

Analyzing Condition of India's Inland Lakes and Reserves for Fish and Fishing

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Abstract

Over the last decade, the decline of the world's fisheries supplies has been a source of widespread anxiety. Creating up to 5.68 percent of the world's fish stock, India is considered the second-largest source of fish assets. Due to recent technological advancements, fishery frameworks have become a more practical and alluring option. Our country's interior fisheries are arguably one of the greatest; they range from icy lakes at high altitude to tropical marsh ponds and lakes. As the cost of maintaining these systems has decreased because to recent mechanical advancements, they have become a more conservative and attractive suggestion. The Fisheries Department is recognized as playing a crucial role in the nation's economic growth.

Keywords: aquaculture, fish, fisheries, reservoirs, etc.

1. INTRODUCTION

Over the last decade, the decline of the world's fisheries supplies has been a source of widespread anxiety. With a contribution equal to around 5.68 percent of global fish stock generation, India is considered the world's second-largest source of fish assets. In addition to its traditional agricultural products, India has become known as a major producer of fish using hydroponics, ranking second in the world only to China. The Fisheries Department is recognised as playing an essential role in the economic growth of the nation. It is an asset of efficient and sound food despite being an international exchange worker, and has been recognised as a significant source of income and employment creation as the impetus for the expansion of several beneficial enterprises. For a large number of people in the nation who are economically disadvantaged, this is a very important source of income.

1.1 Schemes relating to development of fisheries sector

The eleventh arranging commission has so far allocated over 2776 crore rupees to Central government initiatives. The

eleventh arranging commission allocated around 1279.62 crore for the full arrangement, of which approximately 1209.97 crore was spent, accounting for 94.56 percent of the overall measure of distribution of financial plan for above stated plot. Nonetheless, during the twelfth planning commission, a total of 2,483 crore was been out for the growth of Fisheries departments across the country. Animal Husbandry, Dairying, and Fisheries Division is as proposed, limiting the details of the various plans.

- National Fisheries Development Board (NFDB)
- National Scheme of Welfare of Fishermen
- Development of Inland Fisheries and Aquaculture
- Development of Marine Fisheries, Infrastructure and Post Harvest Operations.
- Strengthening of Data base and Geographical Information System for Fisheries Sector.

Each of these major types of inland fishery planning accounts for the unique characteristics of ponds, lakes, reservoirs,

and tanks. The primary objective of the plan is to initiate the recruitment of water-accessible areas, to increase aquaculture through the construction of new lakes, tanks, and ponds, to raise awareness about fish culture, to make use of a previously untapped resource (the vast area of harsh) for fish farming, and to provide a suitable innovation for the comfort of fisheries activities related to cold water.

2. DEVELOPMENT OF INLAND FISHERIES AND AQUACULTURE

All 429 Fish Farmers Development Agencies (FFDAs) working together to serve every possible area in the nation. For the purpose of bolstering the fisheries division, the Government of India has established four Fisheries Institutes. These institutions are assisting in the areas of specialised prepared labour to the fisheries sector, examination of techno monetary chance report for site up of fishing harbor/fish landing focuses, etc., training in fish handling, and other collaborative endeavours. Our country's interior fisheries span from icy lakes at high altitude to steamy ponds and lakes in the lowlands. Fish production from inland biological systems is substantial and might account for as much as half of the country's domestic fish gracefully. In India, aquaculture practises have been implemented in the interior reservoirs or lakes that are used in the generation of electricity and in agricultural contexts. To a good extent, these inland biological systems have been introduced to a variety of fish species.

Fewer new reservoirs in India have become focal points for research into the physico-synthetic variables and fish science. Four reservoirs in Northern and Peninsular India were studied biologically, and their utilisation by fish was afterwards documented; the study also highlighted the elements that affect the productivity of financial fish in these reservoirs. Even though the supply fishery has advanced greatly in India, it has had some unfavourable effects on the native fish

species that existed before dams were built. Plans for fish stepping stools and passages in India's dams and weirs fall short, and the lack of water flexibility during dry months and poaching of large fish renders them useless. Dead fish in the water will never be replaced since there is no fish ladder for them to utilise to get back into the river. The rapid-moving stream is transformed into a stagnant body of water, which has unfavourable consequences for stream fishes once a dam is built. Since the water velocity has decreased, the cement-organ fish cannot survive in the lake's deep waters, and the fish are oxygen deficient due to a lack of algae, the fish here are unable to thrive. Due to encrustation caused by the stones in the shallow, fast-moving streams, they are unable to survive in the lacustrine environment. Some fish that have adapted to the new environment will survive.

2.1 Tanks and small reservoirs

Medium and large reservoir specifications are often straightforward, since there are fewer of them and the details are readily available with water system, power, and public works professionals. Still, it's a tedious task to collect data on tiny reservoirs since they're everywhere and too different to assess all at once. Adding more confusion to the situation is the ambiguity introduced by the language changes made by certain of the States. Commonly used to describe some of the smaller reservoirs in the water system, the term tank is frequently roughly described and used in similarly idiomatic ways. As a result, a large number of man-made ponds and lakes are classified as tanks, preventing them from being included as reservoirs in assessments. As a term, "tank" lacks consensus. Tanks refer to a component of water system reservoirs, comprising small and medium sized water bodies, in Andhra Pradesh, Karnataka, and Tamil Nadu, but in the eastern states of Orissa and West Bengal, lake and tank are interchangeable articulations.

3. INLAND FISHERIES IN INDIA

Fish consumption in India is 9.8 kg/capita/year, whereas chicken consumption in the country is just 1 kg oven meat per year, revealing the importance of fish in India's nutritional security. Eighteen percent of the nation's total agricultural fare is generated by the sale of fish and shellfish, totaling 8.13 lakh tonnes in 2011-12. With an impressive eleven-fold increase over the last sixty years, India's fisheries industry has propelled the country to the forefront of fish-delivering nations worldwide. Production of marine (3.22 million tonnes) and inland (5.07 million tonnes) fish in India increased from 0.75 million tonnes in the 1950s to 8.29 million tonnes in 2010-11. With a concomitant increase in inland fish production, the percentage of marine fish in overall fish production has decreased steadily over time, from 71% in the 1950s to 39% in 2010-2011. India is the world's third-largest producer of fish and the largest producer of inland fish, according to data from 2012. Production of about 8.29 million tonnes per year, worth Rs 415 billion, means that fish contributes more than 1% to public GDP, while its supply in agriculture GDP is over 5%. (Fisheries is understood by strategy creators to be a segment of farming). More than 14 million people make their livelihood from fishing and fish farming, and another similar number earn a living through support activities including fish preparation, trade, and the development of fishing specialty and rigging.

3.1 Inland fisheries

India's rivers, ponds, lakes, reservoirs, and floodplain wetlands are all excellent resources. Catch fisheries in rivers, estuaries, tidal ponds, and lakes; aquaculture in ponds; and other forms of upgrades (mostly culture-based fisheries and stock development), being practised in reservoirs, lakes, and floodplain wetlands make up the nation's inland fish creation frameworks. Regardless, detrimental human influences on the marine climate are

dramatically decreasing catches from rivers and estuaries.

3.2 Freshwater aquaculture

At a current level of use of 40% of the potential water zone of 2.4 million hectares, freshwater aquaculture produces 3 million tonnes of fish annually, providing sufficient expansion for vertical and even growth. Three important Indian carps—the (catla), (rohu) (Labeo rohita), and (mrigal) (*Cirrhinus mrigala*)—currently account for 87% of freshwater aquaculture production. Standardized culture frameworks with different carp mixes have been developed to adapt to a variety of settings and informational levels, and these frameworks have been integrated with other cultivating practises to ensure an annual profit of Rs 50,000 to 90,000. (in the same place.).

Initiated fish breeding and composite carp culture sparked the growth of carp culture in the 1970s, but two recent innovations have expanded freshwater aquaculture's potential even further: the development of an improved rohu (Jayanti) with 70% higher development, made possible by a determination programme; and, the widespread and off-season breeding of carps, which has made seed accessibility possible in a wider range of seasons. Fish Farmers' Development Agency (FFDA) ponds throughout the country have increased their average output to more than 2.9 tons/ha/year thanks to the use of composite carp culture innovations, with some farmers achieving far higher creation levels of 8-10 tons/ha/year. In addition to the cultivation of Indian notable carps, there is room for developing a society of catfish, especially magur (*Clarias batrachus*), which is in great demand. High-value coldwater fisheries and aquaculture are also seen as a priority area for research and development in India, particularly in the mountainous regions of Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, and Arunachal Pradesh.

Despite progress, there is still a lack of fish seed throughout the country, and a sufficient number of incubation facilities

must be established in diverse locations to prevent the necessity for substantial distance transportation. Adequate growing area must also be created to ensure the consistent mobility of fingerlings. The success or failure of an aquaculture enterprise is also determined by the quality and price of the feed used in the operation. The estimated feed need in the next 10 years is 10 million tonnes, of which 30% would be commercial pelleted feed, taking into account the increased depth and breadth of freshwater aquaculture. A similar lack of animal diversity is also seen in the aquaculture industry. Twenty-five to twenty-seven different species of finfish and shellfish, such as giant freshwater prawn, catfishes, and ornamental fishes, are prepared for commercial development to meet the demand from domestic and international markets. Research institutions in the country have deployed major efforts on seed generation of selected species at the public level, establishing model creation units to promote species promotion in freshwater aquaculture. The need for a sustainable post-harvest and advertising architecture, including cold chains, is another major concern. Breed improvement, fish genomics, transgenic, bio-remediation, and antibodies are some of the major areas of research and development on the anvil. With freshwater supplies dwindling and wastewater populations growing, scientists are looking at water-efficient production methods and ways to recycle wastewater. Additional consideration is being given to the expanding demand for naturally grown fish, and efforts are being made to diversify the range of natural farming methods and confirmation systems such that they constitute at least 10% of the entire aquaculture output for satisfying the niche market.

4. INTEGRATED FARMING SYSTEMS

In order to maximise resource efficiency and increase productivity, integrated

farming systems coordinate several facets of agriculture, such as field crops, livestock, poultry, and fish. It's fairly uncommon for the byproducts and wastes of one area to serve as inputs for another, dramatically cutting down on production costs. Integrated agricultural systems are a tool for achieving sustainability and lowering ecological corruption risks by making use of natural wastes. Integrated farming with rice and fish is a long-standing tradition in many parts of India. Because of the recent technological advancements, these systems are now recommended as a safe and desirable option. More than 60% of India's total 18 million hectares of trench flooded land, 6 million hectares of low and rain taken care of land, 3 million hectares of deep water, and 1 million hectares of coastal wetland rice culture systems are suitable for rice-fish growth. Indian major carps (catla, rohu, mrigal), catfishes (magur, singhi), medium carps (bata, kalbasu), minor carps (mola, spikes), snakeheads (murrels), and roosts are all fish and shellfish species that would do well in a freshwater rice habitat (koi and gourami). Seaside salt areas are populated with mullets and tiger shrimps alongside salt-tolerant, lowland rice, and in flooded shallow waterways, fish and prawn seed growing may be combined with rice growth under favourable conditions (20-30 cm water profundity).

4.1 Capture fisheries

- **Rivers:** With 14 major rivers, 44 medium rivers, and countless tiny rivers and desert streams, the country's river systems are home to one of the world's most lavish fish genetic resources. As many as 265 distinct fish species are found in only the Gangetic trough. In addition, 76 species have been documented from the rivers of the peninsula, and 126 species from the Brahmaputra system, distributed among 26 families. However, the rivers have a complex mix of unique, medium, and traditional

fisheries with a deeply dispersed and sloppy advertising system, making it difficult to collect average data on fish productivity. However, a solid data foundation on river fish reproduction patterns is still elusive. Data collected by CIFRI from specific locations along the Ganga, Brahmaputra, Narmada, Tapi, Godavari, and Krishna show that the average production of fish from these rivers is 1 tonne per kilometre, with a range of 0.64 to 1.64 tonnes.

Several disturbing trends in riverine fisheries, especially the Ganga, have emerged through analyses of capture data collected over the years. The negative effects of natural changes on fish output are shown by a precipitous decline in fish production along five segments of the Ganga: Kanpur, Allahabad, Buxar, Patna, and Bhagalpur. After peaking at around 205 tonnes between 1958–59 and 1965–66, fish harvesting in the Ganga at Allahabad has steadily decreased to 59 tonnes in 1996–97. The reduction in the production rate of valuable Indian notable carps from 91.35 tonnes in the 1950s to an alarming 4.9 tonnes in 1996–97 has also been noted. The Brahmaputra, Godavari, and other rivers have contributed to a general drop in catches. There are several causes for the decline of fish populations in rivers, including environmental destruction, over discharge, and the lowering effect of dams and other controls.

- **Upland lakes:** Because distinctive lakes have not been analysed for their fishing potential, data on fisheries exercises in highland lakes is limited. Because of their limnological properties, they are suitable for developing cold-water fisheries. Some of the native and colourful fish species that thrive in upland lakes include schizotharacids, mahseers, trout, trench, Crucian carps, and the mirror carp. Based on our 2001 research, we found that the yield rates in Himalayan lakes

varied from 8 to 22.5 kg/ha in Dal lake, 10 to 28.5 kg/ha in Anchar, 15 to 45 kg/ha in Wular, 2 to 6 kg/ha in Manasbal, and 5 to 15 kg/ha in Sivalik lakes. *C. carpio* dominates the gills in most of these lakes, however schizothoracids and mahseers in the northern lakes and *Oreochromis mossambicus* in the Deccan lakes have made sizable commitments of their own. These highland lakes have hardly no regulations at all. Some of Kashmir's lakes are also seeing a disturbing trend in which schizothoracids are making way for the common carp. At the moment, common carp accounts for anywhere between 65 and 78 percent of all fish caught in the Kashmir valley. Similarly, if the mahseers in Kumaon and Sivalik lakes should ever appear, we would see a situation similar to what we have already experienced. The fundamental carp is a vital component in Bhimtal Lake's discovery checking degradation of the *Tor putitora* population. These sources of water are too far away and have too cold of a climate for rapid growth in output and production.

- **Estuarine fisheries, tidal ponds and backwaters:** One of India's most valuable resources is its fish population, and much of this population relies on the country's many estuary systems. Estimates put the average output somewhere in the range of 45 and 75 kg/ha. The Hooghly-Matlah estuary framework, the largest estuarine complex in India, is now undergoing a continuous monitoring of the fisheries. However, alterations in riverbeds have had a devastating impact on estuarine fish populations. Due to sand bar growth at the ocean outlet,

the Mahanadi estuary is characterised by weak flowing movements and flood discharge, which has an effect on fish supplies. Likewise, the fisheries of the Godavari estuary have been significantly impacted by the growth of sand bars. Since the Ukai dam was built and the number of companies along the banks of the Mahi River has increased, the estuary's capacity to support fishing has decreased significantly.

➤ **Mangroves and estuarine impoundments (bheries):**

Mangroves are delicate ecosystems that play an important role in the reproduction and growth of many commercially valuable riverine and marine species, in addition to supporting their own fisheries. However, the nuances of fish production in these water bodies are unavailable since mangroves are protected zones where fishing is either forbidden or done on a resource premise. The Sundarban, where about 85 percent of India's mangroves are located, is under unprecedented climate and human-caused stress.

5. CONCLUSION

India is also a major producer of fish via aquaculture, ranking second in the world after China. The Fisheries Department is recognised as playing an essential role in the economic growth of the nation. Production of marine (3.22 million tonnes) and inland (5.07 million tonnes) fish in India increased from 0.75 million tonnes in the 1950s to 8.29 million tonnes in 2010-11. Integrated farming with rice and fish is a long-standing tradition in many parts of India. In India, aquaculture is practised in the interior reservoirs or lakes that are utilised for the production of intensity and for agricultural uses.

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