

Aquaculture: Riverine Fisheries Development in Bihar

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Abstract: A large Bihar's population relies on agriculture and fishing for their livelihood. The fisheries sector plays a critical role in ensuring nutritional security and creating employments. The culture and consumption of fish therefore has important implications for national income and food security. Bihar's fisheries sector has witnessed significant growth and development in recent years. But even in the 1960s and 1970s, Bihar was the largest provider of Indian major carp seed to the entire nation from its riverine resources in order to supply the expanding freshwater aquaculture industry. Bihar's primary fishing resources are located in rivers, lake, reservoirs, ponds and tanks of various sizes that are dispersed all over the state. They provide tremendous opportunity for the growth of aquaculture, whereas seasonal ponds are ideal for raising seed fry, fingerlings, and yearlings. Read more about the universities in Bihar from and in this article in detail.

Keywords: Aquaculture, planktons, Physico - chemical, fisheries, River

1. Introduction

Bihar, a state in eastern India, is home to a thriving fisheries sector. The state's abundant water resources, including rivers, lakes, reservoirs, and ponds, provide favourable conditions for fish farming and contribute to the development of the fishing industry. The fisheries sector in Bihar plays a significant role in the state's economy, providing employment opportunities and contributing to the nutritional security of the population. It is primarily focused on freshwater aquaculture, including both traditional and modern farming practices. Bihar has a rich tradition of small - scale fisheries, with local communities engaged in fish farming for centuries. However, in recent years, the state government has taken various initiatives to promote commercial aquaculture and enhance fish production. The major fish species cultivated in Bihar include rohu, catla, mrigala, silver carp, grass carp, and common carp. These species are well - suited to the climatic conditions and water resources available in the state. The government of Bihar has implemented several schemes and programs to support fish farmers and boost the fisheries sector. These initiatives include the establishment of fish seed farms, the distribution of improved fish breeds, the provision of financial assistance, and the promotion of scientific fish farming techniques. The state has also focused on developing infrastructure for fisheries, including the construction of ponds and tanks, the improvement of fish landing canters, and the establishment of fish markets and processing units. Furthermore, Bihar has witnessed the adoption of modern techniques such as composite fish culture, integrated fish farming, and the use of advanced feed and disease management practices. These advancements have helped increase fish production and improve the overall productivity of the fisheries sector. At present, Bihar is India's 12th greatest fisheries resource, with 4th place in inland fish output and 6th place in freshwater seed production (Kumar et al., 2018). However, frequent floods in North Bihar and drought in South Bihar, dominance of traditional agriculture and aquaculture practices, underutilization and low productivity in floodplain wetlands, reservoirs and ponds and tanks, availability of limited

species for freshwater aquaculture, high cost and less availability of input (fish seeds, feed, aqua - medicine, etc), imbalance use of feed, fertilizers and chemical, lack of storage facilities, marketing and transport infrastructure and uncertainty in adequate and timely availability of bank credit are the major challenges for aquaculture in Bihar (Kumar et al., 2012, Pagnani et al., 2021, Agarwal et al., 2022, Singh et al., 2022). Bihar currently needs to work on raising farmers' realised prices in order to stimulate increasing production through significant investments in fisheries and the development of farmer - oriented market infrastructure for both input and output items (Sundaray et al., 2020, Giller et al., 2021).

2. Material and methods

Data Sources: Handbook on Fisheries Statistics and various research Articles.

Objective of the study: To study and understand Riverine Fisheries resources

Riverine Fisheries

Bihar is blessed with vast inland water resources in the form of Natural rivers, lake and manmade pond. The Inland water bodies have been divided into five riverine systems and their tributaries extending to a length of about 29, 000 km in the country – Indus, Ganges, Brahmaputra, East flowing riverine system and West riverine system. All these rivers, their tributaries, canals and irrigation channels have an area of roughly 13000km. These water bodies harbour the original germplasm of one of the richest and diversified fish fauna of the world comprising 930 fish species belonging to 326 genera. The major river systems of India on the basis of drainage can be divided broadly into two major rivers systems. They are (i) Himalayan rivers system (Ganga, Indus and Brahmaputra) and (ii) Peninsular river system (East cost and West coast river system).

Ganges River System:

It is the largest river systems of the world, having a combined length (including tributaries) of 12, 500 km. It

originates from Gangotri in the Himalayas at a height of about 3129 km above the sea level. After origin it drains the southern slopes of the central Himalayas. Ganga passes through UP, Bihar, some parts of Rajasthan, M. P. and west Bengal and finally joins to the Bay of Bengal. It has a large number of tributaries and 'Yamuna' river is one of the major tributaries of this system, which is about 1000 km long. The other tributaries are – Ram Ganga, Gomti, Ghaghra, Gandak, Kosi, Chambal, Betwa and Ken. Further more; it has numerous lakes, ponds and Jheels, both perennial and seasonal areas. It has a total catchment area of 9.71 lakh sq. km and receives an annual rainfall of 25 - 77 inches.

Physico - Chemical Characteristics:

- 1) Temperature range - 16.70C in January – 31.50C in June to sept.
- 2) pH - 7.4 during June to August and Maximum 8.3 during January to May.
- 3) Turbidity - 100 ppm in January; 1100 - 2170 ppm during July to September.
- 4) Do₂ - 5.0 to 10.5 ppm during January to February while in monsoon 2.00ppm (July - Sept.)
- 5) Co₂ - 0.6 ppm - 10.0ppm
- 6) Chloride - 4.0 - 35.4 ppm
- 7) Phosphate - 0.05 - 0.21ppm
- 8) Nitrates - 0.08 - 0.22ppm
- 9) Silicates - 4.0 - 20.3ppm
- 10) Carbonates - 1.0 – 12.0 ppm

Common Phytoplanktons:

Phytoplanktons are generally poor during the monsoon and autumn months. Common phytoplanktons found in Ganga river system are – (i) Members of Bacillariophyceae like Amphora, Asterionella, Cymbella, Navicula and Synedra etc. (ii) members of Chlorophyceae like, Chlorella, Closterium, Denticula, Pandorina and Spirogyea etc. (iii) members of Myxophyceae like Anabaena, Nostoc, Oscillatoria etc.

Common zooplanktons:

Ratulas, Rotaria, Keratella, Filuia, Notops, Monostyla etc.

Fisheries of Ganga river systems:

The Ganga river system supports a large number of commercially important fish species including major carps (*Labeo rohita*; *L. Calabasu*, *Catla catla* and *Cirrhinus mrigala*), minor carps (*Labeo fimbriatus*; *L. bata*; *Cirrhinus reba*), catfishes (*Wallago attu*; *Mystus aor*; *M. tengara*, *Clarias batrachus*; *Heteropneustes fossilis*), clupeoids, murrels (*Channa species*), feather backs (*Notopterus notopterus*; *N. chitala*), mullets (*Mugil corsula*), fresh water eel (*Anguilla*) and prawns (*Macrobrachium malcolmsonii*; *Palaemon. Lamarii*). Apart from these fishes, the others like *Pangasius silonia silondia*; *Gudusia chapra*; *Bagasius bagasius*; *Eutropichthys vacha* are also found in the river system.

The commercial fisheries in this zone are non - existing due to sparse population, inaccessible terrain and poor communication between fishing grounds and landing centers. The fish yield has been declined over the years due to 1) sandification of the river bed (upto Patna) which reduced the rivers productivity due to blanket effect, (2)

marked reduction in the water volume on account of increase sedimentation, (3) increased water abstraction and (4) irrational fishing. In spite of this, the Ganga river system is contributing nearly about 89.5% of the total fish seed correlation of India.

Fishing gears used:

The principal gears used in Ganga river system are dragnets, cast nets and bag nets.

Factors influencing fish yield from rivers:

The intensity of fishing, nature of exploitation and species orientation are the characteristics of the artisan riverine fisheries and are governed by

- 1) Seasonality of riverine fishing activity
- 2) Unstable catch composition
- 3) Conflicting multiple use of river water
- 4) Cultural stresses leading to nutrient loading and pollution.
- 5) Lack of understanding of the fluvial system and infirm data base.
- 6) Fragmentary and out moulded conservation measures lacking enforcement machinery.
- 7) Inadequacy infrastructure and supporting services
- 8) Affordability and playability and

An intelligent management strategy has to take cognizance of key parameters such as hydrology, fish stocks and dynamics of their population together with regulatory measures for fishing. Observance of closed seasons and setting up of fish sanctuaries has proved their efficacy in the faster recovery of impaired fisheries.

3. Conclusion

The trend of fish production in Bihar, The maximum utilization of water resources can fetch prosperity for the State in addition to ensuring food and nutritional security. But, the lack of knowledge about scientific fish culture, illiteracy and disorganized extension linkages amongst the fishermen community are the most important obstacles of fisheries progress in Bihar. Due to these difficulties, maximum fish farmers in the State still follow the traditional method of aquaculture i. e. extensive method of aquaculture, where per capita fish production is very low.

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