.75	0.31	4981
Jan-21	0.00	0.00	14.73	0.01	372.88	0.30	387.61	0.31	5111
Feb-21	0.00	0.00	14.63	0.01	422.96	0.34	437.59	0.35	6388
Mar-21	0.00	0.00	16.04	0.01	435.69	0.35	451.73	0.37	5956
Apr-21	0.00	0.00	16.09	0.01	348.70	0.28	364.79	0.30	4970
May-21	0.00	0.00	8.70	0.01	754.51	0.61	763.21	0.62	10063
Jun-21	0.00	0.00	11.61	0.01	1990.29	1.61	2001.90	1.62	27275
TOTAL	11441.51	9.28	193.39	0.16	8546.73	6.93	20181.62	16.36	22604
Jul-21	0.00	0.00	23.10	0.02	55.19	0.04	78.29	0.06	1032
Aug-21	0.00	0.00	36.02	0.03	31.13	0.03	67.15	0.05	885

Sep-21	0.00	0.00	28.36	0.02	0.00	0.00	28.36	0.02	386
Oct-21	0.00	0.00	44.12	0.04	202.37	0.16	246.49	0.20	3250
Nov-21	0.00	0.00	32.13	0.03	204.88	0.17	237.01	0.19	3229
Dec-21	0.00	0.00	36.98	0.03	102.49	0.08	139.47	0.11	1839
Jan-22	0.00	0.00	34.95	0.03	0.23	0.00	35.18	0.03	464
Feb-22	0.00	0.00	19.77	0.02	0.00	0.00	19.77	0.02	289
Mar-22	0.00	0.00	25.92	0.02	4.13	0.00	30.05	0.02	396
Apr-22	0.00	0.00	20.76	0.02	298.09	0.24	318.85	0.26	4344
May-22	0.00	0.00	21.47	0.02	353.30	0.29	374.78	0.30	4941
Jun-22	0.00	0.00	20.75	0.02	586.37	0.48	607.12	0.49	8272
TOTAL	0.00	0.00	344.34	0.28	1838.18	1.49	2182.52	1.77	2444
Jul-22	0.00	0.00	26.85	0.02	1448.82	1.17	1475.67	1.20	19457
Aug-22	9903.23	8.03	30.47	0.02	3376.38	2.74	13310.08	10.79	175495
Sep-22	4005.41	3.25	32.61	0.03	3164.23	2.57	7202.24	5.84	98128
Oct-22	456.38	0.37	36.11	0.03	2357.29	1.91	2849.79	2.31	37575
Nov-22	0.00	0.00	20.07	0.02	180.71	0.15	200.78	0.16	2736
Dec-22	0.00	0.00	26.73	0.02	99.46	0.08	126.20	0.10	1664
Jan-23	0.00	0.00	31.75	0.03	239.09	0.19	270.85	0.22	3571
Feb-23	0.00	0.00	16.12	0.01	777.68	0.63	793.79	0.64	11588
Mar-23	0.00	0.00	17.76	0.01	308.40	0.25	326.16	0.26	4300
Apr-23	0.00	0.00	43.02	0.03	0.00	0.00	43.02	0.03	586
May-23	0.00	0.00	45.63	0.04	137.44	0.11	183.07	0.15	2414
Jun-23	0.00	0.00	42.14	0.03	160.54	0.13	202.68	0.16	2761
TOTAL	14365.02	11.65	369.26	0.30	12250.05	9.93	26984.33	21.88	30023
Jul-23	0.00	0.00	18.10	0.01	1547.70	1.25	1565.80	1.27	20645
Aug-23	0.00	0.00	2.09	0.00	3151.75	2.56	3153.83	2.56	41584
Sep-23	9302.65	7.54	17.73	0.01	1765.98	1.43	11086.36	8.99	151047
Oct-23	46.56	0.04	18.60	0.02	1435.72	1.16	1500.88	1.22	19789
Nov-23	0.00	0.00	30.62	0.02	237.18	0.19	267.80	0.22	3649
Dec-23	0.00	0.00	17.53	0.01	178.42	0.14	195.95	0.16	2584
Jan-24	0.00	0.00	23.95	0.02	388.58	0.32	412.52	0.33	5439
Feb-24	0.00	0.00	34.15	0.03	311.67	0.25	345.82	0.28	4874
Mar-24	0.00	0.00	13.48	0.01	0.00	0.00	13.48	0.01	178
Apr-24	0.00	0.00	29.30	0.02	110.07	0.09	139.37	0.11	1899
May-24	0.00	0.00	18.76	0.02	582.44	0.47	601.21	0.49	7927
Jun-24	0.00	0.00	18.70	0.02	1390.20	1.13	1408.90	1.14	19196
TOTAL	9349.20	7.58	243.01	0.197	11099.70	9.00	20691.91	16.77	278811

Annexure – R2

Vijay Rupani
Chief Minister, Gujarat State

13 MAR 2019

Annex-12

Hon'ble Shri Gadkariji,

Sadar Namaskar,

As you are well aware, Sardar Sarovar Project is the terminal dam on river Narmada, mission of which is to provide essence of life – Water and Energy to the millions of people and benefitting four states Viz. Madhya Pradesh, Rajasthan, Maharashtra and Gujarat. For sustaining the riverine eco-system in 157 km stretch downstream of the dam (up to Gulf of Cambay), minimum 600 cusecs of water is being released from the dam as decided by the Environment Sub-Group (ESG) of Narmada Control Authority (NCA) in January-2006.

However, during last few years it has been experienced that 600 cusecs being released in the downstream through Godbole Gates is just not sufficient to meet even the minimum downstream environmental requirements. Many representations have been received from Members of Parliament, affected people and NGOs and so on and large number of Media Reports has also appeared regarding the deteriorated environmental situation in the downstream. The situation has worsened because other two sources of water in the downstream in a normal year viz. overflow during monsoon and flow through exit tunnels of RBPH (after generating power) have ceased to supplement the mandatory e-flow of 600 cusecs being maintained.

Last two water years have been "Distress" years due to less rainfall in the Narmada catchment with overall water availability being as low as 55% and 80% respectively. As a result, the available quantity of water has been less than the demands of water for drinking, irrigation and industrial usages etc. of the Party States and therefore, running of RBPH has not been possible since July-2017. Needless to say, there has been no overflow in Water Year 2017-18 and 2018-19. Total downstream release is thus recorded as average flow of 626 cusecs in the Water Year 2017-18 and 623 cusecs in the current water year till January-2019. This is very-very less compared to the previous years' averages e.g. in 2016-17 it was 18,288 cusecs and in 2015-16, it was 6,386 cusecs.

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3rd floor, Swarnim Sankul-1, Sachivalaya, Gandhinagar - 382 010, GUJARAT, INDIA
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(55)

Against the above backdrop, Government of Gujarat has (in November-2017 and April-2018) requested the Chairman, ESG, NCA and the Secretary, MoEF& Climate Change to enhance the quantity of water to be released in downstream from 600 cusecs to 1500 cusecs to help protect the downstream environment. In the 90th Meeting of NCA held on 9th February, 2018, this issue was raised by the Joint Secretary, (RD & PP), MoWR, RD & GR and it was minutised that – "As regards inadequacy of this environmental flow, the matter had been discussed with the Secretary, E, F & CC & Chairman Environment Sub-Group and shortly a meeting of the Environment Sub-Group would be convened to take appropriate decision in the matter."

Further, it would be pertinent to point out here that in one of the Applications made in this regard to the Hon'ble National Green Tribunal (NGT), the NGT has issued the Order dated 29th January, 2019 that –"It would be appropriate that the present matter be also placed before Narmada Water Dispute Tribunal / NCA so as to consider all aspects of grievances raised by the Applicant."

It is therefore requested to kindly issue directives to the concerned for expediting the decision in this matter so that it can be helpful in protecting the downstream environment.

Thanking You,

With Regards,

Yours faithfully,

(Vijaybhai Rupani)

To,
Shri Nitin Jairam Gadkari
Hon'ble Minister Water Resources, River Development
& Ganga Rejuvenation, Government of India,
Shram Shakti Bhavan, Rafi Marg,

Annexure – R3

NO. CMS GOI/68/3/... 2351
Annex-13 (57)

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नितिन गडकरी
NITIN GADKARI

मंत्री
जल संसाधन, नदी विकास, गंगा संरक्षण,
सड़क परिवहन, राजमार्ग एवं पोत परिवहन
भारत सरकार
Minister
Water Resources
River Development, Ganga Rejuvenation,
Road Transport, Highways and Shipping
Government of India

4 JUN 2019

D.O. No. A. 50011/28/2019-Estt.IV

22 MAY 2019

Shri Vijay Rupani जी,

Please refer to your DO letter No. CMS/GOI/36 dated 13.03.2019 regarding issuing directives for expediting the decision of enhancing the quantity of water to be released in downstream of Sardar Sarovar Dam for protecting the downstream environment.

I have had the matter examined in consultation with Narmada Control Authority (NCA). NCA has informed that environmental flow of 600 Cusecs was decided by the Environment Sub-Group of Narmada Control Authority, chaired by Secretary, Ministry of Environment Forests & Climate Change. This quantity, being supplemented by releases from Sardar Sarovar River Bed Power House (RBPH), was considered adequate for protecting the downstream environment. Unfortunately, the RBPH could not be operated during the previous two Water Years i.e. 2017-18 and 2018-19, due to drought or deficient yield in Narmada River Basin. The quantity of 600 Cusecs for environment flow is being maintained through releases from Godbole weir of Sardar Sarovar Dam.

NCA has further informed that the Government of Gujarat has entrusted a study to the Central Inland Fisheries Research Institute (CIFRI), Kolkata, for determination of the quantity of water required to be released in the downstream of Sardar Sarovar Dam for protecting the environment. The first report of study is expected to be received in May, 2019. After the said study report is received, a meeting of the Environment Sub-Group of Narmada Control Authority will be convened to review the environmental flow requirement, on the basis of the study report.

With regards,

C. G. M. (T & C)	
In No.	181
Date	10/6/2019

S.S.N.N.L.
No. 586
Date 7/6/19

Yours sincerely,

(NITIN GADKARI)

Shri Vijay Rupani
Hon'ble Chief Minister of Gujarat
Government of Gujarat
3rd Floor, Swarnim Sankul-1,
New Sanchivalaya, Gandhi Nagar (Gujarat)

Dir. (Canal)
S.S.N.N.Ltd.

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Room No. 501, Transport Bhawan, Parliament Street, New Delhi-110 001
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E-mail : minister-mowr@nic.in, nitin.gadkari@nic.in

Annexure – R4

SSNNL/Env/eFlow/73/2020

849

Vijay Rupani
Chief Minister, Gujarat State

सत्यमेव जयते

Outward No. 73
Date 12/06/2020
Addl. Pri. C. C. F.
S.S.N.N.L., Gandhinagar.

Annex-14

Hon'ble Shri Shekhawatji,

SadarNamaskar,

This has reference to my earlier letter dated 13-03-2019 addressed to the then Hon'ble Union Minister of Water Resources wherein, I had requested to expedite the decision regarding increasing the mandatory downstream environmental flow (e-flow)in case of Sardar Sarovar Dam from 600 cusecs to at least 1500 cusecs to help protect the downstream environment (copy attached for ready reference). In response to this, Shri Nitin Gadkariji, the then Hon'ble Union Minister of Water Resources had vide his letter dated 22-05-2019 responded that the matter was examined in consultation with Narmada Control Authority (NCA) and that a meeting of the Environment Sub-Group of NCA will be convened to review the e-flow requirement on the basis of the study report conducted by Central Inland Fisheries Research Institute (CIFRI), Kolkata, which was expected to be received at that point of time (copy enclosed herewith for ready reference).

PA
Copies to be given to
1) CA to Dir(Coords)
2) APCCF
3) DAM(N)
16/VI

The first interim report is received from CIFRI wherein, it has been confirmed that **"there is an urgent need to increase the flow of water downstream of SSD in Narmada estuary."** The report has also clearly mentioned that the present release of 600 cusecs is too meagre to maintain the flow of Narmada till estuary and that this has led to the decrease in freshwater zone and increase in salinity (excerpts of the report are attached herewith).

C.G.M.(T. & C.)
In. No. 266.
Date 16/6/2020

Inward No. 44
Date 19/05/2020
Addl. Pri. C. C. F.
S.S.N.N.L., Gandhinagar.

You would agree and appreciate that in this summer the situation may again arise in which the presently released 600 cusecs may not be adequate. Keeping in view a large number of representations received from Members of Parliament, affected people, NGOs and so on including a Civil Appeal No. 4550 of 2019 pending in the Hon'ble Supreme Court, it is once again requested to kindly issue directives to the concerned for expediting the decision in this matter so that it can be helpful in protecting the downstream environment.

Thanking you,

With regards,

Yours faithfully,

(VijaybhaiRupani)

To,

Shri GajendraSingh Shekhawat
Hon'ble Union Jal Shakti Minister
Government of India
Shram Shakti Bhavan, Rafi Marg,
New Delhi

(63) 131C
Annexure-VII
341/C

Impact Assessment of Hydro-Ecological changes on Fisheries and Socio-Economy of Fisheries downstream of Sardar Sarovar Dam in Narmada Basin

Annex-15

First Interim Report
(April 2018 - March 2019)

Submitted to

Sardar Sarovar Narmada Nigam Limited (SSNNL)
Gandhinagar, Gujrat

ICAR- Central Inland Fisheries Research Institute
(Indian Council of Agricultural Research)
Barrackpore- 700120, Kolkata, West Bengal, India

release from Sardar Sarovar reservoir during lean and monsoon season to sustain Hilsa and other fish species

2. Alternative employment opportunities to fishers to compensate losses
3. Silt removal
4. Afforestation in catchment area

Focused Group Discussion with fishers:

Focused group discussions were organized at Shchrav, and Jhanor on 3rd, and 5th June 2018 respectively. Shchrav is dominated by tribal fishers who do fishing in 10-15 kms stretch. The CIFRI team has discussion with fishers of different age group in the bracket of 20-40 years old, 40-55 year old and 55 plus fishers. The fishers were not happy with the water flow from downstream Narmada. The main demand sraised by the fishers were 1. Release of more quantity of water from the Sardar Sarovar dam and 2.Weed removal from both sides of the bank.

The second focused group discussion was organized at Jhanor, in this FGD the Jila Panchayat member Dinesh Bhai Raisen Bhai Macchi participated along with 20 fishers of Jhanor village. The fishers told us that the Jhanor earlier was a freshwater zone has now changed into a tidal zone. The salinity has increased. Moreover due to weed growth along the banks, they face difficulty in catching fishes. Fisheries in Jhanor are dominated by catch of freshwater prawn. The major demands of fishers were release of water from Sardar Sarovar Dam.

7. SUGGESTED ACTION PLAN AND MEASURES

Presently the Sardar Sarovar Dam has attained a height of 138.68 m an increase of 16.79 m from earlier 121.89 m, and this eventuality lead to enhancement in present storage capacity, enabling this project to become fully operational under defined arrangements. The SSP is designed as a multi-purpose resource and with the prioritized utilization of stored water; have necessitated following action points:

i. During the stakeholder's discussion, the first and foremost demand of the fishers and other stakeholders was to release more water from the dam, to sustain the flow of

Narmada river. The demand of the stakeholders was from a range of 2000 cusec to 6000 cusec. The present release is approximately 600 cusec from Gadbole gate which is to meagre to maintain the flow of the Narmada till estuary. This also led to the decrease in freshwater zone which was earlier available till Jhanor. The salinity in Jhanor has now increased upto 2 ppt. In these circumstances, there is an **urgent need to increase the flow of water downstream of SSD in Narmada estuary** should be considered of topmost priority in the interim, since non-attainment of environmental flows will have irrecoverable impact on the downstream environment.

ii. Earlier, the river flow downstream also gets water from the operation of River Bed Power House (RBPH) and Canal Head Power House (CHPH). Since the power house is not operational at present also leading to decrease in water flow. The operation of RBPH will not only increase the flow in the downstream but also help in flushing out of organic load from dam area of the reservoir.

ii. There is need to religiously **observe and employ "Zero Effluent Discharge"** and this is directly necessitated since the downstream shal be experiencing constrained in freshwater discharge leading to environmental degradation. The corporate sector should be made liable to fulfill their corporate obligations towards environmental conservation so that community participation program may be ensured to address the vagaries of the impact corporate responsibilities may be relooked into for improvement of downstream water qualities.

At present the fisher-folk has been impacted due to habitat modification that led to the decline in fish catch, particularly Hilsa fisheries. There is an urgent need to impart training/skills to provide alternative employment opportunity and livelihood security.

v. Periodical Stake holder's consultation should be convened so that a holistic management approach may be implemented which would take care of sustainable development and conservation needs of Downstream river Narmada.

Annexure – R5

94/2020/E-IV

855

NO. CMS GOI/ 42240/36304

Annex-15 (19)

सिंह शेखावत

Gajendra Singh Shekhawat

जल शक्ति मंत्री
भारत सरकार

Minister for Jal Shakti
Government of India

D.O. No. A 50011/40/2020-Estt.IV

24 SEP 2020

सत्यमेव जयते

31 AUG 2020

Dear Vijay Bhai,

C.P.S. to C.M

Namaskar!

Please refer to your DO letter No. SSNNL/Env/e-flow/73/2020 dated 12th June, 2020 requesting that directives be issued for expediting the decision regarding enhancement of quantity of water released from Sardar Sarovar Dam for protecting the downstream environment.

2. I have had the matter examined. I have been informed by the Narmada Control Authority (NCA) that the matter was discussed in the 51st Meeting of Environment Sub-Group of NCA on 21st August, 2019 under the chairmanship of Secretary, MoEF&CC & Chairman, Environment Sub-Group of NCA. It was decided in the meeting that any decision regarding fixing of e-flow should be consistent with the findings of a study which has been entrusted by Sardar Sarovar Narmada Nigam Limited (SSNNL), Government of Gujarat to Central Inland Fisheries Research Institute (CIFRI), Kolkata. Therefore, matter may be considered once the final report is submitted by CIFRI, in the presence of representatives of the Government of Gujarat.

APCCF

3. I have been further informed that the Report of CIFRI has not been made available to NCA so far and SSNNL has informed that CIFRI has requested for 2 to 3 months' time for submission of final report. SSNNL, however, is anticipating further delay due to Covid-19 pandemic and lock down. They have assured NCA that the final report will be provided as soon as it is received. I am enclosing a copy of SSNNL's letter No. SSNNL/Env/e-Flow/DS/735-36 dated 22.05.2020 for your perusal.

4. Under these circumstances, I would request you to direct, SSNNL to take up the matter with the CIFRI so as to get the report expedited and be made available to NCA at the earliest so as to enable NCA to take an appropriate decision in consultation with the stakeholders.

સ.સ.ન.નિ.લિ.
ગાંધીનગર
આ.નં. 9860
શાખા MOEN

Adv. Copy to:-
CS
MD(SSNNL)

Yours Sincerely,

(Gajendra Singh Shekhawat)

CGM (T&C)

Shri Vijay Rupani,
Hon'ble Chief Minister of Gujarat,
Government of Gujarat, Chief Minister's Office, 3rd Floor,
Swarnim Sankul-1, Sachivalaya,
Gandhinagar – 382 010 (Gujarat).

जल शक्ति अभियान

Inward No. 330
Date 1-10-2020
Add. Prin. C.C.F.
S.S.N.N.L. Gandhinagar

Office : 210, Shram Shakti Bhawan, Rafi Marg, New Delhi-110 001
Tel: No. (011) 23711780, 23714663, 23714200, Fax : (011) 23710804
E-mail : minister-mowr@nic.in

Annexure – R6

नर्मदा नियंत्रण प्राधिकरण
(जल शक्ति मंत्रालय, जल संसाधन, नदी विकास एवं गंगा संरक्षण विभाग, भारत सरकार)
NARMADA CONTROL AUTHORITY
(Ministry of Jal Shakti, Department of Water Resources, RD & GR, Govt. of India)
नर्मदा सदन, सेक्टर-बी, स्कीम नं., 74-सी, विजय नगर, इन्दौर (म.प्र.)
Narmada Sadan, Sector-B, Scheme No. 74-C, Vijay Nagar, Indore - 452 010 (M.P.), INDIA

No. NCA/Env/2019/339

By Speed Post/E-mail
August 23, 2022

To

The Managing Director,
Sardar Sarovar Narmada Nigam Limited,
Govt. of Gujarat,
1st floor, Block No. 12,
New Sachivalaya Complex,
Gandhinagar – 382010, Gujarat.
Email : mdssnnl2009@gmail.com

SUB : E-flow Estimation and implementation downstream to Sardar Sarovar Dam.

Sir,

SSNNL had entrusted ICAR-CIFRI to conduct an additional study for Assessment of environmental flow (e-flow) requirement downstream of Sardar Sarovar dam under the Consultancy Project, '*Impact Assessment of hydro-ecological changes of fisheries and socio economy of fisheries downstream of Sardar Sarovar dam of Narmada Basin*'. The final report of this study was submitted to SSNNL by CIFRI in June 2022.

NCA has observed that the objective of the study was *to estimate the environmental flows (e-flow) in the downstream of Sardar Sarovar Dam (SSD) at Garudshwar for sustainable fisheries in River Narmada*. So, although the study was supposed to encompass the downstream stretch of River Narmada, from Garudeshwar till the sea, which is a stretch of about 150 km, the study has only been confined to the 11 km stretch, upstream to Garudeshwar, between Kevadia (dam site) and Garudeshwar. Further, the objective was to calculate e-flow for sustainable fisheries in River Narmada. The study however has only considered one fish species, i.e., *Tor tor*.

Since the river cross sections taken for this study are only confined to the 11 km stretch, upstream to Garudeshwar, and the total e-flow calculation has been based on the same, where a lentic/stagnant environment has got created due to construction of Garudeshwar weir, calculating e-flow for this stretch is a futile exercise. Mahseer is a migratory fish that move upstream during rains. It prefers clean, fast flowing and well oxygenated waters, gravel /sandy stream beds to breed and can migrate considerable distances in search of suitable breeding grounds. April to September is normally the spawning period but younger fish are known to spawn earlier. The pool that is getting created between Garudeshwar weir and Kevadia (dam) will not be able to provide the desired lotic environment, migratory route and the depth with gravel/sandy river bed. Due to non-availability of river cross-sections downstream to Garudeshwar weir, the study carried out by CIFRI has presumed that similar river bed habitat would be available downstream to the Garudeshwar weir, for a stretch of more than 150 km and suggested the desired e-flow for Mahseer (*Tor tor*) which for each season is 100% of the seasonal average flow in 90% dependable year. Prima facie these figures do not seem realistic.

Contd...p/2.

In view of the above observations including study objective and discussions held with officials of SSNNL on 25th July 2022, it is felt that the e-flow calculation needs to be reviewed taking into consideration the total stretch of the Narmada river (162 km) downstream to Sardar Sarovar Dam, Badhbhut Barrage and its associated fish pass and other relevant details like discharge expected from tributaries, pollution load and carrying capacity so as to arrive at a realistic figure without overlooking the water share of the Party States as per the NWDT Award.

SSNNL is requested to get the e-flow estimation reviewed and come out with implementable figures within the next 6 months for discussion in Environment Sub-Group and NCA meetings and also come up with interim measures that can be implemented for the time being in view of the pending case at Hon'ble Supreme Court to protect the downstream aquatic environment and livelihood of fishermen.

Thanking you,

Yours faithfully,

(Devjani Patra) 22/7/22
Member (Environment & Rehabilitation)
Mobile No. 8527484480
Email : mem.er.nca@nic.in

Copy for favour of kind information to :

1. The Chairman, NCA and Secretary to the Govt. of India, Ministry of Jal Shakti, DoWR, RD & GR, Shram Shakti Bhawan, Rafi Marg, New Delhi-110001 (Email : secy-mowr@nic.in).
2. Executive Member, NCA, Indore.
3. Shri C.V.Nadpara, Director (Canal), SSNNL, Govt. of Gujarat, 1st Floor, Block No. 12, New Sachivalaya Complex, Gandhinagar–382010 (Email : directorcanal@gmail.com)
4. Shri Vivek P. Kapadia, Director (Civil), SSNNL, Govt. of Gujarat, 2nd Floor, Block No. 12, New Sachivalaya Complex, Gandhinagar–382010 (Email : dire.civil.ssnnl@gmail.com)
5. Addl. Principal Chief Conservator of Forests, Environment Cell, Sardar Sarovar Narmada Nigam Ltd, Government of Gujarat, Block no. 12, New Sachivalaya Complex, Gandhinagar –382010, Gujarat (Email : envirmentcell@gmail.com).

(Devjani Patra)

Annexure – R7

SARDAR SAROVAR NARMADA NIGAM LTD.

(A Wholly owned Govt. of Gujarat Undertaking)

ANNEX-94-23

C. V. NADPARA
DIRECTOR (CANAL)

No: SSNNL /Env/e-flow/ 245 - 47

Date 26/09/2022

To,

The Member (E & R),
Narmada Sadan,
Sector-B, Scheme No. 71-C,
Vijay Nagar, Indore-452010 (M.P.)

Sub: E-flow estimation and implementation downstream to Sardar Sarovar Dam.

Ref: Your office letter No. NCA/Env/2019/339 dated August 23,2022.

Madam,

In connection with your letter under reference and a meeting between the officials of the SSNNL, Government of Gujarat and Members of the NCA on 25th July, 2022, we hereby reiterate our commitment for environmental and ecological health of the River Narmada in the downstream stretch i.e. beyond Sardar Sarovar Dam.

As we had discussed, the present report of the CIFRI submitted to the NCA is an initial exercise to estimate the trends of probable values of e-flow required from ecological preservation and socio-economic points of views. As per your suggestions, the SSNNL would certainly get rationalized the assumptions made in the modelling by CIFRI and get extended the stretch of the river under scope of modelling so as to arrive at a more realistic value for e-flow.

Besides an extensive exercise of computing the e-flow, it is desirable to enhance the interim ad hoc value of e-flow from present 600 cusec to 1500 cusec from the Sardar Sarovar Dam appreciating the trends captured from the study carried out by CIFRI and the actual condition of the river such that the

Block No. 12, 1st Floor, New Sachivalaya Complex, G[illegible]gar-382 010, Gujarat. Ph. +91-79-232 52728
Email : pa2directorcanal@gmail.com • Website : www.sardarsarovardam.org

very objectives of the study start getting at least partially served. By the time the results of the study are brought out and we implement our decisions based thereupon, we have some scope of stalling the deterioration of river health and hence this submission please. Necessary process is solicited to be rolled out by the NCA.

(C. V. Nadpara)
Director (Canals)
S.S.N.N.L. Gandhinagar

- **Copy submitted for information to,**

1) PS to Hon Managing Director, SSNNL
2) Additional Principal Chief Conservator of Forests, SSNNL

Annexure – R8

केवल सरकारी प्रयोग के लिए

For Official use only

नर्मदा नियंत्रण प्राधिकरण
NARMADA CONTROL AUTHORITY

सरदार सरोवर बॉध (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

INDEX

ANNEXURES

MINUTES OF THE 1ST MEETING OF THE COMMITTEE ON DOWNSTREAM E-FLOW OF RIVER NARMADA AT SARDAR SAROVAR DAM (SSD) HELD ON 21ST SEPTEMBER, 2023, 11.30 HRS AT SAYAJI HOTEL, INDORE

The 1st meeting of the Committee on Downstream Environmental Flow (E-Flow) of River Narmada at Sardar Sarovar Dam (SSD) was held on 21st September, 2023 in Indore, under the Chairmanship of Shri Ashok Kumar Thakur, Executive Member, NCA. The focus of the meeting was to review the E-Flow Study prepared and submitted by the Central Inland Fisheries Research Institute (CIFRI), Barrackpore to Sardar Sarovar Narmada Nigam Limited (SSNNL) and take further decision regarding the re-assessment 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, praised both Government of Gujarat (GoG) and Government of Rajasthan (GoR) for effective management of the water resources in the canals which has ushered in prosperity and development in the arid regions of Gujarat and Rajasthan. He also emphasized that any developmental activity is bound to have its positive and negative impacts, however all these issues can be addressed and settled amicably through application of technology with the help of Expert Members. He then requested Member (E&R), NCA to give a short presentation on Sardar Sarovar Project (SSP).

Member (E&R), NCA gave a brief background of the SSP, its benefits and regulations prescribed in the Narmada Water Disputes Tribunal (NWDT) Award. She informed that Sardar Sarovar is a multipurpose project where priority is given to drinking and irrigation rather than generation of power. After allocation of water for drinking and irrigation, if excess water is available then the same is allocated for power generation. Whenever the River Bed PowerHouse (RBPH) of SSD is not operational, some portion of the area downstream (d/s) to the dam from the stilling well falls dry, without any longitudinal or lateral connectivity, until the water from Godbole Gate reaches the Narmada river. She further elaborated that Garudeshwar weir is an integral part of the project, located about 12 km d/s from the SSD havingFRL of 31.75 m and Gross Storage Capacity of 87.20 MCM. The storage capacity of the weir is about 35 MCM, as informed by SSNNL. She further added that NWDT Award did not envisage any E-Flow to be released d/s to the dam. However, when the World Bank decided to fund the project, various impact assessment studies were carried out by SSNNL through differentexpert agencies. During this period, M.S. University, Vadodara had suggested 45 cumecs (1590 cusecs); CWPRS, Pune had suggested 30 cumecs (1060 cusecs) and HR Wallingford, London hassuggested 28.30 cumecs (1000 cusecs) of minimum environmental flow to be released d/sto the dam so that salinity ingress is checked, riverine ecology and societal needs are protected.

This necessity of a minimum d/s environmental flow was deliberated upon in various Environment Sub-Group (ESG) Meetings of NCA, chaired by Secretary, MoEF&CC. During the 45th ESG meeting, held on 25th April, 2008, decision was taken to release 600 cusecs as E-Flow, which was later ratified in the 88th Narmada Control Authority (NCA) meeting, held on 12th August, 2008. It was also decided that this E-Flow shall not be treated as "Utilizable flow" and not to be reckoned against the share of Gujarat or any Party State. Till date, this minimum constant discharge of 600 cusecs of water is being maintained d/s of SSD through Godbole gate in Dyke No. 3 of SSP. It has been observed that this 600 cusecs of water, when supplemented by the water released after generation of power from the RBPH, was sufficient to maintain the ecology and environment in the d/s reach of SSD and societal needs. During the later years, around 2017, due to drought, RBPH could not be operated and this 600 cusecs water was found insufficient. Subsequently there have been lots of protests from the people residing in the areas near Bharuch and NCA have received requests to review this E-Flow and increase its quantum.

Member (E&R) also explained through a video as to how salinity ingress has affected 22 villages in the d/s areas of Gujarat and Government's intervention in addressing this issue by way of constructing Bhadbhut barrage, 22 km upstream from the mouth of River Narmada. The main purposes for constructing this barrage were:

- Protection of water quality of river Narmada from salinity due to tidal water influence and salinity ingress for achieving improvement of ground water quality in the upper reaches of the river Narmada.
- Storage of regulated release of water from SSP including free-catchment, if available, for domestic, irrigation and industrial needs.
- Protection of low lying areas affected by high flood of River Narmada on the left bank.
- Addressing livelihood of fishermen through construction of fish ladder for unobstructed migration of fishes and making ship lock type arrangement for allowing boat passages between upstream and d/s of the barrage.

She informed the Committee that, due to salinity ingress and impact of inadequate d/s E-Flow, a case was filed by Narmada Pradusan Nivaran Samiti, in the Hon'ble National Green Tribunal (NGT). The matter was disposed by Hon'ble NGT on 25th January, 2019 by directing the petitioners to approach NCA. But instead of approaching NCA, the Samiti filed a case in the Hon'ble Supreme Court of India against the order of Hon'ble NGT and prayed to increase the d/s E-Flow from 600 cusecs to 1500 cusecs. The matter is pending in the Hon'ble Supreme Court of India and is sub-judice. Subsequently, both NCA and Ministry of Jal Shakti (MoJS) have received numerous representations from political leaders, time to time, to enhance the d/s E-Flow to 1500 cusecs to protect the d/s ecology of the river.

As a result, in one of the ESG meetings, it was decided to award the E-Flow study to CIFRI since they were already doing a Biodiversity study in the d/s stretch of SSD for SSNNL. CIFRI has

submitted its study report titled *"Environmental flows for river ecology with focus on d/s fisheries of SSD in Narmada River"*. CIFRI, in its report, recommended 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). CIFRI has also mentioned that the stretch between the d/s of SSD and Garudeshwar weir will be a lentic (stagnant) 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, it is necessary to do further study for which CIFRI needs relevant data.

Member (E&R) explained that the E-Flow values prescribed by CIFRI are actually very high, which is 100% of the average seasonal flows using 10 daily discharge time series with 90% dependability. These values are neither realistic nor implementable. Having said this, she discussed various orders/guidelines from Hon'ble NGT and MoJS on E-Flow:

- In the matter of Pushp Saini Vs. MoEF&CC & Others dated 09.08.2017 in the Hon'ble NGT, the Tribunal directed that all the rivers in the country shall maintain minimum 15% to 20% of the average lean season flow of that river. However, whichever State is unable to do so, Hon'ble NGT granted liberty to that State Govt. to move to MoEF&CC, GoI who shall in consultation with MoJS, DoWR, RD & GR, GoI examine the representation.
- Hon'ble NGT Order dated 07.09.2020 regarding E-Flow stated that every Hydro Electric Project (HEP) has to release minimum water to d/s in reference to the Sustainable Development Goals. Projects (HEPs), irrespective of the date of its commissioning, is under an obligation to release minimum water to the d/s. It also indicated that technical and/or commercial limitations cannot be a ground to ignore the mandate of law.
- A Gazette Notification of MoJS, DoWR, RD&GR dated 09.10.2018 on River Ganga envisaged that uninterrupted flows of water are maintained throughout its length at all times in River Ganga. The minimum E-Flow should be maintained are 20% of monthly average flow in the dry season (November to March), 25% of monthly average flow in lean season (October, April, May) and 30% of monthly flow of high flow season (June-September).

Thus, the main observations on CIFRI's report were that the E-Flow calculated/estimated by CIFRI was too high and the cross sections given by SSNNL were inadequate to arrive at realistic figures. **Therefore, as discussed with SSNNL, on 25th July, 2022, E-Flow calculation needs tobe reviewed taking into consideration the total stretch of the Narmada river (162 km) d/s to SSD, Bhadbhut Barrage and its associated fish pass and other relevant details like discharge expected from tributaries, carrying capacity of the river Narmada, etc, so as to arrive at a realistic figure without overlooking the water share of the party States as per the NWDT Award.**

Member (E&R) also mentioned about the request received from Director (Canal), SSNNL, GoG, vide letter dated 29.09.2022 to increase E-Flow from present 600 cusecs to 1500 cusecs. This issue was taken up during the 94th NCA meeting held on 8th May, 2023, wherein it was agreed that a Committee, under the Chairmanship of Executive Member, NCA shall be constituted, involving representatives from Water Resources Department (WRD) & Department of Fisheries of party States, Expert Members from different organization and Director (Fisheries) from Ministry of Fisheries, GoI. Further, Chairman, NCA had directed that a site visit may be conducted by all members at an early date to assess the real situation in the d/s areas. The committee shallalso go through the reports of CIFRI and submit its recommendation after a thorough study to the Authority, based on which final decision on the quantum of d/s environmental flow can be taken up with the consensus of all the beneficiary States.

Member (E&R) also opined that while E-Flow quantum needs to be re-determined, SSNNL should think about taking up interim measures on livelihood of fishermen. HR Wallingford and CIFRI had already suggested, in their reports, various livelihood options like equipping the fishermen to switch to non-fishing activities, *viz.* carpentry and farming, encouraging them to go for pisciculture in brackish ponds on coastal mudflats and freshwater inland ponds, employing them in Hilsa, carp and giant prawn breeding stations, agriculture activities, cottage industry, dairy development, etc. The same were also suggested by Jt. Secretary, Ministry of Fisheries, Animal Husbandry and Dairying. They were ready to offer technical and financial help.

She mentioned that Sardar Sarovar is an internationally acclaimed multi-purpose project and if all the social and environmental measures are executed properly with collective efforts, then this single project can fulfill all the 17 Sustainable Development Goals for which India has committed itself to. She insisted to think upon and deliberate on the same for its effective implementation. She further elaborated that, during 2004, SSNNL had accepted the HR Wallingford report for providing alternative livelihood. Even after 19 years SSNNL has not implemented the same, which defeats the whole purpose of sustainable development. Reports need to be implemented effectively on the ground.

Regarding E-Flow she mentioned that currently 600 cusecs is being released. Quantum of water required to meet the E-Flow for a day at existing discharge rate of 600 cusecs is, 1.47 MCM. Quantum of water required to meet the E-Flow for a day at the proposed discharge rate of 1500 cusecs is about 3.675 MCM. Garudeshwar weir (G.W), located at a distance of 12 km d/s of SSD, is the integral part of pumping mode operation of RBPH of SSP. Its construction has been completed by GoG in December, 2020. Reversible operation is in pipeline. Water required for E-Flow is met through discharge from sluice gates of G.W. The pondage capacity of G.W. is approximately 35 MCM. This is sufficient to cater the existing rate of E-Flow (600 cusecs or 1.47 MCM) for 23 days. She further intimated that discharge from one RBPH machine of SSP in a day is 18 MCM (0.75 MCM in 1 hour). Pondage capacity of G.W. (35 MCM) is thus sufficient to cater to the proposed rate of E-Flow, which is 1500 cusecs or 3.675 MCM for 9 days. Quantum of water

discharged through RBPH of SSP when all six machines are operated for 24:00 hrs. is 108 MCM. Stored water at G.W can be regulated and released to meet the E-Flow requirement and 600 cusecs of water from Godbole gate be only used when there is insufficient water in the G.W. pond. She requested SSNNL to look into this aspect as an interim arrangement, till the Pumped Storage Scheme becomes operational and final decision is not taken on the quantum of enhanced E-Flow.

She, thus, requested the Committee for deliberations on the following issues:

- Review of E-Flow taking into consideration Bhadbhut Barrage and its fish pass, target fish species, releases from Karjan and Orsang rivers, 90% or 75% dependable 10 daily discharge series, river cross-section values from the total stretch of 162 km or atleast up to Bhadbhut Barrage.
- Water between dam and weir is going to be a dead zone.
- Interim measures for restoration of livelihood as proposed by HR Wallingford, SSNNL & CIFRI in their reports.
- Possibility of increasing the interim E-Flow from 600 to 1500 cusecs as requested by SSNNL - for this assessment of water being pooled in G.W. and whether thatis sufficient to release the minimum E-Flow, discharge capacity of Sluice gate of G.W. and possibility of regulated release.
- Small Hydro Power Plant (9 MW) at G.W. with 1500 cusecs design discharge - E-Flow should not get impacted due to this project.
- Taking up plantation measures alongside the river banks of river Narmada for recharging of river beds as suggested by Indian Council of Forestry Research & Education (ICFRE), Dehradun.

After her presentation, Member (E&R), NCA requested CIFRI, Barrackpore to make a brief presentation on their findings and recommendations.

CIFRI

1. Dr. B. K. Das, Director

CIFRI has carried out two studies w.r.t. *"Impact Assessment of Hydro-ecological Changes on Fisheries and Socio-economy of Fishers Downstream of SSD in Narmada Basin"* and *"Assessment of Environmental flows for river ecology with focus on downstream of SSD in Narmada River."* Dr. Das presented the findings and recommendations on *"Impact Assessment of Hydro-ecological Changes on Fisheries and Socio-economy of Fishers Downstream of SSD in Narmada Basin"*. He stated that the study area has three zones *viz.* fresh water habitat from Kevadia to Sisodara, Tidal fresh water zones up to Jhanor and Estuarine zone from Bharuch to Ambetha. The objectives of the study were:

1. To assess the present status of ecology and fisheries in the d/s of SSD (biological and ecological changes).

2. To study the hydro-ecological changes and it's adverse impact on fisheries (including erosion and sedimentation).
3. To assess the impact of regulated freshwater discharge and pollution load on the fisheries of d/s environment and suggest their prospective mitigation and conservation program.
4. To study and suggest conservation measures to restore vulnerable resources/rare/ endangered/ extinct fish fauna, if any, in the Narmada River d/s of SSD.
5. To conduct "Socio-economic survey" of fisher-folk with the view to changing scenario of freshwater flow.
6. To prepare an "Action Plan."

The parameters for their study included Planktons, benthic community, *E. coli* count for pollution, water quality, socio-economic changes in all three seasons *viz.* Pre Monsoon (May-June), Monsoon (September) and post Monsoon (January- February). This was a two year study and it was noticed that, depth was varying maximum in the first year to 9 meter and transparency varying at 90 cm. D/s environment was getting impacted gradually due to constrained E-Flow.

He stated that in hydro-biological monitoring, Total Dissolved Solids (TDS), total Alkalinity, total Hardness, Chloride & Specific Conductivity, Salinity parameters were included. Phosphate, Nitrate, Silicate were also recorded. Salinity did not vary much up to Jhanor (0.573 ppt) and it increased from Bharuch (8.47 ppt) to Ambetha (34.1 ppt) due to tidal impact in summer showing impact of constrained freshwater availability at d/s environment. In Monsoon, the estuarine area expanded up to Bhadbhut and in summer & winter the estuarine stretch expanded up to Jhanor. Earlier the freshwater conditions were experienced up to Bhadbhut but now it is up to Sisodara during monsoon.

Composite effluent discharge at Sakkarpura site is reported as totally anaerobic and contains very high BOD, high accumulated CO_2 (6.2 mg/L) during the monsoon, high specific conductivity, high Phosphate & Nitrate content. BOD level recorded up to 897 mg/L during monsoon and 810 mg/L during winter season. These are potentially injurious to the d/s environment health.

The river water is free from the heavy metals. But sediment recorded moderate concentration of heavy metals like Zn, Cr & Cu at some sites. Besides runoff from agricultural fields, the river especially from Bharuch onwards receives industrial effluents at different locations, might be cause of heavy metal presence in the river sediments.

Microbial load in Bharuch, Jhanor, and Sakkarpura is high. *E.Coli* is greater than 1600 count in 100 mL in Bharuch, Jhanor and Sakkarpura due to addition of runoff water from sewages and the industrial discharges. This is alarming conditions for d/s and there is an urgent need for its mitigation.

He intimated that according to the Margalef's species richness index, the Garudeshwar site was the most species-rich site followed by Poicha, both in the freshwater zone but the richness variations were highest at Bhadbhut site in the estuarine stretch**.** Number of Benthos increases the possibility of the river bed health and can be used as pollution monitoring status.

He further stated that during the study, 98 species were recorded. In previous study (2009-11), recorded species was less but species diversity was more. More than 7 species were recorded for the first time in the Narmada River along with the Octopus. Snakehead fish contributes to about 32% while Indian Major Carp's (IMC's) contribution is less. Floods in 2019 extended the effective habitat zone of *T. ilisha* - resulted in the migration of the species up to the freshwater zone at Sisodara but after thatpopulation of the Hilsa reduced drastically.

In Tidal zone, large cat fish like *Wallago attu* is recorded very high followed by the Hilsa is 47%. Fresh water prawn recorded 61% and 4-5 new species of prawn is also recorded. There is increase in biodiversity but decrease in the fish catch. Marine fisheries like Hilsa, *O. Pama*, etc. are more dominant in Zone-III.

Under stock assessment, fisher household increases 135% and Fishers population increases 242% (reference from 1970-2018). The income and employment of the fisherman reduced over the years (since 1978), mostly in the upper stretch of d/s of SSD because of diversification. The fish catch was 70.8 kg/boat/day reduced to 30 kg/boat/day.

He informed that the Tribal population mainly do fishing in villages Rengan, Vasan, Sehrav, Gramdi and Nerkeri in upper stretch of d/s, whereas fishermen community in lower d/s areas.

He further stated that Mahseer population is 0.37% in the d/s but hardly 1 or 2 species was found there. The freshwater species *Eutropiichthys vacha* and *Ailia coila* formed significant components in riverine fish landings of Zone–I in 2010-11, were not recorded in the present study.

During the stakeholder consultation, the major demands of the stakeholders were:

1. Release more water from the Dam to sustain the river flow.
2. Provide alternative employment opportunities to fishers.
3. Eradication of weeds from both banks of Narmada river (mainly in upper stretch up to Jhanor).

Dr. Das in his presentation proposed/suggested the following:

- *More detailed study on the breeding and migration behaviors for implementing sound management measures to sustain the Hilsa fisheries along the d/s stretch of the River Narmada. Moreover, artificial breeding and larval rearing of hilsa shall need to be*

initiated for the river ranching programme in river Narmada below SSD to rejuvenate its population and improve the livelihood of fishermen. Comments received from Dr. Amiya Sahoo, Senior Scientist, CIFRI, Barrackpore dated 7.11.2023 is enclosed at **Annex-II**

- *Protected areas for conservation of spawning grounds of Hilsa should be considered on a long-term basis.*
- *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* **(Annex-II).**
- *The giant freshwater prawn resources d/s of SSD should be exploited at optimum level without hampering the natural recruitment process.*
- *Bhadbhut barrage is coming so that gate fish pass has to be constructed as per the guidelines.*
- *Awareness and sensitization programmes may be organised for the local community for protection of juveniles of threatened fishes.*
- *Provisions for the alternate and diversified livelihoods for fishermen need to be addressed along the d/s stretch of the Narmada River during the off-seasons for their betterment.*
- *Frequent interaction with fishers' community of the d/s is the need of the hour. Periodical stakeholders' consultation should be organized and suggestions of the stakeholders may be recorded for holistic management approach that will take care of sustainable development and conservation needs of d/s River Narmada.*

2. Dr. Amiya Sahoo, Scientist

Dr. Amiya Sahoo, in his presentation on *"Assessment of E-Flows for river ecology with focus on d/s of SSD in Narmada River"* stated that the E-Flow was estimated at 600 cusecs and then 1500 cusecs is the demand, but the result of their report is around 1800 cusecs which is seasonal (Monsoon, Post monsoon and lean season). The demand of 600 cusecs/1500 cusecs is continuous. E-Flow by the definition itself should be seasonal in nature because water requirement for fishes and aquatic flora and fauna differs from season to season.

He further stated that, during the monsoon the water requirement will be more for migration and breeding. CIFRI has calculated 1800 cusecs by using the stitching techniques. Dr. Sahoo informed that the present study has been carried out based on available hydrological data with no cross-section. The Flow Duration Curve (FDC) could not depict the E-Flow comprehensively as no cross section of the River below the G.W. was provided to CIFRI.

He mentioned that in their conclusion they have made it clear that there is need for a comprehensive study below the G.W. with cross sections of relevant river stretches. Dr. Sahoo also said that CIFRI now has Acoustic Doppler Current Profiler (ADCP) thatwould assist in further study as it can ascertain available velocity of the water at different stretch and depth. He also added that data provided by the State WRD need to be authenticated. Further, study is required considering cross section, discharge and keystone species.

IIT, Roorkee
Prof. Arun Kumar

Prof. Arun Kumar stated that E-Flow is a very sensitive subject especially when the water is deficient in the river. He also insisted for strict regulations and compliance measures for controlling the pollution from Effluent Treatment Plant (ETP) and Sewage Treatment Plant (STP) in the river. He stressed that E-Flows should not be used to dilute pollution problems, which should be dealt with at source by treatment and reuse.

He suggested to ensure the purpose of the E-Flow study. He also mentioned that whatever the E-Flow value gets fixed, it should be able to address the concerns and should not be allowed to change. Further, he added to his view that E-Flow includes aqua biodiversity coupled with avifaunal diversity, and in the case of biodiversity, continuity is to be maintained. The E-Flow calculation should be based on 90-95% dependability.

He also suggested that E-Flow must be regulated with an automated system of monitoring to avoid losses and mismanagement. Quantum of E-Flow to be released can be calculated on percentage basis like 15 to 20% during lean period, 20 to 25% during Post Monsoon and 30% during Monsoon and the another method is based on requirement basis. While calculating, one should consider the discharges from the tributaries and other means. In case of Biodiversity, 90 -95% dependable year should be considered for the survival of aquatic species.

The value should be season wise and based on the requirement of fish species to be protected. Fishes are capable to adopt to new environment. He opined that E-Flow must be re-calculated considering the depth, velocity, and cross sections of the River Narmada. He further added to take account of the socio-economic study, but also showcased the challenges in such type of socio-economic study.

Prof. Kumar further suggested for water quality monitoring, since it is a direct indicator of aquatic life under different discharge conditions. He informed that river is a linear identity. There was a study carried out in which it was decided that there will be a release of 25 cumecs of water from Bargi Dam as E-Flow. Whether the same is being released or not which is to be verified.

He further informed that E-Flow equation has been derived in Ganga basin but for Narmada basin the E-Flow equation is yet to be derived. There should be an E-Flow in the river from the beginning to end of the river season wise, irrespective of the State. **He insisted that E-Flow is the right of the river and it is to be given to the river.**

In hydropower project, there may not be 24 hours hydro power operation. **But the E-Flow is to be maintained continuously throughout the year for the survival of aquatic species which will not survive if there is no water in the river. He concluded his view with the statement that determining the quantum of E-Flow and its implementation are not simple but complicated and requires enormous co-ordination from various stakeholders to resolve and implement.**

Central Water Commission (CWC)
Shri N.N. Rai, Director (Hydrology)

Shri N. N. Rai, stated that he has some observation on the presentation of Dr. Amiya Sahoo with respect to E-Flow. He opined that although FDC is extensively used in India for calculation of E-Flow, it is not applicable to Indian conditions. There are only 28 to 31 rainy days in Ganga & Yamuna basin, 60 days in Kerala, etc. Therefore, the Classes A, B, C for river are only applicable, where the number of rainy days are more than 200 days in a year. The methodology used so far belongs to European conditions where the number of rainy days is more than 200.

He suggested that for E-Flow estimation, it is better to capture the virgin flow sequences instead of modified flow sequences. For an E-Flow of 53.1 cumecs, the value is wrong as per FDC analysiswhereas the corrected E-Flow value is 17.5 cumecs if taking/analyzing the 40 years data of G.W. before 1988. He briefed that since there is a large modification in the Narmadabasin with a series of dams upstream to Sardar Sarovar, the FDC values are going to alter in due course of time. Thus, it is suggested to utilize the data before 1988 for the E-Flow calculation anduse FDC method for verification only. Therefore, 600 cusecs E-Flow is a scientific assessment based on FDC method which will not be sufficient for habitat requirement.

He stated that protecting and maintaining river flow regimes and hence the ecosystems they support by providing adequate environmental flows should be a critical aspect of planning of any river valley project. For assessing environmental 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. The hydraulic rating cum habitat simulation methodology can be considered one of scientific approach to quantify the E-Flows.** He also mentioned that 90% dependable flow is calculated based on the yearly data. He further said that dependability is calculated based on yearly flow calculations and data arranged in descending order. For Hydropower project, 90% dependable flow and incase of irrigation flow 75% dependable flow is adopted. Further, he stated that that the percentile flow is used for making rule curve of the reservoir. In Rule curve of the reservoir, success rate will be governed by the percentile flow. Using each 10 daily data for 30 years one needs to find out the 90% percentile flow (Q90). E-Flow will be lower bound of the rule curve i.e. the minimum water required for conversation purpose. The upper bound will be corresponding to Q50. He stressed the massive success rate (80-85%) of the rule curve methodology and stressed on the importance of these data, Habitat Simulation Modelling along with critical river stretch cross sections, water needs for aquatic fauna, etc. to estimate the required d/s E-Flow. **He also urged GoG to identify the critical river reach area for E-Flow computation and also use ADCP to understand the velocity available at different stretchesand depth of river Narmada with the current E-Flow. This would also help in the estimation of revised E-Flow to be**

carried out through CIFRI. He also stated that there is an order from Hon'ble NGT which states that there should be a minimum of 15% of average flow during the lean period for all the river. Every State has to release E-Flow from the project to conserve River Narmada.

National Mission for Clean Ganga (NMCG)

1. Shri D. P. Mathuriya, Executive Director (Technical)

Shri D. P. Mathuriya in his observation stated that E-Flow is a very touchy subject and no estimation of the E-Flow is the final estimation. Further, he stated that the E-Flow study was carried out for the Ganga basin for the long period and policy decisions were with the consensus of the Committee constituted. Based on the policy decision, the Gazette notification for seasonal flow was issued on 18th October, 2020. This was accepted and implemented by all the stakeholder/ Project developer.

Shri Mathuriya gave a detailed account of how E-Flow was established at different stretches of river Ganga. He stated that the concept of the E-Flow in the Ganga notification has not been the E-Flow for the river stretch but E-Flow at the point of obstructions, where the engineering diversion & interventions have come that affected longitudinal and lateral connectivity of the river. He stated that the target issue of E-Flow in river Ganga was Riverine and Environment Ecology. In case of Yamuna, there was a Riverine Ecology & pollution from Hathnikund to Okhla. In the DPR, National Institute of Hydrology (NIH) has been included, which is one of the prime investigators. He also mentioned that for Ramganga River basin, an elaborate mechanism for assessment of E-Flow is being done under two phases. It is a part of Indo-German project in which CIFRI is also one of the partners alongwith CWC, Ground Water Board, etc. **Various parameters have been taken into consideration like biological survey, social survey, geomorphological survey, water quality analysis, hydrological analysis, hydraulics survey, ecological and social importance and sensitivity**, **etc**. **In the Ramganga study cross sections have been extended to High Flood Level (HFL), river's health taken into account, obtained real time observed hydrological data sets and validation, different flow scenarios made to meet specific river health criteria.**

He informed the Committee that there is court case of Pushp Saini Vs. MoEF&CC & Others dated 09.08.2017 in the Hon'ble NGT. Tribunal directed that all the rivers in the country shall maintain minimum **15%** to **20%** of the average lean season flow of that river. Shri Bharat Jhunjhunwala had filed a Writ Petition in the Hon'ble Supreme Court of India and Hon'ble Supreme Court has directed all the States to file an Affidavit. The States have not yet submitted. The Committee should also know the stand of the States. GoMP is of the view that there is no need of E-Flow because there iscontinuous flow from the intervening catchment and return flow also. Ultimately this issue will come up. States have to own up. **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. However, whichever State is unable to do so, Hon'ble NGT has granted liberty to that State government to move to MoEF&CC, who shall in consultation with DoWR, RD&GR examine the case. He urged to follow similar approaches in the Narmada River.

Further, he also insisted to take up the issue of extensive use of fertilizer in the surrounding areas which led to an increase in nutrient flux in the river/water bodies. He also mentioned that in NMCG, the monsoon E-Flow requirement is bifurcated into two major components i.e. monsoon flux and monsoon baseline requirement. He stated that whether the value of the E-Flow is 600 cusecs or 1500 cusecs, **it should mimic the natural flow of the river**. E-Flow remains important in monsoon period. All Standard Operating Procedure (SOP) is available in this regard at NMCG.

He stated that CIFRI has reported that up to G.W. there is a pool of water. There is a need to derive E-Flow d/s of the Garudeshwar. He stressed that there should be a mechanism to maintain the E-Flow even if there is no engineering structure in between the entire stretch. This is the real problem being faced in the River Yamuna. As per the direction of Hon'ble Supreme Court of India, 10 cumecs of water is being released from Hathnikund. This 10 cumecs of water disappears suddenly after 10 kms in the d/s and when the river enters Delhi at Wazirabad. He also mentioned that there should be an agency/organization, which would be responsible for monitoring and taking responsibility to maintain the E-Flow in between diversions. Anything should not be prescribed which is not implementable and monitorable. Accounting of return flow from natural drain and riverine system is also extremely important.

While concluding, he stated that E-Flow has to be maintained and it is now mandated by the MoEF&CC and Hon'ble NGT. There should be lateral connectivity in the river system not only for Ganga but for all rivers in the country. The same principle is to be reiterated or re-emphasized when the study is undertaken for river Narmada. Wherever there is a discontinuity, E-Flow value should be prescribed clearly and implemented.

2. Dr. Sandeep Behera, Consultant (Biodiversity), NMCG

Dr. Sandeep Behera w.r.t. ecological aspects on E-Flow stated that when Ganga work started under Namami Gange program in 2014, Namami Gange Mission was launched with a mandate and vision for restoring *Nirmalta* and *Aviralta* of River Ganga. The aim was to not just restore Ganga to its pristine glory, but also help the local population connect with its traditional wisdom. Over the years, with more research and studies, the mission and vision of NMCG has evolved and is standing tall on the five important pillars of Namami Gange Programme – *Nirmal* Ganga (Unpolluted river), *Aviral* Ganga (Unrestricted flow), *Jan* Ganga (People's Participation), Gyan Ganga (Knowledge and research based interventions) and *Arth* Ganga (People-river connect through the bridge of economy).

He further stated as in case of *Nirmalta*, the river cannot be rejuvenated to its pristine state. For rejuvenation, NMCG did a lot of exercise. One of the major components of Ganga rejuvenation is 'forestry interventions' to enhance the productivity and diversity of the forests in head water areas and all along the river and its tributaries. Accordingly, Indian Council of Forestry Research and Education (ICFRE), Dehradun prepared a Detailed Project Report (DPR) for afforestation in an area of 1,34,106 hectares in the Ganga river bank States of Uttarakhand, Uttar Pradesh, Bihar, Jharkhand and West Bengal. The ICFRE, DPR provides for taking up works under four major heads *viz.* Natural landscape, Agriculture landscape, Urban landscape and Conservation interventions. The main purpose of the proposed forestry interventions is to contribute towards holistic conservation of river Ganga, including improving the flow in the river (*Aviralta*) by adopting a multi-pronged approach throughout the pre-defined Ganga riverscape. The project of "Forestry Interventions for Ganga" is being implemented by State Forest Departments of Uttarakhand, Uttar Pradesh, Bihar, Jharkhand,and West Bengal as per the ICFRE DPR since year 2016-17, for which NMCG is providing financial support to the respective State Forest Departments. Because of some issues, this could not be implemented for the whole stretch. But utilizing the resources, NMCG did few exercises in the basin States, which gave very good results.

Dr. Behera also mentioned that, recently, MoEF&CC, GoI has released DPRs on rejuvenation of thirteen major rivers through forestry interventions. These are Jhelum,Chenab, Ravi, Beas, Sutlej, Yamuna, Brahmaputra, Luni, Narmada, Godavari, Mahanadi, Krishna, and Cauvery. The DPRs have been funded by the National Afforestation & Eco-development Board, (MoEF&CC) and prepared by ICFRE,Dehradun. He added that these reports are prepared with a holistic vision to create 'Green India' through '*Van Bhagidari* and *Jan Bhagidari'*. The proposed cumulative budget outlay of thirteen DPRs is Rs. 19,342.62 crore. The DPRs are expected to be executed through the State Forest Departments as nodal department and with convergence of schemes of other line departments in the states towards the activities proposed in the DPRs and funding support from the Government of India. The rivers, along with their tributaries, are proposed for forestry interventions in the riverscape under different landscapes, namely natural landscape, agricultural landscape and urbanlandscape. The different models of forestry plantations including timber species, medicinal plants, grasses, shrubs and fuel fodder and fruit trees are aimed to augment water, ground water recharge and contain erosion. Each DPR incorporates detailed geospatial analysis of the delineated riverscape, exhaustive review on the river environment, factors responsible for the current state and prioritization of areas using Remote Sensing and GIS techniques along with field verification for proposed forestry interventions and other conservation measures through an extensive consultative process and designing and development of various treatment models for Natural, Agriculture & Urban landscape in each of the delineated riverscape.

Dr. Behera said that all the party States should look into this DPR on Narmada for augmenting water availability and ground water recharge in their respective States. These DPRs have also focused on Wetland conservation and floodplain rejuvenation. **Flood plains are waste land,**

whichget easily encroached, if not utilised. Creation of Biodiversity Parks for conservation of localhabitat along the basin and eco-tourism for rejuvenation of river ecosystem may be looked into. These are all combined scientific work that NMCG is also doing. For rejuvenating rivers, **stakeholders are debating on E-Flow. These DPRs have suggested as to how we can naturally conserve this water through forestry interventions and utilize it in our E-Flow system.**

For fishery conservation, he states that fishermen are ranching lot of fishes in the river. For the improvement of livelihood and for conservation of fishes, the river should be totally free and should not be totally dependent on fish resources of the river system. So, for the livelihood of the fishers, he stated that the scheme from Fisheries department, like the Pradhan Mantri Matsya Sampada Yojana (PMMSY) and inland fishing activities need to be promoted in the Wetland or waste land of the rivers so that the livelihood of the people is not affected by stopping them from going for the fishing activities.

He also stated that there should be regular monitoring exercises taken up for rejuvenation of the whole Narmada river and its smaller tributaries, branches and canals in line with the Namami Gange Programme that emphasizes on *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).

Member (Civil), NCA

Member (Civil), NCA suggested that in place of one value, the E-Flow value should be seasonal in nature. To arrive at the exact value, critical cross-section of the river stretches has to be considered. He further suggested that the E-Flow should be computed using virgin flow series.

Views of the party States:

Govt. of Madhya Pradesh

Shri Vinod Kumar Dewada, Member (Power), NVDA intimated that at present 600 cusecs of water is being released as E-Flow d/s to SSD through Godbole gate as approved earlier in the NCA meeting with the consensus of the beneficiary States. He mentioned that, as was discussed during the 94th meeting of NCA, held on 8th May, 2023, there is no change in the stand of GoMP. 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 territorial boundary of Madhya Pradesh, for which Government of M.P is not willing to share any extra release of water. He also opined that the views or opinion of GoMP **(Annex-III)** was not sought/included in CIFRI's study. Comments received from Member (Engineering), NVDA, GoMP, vide letter dated 27.10.2023 is enclosed at **Annex-IV**.

Member (E&R) enquired if it is acceptable to GoMP and other party States to award this re-assessment of E-flow Study to CIFRI, Barrackpore. Member (Power), NVDA informed that GoMP has no objection in this regard. Member (E&R), at this point, also clarified that this re-assessment of three season E-Flow, although would be carried out by CIFRI, after obtaining requisite technical inputs and logistical support from SSNNL, but the same would be done in a participatory and transparent manner. 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.

Govt. of Maharashtra

Shri Sanjay Khairnar, Executive Engineer, Narmada Development Division (NDD), Nandurbar, GoM endorsed the views of GoMP. He opined that the E-flow should be continued as decided earlier, i.e. 600 cusecs. NWDT Award is due for review in the year 2024. Hence, GoM will obey the final decision and order of tribunal regarding the issue of increase in E-flow d/s to SSD. Comments received from Executive Engineer, NDD, Nandurbar, GoM, vide letter dated 27.10.2023 is enclosed at **Annex-V**.

Shri S.P. Wategaonkar, Regional Dy. Commissioner (Fisheries), Nashik Division stated that the issue is presented in a well-defined manner and the expert members had expressed their views and suggestion to review the E-Flow d/s to SSD based on the Guidelines of Hon'ble NGT and MoEF&CC so that the ecology of the river is protected. But it is not advisable to decide at this stage as further study is required to be carried out by CIFRI on this issue. Decision can be taken on this issue in the next meeting once the study is completed. He further stated that the study on *"Investigation on ecological status, conservation and enhancement of Fisheries in Maharashtra part of SSR"* has been awarded to ICAR-CIFE, Mumbai at an estimated cost of Rs. 1.18 Cr. The study will be completed in 18 months from the date of award of work. Further course of action will be taken once the report is received from CIFE, Mumbai for fisheries conversation in SSR in an integrated manner. Though the study awarded to ICAR-CIFE pertains to integrated management of SSR, he agreed and stated that there should be d/s E-Flow in Narmada River throughout the year, season wise, to protect the flora and fauna (aquatic species) and ecology of the river but at the same time it should be cost effective.

Govt. of Rajasthan

Shri Amar Singh, Chief Engineer, WRD, Jodhpur stated that at present 600 cusecs of water is being released as E-Flow from SSD to the d/s. He was concerned if there is an increase in d/s E-Flow, how the share of GoR is going to be impacted because they have only 0.50 MAF water allocated to them under NWDT Award. Rajasthan being an arid State, the economy of the two districts namely; Barmer and Jalore is totally dependent on this 0.50 MAF of Narmada water. He also stated that E- Flow in the river is must to protect the ecology of the river**.** Once the dam is

constructed across the river, the d/s of the river become dry, unless the water is released from the dam to safeguard the ecology, conservation of fisheries and livelihood of the people living in the d/s. Further, the groundwater level also goes down and the farmer doing agriculture and allied activities in the d/s are also facing lot of issues, if the water is not released throughout the year season wise.

He also informed that according to the Water Policy 2010 of GoR, the environmental impact of substantive Major and Medium reservoir projects upon d/s uses will be a primary consideration at the planning stage. Comments received from Chief Engineer, Water Resource Department, Jodhpur, GoR, vide letter dated 27.10.2023 is enclosed at **Annex-VI**. When the dam was constructed across the river Narmada, based on the development of command area, water has been allocated to the beneficiary States, but E-Flow was not considered at that time.

He further stated that water is supplied for irrigation through canal (flow system). GoR is gradually shifting from flow irrigation to sprinkler irrigation through which some quantum of water can be saved. Further, evaporation losses can be reduced to some extent by installing solar panel in the watershed area. Thus, quantum of water so saved by adopting sprinkler irrigation and by reducing evaporation losses can be utilized for E-Flow.

He also suggested that in future, if any dam is constructed there should be a separate provision for seasonal E-Flow. After considering the E-Flow, the remaining water available for utilization can be used for drinking, command area (irrigation), and for other purpose.

At this stage, if the E-Flow is enhanced d/s to SSD, it might become a political issue and there will be an agitation from the farmers, if the quantum of water to be released for irrigation is reduced for Rajasthan. He opined that it is necessary to strike a balance between ecology of the river needs of the people in terms of drinking water and irrigation. So he urged thatany decision on upward revision of E-Flow be taken at the highest level as per NWDT Award.

Govt. of Gujarat

Shri Keshvani, CGM (T&C), SSNNL stated that CIFRI has given detailed presentation and the views expressed by Expert Members from IIT Roorkee, CWC and NMCG are very pertinent to the point and enlightening. He stated that it is the effect of that intervention from the distinguished experts and fellow States of GoMP, GoM & GoR that each State, in principle, agreed to release the E-Flow. But the decision is to be taken for quantum of water to be released and as to how the same is going to be implemented, taking into consideration water share of the party States.

CGM (T&C) mentioned that the detailed study presented by CIFRI lacks relevant cross section data. If the cross sections are made available then the value might change. Director, CWC has suggested the value of Q90, which is quite different from the value suggested by CIFRI. For further study, the data will be made available to CIFRI. So having taken the first step to decide in

principle that the E-Flow is required, as a second step, the Committee can frame out which studies are required and if time permits, ToR of the studies also can be decided. To begin with based on Hon'ble NGT direction considering the percentage of the seasonal flow using the virgin flow the value so arrived can be considered as E-Flow till the studies are completed.

Shri G. Ramana Murthy, APCCF stated that the direction of Hon'ble NGT is a legal binding. It has directed for 15 to 20% of E-Flow to be maintained not only for the present projects but for the past projects also. Therefore, at any point of time these things are to be taken into consideration. E-Flow is a part of EIA now, as mandated by MoEF&CC. It is not a direction but it is a norm that during monsoon 30%, post monsoon 25 to 30% and in lean period 20% of flow should be maintained in the river. Probably in future, the norms may be adhered to. In this respect, the Committee is supposed to address these issues.

He further stated that the ESG meeting suggested for inter-State multi-disciplinary Committee with so many authorities just to decide whether that 1500 cusecs is sufficient. Probably, the proposal is under progress. The Chairman, CWC has also said that E-Flow is required to study with reference to the erstwhile river as a whole.

When the study was going on, GoG has taken out the data tentatively from the year 1945 to 2020 almost for 75 years. The statement says for E-Flow, 90% dependable year should be considered. Considering 90% dependable year, E-Flow has been worked out by GoG and arrived to 1500 cusecs which is about 20% of the lean period as recommended by Hon'ble NGT. These values are more or less matching with the value of CIFRI.

He further stated that the annual demand for one year considering 1500 cusecs i.e. 20% of the e-flow arrived to about 1.095 MAF which are more or less matching with the report of CIFRI of about 1.03 MAF. Based on the present E-Flow of 600 cusecs, the annual requirement is 0.438 MAF. However, this needs approval from the higher authority of GoG for consideration.

But, the interim demand of 1500 cusecs of GoG may be considered by the party States for the time being in reference to the recommendation of Hon'ble NGT and MoEF&CC, GoI.

He further stated that there are two aspects; one is Mahseer (*Tor tor),* the key indicator which dictates the riverine system in the d/s. According to IUCN red list, Mahseer is an endangered species, which needs to be conserved. The second one is mangroves in the estuarine area/mouth of the river, which are under the threat and needs to be conserved by providing fresh water. Salinity is increasing near the estuary area which threatens the mangrove species. To protect these mangrove species, fresh water is to be released/maintained d/s of SSD.

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

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.

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Annex - I

LIST OF OFFICERS ATTENDED THE 1ST MEETING OF E-FLOW COMMITTEE HELD ON 21ST SEPTEMBER, 2023 AT SAYAJI HOTEL, INDORE

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 R. Vasudevan, Director (Civil)
5. Shri Hemant Pandey, S.E. (EMC)
6. Shri Ranvir R Dumne, Principal Private Secretary
7. Shri Deepak Malviya, Asstt. Director (Civil)
8. Dr. Nihal Gujre, Project Coordinator
9. Shri Anil R. Wase, Private Secretary
10. Ms. Anjali Singh, J.R.F.
11. Shri Sudesh Pal, U.D.C.
12. Shri Bahadur Singh Bisht, U.D.C.

NATIONAL MISSION FOR CLEAN GANGA (NMCG), DELHI

13. Shri D. P. Mathuria, Executive Director (Technical)
14. Shri Sandeep Behera, Consultant (Biodiversity)

CENTRAL WATER COMMISSION (CWC), DELHI

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

CIFRI, BARRACKPORE

16. Dr B. K. Das, Director
17. Dr Amiya K Sahoo, Senior Scientist

IIT, ROORKEE

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

GOVT. OF MADHYA PRADESH

19. Shri Vinod Kumar Dewada, Member (Power), NVDA
20. Shri Vikram Singh Solanki, Dy. Forest Officer, NVDA

GOVT. OF GUJARAT

21. Shri G. Ramana Murthy, APCCF, SSNNL
22. Shri K. A. Keshvani, CGM (T&C), SSNNL
23. Shri M. K. Chaudhary, Dy. Director (Fisheries), SSNNL
24. Shri M. G. Patel, Dy. Executive Engineer (Dam & Power House), Vadodara
25. Shri H. B. Dave, Dy. Executive Engineer (Dam & Power House), Vadodara

GOVT. OF MAHARASHTRA

26. Shri S. D. Khairnar, Executive Engineer, Narmada Development Division, Nandurbar
27. Shri G. R. Patil, Sectional Engineer, Narmada Development Division, Nandurbar
28. Shri Ravindra B. Wayada, Jt. Commissioner (Inland), Nashik Division, Nashik
29. Shri S.P. Wategaonkar, Regional Dy. Commissioner Fisheries, Nashik Division, Nashik
30. Shri Kiran Padvi, Asstt. Commissioner (Fisheries), Nandurbar

GOVT. OF RAJASTHAN

31. Shri Amar Singh, Chief Engineer, WRD, Jodhpur

Comments on NCA Eflows Proceedings

887

Inbox

Amiya Sahoo 15:25

to me

Dear Madam,

Pls see our comments in the attached file.

Additional comments in the recommendation may kindly be included

1. Artificial breeding and larval rearing of hilsa need to be initiated for the river ranching programme in river Narmada below SSD. This will not only help to rejuvenate hilsa fisheries but also improve the livilihood of fishermen.

2. Integrated Watershed Management Plan needs to be considered with considering E-flows, Biodiversity and Fisheries between these selected stretches on the pilot mode.

Kind regards,

Sahoo

--

DR. AMIYA KUMAR SAHOO, *MFSc, PhD*
ARS-Senior Scientist
ICAR-Central Inland Fisheries Research Institute
Barrackpore, Kolkata, West Bengal 700 120,India

ANNEX-III

Narmada Valley Development Authority

59, Narmada Bhawan, Arera Hills, Bhopal

pl - discuss

Letter No./Env.& Forest/2023/48-B/31 **Bhopal, Date 13 /01/2023**

To,

Member (Environment & Rehabilitation)
Narmada Control Authority, Indore
Govt. of India.

DD(C) 16/1/2023

Sub :- Down Stream Environmental flow in River Narmada from SSD.

Ref :- Your letter No. Env. 2019/461 Date 11/11/2022.

With reference to above mentioned letter observations and suggestions on CIFRI recommendation about e-flow were solicited. These are as follow :-

Objective mentioned in CIFRI report is "To maintain the environmental flow in the downstream of SSD at Garudeshwar for sustainable fisheries in River Narmada"

This is mainly related to fishing activity rather than holistic view of maintaining river ecology. In report e-flow assessment is based on only spp. Mahseer juvenile (Tor tor) breeding and migration pattern. Study area is mainly a small stretch between Kewadia and Garudeshwar (11 Km. Stretch).

Other aspects of e-flow study that is flora, fauna of river eco-system are not clearly specified in report. Water demand for cultivation in lower & upper riparian has increased many folds after commissioning of SSD. This may lead to many unauthorised structures for Irrigation/Nistar thus influencing e-flow. This needs to be incorporated in study. This study does not include any river portion in State of Madhya Pradesh and no views/opinion of State has been included.

Study should include major criteria indicators for assessing e-flow for a river system. These include study of river hydrology, morphology, ecology, livelihoods needs and socio-cultural aspects of people residing there in.

Main criteria and environmental indicators which can be used to assess health of downstream river ecosystem should include following main points:-

- Natural Vegetation inriver bed, Pre & Post dam construction.
- Presence of rare and endemic spp sensitive to flow changes in basin area.
- Presence of exotic spp.
- Overall aquatic spp. richness.
- Human population pressure.
- Water quality in basin area.

Inclusion of these parameter in e-flow study will be holistic approach.

As per earlier decision in ESG meeting (2008), 600 cusec (0.438 MAF) of water is being released as e-flow.NWDT Award(1979) is silent on E-flow, however NWDT award is due for review next year(2024). This matter than can be referred to tribunal.

I would request you to write to CIFRI on deliberating on e-flow issues and give a detail presentation on report submitted.

13/1/23

(Ajay Kumar Yadav)
Member (Environment & Forest)
Narmada Valley Development Authority

नर्मदा नियंत्रण प्राधिकरण

(जल शक्ति मंत्रालय, जल संसाधन, नदी विकास एवं गंगा संरक्षण विभाग, भारत सरकार)

NARMADA CONTROL AUTHORITY

(Ministry of Jal Shakti, Department of Water Resources, RD & GR, Govt. of India)

नर्मदा सदन, सेक्टर-बी, स्कीम नं., 74-सी, विजय नगर, इन्दौर (म.प्र.)

Narmada Sadan, Sector-B, Scheme No. 74-C, Vijay Nagar, Indore - 452 010 (M.P.), INDIA

आज़ादी का अमृत महोत्सव

No. NCA/Env/2019/ 1461

By Speed Post/E-mail
November 11, 2022

To

Shri B Venugopal Reddy,
Principal Secretary,
Revenue and Forests Department,
Government of Maharashtra,
Mantralaya,
Mumbai – 400 032 (Maharashtra)
(E-mail : sec.forest@maharashtra.gov.in)

Shri Ajay Kumar Yadav,
Member (Environment & Forests),
NVDA, Govt. of Madhya Pradesh,
59, Narmada Bhawan,
Arera Hills, Jail Road,
Bhopal - 462003 (M.P)
(Email : memforest_nvda@mp.nic.in
memberforestnvda@gmail.com)

Shri Shikhar Agrawal,
Principal Secretary,
Water Resources Department,
Government of Rajasthan,
Room No. 4404, 2nd floor,
Main Building, Secretariat,
Jaipur – 302 005 (Rajasthan)
(Email : pswardraj@rajasthan.gov.in)

Shri C.V.Nadpara,
Director (Canal),
SSNNL, Govt. of Gujarat,
1st floor, Block No. 12,
New Sachivalaya Complex,
Gandhinagar – 382010 (Gujarat)
(Email : pa2direcanal@gmail.com)

SUB : Downstream Environmental flow in river Narmada from SSD- reg.

Sir,

As you are aware, although NWDT Award is silent about mandatory downstream environmental flow (e-flow), the matter was deliberated during the 45th Environment Sub-Group (ESG) Meeting in 2008, wherein it was decided to release 600 cusecs (0.438 MAF yearly) as e-flow. However, a petition has been filed against the Ministry of Environment, Forests and Climate Change, NCA, Ministry of Water Resources, River Development and Ganga Rejuvenation, SSNNL, Gujarat State Pollution Control Board and others regarding inadequate e-flow with a request to increase it to 1500 cusecs. The matter is now pending in the Hon'ble Supreme Court. The tentative date listed for hearing in the Hon'ble Supreme Court is 28th November 2022.

Government of Gujarat, in compliance of the decision of ESG of NCA taken in the 49th and 50th Meetings, held on 31st August, 2016 and 1st May, 2017 respectively, had entrusted the study for computation of e-flow to the Central Inland Fisheries Research Institute (CIFRI), Barrackpore, West Bengal. During the 51st ESG Meeting, held in Delhi on 21st August, 2019, it was decided that the matter on e-flow shall be considered holistically in front of all the stakeholders concerned after the receipt of CIFRI's report. Copy of Minutes of Meeting of 51st ESG is enclosed as **Annex-I.** CIFRI has submitted its report and recommended quantum of e-flow for Pre-monsoon, Monsoon and Post-Monsoon seasons. Copy of CIFRI's report is enclosed as **Annex-II**. Further, vide letter dated 26th September, 2022, (copy enclosed as **Annex-III**), SSNNL has requested that the e-flow be enhanced to 1500 cusecs till a detailed exercise is undertaken to review the quantum of e-flow and arrive at a more realistic value.

Contd…p/2.

Your valuable observations and suggestions on CIFRI's recommendations and SSNNL's request are solicited at the earliest.

Thanking you,

Yours faithfully,

Encl : As above.

(Devjani Patra) 11/11/22
Member (Environment & Rehabilitation)
Mobile No. 8527484480
Email : mem.er.nca@nic.in

Copy for favour of kind information to :

1. Secretary to the Govt. of India and Chairman, NCA, Ministry of Jal Shakti, Deptt. of Water Resources, River Development & Ganga Rejuvenation, Shram Shakti Bhawan, Rafi Marg, **New Delhi** (Email: secy-mowr@nic.in).
2. Secretary to the Govt. of India, Ministry of Environment, Forests and Climate Change, Indira Paryavaran Bhawan, Jor Bagh Road, **New Delhi – 110003.** (Email : secy-moef@nic.in)
3. Vice Chairman, Narmada Valley Development Authority, Government of Madhya Pradesh, 59, Narmada Bhawan, Arera Hills, Jail Road, **Bhopal - 462003** (M.P). (Email : vcnvda@mp.gov.in)
4. The Managing Director, Sardar Sarovar Narmada Nigam Limited, Govt. of Gujarat, 1st floor, Block No. 12, New Sachivalaya Complex, **Gandhinagar – 382010** (Gujarat). (Email : mdssnnl2009@gmail.com)
5. Principal Secretary, Department of Environment and Climate Change, Government of Maharashtra, 217 Annex, Opp. Mantralaya, 2nd Floor, **Mumbai – 400 032** (Maharashtra) (E-mail : psec.env@maharashtra.gov.in)
6. Executive Member, NCA, **Indore**.
7. Shri Shreefal Meena, Additional Chief Engineer, Narmada Canal Project, **Sanchore – 343 041**, District: Jalore, Rajasthan (Email : cencpscr@rediffmail.com / cenarmada.wr@rajasthan.gov.in)

Narmada Valley Development Authority
Narmada Bhawan, 50, Arera Hills Bhopal, (M.P.)
E-mail : memenggnvda@gmail.com. Phone : Office : 0755-2677509, Fax : 0755 – 2677508

ANNEX-IV

891

No.1035 /M (E)NVDA/EE-6/2023, / 1555 Bhopal, Dated 27/ 10/2023

To,

Member (Environment & Rehabilitation),
Narmada Control Authority, Indore.

Sub:- Minutes of the first meeting of Committee to review the environmental flow of river Narmada in the downstream of Sardar Sarovar Dam.

Ref:- Your memo no. NCA/Env/2019/428 dated 18.10.2023

-0-

With reference to above, kindly revise the minutes of meeting as per following comments of GoMP.

S.No.	Draft minutes of meeting	Comments of M.P.
	Shri Vinod Kumar Dewada, Member (Power), NVDA intimated that at present 600 cusecs of water is being released as E-Flow downstream to SSD through Godbole gate as approved earlier in the NCA meeting with the consensus of the beneficiary States. GOMP does not have any issue if E-Flow is enhanced from 600 cusecs to 1500 cusecs if studies say so and agreed by the expert members as per the guidelines of Hon'ble NGT. But, at the same time, it should be discussed and approved in the appropriate platform/level as followed earlier so that all Party States can take an informed decision and come to a consensus. He further stated that there is a review of NWDT Award in 2024. Member (E&R) enquired if it is acceptable to GoMP and other Party States to award this re-assessment of E-flow Study to CIFRI, Barrackpore. Member (Power), NVDA informed that GoMP has no objection in this regard. Member (E&R), at this point, also clarified that this re-assessment of three season E-Flow, although would be carried out by CIFRI, after obtaining requisite technical inputs and logistical support from SSNNL, but the same would be done in a participatory and transparent manner. 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.	It was specifically described in the beginning of meeting that stand of GoMP was recorded in the minutes of 94th meeting of NCA held on 08 may 2023 at New Delhi as follows:- 1. As per earlier decision, 600 cusecs of water is being released for E-Flow. 2. NDWT award is due for review in the year 2024 & this matter can be referred to the Tribunal. 3. Views or opinion of GoMP has not been sought /included in the study. It was opined in the meeting that still there is no change in stand of GoMP. It was also said that the matter of E- flow of SSP is out of territorial boundary of Madhya Pradesh, for which Govt of MP is not willing to share any extra realease of water. During meeting GoMP representative specifically mentioned that the MP's stand has already been communicated in the NCA meeting dated 8 may 2023. It is also pertinent to note that Shri Sanjay Khairnar, Executive Engineer, Narmada Development Division (NDD), Nandurbar, GoM has also quoted the GoMP stand in his letter dated 22.09.2023 addressed to Chief Engineer, Tapi Pat Bandhare vikas maha mandal, Jalgaon that "similar to GoMP's stand E-Flow should be continued as decides earlier 600 cusecs." (copy enclosed)

The deviation from GoMP's stand in the draft minutes are unacceptable.

Encl- As above.

27.10.23
(Pramod Kumar Sharma)
Member (Engineering)

30/10/23

PS/JRF: Avail.

Bhadwa Singh. Kindly file it.

30.10.23

धुळे पाटबंधारे प्रकल्प मंडळ, धुळे.
सिंचन भवन, साक्री रोड, धुळे - ४२४००१

Email - nipcdhl@gmail.com
Email - sedipc.dhulewrd@maharashtra.gov.in
फॅक्स नंबर -: ०२५६२-२७६६६३
दुरध्वनी नंबर -: ०२५६२-२७६६५९

आवक क.	205
दिनाक	26/09/23
शाखा	प्रशा

जा.क्र.धुपाप्रमंधु/प्रशा-४/ ४२१८० /सन २०२३ दिनांक -: 22/९/२०२३

मा.मुख्य अभियंता,
सापी पाटबंधारे विकास महामंडळ,
जळगांव

विषय:- The first meeting of the Committee to review environmental flow of river Narmada in the downstream of Sardar Sarovar Dam-reg..

संदर्भ:- १)नर्मदा नियंत्रण प्राधिकरणाचे पत्र क्र.NCA/Env/२०१९/३५५, दि.१८/०८/२०२३
२)कार्यकारी अभियंता, नर्मदा विकास विभाग, नंदुरबार यांचे पत्र जा.क्र.नविवि/प्रशा-१/ १७७३, दि.२२/०९/२०२३

विषयांकीत प्रकरणी संदर्भीय पत्र क्र.१ अन्वये सादर करण्यात येते की, दि.२१/०९/२०२३ रोजी इंदोर येथे E-flow बाबत पहिली बैठक मा. कार्यकारी सदस्य, नर्मदा नियंत्रण प्राधिकरण, इंदोर (Executive Member of NCA) यांच्या अध्यक्षतेखाली संपन्न झाली.

सदर बैठकीस महाराष्ट्र शासनाचे प्रतिनिधी म्हणुन जलसंपदा विभागातर्फे कार्यकारी अभियंता, नर्मदा विकास विभाग, नंदुरबार आणि मत्स्यव्यवसाय विभागातर्फे सहआयुक्त, मुंबई, उपायुक्त नाशिक व सहाय्यक आयुक्त नंदुरबार उपस्थित होते.

सदर बैठकीत चर्चेच्या वेळी सरदार सरोवर धरणाच्या खालच्या बाजुस E-flow साठी धरणातुन सुरू असलेल्या ६०० घनफुट प्रतीसेकंद विसर्ग सोडण्यात येत असुन, त्यामध्ये वाढ करुन ६०० घनफुट प्रतीसेकंद ऐवजी १५०० घनफुट प्रतीसेकंद विसर्ग सोडण्याची मागणी गुजरात शासनाचे प्रतिनिधींनी केली. तथापि विसर्गामध्ये वाढ न करता सद्या सुरू असलेल्या ६०० घनफुट प्रतीसेकंद एवढा विसर्ग सोडणेबाबत मध्यप्रदेश शासनाचे उपस्थीत प्रतिनिधी व कार्यकारी अभियंता, नर्मदा विकास विभाग, नंदुरबार यांनी सहमती दर्शविली. त्या अनुषंगाने E-flow साठी विसर्ग वाढविणेबाबत सविस्तर चर्चा झाल्यानंतर सखोल अभ्यास करुन सुधारीत अहवाल CIFRI (Central Inland Fisheries Research Institute) यांचे मार्फत तयार करण्याचे सर्वानुमते ठरविण्यात आले. तसेच सुधारीत अहवाल CIFRI यांनी ६ महिन्यांच्या आत तयार करुन समितीपुढे सादर करावा, असे ठरले. तदनंतर सदर सुधारीत अहवाल पुढील योग्य तो निर्णय होणेसाठी नर्मदा नियंत्रण प्राधिकरणाकडे समिती मार्फत सादर करण्यात येईल, असे मा. चेअरमन यांनी चर्चेदरम्यान सांगितले.

हे आपल्या माहिती व पुढील कार्यावाहीसाठी सविनय सादर

(प्र.गो. पाटील)
उप अधीक्षक अभियंता,
धुळे पाटबंधारे प्रकल्प मंडळ,
धुळे.

स्थळ प्रतीवर मा.अ.अ.यांची सही असे.

प्रत:- कार्यकारी अभियंता, नर्मदा विकास विभाग, नंदुरबार यांना माहिती व पुढील कार्यवाहीसाठी.

ANNEX-V

सत्यमेव जयते
Government of Maharashtra Water Resource Department

स्वातंत्र्याचा अमृत महोत्सव

Execuive Engineer,
Narmada Developlment Division,
Nandurbar. 425412.
Teli./Fax No. 02564-222291
email id :-ee_narmada@yahoo.co.in

No./NDDN/PB-1/2030/2023 **Date :- 27/10/2023**

To,

Member (Enviroment & Rehabilitatiion),
Narmada Control Authority,
Indore.

Subject :- Minutes of the first meeting of Committee to review the environmental flow of river Narmada in the downstream of Sardar Sarovar Dam. -reg.

Reference:- Narmada Control Authoritie's Letter No.NCA/EnV/2019/428 Date:- 18/10/2023.

R/ Mam,

With reference to letter and subject cited above, kindly revise the minutes of meeting as following:-

Draft minutes of Meeting	**Alteration/ Corrections**
Page No. 13:- Views of the Party States. Government of Maharashtra Shri Sanjay Khairnar, Executive Engineer, Narmada Development Division (NDD), Nandurbar, GoM endorsed the views of GoMP.	Shri Sanjay Khairnar, Executive Engineer, Narmada Development Division (NDD), Nandurbar GoM endorsed the views of GoMP. However, (1) GoM's stand E-flow should be continued as decides earlier 600 cusecs. (2) NWDT Award is due for review in the year 2024. Hence, GoM will obey the final decision and order of Tribunal, regarding the issue of increase in E-flow downstream to SSD.

This is for kind information and further needful please.

(S.D.Khairnar)
Executive Engineer
Narmada development Division
Nandurbar

Copy:- Respectfully Submitted to Superintendent Engineer, Dhule Irrigation Project Circle, Dhule for information please.

DA : copy of reference letter.

Bhadhur Singh Kindly file it.
निशांत - 30.10.23.

New D/ Waghl to Mem (Env Reh) 27 10 2023

OFFICE OF THE CHIEF ENGINEER WATER RESOURCES ZONE JODHPUR
LALSAGAR, KISHOR BAGH, JODHPUR-342007
Telephone 0291-2570681

NO. 18578 Date: 27/10/2023

Executive Member
Narmada Canal Authority
Indore(M.P.)

Subject:- Draft minutes of meeting.

Kindly find enclosed here with the comment on draft minutes of meeting of committee to review the environment flow of River Narmada in the downstream of Sardar Sarovar Dam(SSD) held on 21st September 2023 at Indore.

Enclosed As above

27-10-2023

(Amar Singh)
Chief Engineer
Water Resources Zone
Jodhpur

Govt. Of Rajasthan

While endorsing the views of GoR, Shri Amar Singh, CE, WRD stated that at present 600 cusecs of water is being released as E-Flow from SSD to the downstream. He was concerned if there is an increase in downstream E-Flow, how the share of Govt of Rajasthan is going to be impacted because they have only 0.50 MAF water allocated to them under NWDT Award. Rajasthan being an arid state, the economy of the two districts namely; Barmer and Jalore is totally dependent on this 0.50 MAF of Narmada water. He also stated that E-Flow in the river is must to protect the ecology of the river. Once the dam is constructed across the river, the downstream of the river become dry, unless the water is released from the dam to safeguard the ecology, conservation of fisheries and livelihood of the people living in the downstream. Further, the ground water level also goes down and the farmer doing agriculture and allied activities in the downstream are also facing lot of issues, if the water is not released throughout the year season wise.

He also informed that according to the Water Policy 2010 of GoR, The environmental impact of substantive Major and Medium reservoir projects upon downstream users will be a primary consideration at the planning stage. When the dam was constructed across the river Narmada, based on the development of command area, water has been allocated to the beneficiary State, but E-Flow was not considered at that time.

He further stated that water is supplied for irrigation through canal(flow system). GoR is gradually shifting from flow irrigation to sprinkler irrigation through which some quantum of water can be saved. Further, evaporation losses can be reduced to some extent by installing solar panel in the watershed area. Thus, quantum of water so saved by adopting sprinkler irrigation and by reducing evaporation losses can be utilized for E-flow.

He also suggested that in future, if any dam is constructed there should be a separate provision for seasonal E-Flow. After considering the E-Flow, the remaining water available for utilization can be used for drinking, command area (irrigation), and for other purpose.

At this stage, if the E-Flow is enhanced d/s to Sardar Sarovar dam, might become a political issue and there will be an agitation from the farmer, if the quantum of water to be released for irrigation is reduced for Rajasthan. He opined that is necessary to strike a balance between ecology of the river needs of the people in terms of drinking water and irrigation. So he urged that any decision on upward revision of E-Flow be taken at the highest level as per NWDT Award.

मुख्य अभियन्ता
जल संसाधन संभाग, जोधपुर

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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

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 (SSNNL), 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

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,

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.

******

Annex - I

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 Solanki, 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 Kanungo, 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

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नर्मदा नियंत्रण प्राधिकरण
NARMADA CONTROL AUTHORITY

सरदार सरोवर परियोजना (एस.एस.पी.) पर नर्मदा नदी के डाउनस्ट्रीम ई–फ्लो पर समिति की तीसरी बैठक का कार्यवृत
दिनांकः 19 मार्च, 2024 ऑनलाइन के माध्यम से।

MINUTES OF 3rd MEETING OF COMMITTEE TO REVIEW THE ENVIRONMENTAL FLOW OF RIVER NARMADA IN THE DOWNSTREAM OF SARDAR SAROVAR PROJECT (SSP) HELD ON 19TH MARCH, 2024 THROUGH VIRTUAL PLATFORM

इन्दौर
अप्रैल, 2024

INDORE
April, 2024

INDEX

ANNEXURE

MINUTES OF THE 3rd MEETING OF THE COMMITTEE TO REVIEW THE ENVIRONMENTAL FLOW OF RIVER NARMADA DOWNSTREAM OF SARDAR SAROVAR PROJECT (SSP), HELD ON 19 TH MARCH, 2024 AT 11.00 HRS THROUGH VIRTUAL PLATFORM

Introduction

The 3rd Meeting of the Committee, to review the Environmental Flow (E-Flow) of river Narmada downstream (d/s) of SSP, was held on 19th March, 2024 through virtual platform, under the Chairmanship of Shri Ashok Kumar Thakur, Executive Member, NCA. The focus of the meeting was to finalize the Scope of work/Terms of Reference (ToR) of CIFRI, with respect to the re-assessment study of E-Flow in order to protect the downstream riverine environment of river Narmada and Award of study to CIFRI through SSNNL, GoG. 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-flow to be carried out by GoG through CIFRI, by considering various parameters while in the 2nd Meeting it was decided that CIFRI would prepare Scope of work/ToR, along with names of partner institutions and financial implications for the re-assessment study of E-flow and submit to NCA.

He further stated that the Scope of work/ ToR received from CIFRI was circulated to the Committee Members **(Annex-II)** to obtain the technical views/comments till 07.03.2024. Technical views/ comments received from GoM **(Annex-III)**, GoG **(Annex-IV)**, GoMP **(Annex-V)** & GoR **(Annex-VI)** vide letters dated 15.02.2024, 04.03.2024, 06.03.2024, 14.03.2024 and 18.03.2024 respectively were circulated among Committee Members.

Further, EM, NCA and Chairman of the Committee reiterated that as per the decision taken during the 94th NCA meeting, and consecutive meetings of the E-flow, the present forum is solely responsible for the process of award of the study to CIFRI and recommending the E-flow quantum. Decision w.r.t. sharing of this revised E-flow Quantum shall be taken at higher level,i.e., in NCA / RCNCA Meetings with the consensus of all the party States.

Chairman of the Committee further stated that the Counsel of NCA, who is defending on behalf of NCA &MoJS, DoWR, RD &GR has conveyed that the Judges of Hon'ble Supreme Court expressed their displeasure against the function of NCA, because the Quantum of E-flow is yet to be decided.

Executive Member, NCA and Chairman of the Committee then requested Member (E&R), NCA to take up the agenda for further deliberation.

Member (E&R), NCA, before taking up the Agenda items for deliberation, clarified to the States that this E-flow Committee is constituted only to assess the quantum of E-Flow and submit its recommendations to the Authority. The study is only to re-assess the quantum of E-Flow to be released from the d/s of SSP/ Garudeshwar Weir. The decision for releasing of E-Flow quantum and water sharing will be taken in the appropriate level, may be in the NCA or RCNCA or during the review of the Award. Arbitrarily, NCA cannot allocate any water without the same getting addressed in the appropriate forum and getting proper consensus from the party States.

Member (E&R), NCA then requested Dr. B.K. Das, Director, CIFRI to share the presentation on the Scope of work/ToR of CIFRI, with respect to the proposal on "*Assessment of Environmental flows towards river habitat and ecological requirement with a focus on downstream fish species of SSD in Narmada River*" and their response to the technical comments/views received from the Committee.

Central Inland Fisheries Research Institute(CIFRI)

Dr. B.K. Das, Director

Dr. B.K. Das before giving his presentation clarified that CIFRI is a scientific and Government organization and the proposed Scope of work for E-flow assessment is based on the ICAR guidelines on Contract/ Consultancy Project. Further, Dr. Das presented the proposal of Scope of work/ToR and the Budget estimate **(Annex-II)** with proposed objectives, study area, methodology, timeline and highlighted the suggestions provided by the party States in details.

He intimated that the proposed study has 3 objectives, which are as follows:-

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

Briefing on the proposed study area, Dr. Das intimated that study will be carried out between Garudeshwar weir to Bhadbhut Barrage which is about 125 km freshwater zone having 9 stations, *viz.*Garudeshwar, Poicha, Sisodara, Jhanor, Bharuch, Sakkarpura, Bhadbhut, one site between Sisodara & Jhanor and one site between Jhanor & Bharuch, to study on different hydro-biological parameters representing different seasons.

With respect to the proposed Methodology, Director, CIFRI intimated that the field data will be collected by performing field visits, assessment w.r.t. habitat, depth, velocity and discharge will be carried out from boat both manually as well as employing Acoustic Doppler Current Profiler (ADCP). Further, there will be an Experimental fishing, biotic and abiotic sample collection as per the standard operating protocol. The proposed methodology comprehensively includes study of Fish species diversity, migratory species and their reproduction cycle, preparing Habitat preference rating curve for identified fish species, Seasonal dynamics of hydrological and ecological parameters, collection of time series hydrological data and its interpretations.

Moreover, the proposed study also involves survey on the major tributaries of Narmada below SSD and its hydrological contribution, Assessment of Fish based habitat using Hydraulic rating cum habitat simulation method (HECRAS), Assessment through Mike 11 hydrological model with fish habitat requirement, integrating fish habitat-based models for E-flow estimation.

Further, Dr. Das gave point wise reply to the observation of the party States:-

Sl. No.	Comments from States	Replies of CIFRI
1.	**Govt. of Rajasthan (Annex-VI)** This office is unable to agree suggestions on (CIFRI)'s recommendation regarding mandatory d/s environmental flow (E-flow) in river Narmada from SSD Because share of Rajasthan state will be reduced up to 20%.	• The comments are not related with the proposed study on "Assessment of environmental flows towards river habitat and ecological requirement with a focus on downstream fish species of SSD in Narmada River"
2.	**Govt. of Madhya Pradesh (Annex-V)** अतः उपरोक्तानुसार **CIFRI** द्वारा प्रेषित उक्त **Draft Project Proposal** पर मध्यप्रदेश राज्य से अभिमत आवश्यक प्रतीत नहीं होता है। इस संबंध में गुजरात राज्य द्वारा निर्णय लिया जाना उचित होगा।	• Matters doesn't pertain to the Scope of Work
3.	**Govt. of Maharashtra (Annex-III)** 1. GoM agrees with cost only. If the rates quoted in item no.6.0 A (1 to 6) are on the basis of current schedule of rates of GoI. Otherwise market rate are assumed in Project Proposal, then it will be appropriate to call for quotations and fix the rates at competent level. 2. According to the opinion of GoM, the Equipments mentioned in item no.6.0 B, should be hired on rental basis as per requirement. 3. According to the opinion of GoM, the overhead cost should be reduced to 10% instead of 20 % on A+B	• Item no. 6.0 A (1-6) has been prepared as per the ICAR guidelines on Contract/ Consultancy Project • Equipment, such as, Biochemical Analyser is not available on rental basis as this is purely laboratory use only. Furthermore, the cost of hiring of Camera and Data Recorder will be almost same as the cost of the equipment. • As per the ICAR guidelines, the overhead cost has been fixed to 20 %.

Sl. No.	Comments from States	Replies of CIFRI
4.	**<u>Govt. of Gujarat</u> (Annex-IV)** 1. The draft ToR provided by CIFRI delineate the study area from the Garudeshwar weir to the Bhadbhut stretch in the Narmada River. Consequently, the d/s segment of the river under consideration for the study, extending from SSD to Bhadbhut Barrage, measures approximately137 km. In light of this, GoG has recognized the need for a more comprehensive assessment. It is imperative to encompass the entire d/s course of River Narmada from the SSD to its confluence with the Arabian Sea, totaling approximately 162 km. 2. The inclusion of the following parameters in the draft proposal is paramount to ensure a comprehensive assessment of the Narmada River ecosystem. I. E-Flow w.r.t. Salinity Mitigation II. Water Quality III. Ecological Balance IV. Mangrove Conservation V. Cultural Needs of People VI. Sustaining Aquatic Flora& Fauna including Fish more particularly w.r.t. a) Requirement for breeding and migration behavior of Hilsa Fish and b) Upstream movement of Mahaseer (*Tor tor*) during rainy season Additionally, focusing on sustaining aquatic flora &fauna, especially the breeding and migration behavior of key fish species like the Hilsa Fish and Mahaseer during critical season, further enhances the overall health and resilience of the Narmada River.	• As per the 1st and 2nd Meeting of the Committee held on 21st September, 2023 & 17th January, 2024, it was discussed and finalized that the d/s of SSD is extremely critical for E-Flows estimation as different agencies have estimated different figures of discharge/release as well as by adopting different methodologies without considering the biodiversity and river habitat ecology. Therefore, the Committee agreed to estimate the E-Flows only for river ecology and Fisheries within the stipulated period of time (9 months). • Furthermore, it was also highlighted that GoG has planned and started developing the Bhadbhut Barrage which would be completed within a few years. Therefore, the river stretch above the Barrage needs to be estimated for protecting the Freshwater ecology, fisheries and biodiversity. The d/s of the Barrage will be entirely different ecosystem i.e. estuarine ecosystem. Water requirement for salinity mitigation and mangrove require a detailed investigation prior to the estimation of E-Flow. Therefore, the methodology will be significantly different from upstream study and would require a multi-disciplinary team with in depth study which is time consuming. • Therefore, combining the proposed study with this would not solve the objectives as discussed in the two Meetings. • As it has been explained, water requirement and habitat *Tor tor* and Hilsa are different. Studies to establish their breeding ground and migration required detailed investigations through different approaches.

Sl. No.	Comments from States	Replies of CIFRI
		Therefore, focus on the proposed study would serve the objectives of the main discussion that the Committee did in the meeting. However, social cultural and other requirement for estimation of E-Flow could be taken up separately towards sustainable Narmada ecosystem.

After detailed presentation of Director, CIFRI, Member (E&R), NCA requested the party States to give their comments/views on these issues.

Views of the party States

Govt. of Gujarat

Shri. Ramana Murthy, APCCF stated that views of GoG has already been submitted vide letter No. SSNNL/Env./review/e-flow/21 dated 04.03.2024. Further, Shri K. A. Keshvani, CGM (T&C), SSNNL stated that sometimes back GoG has requested to carry out the study from d/s of SSP to Gulf of Cambay. Again he requested the Committee to carry out the study up to Gulf of Cambay instead of up to Bhadbhut Barrage.

Govt. of Madhya Pradesh

Shri. John Kingsely, Director (Reh.), NVDA intimated that the length of the River Narmada is 1312 km before draining in to Gulf of Cambay. In the first 1,077 km reach, the river flows in Madhya Pradesh, the next 35 km stretch of river forms the boundary between the States of MP and Maharashtra and the next 39 km, it forms the boundary between Maharashtra and Gujarat. The last stretch of 161 km lies in Gujarat.

Proposal for carrying out the studies only in the part of Gujarat for about 161 km d/s of SSP before draining in to Gulf of Cambay will not serve the purpose. Hence, it is suggested that to safeguard the riverine ecology, the study should be carried out for the entire stretch of river Narmada so that the water required for every stage from Amarkantak till the draining in to Gulf of Cambay can be known instead of carrying out the studies for d/s of SSP.

On the other hand, if the concerned States wanted to carry out the studies in their territory, they can do the study without affecting the NWDT Award. If, NCA wanted to carry out the study, in that case, the study should be carried out for the entire Narmada Basin rather than carrying out only in Gujarat territory.

Govt. of Maharashtra

SE, Dhule Irrigation Project Circle (DIPC), Dhule, representative from GoM stated on the proposal submitted by CIFRI (Annex- VII) that if the E-flow is to be calculated and to be released for the whole stretch of Narmada basin, the views of GoMP is correct. However, if the study is to be carried out only for the d/s of SSP, then the final decision on this issues needs approval of higher/Competent Authority, GoM.

In this regard, Member (E&R), NCA again emphasized that the Committee is constituted only to assess the quantum of E-Flow with the help of Expert Members &Institution and submit the same to the Authority. The study is only to re-assess the quantum of E-Flow to be released from the d/s of SSP.

She then requested GoM to give technical views on the proposal submitted by CIFRI. SE, DIPC, Dhule, GoM agreed with the study of E-flow upto Bhadbhut Barrage only from Garudeshwar Weir and not for downstream of Bhadbhut Barrage. He also clearly stated that, for mitigation of d/s salinity, the required water should be used from Bhadbhut Barrage only and not from SSD.

Govt. of Rajasthan

Shri Shreepal Meena, SE, NCP, Sanchore welcomed the study for the e-flow up to Bhadbhut barrage but also indicated that Rajasthan being an arid State, the economy of the three districts Barmer, Jalore and Sanchore (earlier Sanchore was town and now became/declared as district) is totally dependent on this 0.5 MAF of Narmada water. So, he urged that any decision on upward revision should not affect the share of Rajasthan. Further he suggested that GoG may make a provision to store more water during the rainy season/filling period which can be utilized as E-flow rather than relying only from the share of utilizable flow.

After obtaining the views of party States, Member (E&R), NCA requested the Expert Members to give their comments/views on these issues.

<u>Views of Expert Members:</u>

I. Central Water Commission (CWC)

Shri N.N.Rai, Director (Hydrology)

Shri. N.N.Rai stated that for E-flow assessment for the ecological needs i.e., Fish diversity as decided in the 2nd Meeting of the E-flow Committee, the d/s of SSP up to Bhadbhut Barrage should be carried out instead of going for the whole basin which will take more time. But for the salinity mitigation, mangrove conservation and cultural needs of people the requirement of E-Flow will be entirely different. He further stated that the methodology for assessment of E-flow is still not standardized in the estuarine ecosystem; hence the extended

study area in accordance to GoG is not feasible at present moment. He further added that for assessment of the E-flow HECRAS method is a most appropriate method which can be employed in the present study.

II. IIT, Roorkee

Prof. Dr. Arun Kumar

Dr. Arun Kumar endorsed the views of Director (Hydrology), CWC. After going through the comments received from different States, he stated that E-flow in the river is a necessity which has not been calculated so far for Narmada Basin. Therefore, E- flow should be calculated for the entire Narmada basin.

Dr. Arun Kumar stated that the study be conducted till Bhadbhut Barrage in the first phase and may be extended later to the Sea in the second phase. He also urged to carry out the study as soon as possible because if the Hon'ble NGT issues an order, it might fix a higher quantum of E-flow which will surely affect the water sharing of all party States.

III. National Mission for Clean Ganga (NMCG)

Shri Anup Shrivastava, Executive Director (Technical)

Shri. Anup Shrivastava stated that there is a general agreement for carrying out the studies for the d/s of SSP up to the River draining in to the Gulf of Cambay. He suggested for carrying out the study in entire d/s from SSD till the confluence of river but in phased manner. In the first phase the study should be from Garudeshwar weir to Bhadbhut barrage and in the next phase from Bhadbhut barrage to till the confluence of river in to Gulf of Cambay i.e., the mouth of the River. The upstream study of E-Flow can be carried out from the beginning of river Narmada in another phase.

He further stated that in the present study HECRAS and Mike 11 hydrological Model have been proposed which are one dimensional study method. He suggested carrying out the proposed study employing the HECRAS method so as to avoid confusion with two sets of values.

After detailed discussion Executive Member, NCA and Chairman of the Committee thanked everyone for their views and deliberation on these important issues. Further, he stated that NCA is established for the purpose of securing compliance with and implementation of the decision and directions of the Narmada Water Dispute Tribunal Award. The Committee is taking up the reassessment work as per the decisions of 94th NCA meeting. Views of the NCA comprises of all the States and NCA takes any decision with the consensus of the party States. The proposed study will be carried out by the SSNNL, GoG through CIFRI as decided in the first and second Meeting of E-flow Committee for the d/s of SSP. He further stressed that by this time the study would have been awarded which is still pending.

Moreover, as per the direction of Hon'ble NGT, all States have to maintain a minimum E-Flow in their rivers to protect the riverine ecology and meet the societal needs. The intervening structures on river Narmada cannot be exempted from the regime of E-Flow. Therefore, it is the responsibility of every States 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.

Further, during the second meeting when Member (E&R), NCA, had enquired about the amount of water being released by GoMP in their territory from various dams, like, Bargi, Tawa, ISP, etc., Member(Power), NVDA intimated that these data are available with CWC, Bhopal and the same can be obtained from them.

Even though, if all the States agreed to carry out the study for the whole basin and the expert Members also suggest for the same, it is acceptable to the Committee. But at the same time, it is a lengthy process and to complete the study for the whole basin more time is required. But the present case is already in the Hon'ble NGT to release the downstream E-Flow from SSD. If the issue is not settled at the right time, as informed by the Expert Members, Hon'ble NGT may issue a direction to release the E-flow which may be on the higher side. Then, every States will have to follow the direction of Hon'ble NGT and accordingly each States has to release the water to safeguard the riverine ecology of the River Narmada.

Keeping in view, if all the States agree for reassessment of E-flow for the downstream of SSP, the same will be awarded to CIFRI .Else, if the studies are required for whole basin or till the sea, then the issue will be put up in NCA meeting and as per the directions of the Authority further action can be taken. He then requested the party States to give their final views on this issue for taking decision.

Member (E&R), NCA stated that as discussed in the earlier Meeting in the first phase the study would be given for the d/s of SSP. For the upstream of SSP, as decided in the first meeting GoMP will take up the study in their territory separately.

Further Member (E&R), NCA enquired from CIFRI that if the study is extended for another 25 km from Bhadbhut barrage to the mouth of the river whether the study period will increase, methodology will change and the estimate will increase.

In response to above, Dr. Amiya Sahoo, Senior Scientist, CIFRI stated that as per decision taken in first and second Meeting of the E-Flow Committee, the study area is restricted from Garudeshwar weir to Bhadbhut Barrage. The entire 20-25 km areas d/s to Barrage is an estuarine zone with wider mouth, which has different cross section and hydraulic parameters.

Dr. Amiya Sahoo emphasized that keeping in view the technical and scientific constraints, currently the study can be initiated up to Bhadbhut Barrage in the first phase.

Shri N.N. Rai, Director (Hydrology), CWC agreed with the views of Dr. Amiya Sahoo. He stated that the estuarine ecosystem is entirely different. Therefore, in the initial phase, the study may be considered up to Bhadbhut Barrage. As Bhadbhut barrage is under construction, study will be required up to the Barrage. At this stage the study area of estuarine ecosystem should not be considered along with fresh water ecosystem. Referring the issues being faced while computing the E-Flow for estuarine ecosystem of Mahanadi, Director, CWC suggested to go for the fresh water ecosystem i.e. up to Bhadbhut barrage.

Dr. Arun Kumar, Professor, IIT Roorkee also endorsed the views of Shri N.N. Rai, suggesting to get the proposed study done up to Bhadbhut Barrage initially and then from Bhadbhut Barrage to mouth of the river in the next phase.

Shri R.G. Kanungo, CE (Dam & Vadodara), SSP in reference to the Member (E&R)'s enquiry on the status on construction of Bhadbhut barrage stated that about 40% of works has been completed. Then Member (E&R) informed that since the construction of Bhadbhut barrage as already started in 2020 and going to be completed by 2026, the present E-flow study from Garudeshwar Weir be confined upto Bhadbhut barrage only, which is a practice in cascade projects.

Shri Ramana Murthy, APCCF, GoG intervened and stated that MD, SSNNL in the recent past convened an internal meeting along with the officers from Kalpasar Department, wherein it was decided that an integrated study should be carried out for the entire stretch d/s rather than up to Bhadbhut Barrage for comprehensive assessment to effectively mitigate salinity levels, address the cultural needs of people and to preserve mangrove habitats.

He further stated that in 2012, it was also decided that whatever the quantum of E- flow is released from SSP, the same quantum will be released from Bhadbhut Barrage up to mouth of the river. Therefore, the study should be considered for comprehensive assessment of E-Flow up to mouth of the river with reasonably compromising some of the study parameters.

During discussion Shri Ramana Murthy, APCCF, GoG enquired whether the E-flow is/not required for the d/s of Bhadbhut Barrage. And if required, the stretch below the Bhadbhut barrage can be considered for computing E-flow to some extent by compromising some parameters.

In view of the above, Member (E&R) NCA suggested that in first phase the study may be assigned to CIFRI up to Bhadbhut Barrage as CIFRI has already submitted the proposal for the first phase. In the second phase the extended area below the Bhadbhut may be considered. In this regard, Shri.Ramana Murthy, APCCF informed that approval of Competent Authority is required for assigning the work for the first phase, i.e., up to Bhadbhut Barrage.

SE, DIPC, Dhule, GoM had stated that opinion of other party States is also required for carrying out the studies as suggested by Member (E&R) as above. He further stated that as

informed by the Expert Members the area under consideration for E-flow study has two ecosystem, different catchment and hydrological parameters. The E- flow requirement below the Bhadbhut Barrage will be met out from the water stored in Bhadbhut Barrage.

Therefore, as suggested by Expert Members in the first phase the study can be considered from Garudeshwar weir to Bhadbhut barrage as proposed by CIFRI, the second phase from Bhadbhut till the Gulf of Cambay can be considered later as this would involve more complicated study, involving an array of parameters to address wide river mouth and its estuarine zone.

After the views and comments of the Members of the Committee, in order to converge on the issue, EM, NCA and Chairman of the Committee called for the final views from the party States. SE, DIPC, Dhule, GoM and GoR agreed to the proposal of the study up to Bhadbhut barrage only while GoG suggested to extend the study area up to mouth of the river. However, GoMP representative did not comment on this.

As there was no consensus among the party States, EM, NCA & Chairman of the Committee desired that the issues will be put up for the directions of the Authority in the next NCA Meeting.

Meeting ended with a vote of thanks to the Chair.

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ANNEXURE

Annex - I

LIST OF PARTCIPANTS OF THE 3rd MEETING OF E-FLOW COMMITTEE HELD ON 19TH MARCH, 2024 THROUGH VIRTUAL PLATFORM

NARMADA CONTROL AUTHORITY

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

NATIONAL MISSION FOR CLEAN GANGA (NMCG), DELHI

8. Shri Anup Shrivastava, Executive Director (Technical)

CENTRAL WATER COMMISSION (CWC), DELHI

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

CIFRI, BARRACKPORE

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

IIT, ROORKEE

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

GOVT. OF MADHYA PRADESH

13. Shri John Kingsley, Director (Reh.) NVDA
14. Shri Vikram Singh Solanki, Dy. Forest Officer, NVDA

GOVT. OF GUJARAT

15. Shri G. Ramana Murthy, APCCF, SSNNL
16. Shri K. A. Keshvani, CGM (T&C), SSNNL
17. Shri Kanungo, Chief Engineer, SSP
18. Shri R. J. Shah, Executive Engineer, SSNNL

GOVT. OF MAHARASHTRA

19. Shri S. S. Khandekar, Superintending Engineer, WRD
20. Shri Abhay Pimparkar, Director (Environment)
21. Shri S.P. Wategaonkar, Regional Dy. Commissioner Fisheries, Nashik Division, Nashik
22. Shri Sanjay Khairnar, Executive Engineer, NDD, Nandurbar
23. Shri Kiran Padvi, Asstt. Commissioner (Fisheries), Nandurbar

GOVT. OF RAJASTHAN

24. Shri Shreepal Meena,SE,WRD,Sanchore

Proposal on E-flow in the downstream of SSD/Garudeshwar Weir – reg

-13 & 14-

1 message

Anil R <ps-mem-nca@gov.in> Fri, Feb 9, 2024 at 4:58 PM
To: Executive Member NCA <exe.mem.nca@nic.in>, Dr T R Nayak <memc.nca@gov.in>, Member Env and Rehab NCA <mem.er.nca@nic.in>, Anup Kumar Srivastava <ed-technical@nmcg.nic.in>, SandeepBehera Consultant <sandeepbehera@nmcg.nic.in>, sandeepbehera1967 <sandeepbehera1967@gmail.com>, nitya20may <nitya20may@yahoo.co.in>, hydne <hydne@cwc.delhi.nic.in>, "Hydrology(S), CWC" <hydsouth@nic.in>, director cifri <director.cifri@icar.gov.in>, director cifri <director.cifri@gmail.com>, amiya7 <amiya7@gmail.com>, arun kumar <arun.kumar@hre.iitr.ac.in>, aheciitr ak <aheciitr.ak@gmail.com>, memengg <memengg@mp.nic.in>, memenggnvda <memenggnvda@gmail.com>, dfom21 <dfom21@gmail.com>, envirmentcell <envirmentcell@gmail.com>, gm coor ssnnl <gm.coor.ssnnl@gmail.com>, cgmtnc-ssnnl <cgmtnc-ssnnl@gujarat.gov.in>, s amar46 <s.amar46@gmail.com>, cejdr wr <cejdr.wr@rajasthan.gov.in>, cejdr wr <cejdr.wr@gmail.com>, ce wr <ce.wr@rajasthan.gov.in>, commfishmaha <commfishmaha@gmail.com>, dir.mev-mh@nic.in, sedipc dhulewrd <sedipc.dhulewrd@maharashtra.gov.in>, ee narmada <ee_narmada@yahoo.co.in>, rdcfnashik <rdcfnashik@gmail.com>, wategaonkar sanjay <wategaonkar.sanjay@yahoo.com>, acfnandurbar <acfnandurbar@gmail.com>
Cc: Debashree Mukherjee <secy-mowr@nic.in>, mdssnnl2009 <mdssnnl2009@gmail.com>, I C P Keshari <vcnvda@mp.gov.in>, sec forest <sec.forest@maharashtra.gov.in>, psec env <psec.env@maharashtra.gov.in>, osdwr2019 <osdwr2019@gmail.com>, Sagar Mehra <sagar.mehra@nic.in>

Respected Sir/Madam

Please find attached herewith a letter dated 9th February, 2024 from Member (E&R), NCA enclosing therewith the draft 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 CIFRI, vide its letter dated 8th February, 2024, for furnishing **technical** views/comments positively by **7th March, 2024** to NCA on the proposal.

--
With regards

PS to Member (E&R)
Narmada Control Authority
(MoJS, DoWR, RD & GR)
Narmada Sadan, BG Sector
Scheme No. 74 Vijay Nagar
Indore - 452 010, M.P.
Tel : 0731-2554333

2 attachments

NCA Env 2023 50 2024 02 09 letter from Member (E&R).pdf
389K

CIFRI Project E-flows NCA 08-02-2024.pdf
925K

नर्मदा नियंत्रण प्राधिकरण

(जल शक्ति मंत्रालय, जल संसाधन, नदी विकास एवं गंगा संरक्षण विभाग, भारत सरकार)

NARMADA CONTROL AUTHORITY

(Ministry of Jal Shakti, Department of Water Resources, RD & GR, Govt. of India)

नर्मदा सदन, सेक्टर-बी, स्कीम नं., 74-सी, विजय नगर, इन्दौर (म.प्र.)

Narmada Sadan, Sector-B, Scheme No. 74-C, Vijay Nagar, Indore - 452 010 (M.P.), INDIA

आज़ादी का अमृत महोत्सव

No. NCA/Env/2023/ 50

By Speed Post/Email

February 9, 2024

To,

All the concerned Officers,
(As per the list enclosed)

SUB : Proposal on E-flow in the downstream of SSD/Garudeshwar Weir – reg.

REF : This office letter No.NCA/Env/2023/23, dated 19th January, 2024.

Sir/ Ma'am,

In pursuance to the decisions taken in the second meeting of E-flow Committee, to review the environmental flow of river Narmada in the downstream of Sardar Sarovar Dam/Garudeshwar Weir, held on 17th January, 2024 through virtual platform, please find enclosed herewith the draft 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 CIFRI, vide its letter dated 8th February, 2024.

You are kindly requested to peruse the same and furnish your **technical** views/comments positively by **7th March, 2024** to NCA. A meeting in this regard is scheduled to be held on **15th March, 2024** to finalise the proposal for Award to CIFRI through SSNNL.

Thanking you,

Yours faithfully,

Encl: As above.

(Devjani Patra)
Member (Env. & Reh.)
Mob. No. 8527484480
Email : mem.er.nca@nic.in

Copy for kind information to:

1. Secretary to the Govt. of India and Chairman, NCA, Ministry of Jal Shakti, DoWR, RD & GR, Shram Shaka Bhawan, Rafi Marg, New Delhi (Email: secy-mowr@nic.in).
2. Managing Director, Sardar Sarovar Narmada Nigam Limited, Govt. of Gujarat, 1st Floor, Block No. 12, New Sachivalaya Complex, Gandhinagar - 382010, Gujarat (Email: mdssnnl2009@gmail.com).
3. Vice Chairman, Narmada Valley Development Authority, Govt. of Madhya Pradesh, Narmada Bhawan, 59, Arera Hills, Jail Road, Bhopal - 462003, (M.P.) (Email: vcnvda@mp.gov.in).
4. Principal Secretary, Revenue & Forest Department, Govt. of Maharashtra, Room No.103, Mantralaya, Madam Cama Marg, Hutatma Rajguru Chowk, Mumbai – 400 032 (Maharashtra) (Email : sec.forest@maharashtra.gov.in)
5. Principal Secretary, Department of Environment & Climate Change, Govt. of Maharashtra, 217 Annex, Opposite to Mantralaya, 2nd Floor, Mumbai-400032, Maharashtra. (Email: psec.env@maharashtra.gov.in)
6. Addl. Chief Secretary, Water Resource Department, Govt. of Rajasthan, Main building, Secretariat, Jaipur-302005, Rajasthan. (Email: osdwr2019@gmail.com)
7. Joint Secretary (Inland Fisheries & Administration), Department of Fisheries, Govt. of India, Room No. 482, 4th Floor, Krishi Bhawan, New Delhi (Email: sagar.mehra@nic.in)

LIST OF ADDRESSEE

Narmada Control Authority

1. Shri Ashok Kumar Thakur, Executive Member & Chairman of the Committee, NCA, Indore.
2. Dr. Tejram Nayak, Member (Civil), NCA, Indore.
3. Ms. Devjani Patra, Member (E&R), NCA, Indore.

National Mission for Clean Ganga (NMCG)

1. Shri Anup Kumar Srivastava, Executive Director (Technical), National Mission for Clean Ganga, Ministry of Jal Shakti, DoWR, RD&GR, GoI, 1st floor, Major Dhyan Chand National Stadium, India Gate New Delhi-110001 (Email: ed-technical@nmcg.nic.in)
2. Shri Sandeep Behera, Consultant (Biodiversity), National Mission for Clean Ganga, Ministry of Shakti, DoWR, RD&GR, GoI, 1st floor, Major Dhyan Chand National Stadium, India Gate, New Delhi-110001 (Email: sandeepbehera@nmcg.nic.in/sandeepbehera1967@gmail.com)

Central Water Commission (CWC)

1. Shri N. N. Rai, Director (Hydrology) Dte HSO Unit, Central Water Commission, Sewa Bhawan, R. K. Puram, Sector 1, New Delhi – 110066
   (Email:nitya20may@yahoo.co.in/hydne@cwc.delhi.nic.in/hydsouth@nic.in)

Central Inland Fisheries Research Institute (CIFRI)

1. Dr. B. K. Das, Director, ICAR- Central Inland Fisheries Research Institute, Monirampur (Post), Barrackpore, Kolkata - 700120, West Bengal (Email: director.cifri@icar.gov.in/director.cifri@gmail.com)
2. Dr. Amiya K Sahoo, Senior Scientist, ICAR- Central Inland Fisheries Research Institute Monirampur (Post), Barrackpore, Kolkata - 700120, West Bengal. (Email: amiya7@gmail.com)

Indian Institute of Technology (IIT), Roorkee

1. Dr. Arun Kumar, Professor, NEEPCO Chair Professor, Hydro & Renewable Energy Department, IIT Roorkee, Roorkee-247667, Uttarakhand.(Email: arun.kumar@hre.iitr.ac.in/aheciitr.ak@gmail.com)

Government of Madhya Pradesh

1. Member (Engineering), Narmada Valley Development Authority, Govt. of Madhya Pradesh, Narmada Bhawan, 59, Arera Hills, Jail Road, Bhopal - 462003, (M.P.).
   (Email: memengg@mp.nic.in/memenggnvda@gmail.com)
2. Member (Power), Narmada Valley Development Authority, Govt. of Madhya Pradesh, Narmada Bhawan, 59, Arera Hills, Jail Road, Bhopal - 462003, (M.P.).
3. Shri Vikram Singh Solanki, Divisional Forest Officer (Monitoring), Narmada Valley Development Authority, Govt. of Madhya Pradesh, Narmada Bhawan, 59 Arera Hills, Jail Road, Bhopal 462003, (M.P.) (Email: dfom21@gmail.com)

Government of Gujarat

1. Shri G. Ramana Murthy, Additional Principal Chief Conservator of Forests, Environment Cell,Sardar Sarovar Narmada Nagar Nigam Limited, Govt. of Gujarat, Block No. 12, New Sack Complex, Gandhinagar - 382010, Gujarat. (Email: envirmentcell@gmail.com)
2. Shri K. A. Keshvani, Chief General Manager (Technical & Coordination), SSNNL, Govt of Gujarat, 1st floor, Block No. 12, New Sachivalaya Complex, Gandhinagar-382010, Gujarat (Email: gm.coor.ssnnl@gmail.com/cgmtnc-ssnnl@gujarat.gov.in)
3. Shri M.K. Chaudhary, Dy. Director (Fisheries), O/o Commissioner of Fisheries, Dr. Jivraj Mehta Bhawan, Block No-10, 3rd Floor, Old Sachivalaya, Gandhinagar (Gujarat)

Government of Rajasthan

1. Shri Amar Singh, Chief Engineer, Water Resources Department, Govt. of Rajasthan, Lal Sagar, Kishore Bagh Jodhpur-342007 Rajasthan. (Email: s.amar46@gmail.com/cejdr.wr@rajasthan.gov.in/cejdr.wr@gmail.com)
2. Chief Engineer Water Resources Department, Govt. of Rajasthan, Indira Gandhi Nahar Mandal, Bhawani Singh Road, C Scheme, Ashok Nagar, Jaipur-302005, Rajasthan. (Email: ce.wr@rajasthan.gov.in)

Government of Maharashtra

1. Dr.Atul Patne, Commissioner of Fisheries, C-24, 2nd floor, Mittal Tower C- wing, Nariman Point, near Vidhan Bhavan, Mumbai-400021 (Maharashtra) (E-mail : commfishmaha@gmail.com)
2. Director (Environment), Department of Environment & Climate Change, Govt. of Maharashtra, 15th Floor, New Administrative Building, Hutatma Rajguru Chowk, Mantralaya, Mumbai-400002, Maharashtra. (Email: dir.mev-mh@nic.in)
3. Shri S.S.Khendekar, Superintending Engineer, Dhule Irrigation Project Circle, Sinchan Bhawan, Sakri Road, Dhule – 424 001 (Maharashtra) (Email : sedipc.dhulewrd@maharashtra.gov.in)
4. Shri S. D. Khairnar, Executive Engineer, Narmada Development Division (NDD), Narmada Colony, Near G.T.P. College, Khodaimata Road, Nandurbar - 425412, Maharashtra. (Email: ee_narmada@yahoo.co.in)
5. Shri Ravindra B. Wayada, Joint Commissioner (Inland), Nashik Division, Old Ashwini Barrack No.06, Opposite to O/o the Divisional Commissioner, Nashik Road, Nashik-422101, Maharashtra (Email: rdcfnashik@gmail.com)
6. Shri Sanjay P. Wategaonkar, Regional Deputy Commissioner of Fisheries, Nashik Division, Old Ashwini Barrack No. 06, Opposite to O/o the Divisional Commissioner, Nashik Road, Nashik-422101, Maharashtra (Email: wategaonkar.sanjay@yahoo.com/rdcfnashik@gmail.com)
7. Shri Kiran Padvi, Asstt. Commissioner of Fisheries, 17, Kamnath Mahadeo Nagar, Near Aadarsh Hotel, Sakri Road, Nandurbar - 425412, Maharashtra. (Email: acfnandurbar@gmail.com)

भाकृअनुप–केन्द्रीय अंतर्स्थलीय मात्स्यिकी अनुसंधान संस्थान
आई एस ओ 9001: 2015 प्रमाणित संगठन
(भारतीय कृषि अनुसंधान परिषद्)
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)

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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

925

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.

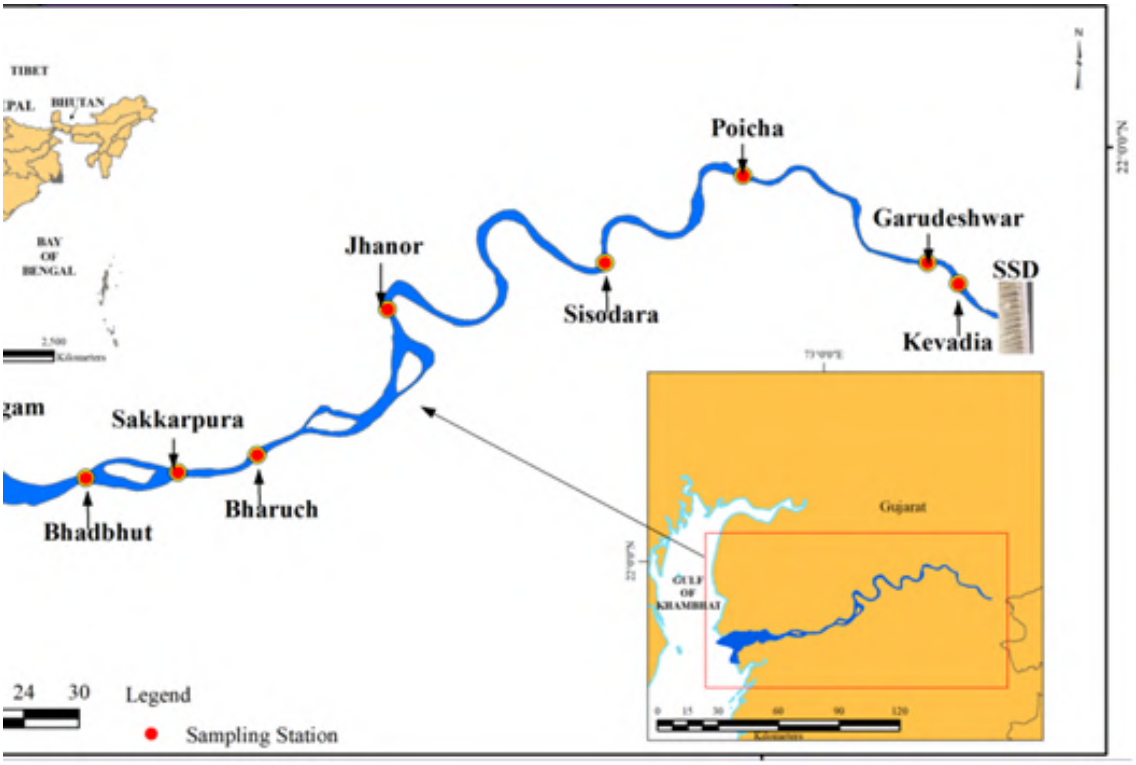
Environmental flows in rivers has been considered as one of the top priorities towards river biodiversity and habitat conservation. In addition, depending on the societal needs the environmental flows becomes more challenging. Looking into the river morphology, few studies on the environmental flows 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



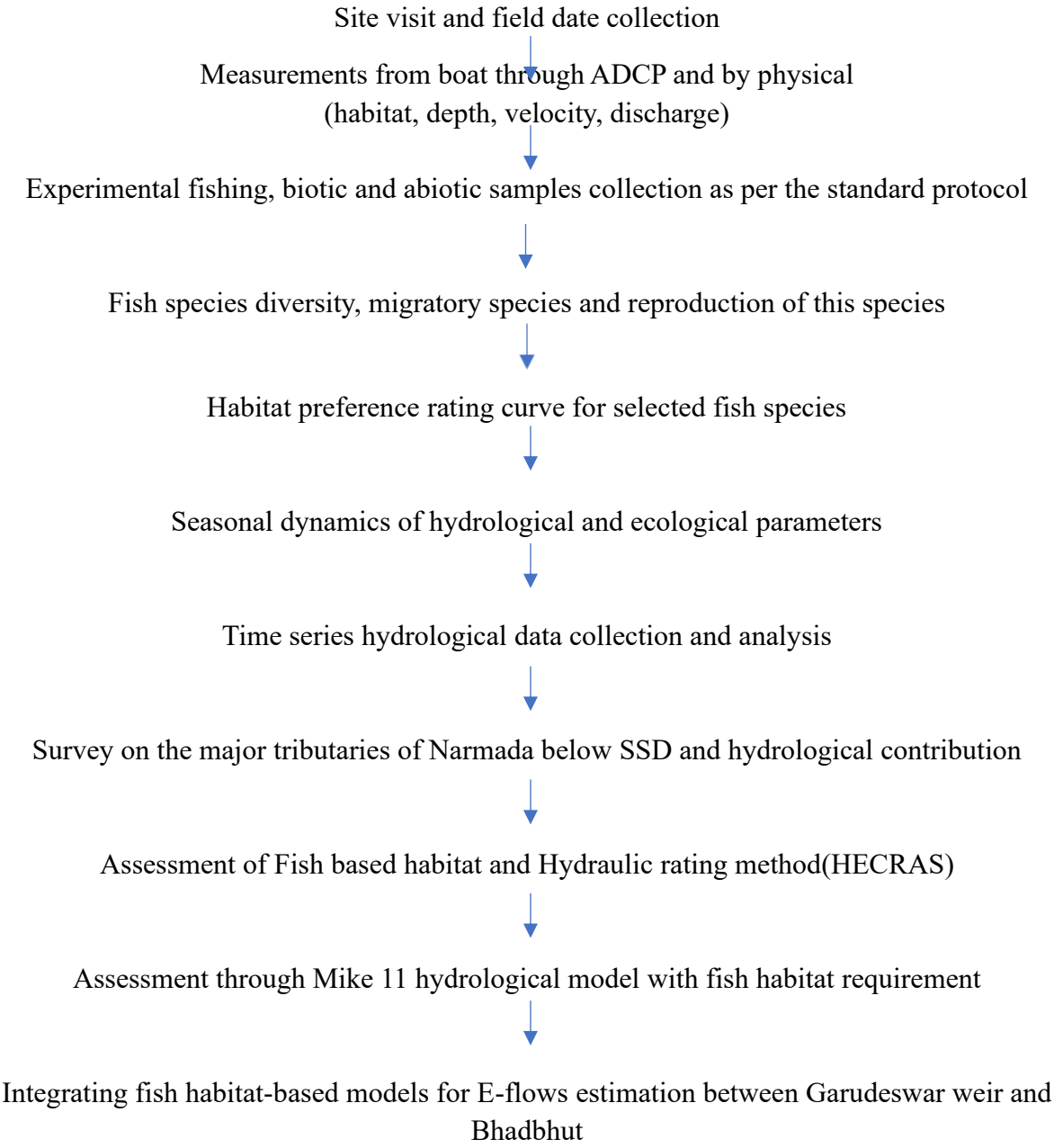
The study will be carried out between the Garudeswar weir to Bhadbhut stretch in river Narmada (162 km). Total -9 stations (Garudeswar, Poicha, Sisodara, Jhanor, Bharuch, Sakkarpura and Bhadbhut and additional one site between Sisodara and Jhanor and one site between Jhanor and Bharuch) will be selected 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**

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

Dhule Irrigation Project Circle, Dhule

Sinchan Bhavan, Sakri Road, Dhule 424001

Web Site :-www.nipcdhule.com	Fax No. 02562-276663
Email :- sedipc.dhulewrd@maharashtra.gov.in	Tel. No. 02562-276659
No./DIPC/PB-4/ 651 /2024	**Date :- 15 / 02/2024**

To,

The Chief Engineer,
Tapi Irrigation Development
Corparation, Jalagaon.

Subject :- Comments on proposal E-Flow in the downstream of SSD/Garudeshwar weir -reg.

Reference:- 1) Narmada Control Authority's Letter No.NCA/Env./2023/50 Date 9th February, 2024.
2) Executive Engineer, Narmada Development Division, Nandurbar letter No./NDDN/PB-1/246/2024, Dt. 14/02/2024

With reference to letter and subject cited above, Comments are submitted herewith on Project Proposal, regarding E-Flow in the downstream of SSD/Garudeshwar weir as submitted by CIFRI to NCA, for your kind information and further needful please.

In this regard it is to submit that, GoM will have to pay the share cost amount for the work as proposed in CIFRI's proposal. Therefore it is requested to communicate this proposal to GoM for favor of Information and further necessary action please.

DA :- As Above

OC sign by SE

(P. G. Patil)
Dy. Superintending Engineer
Dhule Irrigation Project Circle
Dhule

Copy to:- Copy Respectfully Submitted to the Member (Env.& Reh.), Narmada control Authority, Narmada Sadan, Sector-B, Scheme no. 74-C, Vijay Nagar, Indore (MP)-452-010 for favor of Information please. (DA as above)

Copy to:- Executive Engineer, Narmada Development Division, Nandurbar for information and necessary action. (DA as above)

COMMENTS ON 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

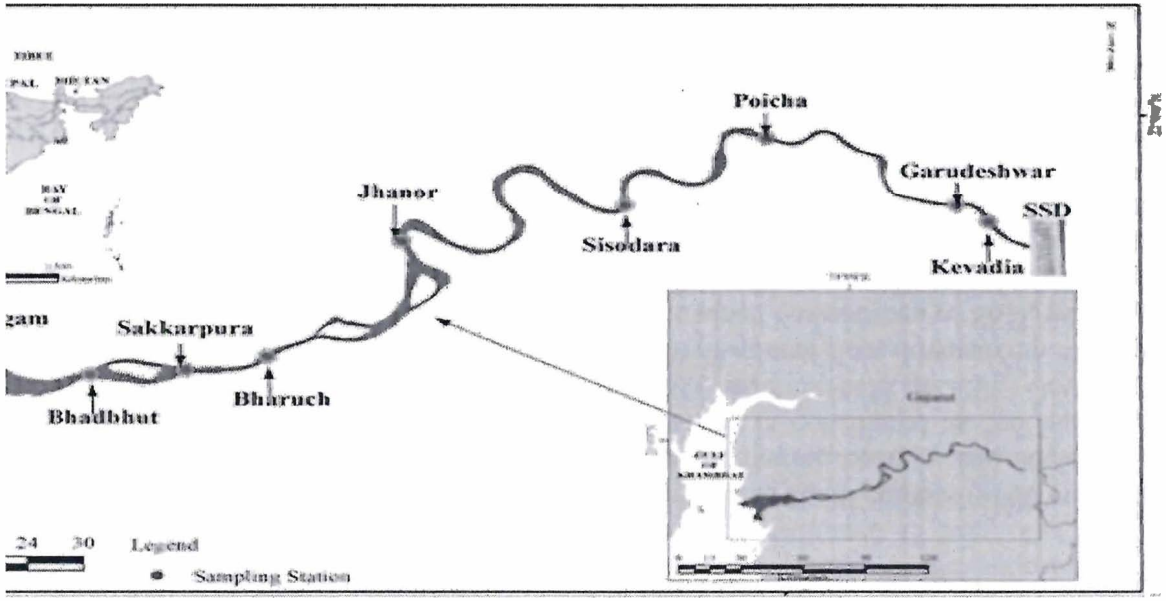
Project Duration: 9 months (March-November 2024) (Lean/Pre-monsoon and Post-monsoon)

Project Details:

1.0 Background:

Sardar Sarovar 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 SubGroup 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 PostMonsoon (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

934

Sr. No.	Item	Comments
1	**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.	GoM agrees with Objectives which mentioned in point no 2.0 (1 to 3)
2	**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, Sakkarpura 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.	GoM agrees with Study area
3	**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.	GoM agrees with Work plan which mentioned in point no 4.0 (1 to7)

Sr. No.	Item	Comments
	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 presentday 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	**4.0 Methodology:** Site visit and field date collection ↓ Measurements from boat through ADCP and by physical (habitat, depth, velocity, discharge) ↓ Experimental fishing, biotic and abiotic samples collection as per the standard protocol ↓ Fish species diversity, migratory species and reproduction of this species ↓ Habitat preference rating curve for selected fish species ↓ Seasonal dynamics of hydrological and ecological parameters ↓ Time series hydrological data collection and analysis ↓ Survey on the major tributaries of Narmada below SSD and hydrological contribution ↓ Assessment of Fish based habitat and Hydraulic rating method(HECRAS) ↓ Assessment through Mike 11 hydrological model with fish habitat requirement ↓ Integrating fish habitat-based models for E-flows estimation between Garudeswar weir and Bhadbhut	GoM agrees with Methodology

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Sr. No.	Item	Comments
5	5.0 Activities and Time line	GoM agrees with 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

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Sr. No.	Item	Comments
6	**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:	GoM agrees with cost only. if the rates quoted in item no.6.0 A (1 to 6) are on the basis of current schedule of rates of GoI. Otherwise market rate are assumed in Project Proposal, then it will be appropriate to call for quotations and fix the rates at Competent level.

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)		2,20,000	
	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**			**8,78,000**
D	**GST @ 18% on Consultancy cost**			**8,22,888**

According to the opinion of GoM, the Equipments mentioned in item no.6.0 B, should be hired on rental basis as per requirement.

According to the opinion of GoM, the overhead cost should be reduced to 10 % instead of 20 % on A+B

No Comments

Sr. No.	Item			Comments
	(A+C)			
	Total Cost (A + B + C + D)		**60,94,488**	
7	**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.			**No Comments**
8	**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			

OC signed by SE

(P. G. Patil)
Dy Superintending Engineer
Dhule Irrigation Project Circle
Dhule

Sardar Sarovar Narmada Nigam Ltd.
"A Government of Gujarat undertaking"
Block No. 12,
New Sachivalaya Complex,
Gandhinagar - 382 010. Gujarat
Fax : 079 - 23252390

No.SSNNL/Env/review/e-flow/212 Date: 04/03/2024

To,

The Executive Member, NCA & Chairman of E-flow Committee
Narmada Sadan, Sector-B, Scheme No. 71-C,
Vijay Nagar, Indore-452010 (M.P.)

Subject : Proposal on E-flow in the downstream of SSD/Garudeshwar Weir- reg.
Ref : Member (E &R), NCA's letter no. NCA/Env/2023/50 dated 09/02/2024.

Sir,

In continuation of the aforementioned letter from Member (E&R), NCA seeking views/comments on the draft proposal submitted by CIFRI titled ***"Assessment of Environmental Flows towards River Habitat and Ecological Requirements with a Focus on Downstream Fish Species of Sardar Sarovar Dam (SSD) in Narmada River."***

The Government of Gujarat expresses the views/comments of are as follows:

1. The draft Terms of Reference (ToR) provided by CIFRI delineate the study area from the Garudeshwar weir to the Bhadbhut stretch in the Narmada River. Consequently, the downstream segment of the river under consideration for the study, extending from Sardar Sarovar Dam (SSD) to the Bhadbhut Barrage, measures approximately 137 km.

   In light of this, the Government of Gujarat (GoG) has recognized the need for a more comprehensive assessment. It is imperative to encompass the entire downstream course of the Narmada River from the SSD to its confluence with the Arabian Sea, totalling approximately 162 km.

2. The inclusion of the following parameters in the draft proposal is paramount to ensuring a comprehensive assessment of the Narmada River ecosystem:

   I. E-flow w.r.t Salinity Mitigation
   II. Water Quality
   III. Ecological Balance
   IV. Mangrove Conservation
   V. Cultural needs of people
   VI. Sustaining Aquatic Flora & Fauna including Fish more particularly with reference to
   (a) requirement for breeding and migration behaviour of Hilsa Fish and
   (b) Upstream movement of Mahasheer (Tor tor) during rainy season.

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These parameters collectively address various aspects crucial for the preservation and sustainable management of the Narmada River. From maintaining the flow of water to mitigate salinity levels to safeguarding cultural needs and preserving mangrove habitats, each element plays a vital role in ensuring the ecological integrity of the river ecosystem.

Additionally, focusing on sustaining aquatic flora and fauna, especially the breeding and migration behaviours of key fish species like the Hilsa Fish and Mahasheer during critical seasons, further enhances the overall health and resilience of the Narmada River. By incorporating these parameters into the draft proposal, Govt. of Gujarat's objective is to develop comprehensive strategies that effectively tackle the diverse challenges and opportunities associated with the conservation and management of the Narmada River, ensuring its well-being for both present and future scenarios.

(G. Ramana Murthy IFS)
Add. Pri. Chief Conservator of Forests,
SSNNL, Gandhinagar.

Copy Submitted to:

- Hon'ble Managing Director, SSNNL, Gandhinagar.
- Director (Canals), SSNNL, Gandhinagar.
- Director (Civil), SSNNL, Gandhinagar.
- Commissioner of Fisheries, GoG, Gandhinagar.
- Member (E & R), Narmada Sadan, Sector-B, Scheme No. 71-C, Vijay Nagar, Indore-452010 (M.P.) (Email ID : mem.er.nca@nic.in) for kindly take necessary follow-up action.
- Chief General Manager (T & C), SSNNL, Gandhinagar.
- Chief Engineer (D & V), SSNNL, Ekta Nagar.

नर्मदा घाटी विकास प्राधिकरण,
59, अरेरा हिल्स, नर्मदा भवन, भोपाल

दूरभाष नं. 0755–2677504 / 2677591 Email Id – memberforestnvda@gmail.com /dfom21@gmail.com

क./पर्या. एव वन/मा.चि.(मॉ.)/Tech–281/2024/129 भोपाल, दिनांक/06-03-2024

प्रति,

Member (Env. & Reh.)
Narmada Control Authority.
Narmada Sadan, Sector-B, Scheme No 74 C,
Vijay Nagar Indore 452010

विषय :– Proposal on E-flow in the downstream of SSD/ Garudeshwar Weir -reg

संदर्भ :–आपका पत्र क्रमांक No. NCA/Env/2023/50, दिनांक 09 फरवरी 2024 एवं पत्र क्र. No. NCA /Env/2023/69, दिनांक 23 फरवरी 2024

———000———

उपरोक्त विषयांतर्गत लेख है कि नर्मदा नियंत्रण प्राधिकरण के संदर्भित पत्र से प्राप्त CIFRI द्वारा प्रेषित Draft Project Proposal वस्तुतः सरदार सरोवर परियोजना बांध के Down Stream में Environmental Ecology विशेषतः downstream fish species हेतु Environmental flow की अध्ययन से संबंधित है। यह अध्ययन गुजरात राज्य के Garudeshwar एवं Bhadbut के बीच प्रस्तावित है। अपने–अपने राज्य की सीमा मे Environmental flow को निरंतर बनाये रखने एवं तत्संबंधी अध्ययन कराये जाने बाबत् निर्णय संबंधित राज्य द्वारा लिया जाना होता है।

अतः उपरोक्तानुसार CIFRI द्वारा प्रेषित उक्त Draft Project Proposal पर मध्यप्रदेश राज्य से अभिमत आवश्यक प्रतीत नहीं होता है। इस संबंध में गुजरात राज्य द्वारा निर्णय लिया जाना उचित होगा।

सदस्य (पर्या. एवं वन)
नघाविप्रा भोपाल

Office of The Superintending Engineer Narmada Canal Project Circle I Sanchore

No. 3263 Date:- 14/03/2024

The Chief Engineer
Water Resources
Jodhpur

Sub.:- Downstream Environmental flow in river Narmada from SSD.-reg.

Ref.:- Director (Civil),NCA Indore letter No. NCA/Env/2023/91 dated 14-03-2024 & CEWR Zone Jodhpur letter No.3716 Date 12-03-2024 and

Sir.

With reference to the above cited subject, SSNNL requested for observations sand suggestions **on Central Inland Fisheries Research Institute(CIFRI)'s recommendation** regarding mandatory downstream environmental flow (e-flow) flowin river Narmada from Sardar sarovar Dam.

As CIFRI has submitted its report and recommended quantum of e-flow for Pre-monsoon, Monsoon and Post-Monsoon seasons and SSNNL has requested that the e-flow be enhanced from 600 to 1500 cusecs till a detailed exercise is undertaken to review the quantum of e-flow and arrive at a more realistic value.

In this regard Comments of Superintending Engineer,Narmada Canal Project Circle I Sanchore are as under.

"This office is unable to agree suggestions on (CIFRI)'s recommendation regarding mandatory downstream environmental flow (e-flow) in river Narmada from Sardar sarovar Dam Because **share of Rajasthan state will be reduced up to 20%."**

AS per CIFRI's recommendations it is found from calculation that 118 cusecs water will be reduced from the share of Rajasthan which his near about 20% of Rajasthan state's share. Also Considering water allowance @2.70/1000 acre, It will reduce 43700 acre(17690ha) Culturable Command Area of Narmada Canal Area, of Rajasthan, Which is not affordable for Rajasthan being a desert state Since command area of Narmada Canal Project in Rajasthan Located in Desert Area Almost 30% quantum of water is Being utillied for Drinking Propose hence there is necessity to not reduce Rajasthan share.

Even a minimum volume of water is also needed to ful fill minimum requirements for natural habit at Ecology aspect in Rajasthan state portion.

So,it is requested that Rajasthan state's share should not be reduced regarding downstream environmental flow(e-flow) in river Narmada from Sardar sarovar Dam.

Your's sincerely

14/3/24

Superintending Engineer
Narmada Canal Project
Circle I, Sanchore

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कार्यालय अधीक्षण अभियंता नर्मदा नहर परियोजना वृत प्रथम सांचौर

क्रमांक: 3302 दिनांक: 18/03/2024

Member (Env. & Reh.)
Narmada Control Authority.
Narmada Sadan, Sector-B, Scheme No 74 C,
Vijay Nagar Indore 452010

विषयः— Proposal on E-flow in the downstream of SSD/Garudeshwar Weir

संदर्भः— आपका पत्र क्रमांक No. NCA/Env/2023/50, दिनांक 09 फ़रवरी 2024 एवं पत्र क्र. No. NCA/Env/2023/69, दिनांक 23 फ़रवरी 2024

उपरोक्त विषयान्तर्गत लेख है कि नर्मदा नियंत्रण प्राधिकरण के संदर्भित पत्र से प्राप्त CIFRI द्वारा प्रेषित Draft Project Proposal वस्तुतः सरदार सरोवर परियोजना बांध के Down Stream में Environmental Ecology विशेषतः downstream fish species हेतु Environmental flow की अध्ययन से सम्बंधित है।

अतः CIFRI की उपरोक्त रिपोर्ट पर राजस्थान के Comments निम्न प्रकार से है :-

1. राजस्थान राज्य के हिस्से के पानी की कटौती किये बिना तथा राजस्थान राज्य के हिस्से की लागत में किसी भी प्रकार की वृद्धि किये बिना राजस्थान राज्य CIFRI की उक्त रिपोर्ट से सहमत है।

2. सरदार सरोवर बांध के downstream में मानसून के दौरान होने वाले overflow पानी को उचित रूप से सहेजकर यथा Storage Dam बनाकर अथवा अन्य स्रोतों में इकठ्ठा कर जरूरत के समय आवश्यकतानुसार उस पानी को E-Flow के रूप में गुजरात राज्य द्वारा उपयोग में लिया जा सकता है।

3. चूँकि उक्त E-flow का प्रस्तावित क्षेत्र सरदार सरोवर बांध के Downstream में गुजरात राज्य में प्रवाहित नर्मदा नदी में है, अतः इस सम्बन्ध में गुजरात राज्य द्वारा निर्णय लिया जाना उचित होगा।

4. विशेष परिस्थितियों में यदि overflow पानी Dam में नहीं होता है तो उस वर्ष अन्य सम्बंधित राज्यों से सुझाव लिया जाना उचित होगा।

अधीक्षण अभियंता
नर्मदा नहर परियोजना
वृत प्रथम, सांचौर

क्रमांक: 3303-04 दिनांक: 18/03/2024

प्रतिलिपि निम्नलिखित को सूचनार्थ एवं आवश्यक कायर्वाही हेतु प्रस्तुत है :-

1. श्रीमान मुख्य अभियंता जल संसाधन विभाग राजस्थान, जयपुर।
2. श्रीमान मुख्य अभियंता जल संसाधन संभाग जोधपुर।

अधीक्षण अभियंता
नर्मदा नहर परियोजना
वृत प्रथम, सांचौर

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सत्यमेवजयते
Government of Maharashtra
Water Resource Department

स्वातंत्र्याचा अमृत महोत्सव

Executive Engineer,
Narmada Developlment Division,
Nandurbar. 425412.
Teli./Fax No. 02564-222291
email id :-ee_narmada@yahoo.co.in

No./NDDN/PB-1/587/2024 **Date :-30/ 04/2024**

To,

The Superintending Engineer,
Dhule Irrigation Project Circle,
Dhule.

Subject :- Comments on Minutes of 3rd meeting of E-flow committee-reg.

Reference:- Narmada Control Authorit y, Indore'sLetter No.NCA/Env/2023/125 Date:-16/04/2024.

Withre ference to letter and Subject cited above, Comments on Minutes of 3rd meeting of E-flow committee are submitted herewith for your kind information and further needful please.

DA :-As Above

(S.D Khairnar)
Executive Engineer
Narmada development Division
Nandurbar

Copy Respectfully Submitted to Hon.Member (Env. & Reh.) Narmada Control Authority, Indore for information and necessary action please.
D.A:- As Above.

COMMENTS ON MINUTES OF THE 3rd MEETING OF THE COMMITTEE TO REVIEW THE ENVIRONMENTAL FLOW OF RIVER NARMADA DOWNSTREAM OF SARDAR SAROVAR PROJECT (SSP), HELD ON 19 TH MARCH, 2024 AT 11.00 HRS THROUGH VIRTUAL PLATFORM

1. INTRODUCTION:-

The 3rd Meeting of the Committee, to review the Environmental Flow (E-Flow) of river Narmada downstream (d/s) of SSP, was held on 19th March, 2024 through virtual platform, under the Chairmanship of Shri Ashok Kumar Thakur, Executive Member, NCA. The focus of the meeting was to finalize the Scope of work/Terms of Reference (ToR) of CIFRI, with respect to the re-assessment study of E-Flow in order to protect the downstream riverine environment of river Narmada and Award of study to CIFRI through SSNNL, GoG. 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-flow to be carried out by GoG through CIFRI, by considering various parameters while in the 2nd Meeting it was decided that CIFRI would prepare Scope of work/ToR, along with names of partner institutions and financial implications for the re-assessment study of Eflow and submit to NCA.

He further stated that the Scope of work/ ToR received from CIFRI was circulated to the Committee Members (Annex-II) to obtain the technical views/comments till 07.03.2024. Technical views/ comments received from GoM (Annex-III), GoG (Annex-IV), GoMP (AnnexV) & GoR (Annex-VI) vide letters dated 15.02.2024, 04.03.2024, 06.03.2024, 14.03.2024 and 18.03.2024 respectively were circulated among Committee Members.

Further, EM, NCA and Chairman of the Committee reiterated that as per the decision taken during the 94th NCA meeting, and consecutive meetings of the E-flow, the present forum is solely responsible for the process of award of the study to CIFRI and recommending the E-flow quantum. Decision w.r.t. sharing of this revised E-flow Quantum shall be taken at higher level,i.e., in NCA / RCNCA Meetings with the consensus of all the party States.

Chairman of the Committee further stated that the Counsel of NCA, who is defending on behalf of NCA &MoJS, DoWR, RD &GR has conveyed that the Judges of Hon'ble Supreme Court expressed their displeasure against the function of NCA, because the Quantum of E-flow is yet to be decided.

Executive Member, NCA and Chairman of the Committee then requested Member (E&R), NCA to take up the agenda for further deliberation.

Member (E&R), NCA, before taking up the Agenda items for deliberation, clarified to the States that this E-flow Committee is constituted only to assess the quantum of E-Flow and submit its recommendations to the Authority. The study is only to re-assess the quantum of EFlow to be released from the d/s of SSP/ Garudeshwar Weir. The decision for releasing of EFlow quantum and water sharing will be taken in the appropriate level, may be in the NCA or RCNCA or during the review of the Award. Arbitrarily, NCA cannot allocate any water without the same getting addressed in the appropriate forum and getting proper consensus from the party States.

Member (E&R), NCA then requested Dr. B.K. Das, Director, CIFRI to share the presentation on the Scope of work/ToR of CIFRI, with respect to the proposal on "Assessment of Environmental flows towards river habitat and ecological requirement with a focus on downstream fish species of SSD in Narmada River" and their response to the technical comments/views received from the Committee.

Item No.	Item	Comments
2.	**Central Inland Fisheries Research Institute(CIFRI)**	
	Dr. B.K. Das, Director Dr. B.K. Das before giving his presentation clarified that CIFRI is a scientific and Government organization and the proposed Scope of work for E-flow assessment is based on the ICAR guidelines on Contract/ Consultancy Project. Further, Dr. Das presented the proposal of Scope of work/ToR and the Budget estimate (Annex-II) with proposed objectives, study area, methodology, timeline and highlighted the suggestions provided by the party States in details. He intimated that the proposed study has 3 objectives, which are as follows:- 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 Briefing on the proposed study area, Dr. Das intimated that study will be carried out between Garudeshwar weir to Bhadbhut Barrage which is about 125 km freshwater zone having 9 stations, viz.Garudeshwar, Poicha, Sisodara, Jhanor, Bharuch, Sakkarpura, Bhadbhut, one site between Sisodara & Jhanor and one site between Jhanor & Bharuch, to study on different hydrobiological parameters representing different seasons. With respect to the proposed Methodology, Director, CIFRI intimated that the field data will be collected by performing field visits, assessment w.r.t. habitat, depth, velocity and discharge will be carried out from boat both manually as well as employing Acoustic Doppler Current Profiler (ADCP). Further, there will be an Experimental fishing, biotic and abiotic sample collection as per the standard operating protocol. The proposed methodology comprehensively includes study of Fish species diversity, migratory species and their reproduction cycle, preparing Habitat preference rating curve for identified fish species, Seasonal dynamics of hydrological and ecological parameters, collection of time series hydrological data and its interpretations. Moreover, the proposed study also involves survey on the major tributaries of Narmada below SSD and its hydrological contribution, Assessment of Fish based habitat using Hydraulic rating cum habitat simulation method (HECRAS), Assessment through Mike 11 hydrological model with fish habitat requirement, integrating fish habitat-based models for E-flow estimation. Further, Dr. Das gave point wise reply to the observation of the party States:-	

Sl. No.	Comments from States	Replies of CIFRI
1.	**Govt. of Rajasthan (Annex-VI)** This office is unable to agree suggestions on (CIFRI)'s recommendation regarding mandatory d/s environmental flow (E-flow) in river Narmada from SSD Because share of Rajasthan state will be reduced up to 20%.	• The comments are not related with the proposed study on "Assessment of environmental flows towards river habitat and ecological requirement with a focus on downstream fish species of SSD in Narmada River"
2.	**Govt. of Madhya Pradesh (Annex-V)** अतः उपरोक्तानुसार **CIFRI** द्वारा प्रेषित उक्त **Draft Project Proposal** पर मध्यप्रदेश राज्य से अभिमत आवश्यक प्रतीत नहीं होता है। इस संबंध में गुजरात राज्य द्वारा निर्णय लिया जाना उचित होगा।	• Matters doesn't pertain to the Scope of Work
3.	**Govt. of Maharashtra (Annex-III)** 1. GoM agrees with cost only. If the rates quoted in item no.6.0 A (1 to 6) are on the basis of current schedule of rates of GoI. Otherwise market rate are assumed in Project Proposal, then it will be appropriate to call for quotations and fix the rates at competent level. 2. According to the opinion of GoM, the Equipments mentioned in item no.6.0 B, should be hired on rental basis as per requirement. 3. According to the opinion of GoM, the overhead cost should be reduced to 10% instead of 20 % on A+B	• Item no. 6.0 A (1-6) has been prepared as per the ICAR guidelines on Contract/ Consultancy Project • Equipment, such as, Biochemical Analyser is not available on rental basis as this is purely laboratory use only. Furthermore, the cost of hiring of Camera and Data Recorder will be almost same as the cost of the equipment. • As per the ICAR guidelines, the overhead cost has been fixed to 20 %.

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Sl. No.	Comments from States	Replies of CIFRI
4.	**Govt. of Gujarat (Annex-IV)** 1. The draft ToR provided by CIFRI delineate the study area from the Garudeshwar weir to the Bhadbhut stretch in the Narmada River. Consequently, the d/s segment of the river under consideration for the study, extending from SSD to Bhadbhut Barrage, measures approximately137 km. In light of this, GoG has recognized the need for a more comprehensive assessment. It is imperative to encompass the entire d/s course of River Narmada from the SSD to its confluence with the Arabian Sea, totaling approximately 162 km. 2. The inclusion of the following parameters in the draft proposal is paramount to ensure a comprehensive assessment of the Narmada River ecosystem. I. E-Flow w.r.t. Salinity Mitigation II. Water Quality III. Ecological Balance IV. Mangrove Conservation V. Cultural Needs of People VI. Sustaining Aquatic Flora& Fauna including Fish more particularly w.r.t. a) Requirement for breeding and migration behavior of Hilsa Fish and b) Upstream movement of Mahaseer (*Tor tor*) during rainy season Additionally, focusing on sustaining aquatic flora &fauna, especially the breeding and migration behavior of key fish species like the Hilsa Fish and Mahaseer during critical season, further enhances the overall health and resilience of the Narmada River.	• As per the 1st and 2nd Meeting of the Committee held on 21st September, 2023 & 17th January, 2024, it was discussed and finalized that the d/s of SSD is extremely critical for E-Flows estimation as different agencies have estimated different figures of discharge/release as well as by adopting different methodologies without considering the biodiversity and river habitat ecology. Therefore, the Committee agreed to estimate the E-Flows only for river ecology and Fisheries within the stipulated period of time (9 months). • Furthermore, it was also highlighted that GoG has planned and started developing the Bhadbhut Barrage which would be completed within a few years. Therefore, the river stretch above the Barrage needs to be estimated for protecting the Freshwater ecology, fisheries and biodiversity. The d/s of the Barrage will be entirely different ecosystem i.e. estuarine ecosystem. Water requirement for salinity mitigation and mangrove require a detailed investigation prior to the estimation of E-Flow. Therefore, the methodology will be significantly different from upstream study and would require a multi-disciplinary team with in depth study which is time consuming. • Therefore, combining the proposed study with this would not solve the objectives as discussed in the two Meetings. • As it has been explained, water requirement and habitat *Tor tor* and Hilsa are different. Studies to establish their breeding ground and migration required detailed investigations through different approaches.

Sl. No.	Comments from States	Replies of CIFRI
		Therefore, focus on the proposed study would serve the objectives of the main discussion that the Committee did in the meeting. However, social cultural and other requirement for estimation of E-Flow could be taken up separately towards sustainable Narmada ecosystem.

After detailed presentation of Director, CIFRI, Member (E&R), NCA requested the party States to give their comments/views on these issues.

3.	**Views of party States:-**	
	a) Govt. of Gujarat:- Shri. Ramana Murthy, APCCF stated that views of GoG has already been submitted vide letter No. SSNNL/Env./review/e-flow/21 dated 04.03.2024. Further, Shri K. A. Keshvani, CGM (T&C), SSNNL stated that sometimes back GoG has requested to carry out the study from d/s of SSP to Gulf of Cambay. Again he requested the Committee to carry out the study up to Gulf of Cambay instead of up to Bhadbhut Barrage.	This issue pertaining with GoG.
	b) Govt. of Madhya Pradesh:- Shri. John Kingsely, Director (Reh.), NVDA intimated that the length of the River Narmada is 1312 km before draining in to Gulf of Cambay. In the first 1,077 km reach, the river flows in Madhya Pradesh, the next 35 km stretch of river forms the boundary between the States of MP and Maharashtra and the next 39 km, it forms the boundary between Maharashtra and Gujarat. The last stretch of 161 km lies in Gujarat. Proposal for carrying out the studies only in the part of Gujarat for about 161 km d/s of SSP before draining in to Gulf of Cambay will not serve the purpose. Hence, it is suggested that to safeguard the riverine ecology, the study should be carried out for the entire stretch of river Narmada so that the water required for every stage from Amarkantak till the draining in to Gulf of Cambay can be known instead of carrying out the studies for d/s of SSP. On the other hand, if the concerned States wanted to carry out the studies in their territory, they can do the study without affecting the NWDT Award. If, NCA wanted to carry out the study, in that case, the study should be carried out for the entire Narmada Basin rather than carrying out only in Gujarat territory.	This issue pertaining with GoMP.
	c) Govt. of Maharashtra:- Shri. S.S Khandekar, SE, Water Resource Department, Dhule stated that if the E-flow is to be calculated and to be released for the whole stretch of Narmada basin, the views of GoMP is correct. However, if the study is to be carried out only for the d/s of SSP, then the final decision on this issues needs approval of higher/Competent Authority, GoM. In this regard, Member (E&R), NCA again emphasized that the Committee is constituted only	As a representative of GoM, S.E, DIPC, Dhule has stated the opinion regarding the study on the proposal submitted by CIFRI which included in the minutes.

	to assess the quantum of E-Flow with the help of Expert Members &Institution and submit the same to the Authority. The study is only to re-assess the quantum of E-Flow to be released from the d/s of SSP. She then requested GoM to give technical views on the proposal submitted by CIFRI. SE, GoM stated that the study to be restricted upto Bhadbhut Barrage only from Garudeshwar Weir. Mitigation of d/s salinity should be addressed by the Bhadbhut Barrage project and water from SSD should not be used for the same.	However, S.E, DIPC, Dhule has agree with the study of E-flow upto Bhadbhut Barrage only from Garudeshwar weir and not for Downstream of Bhadbhut Barrage. S.E, DIPC, Dhule, also clearly stated that, for mitigation of D/S salinity, the required water should be used from Bhdbhut barrage only and not from Sardar Sarovar Dam.
	d) Govt. of Rajasthan:- Shri Shreepal Meena, SE, NCP, Sanchore welcomed the study for the e-flow up to Bhadbhut barrage but also indicated that Rajasthan being an arid State, the economy of the three districts Barmer, Jalore and Sanchore (earlier Sanchore was town and now became/declared as district) is totally dependent on this 0.5 MAF of Narmada water. So, he urged that any decision on upward revision should not affect the share of Rajasthan. Further he suggested that GoG may make a provision to store more water during the rainy season/filling period which can be utilized as E-flow rather than relying only from the share of utilizable flow.	This issue pertaining with GoR.
	After obtaining the views of party States, Member (E&R), NCA requested the Expert Members to give their comments/views on these issues.	
4.	**Views of Expert Members:-**	
	Central Water Commission (CWC) **a) Shri N.N.Rai, Director (Hydrology)** Shri. N.N.Rai stated that for E-flow assessment for the ecological needs i.e., Fish diversity as decided in the 2nd Meeting of the E-flow Committee, the d/s of SSP up to Bhadbhut Barrage should be carried out instead of going for the whole basin which will take more time. But for the salinity mitigation, mangrove conservation and cultural needs of people the requirement of E-Flow will be entirely different. He further stated that the methodology for assessment of E-flow is still not standardized in the estuarine ecosystem; hence the extended study area in accordance to GoG is not feasible at present moment. He further added that for 7 assessment of the E-flow HECRAS method is a most appropriate method which can be employed in the present study. **IIT, Roorkee** **b) Prof. Dr. Arun Kumar** Dr. Arun Kumar endorsed the views of Director (Hydrology), CWC. After going through the comments received from different States, he stated that E-flow in the river is a necessity which has not been calculated so far for Narmada Basin. Therefore, E- flow should be calculated for the entire Narmada basin.	This issue not pertaining with GoM. This issue not pertaining with GoM.

	Dr. Arun Kumar stated that the study be conducted till Bhadbhut Barrage in the first phase and may be extended later to the Sea in the second phase. He also urged to carry out the study as soon as possible because if the Hon'ble NGT issues an order, it might fix a higher quantum of E-flow which will surely affect the water sharing of all party States.	
	National Mission for Clean Ganga (NMCG) **c) Shri Anup Shrivastava, Executive Director (Technical)** Shri. Anup Shrivastava stated that there is a general agreement for carrying out the studies for the d/s of SSP up to the River draining in to the Gulf of Cambay. He suggested for carrying out the study in entire d/s from SSD till the confluence of river but in phased manner. In the first phase the study should be This issue pertaining with GoM. from Garudeshwar weir to Bhadbhut barrage and in the next phase from Bhadbhut barrage to till the confluence of river in to Gulf of Cambay i.e., the mouth of the River. The upstream study of E-Flow can be carried out from the beginning of river Narmada in another phase. He further stated that in the present study HECRAS and Mike 11 hydrological Model have been proposed which are one dimensional study method. He suggested carrying out the proposed study employing the HECRAS method so as to avoid confusion with two sets of values. After detailed discussion Executive Member, NCA and Chairman of the Committee thanked everyone for their views and deliberation on these important issues. Further, he stated that NCA is established for the purpose of securing compliance with and implementation of the decision and directions of the Narmada Water Dispute Tribunal Award. The Committee is taking up the reassessment work as per the decisions of 94th NCA meeting. Views of the NCA comprises of all the States and NCA takes any decision with the consensus of the party States. The proposed study will be carried out by the SSNNL, GoG through CIFRI as decided in the first and second Meeting of E-flow Committee for the d/s of SSP. He further stressed that by this time the study would have been awarded which is still pending. 8 Moreover, as per the direction of Hon'ble NGT, all States have to maintain a minimum E-Flow in their rivers to protect the riverine ecology and meet the societal needs. The intervening structures on river Narmada cannot be exempted from the regime of E-Flow. Therefore, it is the responsibility of every States 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. Further, during the second meeting when Member (E&R), NCA, had enquired about the amount of water being released by GoMP in their territory from various dams, like, Bargi, Tawa, ISP, etc., Member(Power), NVDA intimated that these data are available with CWC, Bhopal and the same can be obtained from them. Even though, if all the States agreed to carry out the study for the whole basin and the expert Members also suggest for the same, it is acceptable to the Committee. But at the same time, it is a lengthy process and to complete the study for the whole basin more time is required. But the present case is already in the Hon'ble NGT to release the downstream E-Flow from SSD. If the issue is not settled at the right time, as informed by the Expert Members, Hon'ble NGT may issue a direction to	This issue not pertaining with GoM.

release the E-flow which may be on the higher side. Then, every States will have to follow the direction of Hon'ble NGT and accordingly each States has to release the water to safeguard the riverine ecology of the River Narmada.

Keeping in view, if all the States agree for reassessment of E-flow for the downstream of SSP, the same will be awarded to CIFRI .Else, if the studies are required for whole basin or till the sea, then the issue will be put up in NCA meeting and as per the directions of the Authority further action can be taken. He then requested the party States to give their final views on this issue for taking decision.

Member (E&R), NCA stated that as discussed in the earlier Meeting in the first phase the study would be given for the d/s of SSP. For the upstream of SSP, as decided in the first meeting GoMP will take up the study in their territory separately.

Further Member (E&R), NCA enquired from CIFRI that if the study is extended for another 25 km from Bhadbhut barrage to the mouth of the river whether the study period will increase, methodology will change and the estimate will increase.

In response to above, Dr. Amiya Sahoo, Senior Scientist, CIFRI stated that as per decision taken in first and second Meeting of the E-Flow Committee, the study area is restricted from Garudeshwar weir to Bhadbhut Barrage. The entire 20-25 km areas d/s to Barrage is an estuarine zone with wider mouth, which has different cross section and hydraulic parameters.

Dr. Amiya Sahoo emphasized that keeping in view the technical and scientific constraints, currently the study can be initiated up to Bhadbhut Barrage in the first phase.

Shri N.N. Rai, Director (Hydrology), CWC agreed with the views of Dr. Amiya Sahoo. He stated that the estuarine ecosystem is entirely different. Therefore, in the initial phase, the study may be considered up to Bhadbhut Barrage. As Bhadbhut barrage is under construction, study will be required up to the Barrage. At this stage the study area of estuarine ecosystem should not be considered along with fresh water ecosystem. Referring the issues being faced while computing the E-Flow for estuarine ecosystem of Mahanadi, Director, CWC suggested to go for the fresh water ecosystem i.e. up to Bhadbhut barrage.

Dr. Arun Kumar, Professor, IIT Roorkee also endorsed the views of Shri N.N. Rai, suggesting to get the proposed study done up to Bhadbhut Barrage initially and then from Bhadbhut Barrage to mouth of the river in the next phase.

Shri Kanungo, CE (Dam & Vadodara), SSP in reference to the Member (E&R)'s enquiry on the status on construction of Bhadbhut barrage stated that about 40% of works has been completed. Then Member (E&R) informed that since the construction of Bhadbhut barrage as already started in 2020 and going to be completed by 2026, the present E-flow study from Garudeshwar Weir be confined upto Bhadbhut barrage only, which is a practice in cascade projects.

Shri Ramana Murthy, APCCF, GoG intervened and stated that MD, SSNNL in the recent past convened an internal meeting along with the officers from Kalpasar Department, wherein it was decided that an integrated study should be carried out for the entire stretch d/s rather than up to Bhadbhut Barrage for comprehensive assessment to effectively mitigate salinity levels, address the

	cultural needs of people and to preserve mangrove habitats. 953 He further stated that in 2012, it was also decided that whatever the quantum of E- flow is released from SSP, the same quantum will be released from Bhadbhut Barrage up to mouth of the river. Therefore, the study should be considered for comprehensive assessment of E-Flow up to mouth of the river with reasonably compromising some of the study parameters. During discussion Shri Ramana Murthy, APCCF, GoG enquired whether the E-flow is/not required for the d/s of Bhadbhut Barrage. And if required, the stretch below the Bhadbhut barrage can be considered for computing E-flow to some extent by compromising some parameters.	
5.	**<u>Decision taken.</u>** In view of the above, Member (E&R) NCA suggested that in first phase the study may be assigned to CIFRI up to Bhadbhut Barrage as CIFRI has already submitted the proposal for the first phase. In the second phase the extended area below the Bhadbhut may be considered. In this regard, Shri.Ramana Murthy, APCCF informed that approval of Competent Authority is required for assigning the work for the first phase, i.e., up to Bhadbhut Barrage. Shri SS Khandekar, SE,WRD, GoM stated that opinion of other party States is also required for carrying out the studies as suggested by Member (E&R) as above. He further stated that as informed by the Expert Members the area under consideration for E-flow study has two ecosystem, different catchment and hydrological parameters. The E- flow requirement below the Bhadbhut Barrage will be met out from the water stored in Bhadbhut Barrage. Therefore, as suggested by Expert Members in the first phase the study can be considered from Garudeshwar weir to Bhadbhut barrage as proposed by CIFRI, the second phase from Bhadbhut till the Gulf of Cambay can be considered later as this would involve more complicated study, involving an array of parameters to address wide river mouth and its estuarine zone. After the views and comments of the Members of the Committee, in order to converge on the issue, EM, NCA and Chairman of the Committee called for the final views from the party States. GoM and GoR agreed to the proposal of the study up to Bhadbhut barrage while GoG suggested to extend the study area up to mouth of the river. However, GoMP representative did not comment on this. As there was no consensus among the party States, EM, NCA & Chairman of the Committee desired that the issues will be put up for the directions of the Authority in the next NCA Meeting.	S.E, DIPC, Dhule has stated the opinion regarding E-folw which included in minutes. S.E, DIPC, Dhule agrees with the proposal of the study upto Bhadbhut Barrage only. However, Hon. Chairmen of Committee has desired the issues regarding E-flow will be put up for direction of Authority in the next meeting of NCA. Hence no comments.

Meeting ended with a vote of thanks to the chair.

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