



**CIFRI'S ENVIRONMENT
IMPACT ASSESSMENT
(EIA) TECHNOLOGY
- FINDING USERS**



CENTRAL INLAND CAPTURE FISHERIES RESEARCH INSTITUTE

**CIFRI'S Environment Impact
Assessment (EIA) Technology
- Finding Users**



Bull.No.99

May 2000

Central Inland Capture Fisheries Research Institute
(Indian Council of Agricultural Research)
Barrackpore-743 101 West Bengal

CIFR'S Environment Impact Assessment (EIA) Technology - Finding Users

ISSN 0970-616 X

©
2000

Material contained in this Bulletin may not be reproduced, in any form, without the permission of the publisher

Prepared & Composed at : **The Project Monitoring &
Documentation Section
CIFRI, Barrackpore**

Published by : The Director, CIFRI, Barrackpore

Printed at : M/S. Toparts Private Ltd.
8/2, Dr. Biresw Guha Street
Calcutta-700017

Background

Natural resources, for the past few decades, are being continuously and brutally exploited to provide for necessities, luxury and comfort to the growing populace. Aquatic resources are the worst sufferers in this regard, being the *ultimate sinks* of all environmental aberrations. The waste products generated on account of cultural eutrophication are directly discharged into the aquatic system, endangering the health of its denizens. This phenomenon has led to accumulation of toxic substances, heavy metals and non-biodegradable chemicals, besides unabated organic loading of the system, affecting its biotic health. Siltation, increased water abstraction and river course modification have further compounded the problem. These unhealthy practices have led to a significant shift in the biotic texture of the aquatic environment with gradual dominance of economically less preferred species over the desired ones.

The required increase in production and productivity on a sustainable basis in future requires a sense of caution at every level of production and development activities. We need to set ecologically motivated priorities for the same to *anticipate and prevent* rather than *react and cure*. Environmental impact assessment studies are a tool to arrive at the required priority of anticipation and prevention.

Central Inland Capture Fisheries Research Institute, as a result of its work during the last decade, has been able to evolve technology of Environmental Impact Assessment of various types of changes being commonly encountered in aquatic environment in the country.

The Institute's studies on the environmental problems relating to aquatic ecosystems since 1986 have been widely recognised in India & abroad and consequently it is looked upon as the main consultancy agency for assessing the environmental impact of major development projects.

The various consultancy work under taken by CIFRI in this field are enlisted below :

<i>Title of the Project</i>	<i>Category of the Project</i>	<i>Name of funding agency</i>	<i>Period</i>
Bioassay Toxicity Studies on Paradeep Phosphate Effluents	Consultancy	Paradeep Phosphate	1992-1993
Environmental situation and threat to Marine Fisheries in Bay of Bengal	Consultancy	BOBP Scheme	1993-1994
Studies on fish conservation in Narmada Sagar, Sardar Sarovar and its down stream - a desk review	Consultancy	Narmada Control Authority	1992-1993
Water quality monitoring and evaluation in River Ganga in West Bengal GPD	Sponsored	Min. of Environment & Forest, Govt. of India	1993-1998
Biomonitoring & Ecorestoration measures in selected stretches of River Ganga & Yamuna	Sponsored	Min. of Environment & Forests, Govt. of India	1993-96
Potentialities of tidal mangrove forests of Sundarbans	Sponsored	Min. of Environment & Forest, Govt. of India	1993-96
Studies on the impact of hot water discharge from Singrauli - NTPC	Consultancy	National Thermal Power Corporation	1993-96
Ecological and conservational perspectives of river Narmada with a special reference to SSP	Consultancy	Deptt. of Fisheries, Govt. of Maharashtra	1995-99
Likely impact on aquatic ecology in the context of barrage construction across the river Ganga at Kanpur	Consultancy	Deptt. of Irrigation, Govt. of U.P.	1997-1999
Environmental monitoring of oxbow lakes fisheries impact in the State of Bihar and Uttar Pradesh	Consultancy	Min. of Agril., Govt. of India	1998-2000

The following pages will detail some of the important EIA consultancies successfully undertaken by CIFRI.

A. Studies on the Impact of hotwater discharge on the aquatic life of the Rihand Reservoir

Sponsored by National Thermal Power Corporation Ltd., New Delhi

Objectives

Scientific information on impact of hot water discharge from Thermal Power Station on aquatic life in tropical conditions like India is scanty. The present study aimed to evaluate the impact through cooling system of Singrauli STPP on the aquatic life of Rihand Reservoir reported to have a 8-10°C rise in temperature. At present, Indian regulations does not permit more than 5°C rise in discharge water temperature over the *in situ* temperature.

The study covered the following aspects

- ☆ Physico-chemical parameters of the reservoir water receiving the hot condenser cooling water.
- ☆ Biological investigation of the reservoir.
- ☆ Conductance of bioassay experiment for thermal tolerance.
- ☆ Studying impact on aquatic organism due to thermal discharge and other such environmental modifications.
- ☆ Evaluation of the changes if any due to operation of the once through cooling system of Singrauli STPP on the ecology of Rihand reservoir.

Results and Recommendations

- ◆ Proper functioning of the proposed barrage is vital for maintaining optimum ecological behaviour of the river stretch, especially downstream.
- ◆ The barrage may not effect the movement of fish as the river stretch lack migratory fish species. However, it does effect local movements of fish and other biota.
- ◆ The upstream of the barrage, the reservoir area may provide relatively conducive environment for better growth of IMC provided there is no dislocation of breeding grounds.
- ◆ In case the discharge from the barrage fails to deliver the quantum or density of water and diluted sewage as per prescribed norms envisaged under the plan, the ecology of the river will be affected otherwise their will be ecological rehabilitation.
- ◆ The fish sanctuary at Bithur with *R.rita* dominance may become richer with widening of fish spectrum and can be converted into a potential recreation spot.
- ◆ The river would definitely experience shift in community structure of fauna and flora at lower trophic strata both above and below the barrage, which needs careful monitoring in future. Further likely colonization by macrophytes, *E.crassipes* in particular, need to be watched carefully.
- ◆ Past experince from many river systems suggest that any stable solid structure erected in rivers form the ideal substrata for *Trichoptera* sp. in troublesome swarms. Such likely development have to be looked into.
- ◆ Expansion in water area above the barrage would submerge substantially large areas of virgin lands on the northern bank of Ganga presently used for vegetable cultivation, cattle raising and other day to day activites by local inhabitants dominated by

- ❖ In future while developing site for setting up new power plant the discharge canal may be so located that breeding of fish species is not affected.

B. Likely impact on aquatic ecology in the context of barrage construction across the river Ganga at Kanpur.

Sponsored by Dept. of Irrigation, Govt. of Uttar Pradesh

Objectives

The city of Kanpur is facing a number of serious problems, ever since the river Ganga shifted its course away from it. The immediate fallout of this natural phenomenon has been felt not only aesthetically, like loss of water front along the city, but it has also thrown upon the city dwellers impalatable un-hygienic conditions arising out of the disposal of sewage over the dry and exposed old river course of the Ganga resulting in mosquito menace. Considering the public resentment and in the light of the recommendation of Chitale Committee, the Govt. of U.P. proposed to construct a barrage across river Ganga near Kanpur with the aim to restore the water front along the city and reduce the impact of sewage on the city dwellers. In the background of anticipated impacts of the barrage on various environmental variables likely to emanate from the changed hydrography of the river stretch between Bithur (upstream) to Shekhpur (downstream), it was felt necessary to conduct EIA studies. The Govt. Of U.P. assigned CIFRI this study under the project.

CIFRI carried out the assigned consultancy with the broad objectives viz., (i) fish biodiversity assessment in around the barrage site, (ii) population dynamics of economically important fish species and the likely impact on their fishery (iii) the suitability of the proposed fish ladder in relation to resident and migratory fish population and (iv) to suggest package of practices for fish species of economic importance and harvesting sustainable yield from the upcoming impoundments. In addition to these water quality assessment, biodiversity and socioeconomic aspects of fishermen community were also studied.

Results & Recommendations

- ◆ The thermal difference between inlet and discharge water in all the seasons was above permissible limit of 5°C and the 12 km long hot water cooling channel did not lower the effluent temperature to desirable level.
- ◆ Destructive method of fishing employed in the reservoir contributed to biodiversity loss.
- ◆ Hot water discharge have created barrier for migration of fry of major carps to nursery areas.
- ◆ There has been siltation in plume and adjoining lotic sector of the reservoir. Shallowness created in this sector is responsible for extending influence of hot water deep into offshore area where a temperature range of 37°C to 39°C is recorded. This has created a thermal impact at the prospective breeding grounds.
- ◆ Long term exposure of plankton communities to temperature of 36°C and above, suppresses the rate of primary production at the stressed site in the reservoir.

It has been recommended to

- ❖ Bring down present effluent discharge temperature through spray ponds etc or by rapid mixing through submerged discharge structure.
- ❖ Develop suitable plantations on both banks of discharge channel to drop water temperature by 1-2°C.
- ❖ Possibility of developing tolerant aquatic weeds along the channel. This may help in lowering temperature.
- ❖ Silting of lotic sector, resulted in extension of hotwater deep into offshore areas, affecting fish breeding zones. Thus dredging has been suggested close to the discharge channel.

fisher community. Evidently decline in income will occur which may be compensated by occupational shift in favour of fisheries.

C. Environmental Impact assessment of world bank assisted shrimp and fish culture project in Uttar Pradesh and Bihar.

Sponsored by World Bank

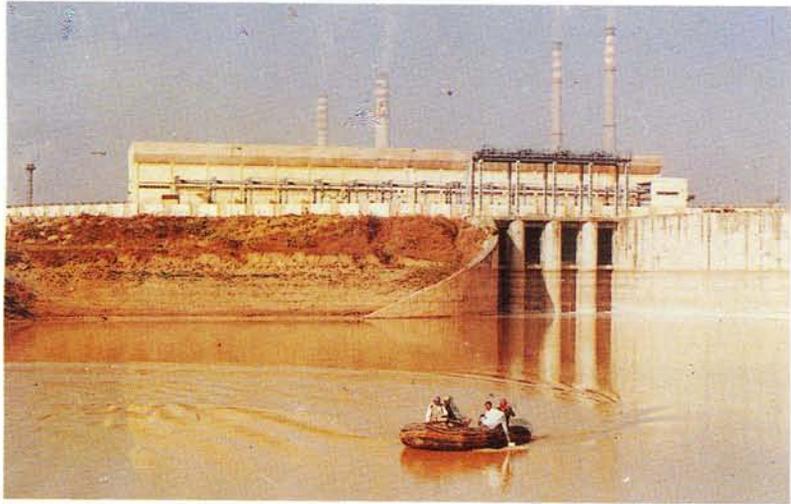
Objectives

A world bank assisted project on shrimp and fish culture is being implemented in five states of India. The fish culture component of the project comprises 200 small reservoirs and 37 oxbow lakes covering a surface area of 3175 ha. The main purpose of the proposed EIA studies is to conduct a comprehensive ecological survey of the 37 oxbow lakes covered under the World Bank assisted project in U.P. and Bihar. This will enable collection of baseline data for assessing the possible negative and positive environmental impact of the fisheries development project. The broad objective are :

- To monitor and evaluate the positive and negative impacts of the proposed development activities on these ecosystems by utilizing the background information and scientific database to be generated during the project period.
- To prepare monitoring protocol and environmental management plan specific to each or group of ecosystems.

Results and Recommendations

Two interim reports have been submitted and final report is in the preparatory stage.



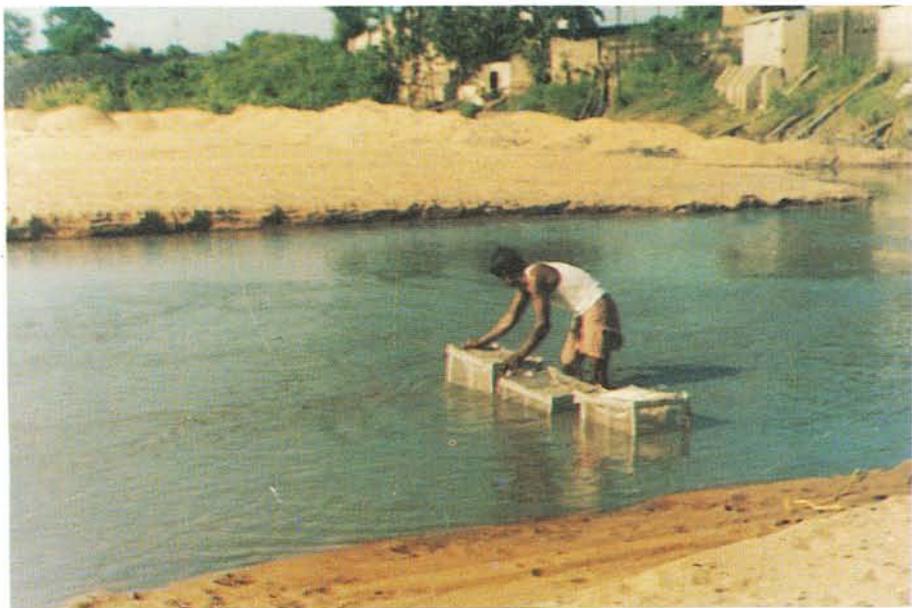
Environment impact assessment



Effluent discharge



Effluent draining into River Damodar



In situ toxicity studies



SEWAGE DISCHARGE AT ETAWAH



WASTE DISCHARGE AT MATHURA



INDUSTRIAL EFFLUENT, IRADATGANJ, ALLAHABAD, YAMUNA



SEWAGE DISCHARGE AT AGRA AT TAJ DOWN STREAM