Dams are a fishy business

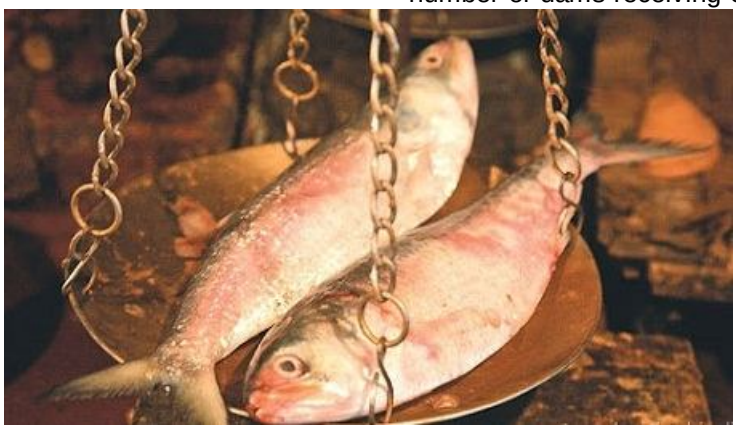
In the recent times, fish-loving Bengalis have been a troubled lot. The supply of coveted Hilsa or *Ilish* fish, from Bangladesh has reduced to a trickle. Bangladesh imposed an import ban on Hilsa and the price in Indian markets soared to over 1500 Rs/ kilo. Mamta Banerjee actually requested the Centre to intervene and convince Paschim Banga to send more *Ilish* to Bengal. Deepa Dasmunshi raised this issue first when Bangladesh Leader of Opposition, Khalida Zia visited Prime Minister in October 2012. And she was told the real reason. Padma, a distributary of Ganga River, famed for *Padma Ilish* is facing an acute drought-like situation. What was not stated was that Farakka Barrage built on the Ganga just before it enters Bangladesh, has been responsible for this and the near extinction of Hilsa, which once was found much beyond Allahabad.

21st November is observed as the World Fisheries Day

On this occasion, SANDRP made this submission to the Ministry of Environment and Forests, specifically it's Expert Appraisal Committee which sanctioned River Valley and Hydropower Projects on urgent need to pay attention to fisheries related issues while sanctioning dams.

The submission was endorsed by over 20 fisheries scientists, researchers, organisations and activists, including a member from National Board for Wildlife, a renowned Dolphin Conservationist and many authorities of fish diversity. (Endorsements at the end)

The above was just the most blatant example of impacts of dams on fish, an indicator of riverine health. Impacts of dams on Riverine biodiversity, including fish biodiversity, have been devastating for Indian Rivers.[1] This has been stressed many times by fisher folk as well as studies by Central Inland Fisheries Research Institute (CIFRI), Central Marine Fisheries Research Institute (CMFRI), several universities, independent researchers, NGOs and even the last three Five Year Plans. Dams have been singled out as the main reason behind fisheries collapse in major rivers like Ganga and its tributaries, Krishna, Mahanadi and Narmada, to name a few. Dams and related hydrological fluctuations have magnified the impacts of several other aspects detrimental to fisheries like pollution, sedimentation, wrong fishing practices and invasion by exotic introduced fish species.



Hilsa's fate hangs in a balance **Photo:** Travel.outlook.com

Dams have jeopardised the livelihood and nutritional security of more than 10.86 million fisherfolk in India, without any compensation, redressal or mitigation. There is no body entrusted with the protection of aquatic biodiversity, no separate Ministry for fisheries, no law for protecting fish diversity (the Fisheries Act, 1897 deals only with edible species), no law for protecting river flows, no law for enabling fish migration, no law for compensating affected Fisherfolk, to list a few. These are very serious gaps, with impacts on ecology as well as sociology.

In this scenario, proposals for more dams which will fragment rivers further and divert flows away from the river have to be looked at very carefully. Unfortunately, most of the decisions taken during the meetings of Expert Appraisal Committee (EAC)[2], and the number of dams receiving environment clearance at various stages, without adequate attention to impact on fish and mitigation measures, is very disturbing and needs to change.

EAC discussions and decisions are based on EIAs submitted by the proponent and these are routinely of a poor quality. Most of the EIAs severely underestimate fish diversity, for example Environment Impact Assessment of 200 MW Gundia HEP done by KPCL which concludes that there are *'no rare or endemic species fish species in the river'.* Not only does the region have endemic fishes, the region is one of the most

[1] http://sandrp.in/dams/Impacts_of_Dams_on_Riverine_Fisheries_in_India_ParineetaDandekar_Sept2012.pdf

[2] Expert Appraisal Committee (EAC) under the Ministry of Environment and Forests recommends environmental clearances to river valley and hydropower projects

important sites in India for protection of fish diversity as clarified by many studies in the region including one conducted by Indian Institute of Sciences, Bangalore. And this is just indicative, there are scores of such examples which can be readily provided.

The EAC needs to lay clear norms for EIAs about fish diversity in the region, dependant livelihoods, community conserved fish sanctuaries: impact of dams on all these, in situ mitigation measures, including eflows and only after that ex situ measures like hatcheries.

Unfortunately, an analysis of EAC decisions during the past nearly three years [3]reveals:

1. The EAC has demanded for fish passes and fish ladders at the time of recommending environmental clearance for only six projects out of 157 projects considered by it for clearance at stage I or II. Even in the six cases, this important condition is not clearly or strongly worded.

2. The EAC has demanded for fish passes/fish ladders at the time of granting/reconsidering Term of References for only nine projects and even here, the wording has been ambiguous. For example, in case of 50 meters high Mago chu Dam in Tawang Basin in Arunachal Pradesh, the EAC says 'fish pass *may be* considered'. Or for 128 MW Jelam Tamak in Uttarakhand, it says fish pass '*may*' be provided.

3. For scores of dams, fish passes and ladders have not at all been recommended, though there is a strong reason to do so.

o For example, in case of 36 MW Chanju I project whose barrage is only 16 metres high or 17 MW Chanju II HEP on Chanju Nallah in Himachal Pradesh, the EAC has not recommended a fish ladder. It has simply taken the word of the developer that there are no fish in Chanju Nallah. Actually Chanju Nallah and Siul Nalla where the projects will come up are on the Negative List provided by the Himachal Pradesh Fisheries Department, recommended for In situ protection of fish.[4]

o In case of Baspa Barrage, which is on Baspa River, also on the negative list, the EAC have not recommended a ladder though the barrage is just 16 meters above river bed.

The EAC must immediately reconsider their decisions on Baspa, Chanju I and II projects, reject the projects and recommend strong punitive measures against the developer, as per the steps provided in EIA notification. EAC also needs to take steps to ensure that it does not get misled like this in future and take wrong decisions.

o Same is the case with dams in Lahual and SPiti region, famed for its trout fishing. For many dams in Eastern Himalayan Biodiversity hotspot, no ladders or passes have been recommended.

o 200 MW Gundia Dam coming up on Gundia River in Kumaradhara Netravathi Basin, where just in the past six months six new fish species were discovered[5], no fisheries management plan is in place while recommending a very erroneous environmental clearance. This region is especially important for in situ protection of fish biodiversity and is a freshwater fish biodiversity hotspot in the World Heritage Site of Western Ghats.

o In case of Renuka dam on Giri river in Himachal Pradesh, the Central Empowered Committee of the Supreme Court and the Supreme Court itself had directed that fish ladder be constructed, but the developer, EIA consultant, the EAC and the MoEF all ignored that statutory direction.

The above list is only an indicative list, fish ladders/ passes are not recommended for most dams at the time of granting TORs or Environmental Clearances (EC).

4. While some dams are recommended fish ladders or passes, some are not without assigning any reasons for such inconsistencies. Decisions of the EAC seem totally inconsistent, unscientific and erratic.

o For example, in case of 50 meters high Mago Chu in Arunchal Pradesh, EAC has said fish pass may be considered, but for 42 meters high Dinchang Dam the EAC explicitly said: "The proposal for providing fish ladder in a 42 m high dam was not appreciated by the EAC as fish ladder in high dams is failure everywhere."

However, for the same dam, while reconsidering TOR for revised capacity from 90 MW to 360 MW, the EAC says "Committee felt that the issue cannot be left loose ended for a study. The Proponent needs to agree to provide fish passage for which the Proponent agreed." Firstly, EAC needs to ensure that decisions made one stage are not reversed at another without assigning any reasons. Such lack of

[3] Analysis of decisions from 34th EAC Meeting: Jan 2010 to 61st EAC Meeting: Oct 2012

[4] http://hpfisheries.nic.in/pdf/Negative_list_rivers_etc.pdf

[5] http://www.deccanherald.com/content/264870/researchers-stumble-species-fish.html
SANDRP's submission to the EAC on Fish Diversity affected by Gundia Dam, October 2012

consistency in EAC decisions for same projects but at different stages have been seen in other cases too like the Seli hydro project on Chenab River in Himachal Pradesh. Secondly, the EAC needs to define fish pass and fish ladder clearly as in normal parlance, the phrases are interchangeable and there are numerous designs for fish passes and ladders.

Fish Ladder on 60 MW Kuricchu Dam in Bhutan for migration of Golden Mahseer built by Indian NHPC Photo: drukgreen.bt

In many countries, including Bhutan, fish ladders are built effectively for high Dams. In Bhutan, for the 60 MW Kurichhu Dam built by India NHPC, a functioning fish ladder for Golden Mahseer Migration has been provided and is reported to be working well.

o While the EAC has recommended fish ladder for some irrigation projects, it has not done so for many irrigation projects with comparatively low dams on biodiversity rich rivers like Kanhan, near Pench National Park in Maharashtra or Kundalia Major Irrigation Project on River Kali Sindh in Madhya Pradesh, a tributary of river Chambal, or the Indira Gandhi Sagar Project on Wainganga River, which is destroying the livelihoods of 15000 fisherfolk only in the upstream, while the downstream impacts are not even estimated. More than 4 lakh people depend on Wainganga River for fisheries alone.

The MoEF and EAC to be consistent in recommending fish passes and ladders, based on unbiased, scientific studies and local participation.

5. Hatcheries and Fish Farms are increasingly being recommended by EAC when impacts of these on riverine biodiversity are entirely unstudied and unmonitored by MoEF. When effectiveness of these measures is not known, millions of rupees are allocated for the purpose without an assessment of what happens to the money.

The mainstay of all Fisheries Management Plans for hydroelectric projects seems to be **hatcheries, reservoir fisheries and fish farms**. However, there has been no study commissioned by the MoEF or recommended by the EAC or by any credible agency to study the impacts of these measures on riverine fisheries, livelihoods of local fisherfolk which are destroyed by the projects or the fish diversity in the river.

In this process, state fisheries departments are receiving huge sums of money from the private developers as compensation and for developing hatcheries and fish farms. This seems to be the main reason for easily-acquired NOCs from State Fisheries Departments.

In Himachal alone, the Department of Fisheries charges "compensation @ Rs. 0.50 lacs per MW power capacity and Rs. 0.50 lacs per km from tail race to weir of the project in case of macro projects being envisaged on the run of the river development." Bajoli Holi Project envisages paying a compensation of Rs. 97.75 lakhs to the fisheries Department, in addition of development charges for farms and hatcheries. Luhri Environmental Management Plan has an outlay of Rs. 346.57 Lakhs for fisheries management plan, to be paid to fisheries department. No wonder then that the Fisheries Departments are giving NOCs to most hydel projects, including those coming up in Negative List of Streams for in situ fish conservation.

What studies are conducted to ascertain the impact of these farms of riverine fish diversity? The EAC is fast in rubbishing fish ladders for high dams, though the same are being used worldwide after some serious research. But, the EAC does not seem to have any doubts about the efficacy of Hatcheries and Fish Farms.

However, it has been proved the world over that hatcheries help only a few targeted species (often exotic species) and not the biodiversity of the river. On the other hand, fish from hatcheries may actually be detrimental to wild riverine fish, as they may carry diseases.[6] In India too, hatcheries are breeding bigger species, commercial varieties and exotics like exotic carps and Rainbow Trouts in most of the Himachal Hatcheries. **They do not help fish biodiversity and natural population restoration, nor are they targeted to protect indigenous species**. They have impact on fish diseases, limit the gene pool, and affect invaluable biodiversity. Measures like Hatcheries, fish farms, reservoir fisheries also change the ownership of fisheries from a common pool resource to a controlled resource, severely affecting security of the people who depend on riverine fisheries for nutrition and livelihoods.

In case hatcheries and fish farms are unavoidable and these and reservoir fisheries are the only option, they can be set up on the lines of community managed reservoir fisheries like on Dimbhe Dam near Pune organised by the efforts of Shashwat.[7]

[6] http://www.nwfsc.noaa.gov/resources/salmonhatchery/risks.cfm
http://phys.org/news/2012-05-hatchery-fish.html

[7] http://articles.timesofindia.indiatimes.com/2012-07-10/pune/32617839_1_tribal-farmers-catchment-area-villages

Why is the EAC not recommending other options like innovative and well researched fish ways, fish passages and ladders and actual in situ conservation of fish by protected rivers? River Tirthan in Himachal Pradesh is the only example in India of a River protected for its rich fisheries. We urgently need to replicate such initiatives for other biodiversity rich rivers and stretches in all states and all kinds of aquatic ecosystems.

6. In situ Conservation of fish and aquatic biodiversity and protection of rivers needs to be looked at more seriously. For this, a number things need to be changed like:

a. Environmental flows The current norm of recommending 20% of average lean season flow in a 90% year, 30% of average monsoon flow and 20-30% of flow for months in transition is too little, ad-hoc, unscientific and not river and species specific. For many fish species which need flooding as a cue for spawning and upstream migration, 30% of monsoon flows will not help. Project specific, river specific eflows studies, based on the ecology and sociology of the river need to be undertaken by independent organisation, with local participation. State of art methodologies like the Building Block Methodology need to be explored instead of ad hoc, unscientific 'rule of thumb' methods currently adopted. In the absence of e-flows, fish passes and ladders will have no meaning.

It has been proved beyond doubt that fisheries collapse in most of the rivers have occurred due to absence of freshwater flows and spawning cues. Environmental flow allocation to estuaries like Krishna is extremely crucial. Maintenance of artificial floods has been practiced in many countries in Africa which has led to improvements in fisheries and have regularized high flow volumes well. These techniques need to be added to year-round regular maintenance of e-flows.

What Experts Say about Fish Ladders and Passes

Fish ladders/ passes are a controversial topic in India. While the MoEF and EAC would like us to believe that fish ladders do not work for our high dams, ladders for much higher dams (Ex. Pelton am in Oregon, Kurichhu Dam in Bhutan) exist and have been functioning well. SANDRP interviewed several fish and conservation experts from across India and Bhutan about fish ladders and passes. Fisheries Scientists and Experts are unanimous in asserting that we do not have any studies to back the assumption fish ladders/ passes are ineffective in India. We need more studies for our species as "our fish are not Salmon".

Nor do we have studies about the functioning, monitoring, management and efficacy of the rare few existing fish ladders (like at Narora Barraga, Hirakud, Harike, older Bhimgouda Barrage, Farraka Barrage, etc.) we have.

Questions to CIFRI solicited a response that MoEF takes fisheries mitigation very seriously and that CIFRI is working on a report on ladders.

Interestingly, experts were also unanimous in stating that hatcheries should be used as a last resort, if all in situ mitigation measures fail. In their opinion, hatcheries help only few commercial species, while loss of original gene pool and indigenous biodiversity goes unnoticed. Some experts also raised questions about the unaccountable and opaque way of functioning of hatcheries like the Tehri Hydropower Development Corporation's hatchery for Tehri Dam.

b. Release of environmental flows through fish passes/ ladders and not turbines Eflows need to be linked with fish passes. While well researched innovative designs of fish ladders/ passes need to be explored, all the eflows releases should take place through these fish ways and not additional, smaller turbines, as is being done now. It is well known that fish face high mortality and injuries even passing through turbines, so migration is impossible. If assurance of continuous flow is the concern then an ungated opening in the dam just below the MDDL (minimum Draw Down Level) adequate to assure lean season eflows should be mandated.

c. Distance between Dams The current onslaught of cascade dams on biodiversity rich rivers like Alaknanda, Bhagirathi, Chenab, Sutlej, Siang, Dibang, Subansiri, Teesta, Tawang, Kameng, Lohit, Netrawathi, Narmada, etc., will be disastrous to fish biodiversity. The current norm of EAC (though the EAC does not accept it as a norm, is what is being recommended) of a mere 1 kilometre between two hydropower dams will have very serious impacts on fish biodiversity and fisheries. This distance should be based on study of fish and riverine biodiversity for each river by an independent credible agency (not EIA consultants paid by the project developers without ANY credible accountability mechanism) done before more than one projects start getting allocated on any river. The EAC itself has stated in its 56th Meeting that minimum 50% of the river should be left free flowing. **MoEF and EAC need to conduct studies about optimum distance between two dams, based on the carrying capacity, ecology and sociology of the basin. This study should be done prior to**

recommending environmental clearances (EC) and not delinked from ECs.

d. Monitoring and compliance Monitoring and compliance of actual eflows releases, functioning of fish ladders, impacts of hatcheries and fish farms on diversity and local livelihoods needs to conducted by a legally empowered project specific team with 50% participation from local communities and civil society groups.

e. Exclusion of dams from EIA notification The EIA notification of Sept 2006 that is currently being followed has excluded large dams for drinking and industrial water supply, hydroelectric projects below 25 MW and also control measures like embankments from its purview. The assumption that these are benign measures with low environmental impacts (including on fisheries) is clearly wrong. Embankments on Brahmaputra have resulted in declined carp fisheries while small hydro projects in Western Ghats of Karnataka are seriously damaging invaluable fish biodiversity and community fish sanctuaries.

The MoEF urgently needs to change this to include all large dams (as per CWC/ ICOLD/ WCD definition), all hydro projects above 1 MW and all embankment projects for Environment clearance requirements. This will also help protect fisheries and riverine biodiversity. The River Regulation Zone (RRZ) Notification needs to be promulgated to protect riparian habitats along rivers and dams which play a crucial role in fish breeding and populations.Many fish are apex feeders in most riverine systems and fish diversity and abundance, along with vital population processes (migration, recruitment, spawning etc.) indicate the overall health of the river. **Freshwater fisheries, which are an important component of our rich freshwater biodiversity and a source of subsistence for millions of Indians, should be given their due by the MoEF.**

This is even more relevant and urgent in the context of climate change which is leading to major hydrological changes and affecting habitats. Dams are compounding habitat loss leaving no adaptive options for people or biodiversity alike. Let us hope that the MoEF and EAC together look at in situ conservation of fish urgently and seriously and help protect rivers and communities in the process.

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