Thirsty Rivers, Bygone Fishes, Hungry Societies

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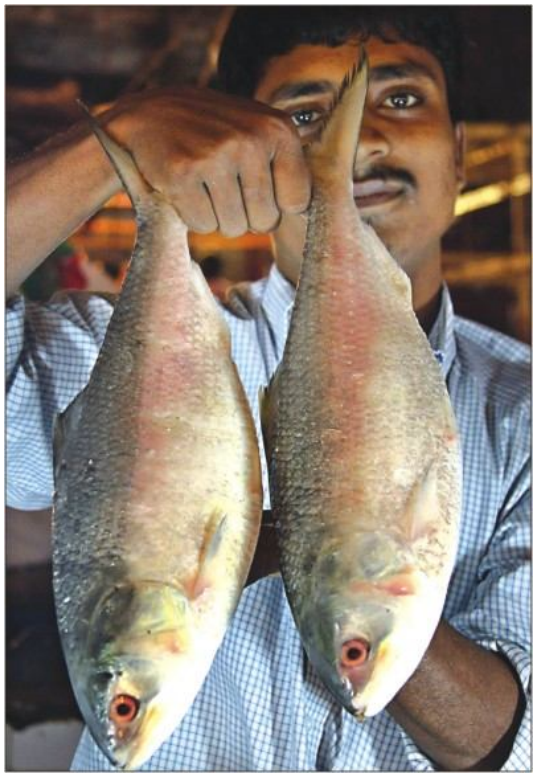
More than seven decades ago, there used to be a facultative[1] clan of monsoonal fishers in the interfluve region of the Ghaghra and Sarjyu rivers in eastern Uttar Pradesh. They would be involved otherwise in farming and related activities, but a time would come in September when they would go seeking Hilsa, that tasty fish running up the waters of the Ganges and into the Ghaghra River, all the way from West Bengal. The Hilsa *Tenualosa ilisha*, a clupeid fish species, used to make annual migrations upriver for spawning in the monsoons, throughout the Gangetic rivers. With that migration it would not only symbolize an eternal and connected river, but also the arrival of a nature-borne delicacy for poor fisher folk. In the Ghaghra basin, that delicacy is not even in anybody's memory now. The Hilsa, except in estuarine Bengal, has become extinct almost everywhere today due to the construction of the Farakka barrage across the Ganges. This barrage was constructed in 1972-73 and thereafter led to a complete blockade in their spawning migratory routes upriver, eventuating in a collapse of the once-viable commercial Hilsa fishery upstream. That was why I was astonished on hearing from the Ghaghra fishers that the Hilsa ranged so north once. Even British records have not mentioned the occurrence of migrating Hilsa much north of Allahabad.



The Hilsa is just one tragic example of many of its cousins that have met the same fate because of large dams. The yellow catfish *Mystus menoda* used to be another such sought-after seasonal fishery. Most fishers have not seen the 'Belonda' as it is locally called, in several years. The trend of declines in 'yellow migrant catfishes', irrespective of actual species, seems to be a mysterious yet common feature to all perennial rivers of India, from the Cauvery to the Himalayan foothill streams. Enormous declines have been noted for Mahseer in the southern region of the Ganges, to the tune of 'ecological extinctions', where these species are not able to perform their ecological roles or provide resources to fisheries anymore. Giant catfishes of our rivers, such as the Goonch *Bagarius yarrellii*, *Silonia silondia* and Pangas *Pangasius pangasius* that once grew to 200 kilos and above, have been nearly lost too. The freshwater stingray *Himantura sephen* is now a creature of the imagination. The freshwater *Macrobrachium* prawn fishery of the middle and lower Ganges upstream of Farakka has breathed its last. Our native carps, so highly valued by one and all that eat fish, have shown tremendous declines (up to 70%) due to dam regulation of river systems.

Dry Ganga downstream Farakka Barrage Photo Courtesy: http://riversandcommunities.wordpress.com/2008/06/

Fisheries collapse from dams has also acted in the reverse order, for species that migrate to the sea to breed and swim upriver to develop as adults. The most notable of these declines has been that of the *Anguilla benghalensis* eel or the *Bannbir* or *Bannbouchh* in local terms. This eel is not a sensitive animal.

[1] Not necessarily fishing, not obligate or restricted to fisheries alone.

Apart from being a good, powerful swimmer it can 'walk' on flooded rice fields and marshy wet grassland until it reaches the next water body. It uses surface water connectivity of flooded wetlands by powering itself with large air sacs. Despite this, fishers throughout north and central India report that these large eels have nearly vanished. If even the hardy eel finds no water, it says everything about the rate at which crucial fish habitats are being dissipated.

***Anguilla benghalensis* eel or the Bannbir or Bannbouchh Photo: Wikimedia Commons**

Also, dams have seriously limited the influx of freshwater that maintains estuarine conditions and processes. 'The sea is already at the doorstep of people near Sonakhali' says an old fisher about 30 km inside from the Hooghly-Sunderbans delta mouths at the Bay of Bengal. Historically important commercial fishes such as the sawfish or the 'comb fish' or *Chiruni Maachh* in West Bengal, have become extinct in the estuary. This fish was a predatory unique species with a side-barbed snout. The increase in salinity of estuaries because of low freshwater releases by dams across India is also leading to destruction of mangroves and increased coastal erosion. Thus dams have not only affected the fishes but also their homes and nurseries. Seeing the impressive pictures of these unique river giants, one often feels a sense of guilt, along with loss. The bygone fishes of the Gangetic basin serve as painful memory of the undammed past.

Fishing in Ganga Delta Photo: http://www.realmagick.com/ganges-delta-agriculture-and-fishing/

It is also difficult to imagine fishes now as more than food in the public psyche; especially less so as independent, charismatic entities of biodiversity, recognition they immediately deserve. But for the fisher community it is a memory of tastes that heralded a glorious, pristine past. It is folk lore, cuisine and grandfathers' tales of their times. For the young fisherman it is a borrowed, created experience, feeling those tastes without never actually feeling them. Being able to eat these fishes has been a sense of identity, now stepped over by a distant process of destruction.

Fishers who live off the Ganges strongly feel the pressure of dams everywhere. In north India, 'Farakka' – the word doesn't mean a village on the Bangladesh border anymore, but means destruction by dams. The local Hindi dialects have borrowed new phraseology: "*Farakka hua, tabse hilsa toh bas bhabis* (Farakka happened, and then Hilsa exist only in imagined future)". The same phrase repeats up to the Yamuna River! In my recent status survey of Gangetic fisheries almost 75-80% of fishers singled out 'Farakka' as the root cause of all their miseries. They actually referred to multiple barrages built on the respective rivers. But destruction had a common name.

The in-river scarcity of water is not limited to the loss of fish species alone. Having little water causes a cascade of effects – the collapse of fisheries (to the tune of 90% in general, and almost 99% for migrant fishes) leads to destructive fishing methods being adopted in desperation and a boom-and-bust fishery begins. Mosquito nets are set up in the main channels of rivers (which would not withstand the flow of enough water), which cause indiscriminate capture and mortality of fish eggs and the smallest of juvenile fishes. How will the fish even grow as a population if the youngest of their lot die at the rate of thousands of tons daily? Invasive exotic species such as Tilapia, Chinese Carps, and (hold your breath) Red-Bellied Piranha, are taking completely over natural river fisheries in India by escaping from food fish culture ponds, as they can establish faster in low flows. Poisoning of shallow side-channels to capture fishes *en masse* is another horrible fallout of not having much water. The human capacity to degrade fisheries has only been exacerbated by dams and excessive, wasteful regulation of water. When the river flow is so impoverished, digging sand or gravel becomes much easier. And then there is the threat of excessive sand mining that causes extreme destruction of alluvial floodplains and nesting habitats of several turtles, birds and crocodilians.

Completely Dry Ganga downstream Bhimgouda barrage in Uttarakhand Photo: Parineeta Dandekar

We are not much behind China in our freshwater biodiversity debacle. China has also had very similar species going almost extinct in the last 2-3 decades: broadly shads (Clupeids), large catfishes and sturgeons. The Three Gorges Dam on the Yangtze River has converted this mighty river into a large open sewer. Much has been lost in this human-made disaster, including remarkable wild species such as the Baiji or Chinese River Dolphin that are totally extinct, and the Chinese alligator and several endemic turtle species that are now extinct in the wild. It is a for-real forecast of what our species are likely to face given imminent 'complete devastations' of freshwater habitats in the form of proposals of hundreds of dams and river interlinking. The Ganges river dolphin, Gharial, soft-shell and *Batagur* turtles and several fishes are exact parallels to species that are only confined to human memory now in China. The devastation is in our face.

When will our dam builders, ministries of environments, fisheries developers and technocrats wake up? Dams on regulated rivers are supposed to provide timely releases of water in the river, as 'base flows' or 'minimum flows', 'environmental flows or e-flows' as per seasonal dynamics of pulsed flooding and flowing cycles of the rivers. There has however, been no commitment at all from the government or the National Water Policy Draft, 2012, (or even the current NWP 2002) on the issue of 'e-flows', and of course, no action to maintain flow regimes similar to natural variation or even to maintain minimum flows to maintain hydrological continuity. In fact, recent studies on regulation of tropical rivers suggest that it is not enough to just maintain minimum or e-flows, but near-natural, adequate flows are required for a multitude of ecosystem processes and functions apart from meeting irrigation, hydropower and industry needs. This is a difficult balance, but it has been suggested that it may still be possible to approximate these needs through regular releases that follow seasonal changes in natural flow regimes. Regular flow releases could actually entail significant benefits to local farm and fish-based economies, mostly practiced by marginalized resource users. Just allowing more water to flow in the river could be a far more effective subsidy than other 'intensive' allocations to these producers (e.g. fertilizers or imported gillnets). At the moment, there is virtually no water in the dry-season even in many large, mountain-fed rivers across the country, as dams have diverted it all away rather wastefully and cheaply, and there is no accountability on the rational use of water distributed. Wasteful, high-end use of water by urban areas, industry or hydropower projects is highly subsidized, whereas it is these uses that need to be charged for cross-subsidy benefits to marginal producers directly dependent on the rivers. These careless allowances have fuelled the pipe dream of technological capacity that our urban societies are still lost in.

If there is not enough water in our reservoirs and rivers, where is the question of mitigation measures for river fishes to migrate for spawning, as is assumed vehemently for a safeguard? For instance, the Farakka fish lifts do not seem to have been of any help, for studies have been reporting Hilsa extinctions both upstream and downstream to the tune of 99.9%. If they were effective even up to a tidbit of what is claimed, poor fisher people wouldn't have singled out these extinctions so firmly. Some other dams in hill-streams and

rivers in the Western Ghats and lower Himalaya have fish ladders that have been claimed relatively helpful, but there is absolutely no empirical demonstration of success available. For large rivers, fish ladders, lifts and passages have been a total failure of mitigation. The success of mitigation has to be assessed at least through the partial restoration of viable local commerce based on migrant fishes, not by touting the occasional flood-time crossover of a handful of fishes to reaches upstream of dams.

Most fish ladders have been completely ineffective as the water levels are simply too low for fishes to cross over their rungs. Tropical fishes have different strategies from species such as Salmon that migrate over dam passages in cold-water rivers and streams. Yet, there is hardly any research on the needs of migratory tropical fish species while planning 'engineering textbook designs' of these ladders and passes. There are many designs, ideas and trials, but what is really needed is enough flowing water. Furthermore, we need a whole body of research on what 'our' fishes actually need, for our fishes are no salmon, and the rivers are not bursting with rapids of icy water (our rivers are much bigger forces to reckon with). There has to be the context of specific address of livelihoods and biodiversity in dam engineering design, mitigation measures, through consultations with local farmers and fishers about the levels of water they desire to see in the river. It does take courage to conduct large-scale experiments on the effective and optimal flow release procedures, but it is needed urgently now if we have to understand the dynamics of species responses to different flow regimes. Will dam engineers and ecologists sit together and conceive options for flow regime 'creation' by fixing timely releases? It will be of high value and take substantial bureaucratic courage to test experimentally, through treatments and controls with flow regimes for short time-periods in actual dams. Multiple new practices are being adopted in many tropical countries in Africa for the maintenance of artificial flooding to help wetland rice cultivation (IUCN, 2000, www.omvs-hc.org). Artificial flood maintenance might be an important temporary solution to balance provision of enough water for replenishment of floodplain soils and hyporheic recharge.

River fisheries have been one of India's most underperforming production sectors over the last 3-4 decades. If one had to clinically investigate this decline, it coincides with the period of maximum dam building in India. Very few reports actually mention that the major cause of river fishery collapse has been dams, most reports point to river pollution. But dams have also played a role in massively concentrating pollution effects by reducing the dilution capacity of rivers.

States like Andhra Pradesh and West Bengal have become big on commercial carp production in managed ponds. This has contributed to India becoming among the largest producers of inland freshwater fish in the world, registering a growth of something like 30-40% in inland fish production just over the last 15 years. But such ranking hides a lot of miserable facts about river degradation. Pond fisheries, due to their sudden (short-term) economic gains, have cornered all attention of fisheries development only to culture ponds and hatcheries. Hatcheries are even being recommended for helping fish grow, that could be released back into rivers to enhance production. But how will these fishes live out there in nature, without adequate, clean water and unblocked swim ways? Also, millions of fishers have no access or capital to start hatcheries, and continue to subsist on natural flows. With their only basis of survival taken away a mass exodus of fishing castes has been occurring; and eking it out as rickshaw-pullers and construction laborers in cities. One could argue that letting some more water flow in the rivers' natural courses could avert these severe economic collapses. Besides it will provide social, cultural, environmental, ecological and hydrological benefits, including groundwater recharge.

The heavy and criminal discounting of river water is going to hit back hard at us one bad day, a fitting price for our blindness as a society to the everyday impacts of dams we have right before us. In the process of denigrating river water, habitats and biodiversity, we would have sold short the lives of millions of Indians. Natural river courses with adequate water, are not only essential for humans, fishes and wildlife, but most critical for the survival of rivers themselves. It is said how we treat our thirsty rivers is a sign of how much we respect our culture and civilization. A look at the parched river courses points to the course our fish wealth has already taken, and our human resources will soon have taken.[2]

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Ganga, Fish and Farakka in some recent Parliament debate

Shri Prasanta Kumar Majumdar (Revolutionary Socialist Party MP elected from Balurghat, W Bengal) said during a discussion under Rule 193 on *Situation arising out of the threat being posed to the very existence of River Ganga and the Himalayas* in Loksabha on Dec 19, 2011[3], "In my state west Bengal the Farakka dam obstructs the river and the Calcutta port is also in poor condition. So the Central Government must take steps in this regard. The fishing community of the basin is wholly dependent on Ganga. The river Ganga must be preserved in the interest of the fishermen also."

Bihar's RJD leader Shri Lalu Prasad Yadav said in the same discussion, "Right from Farakka to Uttar Pradesh lakhs of fishermen live along both sides of this river but today they are starving and have no work to do. Nobody is there to listen to their grievances. People have disfigured the geography of this nation and have also done a great damage to the rivers."

Shri Parbodh Panda (CPI MP from Midnapore in W Bengal) during a debate in Loksabha on Ganga River on May 17, 2012[4] said: "Farakka project is creating problems in many respects. My suggestion is that, fast augmentation of water flow should be done and most of the dams should be bent and crushed. Steps should be taken against illegal mining. Stringent laws should be made against pollution causing activities. There should be a re-look at the international and several other agreements. There should also be a relook at the dams, canals and hydro plants. There are several options of providing electricity, but there is no alternate to the river Ganga. So, the Ganga should be protected now."

[3] http://164.100.47.132/synop/15/IX/Sup+Synopsis-19-12-2011.pdf
[4] http://164.100.47.132/synop/15/X/Sup+Synopsis-17-05-2012.pdf