

ICSF Occasional Paper

Inland Fisheries, Food Security and Poverty Eradication:

A case study of Bihar and West Bengal

Sumana Narayanan



International Collective in Support of Fishworkers
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AND POVERTY ERADICATION:
A CASE STUDY OF BIHAR AND WEST BENGAL**

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Abbreviations

BOD	biological oxygen demand
CIFE	Central Institute of Fisheries Education
CIFA	Central Institute of Freshwater Aquaculture
CIFRI	Central Inland Fisheries Research Institute
COFI	Committee on Fisheries (of the FAO)
CMFRI	Central Marine Fisheries Research Institute
CRPF	Central Reserve Police Force
DAHDF	Department of Animal Husbandry, Dairying & Fisheries
DISHA	Direct Initiative for Social and Health Action
FISHCOPFED	National Federation of Fishers Cooperatives Ltd
GDP	Gross Domestic Product
GoI	Government of India
ICAR	Indian Council of Agricultural Research
IMC	Indian Major Carps
IUCN	International Union for Conservation of Nature
NFDB	National Fisheries Development Board
NGO	non-governmental organization
RKVY	Rashtriya Krishi Vikas Yojana
RPF	Railway Police Force
SC	Scheduled Castes
ST	Scheduled Tribes

Glossary

<i>anchal adbhikari</i>	<i>tehsildar</i> , revenue officer
<i>anchal samiti</i>	see zilla parishad
<i>athaphum</i>	traditional fishing method of Manipur
<i>bagdis</i>	inland fishing caste
<i>bigha</i>	a measure of land which is equal to 0.13 ha
<i>catla</i>	<i>Catla catla</i>
<i>chuna</i>	calcium hydroxide
common carp	<i>Cyprinus carpio</i>
<i>daak, mojha, kothia</i>	revenue numbers that identify a waterbody
<i>gram panchayat</i>	village-level local government body
grass carp	<i>Ctenopharyngodon idella</i>
<i>hilsa</i>	<i>Tenualosa ilisha</i>
<i>jalkar</i>	tanks, <i>abars</i> (traditional water harvesting tanks), rivers, water course channels, <i>chaurs</i> , reservoir lake, ox-bow lakes etc that are under the Fisheries department and in which aquaculture is carried out.
<i>kaibartas</i>	inland fishing caste
<i>kaoras</i>	inland fishing caste
<i>maimal</i>	traditional Muslim fisher community
<i>mauns</i>	ox-bow lakes
<i>mrigal</i>	<i>Cirrhinus cirrhosus</i>
<i>panidari/panidar</i>	feudal system of water rights similar to zamindari. The landlord having the water rights was called the panidar
<i>pankowri</i>	<i>Phalacrocorax niger</i> (little cormorant)
<i>phumdi</i>	floating islands of aquatic plants used to fish from in Manipur
<i>Pods</i>	inland fishing caste
<i>robu</i>	<i>Labeo rohita</i>
silver carp	<i>Hypophthalmichthys molitrix</i>
<i>tiyars</i>	inland fishing caste
<i>zilla parishad</i>	district-level local government body

RATIONALE

In June 2014, the Voluntary Guidelines for Securing Sustainable Small-scale Fisheries in the Context of Food Security and Poverty Eradication (the SSF Guidelines) was adopted at the 31st session of the FAO's Committee on Fisheries (COFI). Though the SSF Guidelines speak mostly of the marine sector, they apply to the inland fisheries sector as well.

The SSF Guidelines support responsible fisheries and sustainable development (social and economic) for the benefit of current and future generations, emphasizing small-scale fishers and fishworkers and their contribution to global efforts towards eradication of hunger and poverty.

The SSF Guidelines, in its preface, note that small-scale fisheries include all activities along the value chain. Small-scale fisheries play an important role in food security, poverty eradication, nutrition, equitable development, and sustainable resource management. They support local and national economies, and most of their catch is destined for human consumption. Small-scale fisheries provide employment to 90 per cent of the world's capture fishers and fishworkers; they are often a part-time activity, and can serve as a bulwark in difficult times. The SSF Guidelines note that tenure rights are critical to small-scale fisheries as well as the health of aquatic ecosystems. Yet, small-scale fishing communities continue to be marginalized, their contribution unrecognized, and therefore their needs ignored, especially in terms of decision-making in the governance and management of natural resources.

Inland Fisheries Sector in India

Inland fisheries, as defined in the Indian context, covers fishing in freshwater, brackish water, estuarine; in both lotic and lentic; natural and manmade water bodies. In short, inland fisheries can be said to consist of all capture and culture-based fishing, and aquaculture which does not take place in marine waters.

The inland fisheries sector in India is small-scale. The sector comprises mostly poor, marginal fishers, many of whom are part-time fishers, combining agriculture

and working as wage labour to eke out a living. In variance with the marine sector, catch from the inland fisheries (be it capture or aquaculture)¹ is largely destined for local and domestic human consumption, with no contribution to the country's exports.

The inland fisheries sector in India employs over 10.87 million people² along the value chain and contributes 64 per cent of the country's total fish production as of 2013-14.³ The sector, therefore, makes an important contribution to food security, nutrition, and poverty eradication. Yet, this contribution goes unrecognized and inland fishers continue to be marginalized. At the national level, compared to marine fisheries, inland fisheries is neither well understood nor researched. Statistics on catch, fisher population, socio-economics—in short, the status of inland fisheries and fishers—is incomplete, out-of-date and often inaccurate. The scattered and disorganized nature of the sector makes monitoring difficult. Fishing communities are spread over a large area; most are part-time fishers making it difficult to define an inland fisher; often catch is locally consumed and therefore not accounted for in statistics; and governance systems vary with season, water body, and region making regulation complex. In addition, fisheries being a state subject (legislative subjects are divided into 3 lists in India—State, Union and Concurrent)—legislation varies from state to state.

In many areas, traditional systems of resource management and governance have changed with greater State control and involvement in these aspects. The advent of commercially-produced inputs (feeds, medicines, etc) has also meant an increase in the investment needed to carry out aquaculture.

1 The definition of aquaculture as used by the Government of India varies with the FAO definition. FAO's online glossary defines **aquaculture** as, "the farming of aquatic organisms in inland and coastal areas, involving intervention in the rearing process to enhance production and the individual or corporate ownership of the stock being cultivated". **Culture-based fisheries** is defined as "fisheries on resources the recruitment of which originates or is supplemented from cultured stocks raising total production beyond the level sustainable through natural processes. Culture-based fisheries involve enhancement in the form of introduction of new species; stocking natural and artificial water bodies; fertilisation; environmental engineering, including habitat improvements and modification of water bodies; altering species composition; constituting an artificial fauna of selected species; genetic modification of introduced species". In India, aquaculture encompasses all forms of culture-based fishing, mariculture, and aquaculture – in short anything that is not capture. No formal definition could be found but government reports (such as the annual reports of the Department of Animal Husbandry, Dairying & Fisheries) appear to club all culture into aquaculture. This report will use this definition, since the limited data available also follows this classification.

2 Government of India, Planning Commission, *Report of the Working Group on Development and Management of Fisheries and Aquaculture*, 36.

3 Government of India, DAHDF, *Handbook on Fisheries Statistics*, 7.

Inland fisher communities are greatly impacted by the failing ecological health of water bodies and nearby areas but have little or no say in decision-making regarding these resources. They also face competition for resources (water and land) from politically more influential sectors such as agriculture and industries, and face the threat of displacement due to development programmes. In addition, fisher communities are often in remote locations, lacking access to health, education, markets and other services. The poverty of inland fishers is not only in terms of income but also because they are unable to exercise their human rights—be it civil, political, social, economic or cultural. Although inland fisheries contribute 64 per cent of the total fish production in the country, inland fisheries is neglected when compared to marine fisheries. Rivers being interstate rivers (for the most part), states are not inclined to fund development and conservation of riverine fisheries. In addition the environmental condition of inland water bodies is deteriorating rapidly with industrial, domestic and agricultural pollution.

It is in this context that this study is undertaken, to gain some insight into the status of inland fisheries in India, and highlight some of the research lacunae in this sector, in the hope that the path to implementing the SSF Guidelines in this sector may become a bit clearer. Given the limitations of resource, the states of Bihar and West Bengal were chosen. These states are important in terms of fish production and fisher population in the inland sector. The varied types of water bodies and governance systems in these states were also a consideration.

Objectives

The objectives of the study are:

- Review the status of conservation and management of inland fishery resources;
- Examine how inland fisheries contribute to sustainable utilization, food security and nutrition, especially of the poor in rural areas; and
- Analyse factors that can contribute to the equitable development of inland fishing communities.

The study is seen as an opportunity to bridge some of the gaps in information on inland fisheries and to contribute, albeit in a small way, to a better understanding of how the FAO's Voluntary Guidelines for Securing Sustainable Small-scale Fisheries in the context of Food Security and Poverty Eradication (SSF Guidelines) could apply in the Indian inland fisheries context.

The study would identify gaps in policy and governance that hinder the contribution of inland fisheries to food security and poverty eradication.

Methodology

The study started with a review of literature dealing with inland fisheries and fishing communities from the perspective of employment, income, food security, and poverty eradication on the one hand, and conservation and management of inland fisheries resources, on the other. In this context, it examined all relevant legislation and policies, especially with regard to access to resources and various forms of tenure rights. Representatives of fishing communities, NGOs (non-governmental organization), cooperatives, village *panchayats*, district and state-level fisheries administration, scientists at the Indian Council of Agricultural Research (ICAR), officials at the Department of Animal Husbandry, Dairying & Fisheries (DAHDF), etc were interviewed.

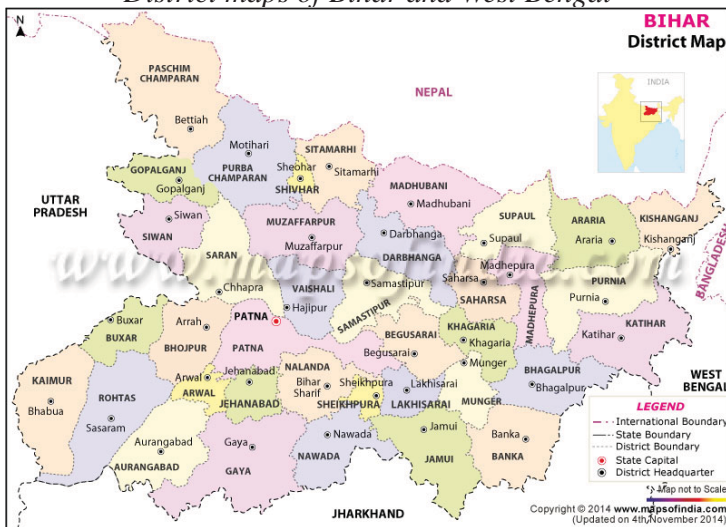
Bihar and West Bengal were chosen for their importance in fisher population, fish production, their varied tenure systems in fisheries—government owned, privately owned; leased to individual, leased to cooperatives; open access river fishing; river fishing controlled by private landowners; and varying levels of culture techniques being practiced—from no intervention to controlling amount of seed stocked. However, given the limited time and resources, Jhanjarpur region of Madhubani district in north Bihar, where the non-profit organisation, Sakhi works with a focus on gender issues, working with inland fishers and farmers was visited and in West Bengal, villages in Howrah and Hooghly districts were visited where the non-profit organisation, Direct Initiative for Social and Health Action (DISHA) works. Field trips were undertaken during December 2014 (to Bihar) and February 2015 (to West Bengal). People met were the Director (Fisheries) of both states, researchers at Patna University, General Secretary, Sakhi, fishers (men and women, including a former head of the women's group), a journalist in Patna, a fisheries consultant and researcher, and researchers at CIFRI. Before the visit to Bihar, a visit to New Delhi was undertaken to meet officials at ICAR, DAHDF, and National Cooperatives Federation.





Map of Ganga basin

District maps of Bihar and West Bengal





A REVIEW OF LEGISLATION

This review of legislation looks at inland fisheries legislation and legislation relating to surface waters at the national level and at the state-level, particularly those of Bihar and West Bengal. The review also notes some interesting aspects of legislation in other states, especially those with a progressive outlook, giving an idea of the variation in inland fisheries policy.

Eminent domain and public trust doctrines

Water laws and judicial rulings on water in India are a complex, amalgamation of sources—British common law, British laws drawn up for the Indian context, customary laws, and more recently international conventions and ideas/discourses on water as a human right, concepts of minimum flows, common property resource, etc.

British India's water laws focused on the rights of the landowner and on strengthening State control over water. These laws also brought in the division of responsibilities between the Centre and the state regarding water governance and linked water rights to land rights.⁴ For example, the Canal and Drainage Act of 1873 declares the government's right to control the use of water in all natural courses (rivers, canals, lakes, etc) for public purposes. This was then extended to complete control over all surface water resources in various state laws.

Post-Independence, this view of surface water being owned by the State continued, as seen by Supreme Court rulings such as *Tekaba AO v Sakumeren AO* (2004)5 SCC 672, where the court asserts, "So far as natural resources like land and water are concerned, dispute of ownership is not very relevant because undoubtedly the state is the sovereign dominant owner."

At the same time, the Supreme Court also affirmed that all surface waters are under the doctrine of public trust wherein they are held by the State in trust for the public as they are too valuable to be owned by any person (*MC Mehta v Kamal Nath*, (1997)1 SCC 388). The doctrine of public trust was later extended to groundwater and to commons (*Jagpal Singh & Ors vs State of Punjab & Ors*, (2011) No.1132 /2011 @ SLP(C) No.3109/2011). The Supreme Court has accepted the doctrine as a part of common law, and as a concept that is established in the national legal system, even if not explicitly mentioned. The idea that natural resources should be protected for current and future generations was interpreted by the Supreme

4 Philippe Cullet and Joyeeta Gupta, *India: Evolution of Water Law and Policy*, in *The Evolution of the Law and Politics of Water*, ed Joseph W. Dellapenna and Joyeeta Gupta. (Dordrecht: Springer Academic Publishers, 2009).

Court, to be a part of environmental rights which were seen as an extension of Article 21 of the Indian Constitution which speaks of the Right to Life. However, the doctrine has been applied in only four Supreme Court rulings and is not generally considered in legislation governing water, which continues to treat this resource as State-owned.

Legislative powers

Legislative powers of the Centre and the state are enumerated in the Union and State Lists of the Seventh Schedule of the Constitution of India. A third list—the Concurrent List—talks of areas wherein both Centre and state have legislative power. Any subject not covered by these lists, lies within the purview of the Centre. Under this system, water and fisheries (except fisheries beyond territorial waters) are in the State List. Water though comes with a caveat—it is subject to the provisions of Entry 56 of the Union list, relating to the regulation and development of inter-State rivers through the formation of a river board. This mechanism of river boards has rarely been used. However, on areas where states have legislative power, the Central government can formulate policies (which are legally not binding) and model bills that states can then base their legislation on.

Water legislation

Legislation on water is piecemeal—focusing on sectors individually without a holistic view. There are irrigation laws, laws on hydel power generation, on industrial use of water, sewage disposal etc—each in their own silo. In this arsenal of water-related legislation, environment and fisheries are not high priority.

The function of inland fisheries as a provider of livelihood and nutrition has not been given due recognition in the country's legislation either. The absence of proper enumeration of inland fishing communities and the often part-time nature of their fishing (many are also farmers or landless labourers) have added to their invisibility. The National Water Policy 2012, for example, states that water allocation priorities are as follows—drinking water, irrigation, hydro-power, ecology, industries, navigation and other uses.⁵ Certainly the doctrine of public trust plays no part in these legislations or their implementation. The doctrine holds that these natural resources belong to current and future generations and are held by the State in trust for the public. However, legislation and policy treat water as a resource to be carved up for dominant user groups i.e. drinking water, industry, irrigation and power generation. Concepts of minimum flow, ecological

5 Ministry of Water Resources, Government of India, *National Water Policy*, 2012.

health of the ecosystem, pollution control (water bodies are typically polluted with industrial and domestic effluents), and the concerns of non-extractive water users (such as fishers) are given short shrift. While these concepts are enshrined in legislation, they are rarely implemented, and not discussed when considering highly extractive projects such as irrigation, or dams for hydroelectricity generation.

This lack of priority for fisheries is reflected in state legislation with ownership and/or revenue rights over these water bodies vested with various state departments and institutions and the focus being on generating revenue for the state. While extraction of water for irrigation, from State-owned water bodies is subsidised with no limits set on water extraction and electricity connections provided free for subsidised water pumps, fisheries are not accorded the same privileges. Access to most rivers is open access (at least by law) but in enclosed water bodies (lakes, ponds, tanks, etc, as well as irrigation canals) that are State-owned, the fishery is typically auctioned by the State.

Inland fisheries legislation

Fisheries being a state subject there are a variety of legislations on this subject. Some states have rules of capture fisheries that recognise the rights of local communities, some even have mechanisms to involve communities in managing resources while others focus more on aquaculture and yet other states have not legislated on inland fisheries at all. For the most part, however, management is vested with the State Fisheries Department, which focuses on stocking these water bodies with a limited array of commercially important species (like Indian major carps or IMC and exotic carps), and generating revenue. Water bodies within protected areas are usually under the Forest Department.

The importance of fishing to local communities, both in terms of nutrition as well as livelihood, is rarely noted. One exception is the 2008 Fisheries Policy of Madhya Pradesh which gives priority to traditional fishing castes in leasing of water bodies.

Typically, legislations define fishermen as traditional fishers i.e. belonging to traditional fishing castes. In the case of Bihar, fishermen were defined as ‘professional fishers’ in the 2006 Jalkar Act. This was amended to ‘traditional fishermen’.

Only Kerala includes women fish vendors (whose husbands are fishermen), and widows of fishermen in the definition of fishermen (Kerala Inland Fisheries and Aquaculture Act, 2010). Otherwise the state acts do not specifically mention women, the word used is usually fishermen so it is unclear if the term is used to include women as well.

Tenure rights

The Voluntary Guidelines on the Governance of Tenure, 2012 says that “Tenure systems define and regulate how people, communities and others gain access to natural resources, whether through formal law or informal arrangements. The rules of tenure determine who can use which resources, for how long, and under what conditions. They may be based on written policies and laws, as well as on unwritten customs and practices”. So in the case of fisheries and aquaculture, tenure rights would determine who can access fish or inland water bodies, for how long and under what conditions.

In India, the Fisheries Department of each state is tasked with issuing licences for fishing, and auctioning fishing rights in reservoirs and what are designated as government-owned water bodies. However, in the Arunachal Pradesh Fisheries Act, 2006, water bodies where indigenous communities have customary fishing rights are exempted from the Fisheries Act. In the Assam Fisheries Rules, 1953, fishing licences are to be preferentially given to traditional fishers (Scheduled Castes/Scheduled Tribes i.e SC/ST⁶ or *maimal* communities) with 60 per cent of the available fisheries to be leased only to cooperatives where all members belong to SC/ST or *maimal* communities. Such cooperatives also have to pay less security deposit. Bihar too, in its Bihar Fish Jalkar Management Act, 2006 (amended in 2007, 2010), gives priority to traditional fishers.

Interestingly, Assam requires lessees (of government water bodies) to allow nearby agricultural labour to catch fish for their consumption by paying a nominal annual fee. In addition, the Deputy Commissioner can stipulate in the lease agreement that some part of the catch should be sold for local consumption or in localities where fish is scarce. Fisheries should be settled to the best advantage of the local community, and for this, middlemen as lessees should be avoided. To effect the same, a large water body can be leased in parts to actual fishers and preference will be given to riparian land occupants or actual fishers. In addition, a lessee should not levy duties or hinder the passing of any boats or anchoring of boats within the limit of the fishery. During the closed season in any waters, only locals are allowed to fish for their consumption using specified gear.

6 Under the Schedules of the Constitution of India, historically oppressed and underprivileged communities are classified as Scheduled Castes, Scheduled Tribes, etc, providing them with various benefits in terms of education, subsidies for food, and other resources, as a means of affirmative action. Traditional fishing communities fall under these categories.

7 Traditional Muslim fishing community

In Tamil Nadu, under the Tamil Nadu *Panchayats* (Lease and licensing of Fishery rights in water sources vested and regulated by Village *Panchayats* and *Panchayat* Union Councils) Rules, 1999, the village *panchayat* can auction fishery rights in irrigation and public water bodies that are entrusted to it. In Kerala, power over fisheries and other activities in public water bodies is vested with the government but is subject to the rights vested with the local self-government institutions. Local bodies have the power to issue fishing licences for water bodies under their control though with the assent of the fisheries department. Decisions taken by the government that relate to water bodies vested with local bodies shall be done after consulting, said local bodies. In addition to various state departments, state and district fisheries management advisory committees must have representatives of trade unions, fish farmers, local bodies, and *panchayats* as members.

Management of fisheries and water bodies

In state-owned water bodies, typically the management of fisheries falls on the lessee within certain stipulations (usually these are laid out in the legislation) such as prohibiting certain gear, the use of poisons and dynamite. Details of stocking, harvesting, maintenance of the water body, etc are left to the lessee as is the hiring of labour.

Rivers, while under the purview of the state, are not really ‘managed’. Fishing is supposed to be open access so the state does not see any management role for itself here, though they are supposed to enforce a seasonal fishing ban, gear bans, pollution norms, and also stop fishing in protected areas. However, since this is a difficult prospect when it comes to rivers, there is little evidence of implementation of any such measures.

Revenue sharing

In Arunachal Pradesh, while leasing decisions continue to be with the state, revenue from aquaculture is shared with local bodies. In water bodies where the fisheries department has not actively set up aquaculture, revenue is to be shared equally between the state and the local body (*Gram Panchayat*, *Anchal Samiti*, *Zilla Parishad* etc).

Inland Fisheries Legislation of Bihar and West Bengal

An overview of the inland fisheries legislation of the two states, that this study is particularly concerned with, follows.

Bihar Fish Jalkar Management Act, 2006

Under the Bihar Fish Jalkar Management Act, 2006, some of the important definitions are:

- Fisherman—“a professional fisherman who is engaged in fishing and fish culture”
- Jalkar—Tank, *pokbar*, *abar*, river, water course channel, ‘*chaur*’, ‘*dhav*’, reservoir, lake, ox-bow lake etc under Department of Animal Husbandry and Fisheries, Bihar, in which *Makhana*, *Singhara* and fish is reared
- Fishermen co-operative society—a block level body which is registered under Bihar Co-operative Societies Act 1935 and the Bihar Self Supporting Co-operative Societies Act 1996, wherein only fishers are members

Jalkars are given on lease to registered fisher cooperatives that are managed by a committee of government officials (revenue and fisheries departments) and one fisher representative. This committee assesses the production capacity of the *jalkars* and fixes the price of the catch. The act allows for *jalkars* to be leased for 5 to 10 years (depending on whether they are short or long term settlements); prohibits fishing in rivers from June to August; and lists prohibited gear and methods (nets with less than 4 cm mesh; fencing or any obstruction of fish movement in rivers and reservoirs; dynamiting and poisoning). The Act is implemented by the fisheries department, which at the local level means the District Fisheries Officer.

Bihar Fish Jalkar Management (Amendment) Act, 2007

The amendments include:

- Replacing the word, ‘professional’ with ‘traditional’ in the definition of a fisherman
- Changing the definition of ‘trained fisherman’ from a fisherman “trained by the fisheries department” to a fisherman “trained by the fisheries department or fishermen having qualification of recognized courses in fisheries science”
- Fixes the maximum term of the fisher cooperative representative on the managing and reserve deposit fixation committees as 5 years and allows for two non-government members to be nominated by the Collector to the latter if the government does not nominate a cooperative representative and a fisher representative

Bihar Fish Jalkar Management (Amendment) Act, 2010

The 2010 amendment:

- Deletes the reference to the Bihar Self Supporting Cooperative Societies Act 1996 under the definition of Fishermen Co-operative Societies
- Increases the short term settlement⁸ period of *jalkars* from 5 to 7 years, it also changes the authority to whom appeals against decisions regarding short term settlements may be made, from the Director Fisheries to the Divisional Commissioner.

Bihar Fisheries Policy, 2008

The policy note says that there is a wide gap between demand and supply (of 43 per cent) in spite of the vast fishery resources of the state. This untapped potential (the policy does not give an estimate of this potential), therefore, calls for a comprehensive and enabling fisheries and aquaculture policy. The policy's stated objective is to increase fish production on a sustainable basis to ensure food and livelihood security in the rural sector. The policy:

- Better data collection so as to have timely, reliable and complete statistics
- Development of aquaculture ponds: Ponds less than 10 ha are abundant (total water area 43000 ha) and are the mainstay of small fishers. However, the productivity of these water bodies is only 800 kg/ha as against a potential of 3000-5000kg/ha/year. Hence the policy talks of bringing aquaculture on par with agriculture in terms of credit, water tariff, energy changes, taxation etc.
- Development of fisheries in various kinds of water bodies—ox-bow lakes, floodplains etc while recognizing unique property regimes such as those in floodplains where farmers own part of the cropping land under submergence making culture conditional upon collective effort of the farmers wherein crop cultivation is under individual management while fish culture is done collectively
- In reservoirs, priority of lease will be to displaced/affected populations and traditional fishers by forming fishers' cooperatives, associations and SHGs as a means of rehabilitation. In their absence, the reservoir will be leased out to groups of unemployed youth, private entrepreneurs, public undertakings, etc through open auction. Lease period will be for ten years. An appropriate management plan is to be co-evolved by the department and the lessee

8 Settlements or lease periods are short (originally 5 years, amended to 7 years) or long term (10 years)

- Seeks to develop aquaculture with a focus on commercially important species like freshwater prawn (*Macrobrachium rosenbergii*), carps and catfish as well as ornamental species
- Notes that while water bodies with the revenue department have been transferred to the fisheries department to enable better aquaculture development, this has not taken place in spite of progressive moves such as giving priority to traditional fishers (for fishing and aquaculture). The policy notes that the local level officers continue to use their discretionary powers to make arbitrary decisions in deciding period of lease, revenue and fishery allotments.
- Recognises the need for better marketing links, training for fishers and training for field staff of the fisheries department

The Bihar Fisheries Bill, 2013 (draft)

The draft bill aims to provide for the protection, conservation, development, propagation, exploitation, disposal, marketing, regulation of fish and fisheries in a scientific manner. It:

- Calls for formation of a committee (with two fisher/fish farmer representatives) to advise the state on the matters mentioned above;
- Lists out powers (to prohibit/regulate fixed engines, gear use, construction of dams etc, fishing methods, destruction of resources, granting licences, etc) of the state regarding privately-owned water bodies with the owner's consent;
- Allows for the state to declare fish sanctuaries;
- Prohibits production, marketing, sale of fish seed and feed without registration and licence and provides the process for such registration;
- Talks of developing brood fish banks and seed banks;
- Aims to regulate, monitor and set up a certification process for the sale of fish seed and feed.

CO-OPERATIVES ACTS

Bihar Co-operative Societies Act, 1935

The purpose of this Act is to facilitate the formation and working of cooperative societies so as to promote thrift, self-help and mutual aid among farmers and other groups with common needs. This Act:

- Stipulates cooperatives must have at least 10 members

- Details the process for registering a cooperative
- Provides for formation of a managing committee (of no more than 17 people) for the cooperative including 2 SC/ST representatives, 2 women, 1 BC representative
- Allows the state government officer to be appointed as executive officer of the cooperative
- Allows the state government to nominate 3 members to the managing committee if the state has subscribed directly to the share capital to the tune of Rs 30 lakhs. Of the 3 members, 2 are to be government officials and the third from a cooperative/financing institution connected with the cooperative concerned
- Fixes the term of the managing committee at 5 years and provides the mechanism for holding elections

Bihar Co-operative Societies (Amendment) Act, 2008

The amendment emphasizes the need for integrated development of agriculture to boost income generation in rural areas. The amendment:

- Defines national banks as the national bank for agriculture and rural development
- Allows for a self supporting cooperative (registered under the Act of the same name) to convert into a cooperative under this Act
- Sets out procedural measures for when the managing committee ceases to function before its term is finished
- Provides for formation of a Short Term Co-operative Credit Structure to improve financial services offered by co-operatives for agriculture at the Gram Panchayat level as per the recommendations of the Vaidyanathan Committee

Bihar Self Supporting Co-operative Societies Act, 1996

The aim of this act is the same as that of the Cooperatives Act of 1935. The difference being, cooperatives under the 1996 act do not possess any share capital from the government, are not in receipt of any government loans or guarantees. The 1996 act:

- Notes that members may not hold membership of more than one cooperative society
- Membership shall not be limited by gender

- Provides rules for election of office bearers and their functioning. (Government representatives as office bearers are not a requirement)

Bihar Self Supporting Co-operative Societies (Amendment) Act, 2013

The amendment:

- Specifically notes the right of members to access books and records of the society and to get cooperative related training
- Reserves 2 seats each in the board of directors or managing committee (as it may be called) for SC/ST, backward classes and extremely backward classes but not exceeding 50 per cent of the seats on the board.
- Reserves for women, half of the remaining seats (though this shall be not less than 2 seats)
- Gives the state election authority the power to conduct elections for self supporting cooperatives

The West Bengal Fisheries (Requisition and Acquisition) Act, 1965

- Allows the State to acquire fisheries with or without its adjoining lands, in any inland water body where water is confined artificially or naturally, for any period of time, for aquaculture or fisheries, to improve or develop the said fish resources and supply fish to the public from such water bodies or for any other public purpose which is ancillary to developing aquaculture or fisheries and supplying fish to the public. The Act applies to water bodies over 1 ha in size
- The state government can requisition a fishery with or without its adjoining lands by serving an order to all owners and occupiers of the fishery and the lands
- Such requisitioned land/fishery can be acquired by publishing a notice to that effect in the Official Gazette after giving interested parties an opportunity to be heard
- Once the notice is published in the Gazette, the fishery is vested with the government, completely free of any encumbrance
- Provides for compensation to be paid to the owner of the acquired fisheries calculated as 3 times the net average annual income from the fishery
- Defines net average annual income as $1/3^{\text{rd}}$ the average value of produce derived during the 5 year period just past for agricultural land; for other lands it is defined as the average income less 2 percent derived during the

5 year period just past; and for fisheries, it is 1/3rd average income from the fishery during the 5 year period just past

- Allows the government to release fisheries under requisition that have not been acquired. Such release can be done to the individual who the State deems entitled
- Provides for a mechanism for grievances

West Bengal Inland Fisheries Act, 1984

- Classifies fisherman as a person who by caste or profession is a fisherman and is mainly engaged in culture or capture fisheries
- Requires that any structure built on natural water bodies does not block fish movement and calls for the construction of fish passes, fish ladders and such
- Prohibits disposal of effluents, use of poisons for fishing etc
- Prohibits filling up or change in land use, of any depression (artificial or natural), over 0.035 ha
- Permits the government to take over multi-purpose tanks which are not maintained for more than a stipulated period of time and also transfer to another individual for not more than 10 years. The government cannot also hold the water body for more than 25 years.
- Allows the government to create a committee to ensure equitable distribution of sewage for sewage-fed fisheries. Allows the government to levy a tax on producers and wholesalers of fish

West Bengal Inland Fisheries (Amendment) Act, 1993

- Prohibits change in land use of any water area measuring over 9 cents (including embankments) or any natural or artificial depression 9 cents or more in size that retains water for at least 6 months; also prohibits dividing any water body to make the parts measure less than 9 cents
- Allows for government to confiscate water body where this rule is broken
Bans use of antibiotics that may affect the fish in the farm
- Polluter of any flowing water or confined water will pay for restituting the water body, according to the provisions of the Bengal Public Demands Recovery Act, 1913. Also lays out the punishment to be meted out to polluters

West Bengal Inland Fisheries (Amendment) Act, 2008

The amended act:

- Defines a fishing boat as a boat or canoe with or without mechanical propulsion
- Speaks of confiscation of fish and gear if a fishing boat uses nets with a prohibited mesh size. It also leaves it to the discretion of the competent authority to decide what to do with confiscated fish
- Prohibits use of antibiotics that may affect fish health
- Provides means of punishment for polluting water bodies such as paying for the cost of measures to clean up as well as conviction
- Changes the notice period (from 1 month to 15 days) that the government has to give before taking over a multipurpose water body. The decision to take over the water body is to be based on whether it is being used in accordance with norms or it is necessary for public purpose.
- Allows the competent authority to levy 25 per cent (per annum) of the average crop value⁹ of the last 3 years from the person to whom the multipurpose water body is transferred
- Partly vested water bodies (i.e. with the State) can be given on lease by the state government to a fishermen's cooperative or any fish production group. In addition, anyone with published records of rights as per the last Revisional Settlement will be entitled to claim rent at the rate of 25% of average crop value for the last 3 years according to his/her share of the water body

West Bengal Inland Fisheries Rules, 1985

- Lays out the norms for multi-ownership water bodies that are taken over by the state government
- Speaks of rent to be paid to the owners at the rate of 4% per annum of the market value of the water body in addition to a reasonable (this is not defined) lump sum in lieu of their not harvesting fish
- Allows the state government to organize aquaculture in the taken-over water body by the fisheries department or leasing it out to an individual (the lease rate is the same as above)

⁹ Crop value is defined as quantum of fish by weight netted from any pond or tank on any single occasion

- Allows for formation of a Fish Production Group of 8 to 20 people to ensure efficient production and sale of fish
- Details the process for registration and functioning of such a Group

West Bengal Inland Fisheries Rules, 1985 (amended in 2013)

The amendment was brought in light of the growing concern over depleting *hilsa* (*Tenulosa ilisha*) stock and the impact of the catching of juvenile *hilsa*. This has led to a combined India-Bangladesh project in collaboration with the International Union for Conservation of Nature (IUCN) to conserve the *hilsa*. Amendments to the Rules were brought with reference to inland and marine waters. Here only the inland waters' amendment is discussed.

- Amended rules ban catching *hilsa* with any kind of monofilament gill nets and nets with mesh size less than 90 mm as well as banning nets with mesh size less than 40 mm for other fish
- Amended rules ban the transportation, marketing, sale, possession of *hilsa* less than 23cms in length
- Amended rules declare the riverine area of the Bhagirathi river between Lalbagh and Farakka (in Murshidabad district); Katwal to Hooghly (Burdwan and Hooghly districts); Diamond Harbour to Nischintapur Godakhali; and a 5 km² area around the sand bar in river Matla; Roymongal and Thakuran in Sundarbans; Farakka Barrage as *hilsa* sanctuaries where all catching *hilsa* is banned from June to August and October to December
- Amended rules also prohibit use of bag, scoop, lift, and small mesh gill nets (with mesh size less than 1 inch) for catching *hilsa* smaller than 23 cm in inland and estuarine areas from February to April so as to conserve juvenile *hilsa* i.e *jatka* that migrate downstream

The Inland Fisheries and Aquaculture Bill, 2004 (draft)

In 2005, the Government of India drafted a bill on inland fisheries and aquaculture which recommends promoting community-based fishery management, upholding the 'polluter pays principle', ensuring minimum water flows, protecting the interest of traditional fishers, hygienic fish markets, and inter-departmental coordination. It also highlights the need to collect data, and promote artisanal fishing in rivers (with some sort of licensing to check the level of resource exploitation). It also observes that the Code of Conduct for Responsible Fisheries needs to be adopted to suit specific situations. The bill is meant to act as a template for states to enact their own legislation. However, there has been no progress on this draft bill.

BACKGROUND

Globally, inland fishery catch is growing at about three per cent annually though it is thought that much of the catch continues to be unreported due to the sector's small-scale and diffused nature. In addition, the catch reported by countries such as India is very variable.¹⁰ According to reported figures, China leads inland capture fishery production with 2,297,839 tonnes, followed by India at 1,460,456 tonnes (almost 1.5 million tonnes) as well as in farmed food fish production (China: 41,108,306 tonnes and India: 4,209,415 tonnes, though these figures include mariculture).¹¹ And while, globally, production from inland fisheries lags behind marine (30.6 per cent and 69.57 per cent respectively),¹² it is the sixth major supplier of animal protein.

Inland waters capture production¹³

S.No.	Country	Production (in tonnes)		
		2003	2011	2012
1	China	2135086	2232221	2297839
2	India	757353	1061033	1460456
3	Myanmar	290140	1054585	1246460
4	Bangladesh	709333	445000	957095
5	Cambodia	308750	437415	449000
6	Uganda	241810	368578	407638
7	Indonesia	308656	290963	393553
8	Tanzania	301855	301281	314954
9	Nigeria	174968	248805	312009
10	Brazil	227551	249140	266042

10 Review of the State of the World Fishery Resources: Inland Fisheries 2011. FAO.

11 The State of World Fisheries and Aquaculture 2014. FAO.

12 adapted from table 3 of Review of the State of the World Fishery Resources: Inland Fisheries 2011. FAO.

13 adapted from Table 5 & 7 of State of World Fisheries and Aquaculture 2014. FAO.

Farmed food production (including mariculture) in 2012

S.No.	Country	Production (tonnes)	Share in world total (%)
1	China	41108306	61.7
2	India	4209415	6.3
3	Viet Nam	3085500	4.6
4	Indonesia	3067660	4.6
5	Bangladesh	1726066	2.6
6	Norway	1321119	2
7	Thailand	1233877	1.9
8	Chile	1071421	1.6
9	Egypt	1017738	1.5
10	Myanmar	885169	1.3

The Indian scenario

India has enormous inland water resources of 195,095 kms of rivers and canals and 7.303 million hectares of reservoirs (2.926 million ha), tanks and ponds (2.424 million ha), flood plain lakes and derelict water bodies¹⁴ (0.798 million ha) and brackish water bodies (1.155 million ha).¹⁵ The predominant type of water body varies from region to region. The state of Uttar Pradesh contains 17 per cent of the total length of rivers and canals in India; the southern states (Andhra Pradesh, Telangana, Tamil Nadu and Karnataka) have the majority of the ponds and tanks; while Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Rajasthan and Uttar Pradesh house most reservoirs; Odisha, Uttar Pradesh and Assam have the majority of derelict waters and flood plains (oxbow lakes, beels); and Odisha, West Bengal, Kerala and Gujarat account for most of the brackishwater areas in the country.¹⁶

14 The Government of India in its various reports does not provide definitions for any of these categories of water bodies.

15 Annual Report 2013-14. Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Government of India.

16 Ministry of Water Resources, River Development & Ganga Rejuvenation, Government of India. <http://wrmin.nic.in/forms/list.aspx?lid=281&Id=4>

Inland fisheries are not only a source of livelihood but also a source of food and nutrition for the poor (those who live on less than one dollar a day), especially in rural areas. Employing or engaging at least 0.3 million¹⁷ fishers and fishworkers, the Indian inland fisheries include capture and culture-based fisheries in fresh and brackish water bodies and accounts for nearly two-thirds of the country's estimated annual fish production from all sources.

According to the Handbook on Fisheries Statistics 2014 brought out by the Department of Animal Husbandry, Dairying and Fisheries, Government of India, production from inland waters in India (capture fisheries and aquaculture) has increased from 0.218 million tonnes to 6.136 million tonnes between 1950-51 and 2013-14 (projected). During the same period, production from marine fisheries increased too, though at a much lower rate—from 0.534 to 3.443 million tonnes. Most of the production from inland waters comes from aquaculture. In the last three decades, aquaculture has been promoted extensively and high input aquaculture has become common with the State actively developing, promoting and disseminating culture techniques, particularly for carps. Aquaculture, in 2012-13, contributed over one third of the country's total fish production (9.02 million tonnes). In 2012-13, GDP (gross domestic production) from fisheries (inland and marine) as a percentage of the country's GDP was 0.83 per cent while as a percentage of the GDP from Agriculture, Forestry and Fisheries, it was 4.75 per cent.

Within inland fisheries and aquaculture the major states in terms of production are Andhra Pradesh (1.6 million tonnes), West Bengal (1.45 million tonnes), Uttar Pradesh (0.46 million tonnes), and Bihar (0.44 million tonnes).¹⁸ In terms of fisher population, Bihar tops the list with 4,959,516, followed by Jharkhand (1,930,920), Chhattisgarh (1,911,368) and then West Bengal (911,622 including marine fishers).¹⁹

17 Estimates of fisher population vary considerably. This number, an underestimate, is based on the 2003 Livestock Census after subtracting the fisher population of coastal states as these would include marine fishers as well. However, this means the inland fisher population of coastal states is not included in this 0.3 million.

18 Handbook on Fisheries Statistics 2014. Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Government of India.

19 Livestock Census 2003. Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Government of India.

The Ganga Basin²⁰

The Ganga is the largest river system in the country, passing through some of the most populated regions, with a large number of people dependent on it, including fishers. The basin constitutes 26 per cent of India's landmass, accounts for 30 per cent of the country's water resources and has over 40 per cent of the population.²¹ The Ganga has a high sediment load—1625.6 million tonnes/year (the Amazon's sediment load is 406.4 million tonnes/year).²² The river also has the 5th highest volume of water discharged with a mean discharge rate of 18,700 m³/sec, though over four decades (1980s onwards) water discharge measured at Allahabad has shown a decline of 77,004 million cu m.²³

The river is also used by several sectors—fisheries, agriculture, industries, power generation, sand mining, etc. Agriculture, of course, is a major stakeholder; 66 per cent of the flow of the Ganga and its tributaries are diverted for irrigation and all the major tributaries and the Ganga itself are controlled by barrages.²⁴

The Ganga basin shows varied fish species composition. In the upper reaches of the main river and its tributaries, coldwater species such as snow trout and *mabseer* dominate while in the lower, warmer stretches, cyprinids, particularly cat fish, and carps, are prominent. In addition, there are anadromous species such as *bilsa* whose migration upstream is increasingly being rendered impossible by the construction of water control measures such as the Farakka Barrage (in West Bengal). Indian Major Carps (IMC) has always been an important part of catch though the amount of IMC caught has come down since the 1960s. Data shows that at Allahabad, in 1960, IMCs constituted 43.5 per cent of the catch while by 1980 it had fallen to 20 per cent.

In recent decades the pollution of the river basin from industrial effluents, domestic sewage from the many cities and towns along the river(s) and agricultural runoff (laden with pesticides) has been increasing rapidly. In addition, soil in the

20 Basin refers to the entire region drained by the Ganga, including its upper reaches

21 Pradeep K Katiha, Anil P Sharma and Ganesh Chandra. "Institutional arrangements in fisheries of Ganges River system." *Aquatic Ecosystem Health & Management* 16:4 (2013): 465-466.

22 A.I. Payne, S. Huq, H. Singh, R. Sinha, R. Welcomme, and T. Petr. "A Review of the Ganges Basin; its Fish and Fisheries." *Proceedings of the Second International Symposium on the Management Of Large Rivers for Fisheries* 1 (2004).

23 The Status of River Ganges in the middle stretch (www.cifri.ernet.in/154.pdf)

24 A.I. Payne, S. Huq, H. Singh, R. Sinha, R. Welcomme, and T. Petr. "A Review of the Ganges Basin; its Fish and Fisheries." *Proceedings of the Second International Symposium on the Management Of Large Rivers for Fisheries* 1 (2004).

basin shows increasing salinity.²⁵ In the rivers of West Bengal, while the dissolved oxygen is above the minimum required for fish species to survive, it remains fairly low (activities like reproduction would require more oxygen availability); biological oxygen demand (BOD) is over 2mg/l (the maximum permissible level) and the coliform is very high.²⁶ The Government of India started the Ganga Action Plan in 1985 with an aim of reducing the pollution in the river by setting up more sewage treatment plans so as to reduce the flow of raw domestic sewage into the river. As of 2011, the Plan had spent Rs 8960.5 million.²⁷ In 1996, this plan was incorporated into the National River Conservation Plan. A status paper on the river, published by the Ministry of Environment and Forests in 2009, says the plan has had mixed results; the dissolved oxygen and biological oxygen demand levels have improved i.e., the number of instances where the values have gone beyond permissible amounts have reduced but the total coliform continues to be alarmingly high. This, the report acknowledges, has been a failing of the plan.²⁸

Studies by the Central Inland Fisheries Research Institute (CIFRI) (in Barrackpore, West Bengal) indicate that riverine fisheries production has been also affected by increased sedimentation leading to reduction in water volume, river course changes, excessive water abstraction, and irrational fishing practices. Riverine fisheries are estimated to be below subsistence level with an average yield of 0.3 tonne per km which is about 15 per cent of actual potential.²⁹ In the last few decades, catch per fisher has also decreased due to an increase in the number of people fishing i.e., non-fishers (landless people) also fishing.

Fishing communities

Fishing in the Ganga basin has been a source of income and nutrition for centuries. Fish was, and in some communities/regions such as West Bengal continues to be, an important part of the diet. Texts such as the *Vedas* speak of fishing and fishers while the *Arthashastra* speaks of fishing, fishers and fishing license fee. Today, most of the 80 million people in the floodplains³⁰ fish at some

25 A.I. Payne, S. Huq, H. Singh, R. Sinha, R. Welcomme, and T. Petr. "A Review of the Ganges Basin; its Fish and Fisheries." *Proceedings of the Second International Symposium on the Management Of Large Rivers for Fisheries* 1 (2004).

26 West Bengal Development Report. Planning Commission, Government of India, 2010.

27 PIB Press Release. 2011. <http://pib.nic.in/newsite/erelease.aspx?relid=74173>

28 Status Paper on River Ganga. MoEF 2009.

29 Report of the Working Group on Fisheries for the Tenth Five Year Plan. 2001.

30 Floodplains refer to the lower reaches i.e. the plains – parts of Uttar Pradesh, Bihar, West Bengal, and Bangladesh.

time or the other (though mostly for their consumption) and at least 13 million of them are part-time fishers.³¹

Fishing in the mid and lower reaches of the river basin (includes oxbow lakes, ponds, tanks etc, most of which in this region are connected to the river or its tributaries during the monsoons), as in much of the country's inland waters, is a part-time occupation. Most fishers, though classified within the traditional fishing castes (which, in this region, are *Mallah*, *Kewat*, *Manjhi*, and *Dhimar*), are also agriculturists with some owning small tracts of land or more often than not working as labour on the landlord's fields. The fishers see these as complementary employment—depending on the season, they fish or farm. However, in the upper reaches of rivers, fishing is not a major occupation. Here farming is of greater importance to livelihood while fishing is mostly for domestic consumption or as an occasional source of additional income.

Capture fisheries, as is the case in other parts of the country, is on the decline in the Ganga. While quantitative studies on catch are few, anecdotal evidence indicates capture fisheries continues to decline. According to R K Sinha, a professor at Patna University who has worked on fish toxicology in the Ganga and dolphin conservation, and the fisheries department, hardly 5-10 per cent of fish production is from capture fisheries. Sinha says that there are few landing centres along the Ganga where data is collected; mostly catch is landed locally and there is no reckoning.

A study by CIFRI in 2013-14, found that the catch (landed at Allahabad in Uttar Pradesh) was dominated by a miscellaneous group of fish (33%), exotics (30%), Indian major carps (25%), and cat fishes (12%) with *bilsa* fishery being completely absent in that stretch of the river. Nachiket Kelkar, a researcher with ATREE, in his article in *Current Conservation*, notes that fishers concur that capture fisheries is on the decline.³² Pollution and inadequate water flow are two reasons quoted for fish populations plummeting and species composition changing. Sinha's studies in the 1990s and 2007-2009 found that pollution in the Ganga is extremely high and that while the number of fish species had not changed in this period, over time more exotics were seen (143 species of which 133 were native and 10 exotic).

31 A.I. Payne, S. Huq, H. Singh, R. Sinha, R. Welcomme, and T. Petr. "A Review of the Ganges Basin; its Fish and Fisheries." *Proceedings of the Second International Symposium on the Management Of Large Rivers for Fisheries* 1 (2004).

32 Kelkar, Nachiket. Two failed states: politics, access and institutions in Gangetic river fisheries. *Current Conservation*, 8 (3), 2014.

Bihar

Bihar's poverty ratio as of 2011-12, was 33.7 per cent compared to India's poverty ratio of 21.9 per cent.³³ Agriculture contributes 21.30 per cent to the state's GDP and the region is rich in natural resources with several rivers draining it. The major crops include rice, wheat, coarse cereals and jute. Industries are few; there are sugar factories along the Ganga.

The budget for fisheries in Bihar remains low. In 2012-13, the State spent Rs 786.2 million, in 2013-14 it dropped to Rs 280 million. The budget outlay jumped to Rs 650 million in 2014-15. The allocation for fisheries is the lowest within the agriculture sub sectors except for food storage/warehousing and soil and water conservation. The state however has the largest number of fishers in the country (even if marine fishers are included in coastal states) and it produces 0.432 million tonnes (projected production for 2013-14) of fish most of which comes from aquaculture.

According to the Bihar Handbook on Fisheries Statistics 2011-2012, the extent of water resources in the state stands as follows:

S.No.	Resource	Water area
1.	Ponds and tanks	80000 ha
2.	Ox-bow lakes (<i>mauns</i>)	9000 ha
3.	Reservoirs	25000 ha
4.	Rivers	3200 km
5.	Wetlands	>500000 ha

33 Economic Survey 2013-14. Finance Department, Government of Bihar, 2014.

According to the DAHDF:³⁴

Fish production in Bihar

Year	Total Inland Fish production		Fish Seed Production (million)
	Fish production ('000 tons)	Growth rate (%)	
2004-05	267.51	0.3	318.31
2005-06	279.53	4.5	344.94
2006-07	267.04	-4.5	330.46
2007-08	319.10	19.5	309.53
2008-09	300.65	-5.8	302.99
2009-10	297.40	-1.08	330.78
2010-11	299.91	0.84	275.19
2011-12	344.47	14.86	244.37
2012-13	400.14	16.16	473.83

The estimate of fisher population (of Bihar) is 49,59,516 (men, women and children) as estimated in the Handbook of Fisheries Statistics of the DAHDF. Of this 51,413 are registered (as engaged in aquaculture and allied activities) with the fisheries department of Bihar.³⁵ However, there is no indication if these are traditional fishers, or private entrepreneurs and how this number has been compiled. There is no accurate data on how many people are involved in aquaculture and how many are (capture) fishers.

Madhubani district lies in the North Bihar plains (the Ganga divides the state into the north and south Bihar plains). Madhubani district, carved out of Darbhanga district which was a *zamindari* in British times, is drained by the Kamla and many smaller rivers and dotted by numerous ponds. The Kamla is an important tributary of the Kosi which flows further east through the districts of Supaul, Saharsa etc. The entire region is flood prone.

34 Profile of Fisheries: Bihar. Government of India. 2014.

35 Handbook on Fisheries Statistics (2011-2012), Department of Animal and Fish Resources (Fisheries), Government of Bihar.

West Bengal

The population of West Bengal stands at 91,347,736 as per the 2011 census.³⁶ In 2013-14, fish production in the state was 1,580,650 tonnes (marine and inland) making the state the second largest fish producer in the country after Andhra Pradesh (21 per cent) at 16.5 per cent. Of this 1,580,650 tonnes, just 188,240 tonnes were from marine fisheries. Agriculture (including fisheries, animal husbandry, horticulture and forestry) contributed 22.11 per cent of the state's net domestic product in 2008-09.

Fish is culturally of great significance in Bengal. For example, fish is a part of pre-wedding ceremonies where a fish smeared with turmeric and dressed up is among the items sent to the bride's and groom's houses by the other. Fish is consumed by all social groups with almost 90 per cent of households reporting consumption of fish. Yet per capita consumption of fish in Bengal (rural/urban: 0.813/1.082) lags behind Lakshadweep (4.367/4.117), Kerala (2.117/1.958), Goa (2.071/1.75), Andaman & Nicobar (1.353/1.2), and Tripura (1.177/1.488).

Within inland fisheries, West Bengal (1.45 million tonnes) is the second largest producer after Andhra Pradesh (1.6 million tonnes).³⁷ In terms of fisher population, the state is fourth with 911,622 fishers (including marine fishers) according to the 2003 Livestock Census.³⁸

In terms of fishery resources, West Bengal has:³⁹

S.No.	Fishery	Total potential resource (in million ha)	Area under culture (in million ha)
1.	Ponds/ tanks	0.312	0.287
2.	Bheels/ boars	0.041	0.021
3.	Reservoirs	0.027	0.031
4.	Rivers	0.19	--
5.	Canals	0.083	--
6.	Sewage fed	0.004	0.004
7.	Brackish water	0.21	0.058

36 Census of India website.

37 Handbook on Fisheries Statistics 2014. Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Government of India.

38 Livestock Census 2003. Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Government of India.

39 Annual Report 2010-11, Department of Fisheries, Government of West Bengal.

The fisheries department's annual report for 2010-11 (the last published annual report), notes that Rs 4884.6 million was budgeted for the 11th Five Year Plan period of 2007-2012 with annual budgets increasing through the five year period from Rs.650 million to Rs 1322.8 million. During this period, 90 per cent or more of the money allocated was used. There are 18 FFDA's in the state, which have 129,668 ha of water under them and have trained 209, 138 fish farmers.

Fish production in West Bengal⁴⁰

Year	Inland Fish production		Fish Seed Production (million)
	Fish production ('000 tons)	Growth rate (%)	
2004-05	1035.50	4.81	12200
2005-06	1090.00	5.36	12200
2006-07	1181.01	8.35	13200
2007-08	1264.53	7.07	13572
2008-09	1294.71	2.39	14181
2009-10	1338.00	3.34	12566
2010-11	1246.15	-6.86	13453
2011-12	1290.03	3.52	13826
2012-13	1337.66	3.62	15002

The districts visited were Howrah and Hooghly. Howrah district is bounded by several rivers—the Rupnarayan, Bhagirathi-Hooghly and Damodar. The low-lying and marshy lands in between these rivers get flooded when the rivers breach their banks. Like in Bihar, rivers here are known to change their course; the Howrah district gazetteer of 1909 notes that an earlier map of the region dating to 1779-81 shows the Damodar river joining the Hooghly further north than the current (1909) location and that the 18th century map also marks a third course named the 'Old Dummodah'.

40 Fishery resources and their utilization of West Bengal. DAHDF. Government of India. 2014.

ISSUES

Tenure rights

Bihar

Pre-1947, ponds and tanks were built by the local *zamindar*, the Raja of Darbhanga, for irrigation, potable water and other needs. Fishing was open access and for local consumption. While fishers belonged to traditional fishing castes, they were mostly part-time fishers. They also worked as agricultural labour. Post-Independence, these water bodies were vested with the State and the government started leasing these. In 1956, the government handed all the small water bodies to the revenue department with the *anchal adbhikari (tehsildar)* handling settlements. About 25 years ago—sometime around 1990—these water bodies were given to the fisheries department. Today, the fishing rights in the ponds are settled as per the Bihar Jalkar Management Act, 2006 (amended in 2007 and 2010).

There are two state-level cooperatives in Bihar and 510 primary level fishermen cooperatives.⁴¹ Under the Cooperatives Act, only one cooperative is allowed per block. The state leases the *jalkars* with the cooperatives who then allot them to their members. Currently the pond lease is short term i.e. 1-2 years (though the law talks of 5 year leases and a committee to manage the water body) with the annual deposit to be given in advance. Depending on the size of the water body, the number of members who can fish in the pond varies. Fishers said the secretary of the cooperative (who is an elected member) runs it as his/her fiefdom. This personage gets to allot the water bodies to fishers and this leaves room for much mismanagement. Fishers spoke of how there have been ponds allotted to non-fishers though the paperwork is in the name of a fisher (who is a member of the cooperative). Often this nominal allottee is unaware of his 'allotment'. The secretary is also known to fudge membership records to show more members in villages where he will get support. According to Sakhi, the secretary is usually an agent of the fisheries department though supposedly there are elections. The lease amount is fixed by the department. The state assesses the annual production capacity of *jalkars* every 5 years and is also charged with fixing the selling price of catch (by species) after assessing market value of that species. Based on these pieces of information, the lease amount is fixed.

41 Background Paper for Seminar on Blue Revolution through Fisheries Cooperatives. National Federation of Fishers Cooperatives Ltd, November 2014.

Fishers also explained that the State has a list of water bodies in the block and the cooperative has to take up all the water bodies in the block even though some water bodies are derelict, dried up and completely unusable. In spite of complaints, the fisheries department refuses to cross these ponds off the list, and the cooperative perforce has to pay the lease amount for such ponds as well.

Capture fisheries (especially riverine fisheries) as a livelihood continues to be marginalised. In the rivers, it has always been open access except in some of the *mauns* (ox-bow lakes) which are leased (earlier by the revenue department, and now by the fisheries department) and the section of the Ganga in Bhagalpur district (an 80 km stretch between Pirpanti and Sultangani) where the *panidari* system (a water equivalent of the *zamindari* system) existed. Under the *panidari* system, the *panidar* (or water lord) could tax anyone using the waters that he claimed rights over. These rights (to tax users for fishing and navigation), claim the panidars, were given to their ancestors by the Mughals. An article in India Today⁴², notes that one *panidar*, to sanctify his rights, has ‘transferred’ the rights to the gods. The *panidar* imposed two leases per year on the fishers—one for a nine month period and the other for a 3 month period. The lease rate varied between the two, and also varied based on the boats, gear used, and area of river being fished. Ferry services were also taxed. The India Today article notes that fish taxes (ranged from Rs 300 to Rs 1000 per annum (in the 1980s). Some panidars have also extended their claims to floodwaters (annually floodwaters cover around 80,000 acres of land). Kelkar, talking to fishers along the Ganga in Uttar Pradesh and Bihar, found that although the *panidari* system had been abolished in 1990 after pressure came from a fishers movement organised under the umbrella, Ganga Mukti Andolan.

Several sources indicate that in spite of abolishing *panidari*, there has been little difference on the ground with water mafia harassing fishers. Kelkar quotes a fisher saying that the *panidari* system was better than the current one where supposedly fishing in the river was free and open access but in reality local mafias controlled the area. Sinha concurred, from his several decades of working along the river, that the plight of fishers had not improved post-1990. A Down To Earth article⁴³ in 1993 says that a new mafia of ‘criminals’, zamindars and office bearers of fishing cooperatives continue to exploit fishers. Monthly payments of Rs 25 are collected from each fisher for fishing in the rivers.

42 India Today, *Water War*, 1987. <http://indiatoday.intoday.in/story/bihar-government-fails-to-do-anything-to-end-feudal-panidari-system/1/337124.html>

43 Down To Earth, *Unshackling the Ganga*, November 15, 1993. <http://www.downtoearth.org.in/node/31652>

To reduce exploitation, riverine fishers were issued identity cards. The Deputy Director of Fisheries says these identity cards were issued through the primary cooperatives and officially only those who have cards can fish, but it is not really enforced. [He was not sure when this was done and where the records of this card-giving exercise are. So there is no indication of how many cards were issued and how they identified these fishers.] However, the Down To Earth article also refers to this exercise, so presumably this was done pre-1993. The cards, the article notes, are restricted to cooperatives' members (since they are issued through these bodies) and impose geographical restrictions on the fishers i.e. the card indicates where a fisher can fish (which block).

West Bengal

In Howrah and Hooghly districts, there are few water bodies owned by the government but they are either polluted or given to non-fishers, say the fishers. Most ponds in this region are privately owned. More often than not, the lessees themselves are not fishers but contractors who hire the traditional fishers to work the ponds. So the fishers, hired on a contract basis, earn a pittance (Rs 100/hour) for work which is not an 8-hour-a-day job; at the most there is work for a couple of hours a day.

Typically leases are for as short a period as possible, usually a year or two. Occasionally the owner might agree to a 5 year lease in which case the lessee has to pay at least 2 years rent at the start and then another installment after 2 years. This makes it near impossible for fishers to take on lease ponds in Howrah. In many districts fish farming is moving up in scale from subsistence to commercial so the fallout is grave for traditional fishers as they do not have money to lease ponds. The annual lease of the ponds is high (and is increasing rapidly) - Rs 20,000 (per bigha)⁴⁴ upwards.

Fishers said that the lease agreement is rarely written and if it is, then only after much badgering. Even if the agreement is a written one, it never mentions the schedule of the pond (i.e. the *daak*, *mojha*, and *kothia* numbers from the revenue records which allows exact identification of the pond in government records). This is required when claims are to be filed, for example if there is a flood and the government declares compensation then the schedule is needed to claim the compensation.

In Hooghly district, the fishers said that the pond lease amount starts from Rs 10,000/bigha. This would be for a pond that requires some work—excavation, de-weeding, and other preparation before being used i.e. lowest quality pond.

44 1 bigha = 0.13 ha

In addition to the lease amount, the fisher would have to give the pond owner 40 to 50 kg (per bigha) of fish for his consumption over the year.

In riverine fisheries, pre-1947, as the Howrah district gazetteer of 1909 notes, landlords had river rights. They were paid in cash and fish by fishers or they hired fishers as wage labour for both fishing and agriculture. The going rate for wage labour is Rs 10-12 per month or Rs 3-5 per month with food and clothing included. Daily wage labour rates were at 4-5 annas along with a midday meal. The gazetteer also notes that many landlords were absentee ones who leased their lands on payment of a premium (*salaami*) and annual rent. The lease was usually long term and the estate was further sublet on similar payment conditions so there was little incentive for anyone to invest in improvements to the land. Today, fishing in the rivers is open access. The fisheries department notes that there used to be capture fisheries cooperatives that would get rights to fish in a specific water body or river, but not anymore.

Those fishing in the rivers said the favoured areas to fish were in the deeper parts of the river where fish aggregate but they are often stopped by local villagers (usually non-fishers) who demand payment in cash or kind in return. Fishers say there have been incidents of physical assault and villagers confiscating their gear. In some areas many recreational areas have cropped up that also limit fishers' access to the river. In addition, the embankments and even the dry river bed are occupied by local people/farmers and so fishers cannot park their boats. The approach to the river is difficult as there are no built up roads or lights and the path becomes muddy and slippery during the rains. Fishers also said that there is no drinking water to be had near the river. The government has banned some gear but this is not really heeded as fishers say they cannot afford to replace gear.

Education and employment

Bihar

There is a primary school in most villages but higher education requires people to travel further. Fishers said that they would like some of their children to get a degree in fisheries management so they can come back and advise the fishers.

According to the Director (Fisheries), fishers from Bihar migrate seasonally to other states (Madhya Pradesh, Jharkhand, Delhi, and even as far as Rajasthan and Gujarat) for fishing. However, fishers and Sakhi staff said that the migration from Madhubani was not for fishing but to urban areas to work in the construction industry and any sort of labour work that is available to them. Migration is not on a fixed schedule, but depends on what work is available locally, how pressing are the person's need for cash income and when the contractor

comes to the village to recruit people. The women do not migrate for work. Migration from Bihar to other states for fishing in reservoirs does take place though possibly from other areas of the district and state. Media reports indicate that contractors do bring fishers from Bihar to work reservoirs in Madhya Pradesh and even in sections of rivers that are leased out in Assam.⁴⁵

West Bengal

In most states, migration of men from fishing communities to urban areas has become common. However, fishers in this region say migration has reduced even though capture fisheries is dying and traditional fish farming does not bring in much income. They prefer to manage with whatever little fishing and farming provides. At the most they find some other work locally (agriculture mostly) for perhaps half the month. Many fishers take up mortgage loans and live precariously on this money.

Resource management

Bihar

The rivers in this region, with their heavy silt load, regularly flood their banks depositing silt and replenishing the soil. The floodwaters also replenish the many ponds with fish and nutrients. The rivers are also known to change their course frequently. Dinesh Mishra, who has studied and written extensively on floods, especially with regards to Bihar, notes that traditionally people could anticipate the floods and take necessary measures to protect themselves. The floods were also welcomed as the soil would get replenished and while they were an annual event(s), the floods receded quickly. In general, the region did not require complex irrigation systems as it is crisscrossed with small rivers/streams. Traditionally, small canals and tanks (*abar* and *pyne* system) were sufficient to store water for irrigation.

However, post-Independence, it was politically expedient to start a project to contain the Kosi and some of the other rivers in the region in a bid to avoid annual floods. The embankments have meant that silt is no longer spread over the depleted soils, leading to greater use of fertilizers; and there is no natural rejuvenation of fish stocks and nutrients in the ponds. The silt in the rivers is deposited on the river bed, reducing the river depth and requiring embankments to be raised regularly and so the surrounding areas become low-lying. Villages then get trapped between embankments and are at the mercy

45 Narmada fishermen demand direct fishing rights. Hindustan Times. 2012

Orphans of the River. Down to Earth. 2002.

of rainwater trapped in this space. People have actually ended up cutting the embankment to get relief and there have even been cases filed against people for doing so.⁴⁶ Plus there is always the possibility of the river(s) breaching the embankments. This was seen in the devastating Kosi floods of 2008. The Kamla too is embanked and this has, as expected, caused problems with smaller streams unable to join the Kamla and therefore flooding their banks.

With the abundance of water bodies, fish is an important source of livelihood and provides a cheap source of nutrition. Traditionally, fishers (Mallah, Kewat, Manjhi and other allied castes) in the Madhubani region did not need to culture fish. The rivers would regularly replenish the ponds and so water and fish were plentiful. With the bunding of rivers, the natural stocking of ponds has come down. This may explain why, when asked about traditional management practices, fishers seemed unable to answer.

In terms of State-led resource management of rivers, there is a two month ban (mid-June to mid-August) on riverine fishing, but it is not enforced, admit the fisheries department. Other than this, the State does not seem concerned with riverine fishing.

Today, pond aquaculture is not intensive; fishers' 'management' of ponds is based on how much money they have at their disposal to invest in fish farming. Certainly they do not follow 'scientific management principles' of preparing the pond, monitoring physico-chemical parameters, stocking, adding feed and so on. A hatchery owner said that fishers buy fingerlings to introduce into the pond but there is no calculation on how many fingerlings per hectare of water body is added or should be added. In terms of treating the pond, at the most fishers add *chuna* (calcium hydroxide) and potash. On asked when they add and how much, they said about 200g for an acre of water and one adds it when the water is 'bad' or some fish die. Their source of information and guidance on this is the hatchery owner. So essentially, the culture is an extensive one, with little input. The fishers are not particularly content and would like to learn more on intensive culture to boost their incomes.

The State has schemes to promote fish seed and fingerling production, access fish feed, renovate old ponds, develop new ponds, and install tube wells/pumps (see annexure for details). The fishers say they have not seen the benefits of

46 Life in the Shadow of Embankments – Turning Lost Lands into Assets in the Kosi Basin of Bihar, India. ICIMOD. 2009.

Dinesh Kumar Mishra. Story of a Ghost River and Engineering Witchcraft. 2004.

Dinesh Kumar Mishra. Refugees of the Kosi Embankments.

Dinesh Kumar Mishra. The Kamla – River and People on Collision Course. 2006.

these schemes. The schemes seem to have benefitted entrepreneurs to construct/repair their private ponds and ‘scientifically manage’ them. Fishers said this was a huge lacuna – the lack of information at local level and the need for a block-level person trained in fisheries management to give timely advice and guidance.

West Bengal

A large number of water bodies are privately owned in the state. Those that are vested with the government are managed through fisher cooperatives; there are some 1100 cooperatives in inland water bodies according to the fisheries department. FISHCOPFED says the entire state has 1433 primary cooperatives with a total of 92,759 members and 20 district-level societies (one per district) which include marine fisheries cooperatives. At the top of this hierarchy is Benfish.

Owning a water body of at least one bigha is a requirement to become a member of the cooperative in inland waters. But a fisher does not have to be a cooperative member to access schemes. He can contact the local fisheries officer and can apply for a scheme as long as he can show that he owns a water body.

Government water bodies are leased for a period of three years. The cooperatives are given first preference when leasing out government water bodies (including panchayat water bodies), second preference is to fisher groups (SHGs etc), and then to individuals. Cooperatives have requested it to be increased to seven years so that management of the water body can be planned. The matter has been taken up with the Chief Minister. The lease is fixed by a committee of district officials (fisheries and revenue) and cooperative representatives who calculate it based on the annual production of the last three years, the water area of the water body, and the market price of the catch.

Historically, the important fish species reared in the ponds and tanks were *catla*, *rohu* and *mrigal*. People collected wild seed from the river and sold it for Rs 5-8 per handful. These seeds were placed in ponds and after a month, the fry were sorted by species into different ponds or sold to stock other ponds/tanks.⁴⁷

Traditionally, fishers here used homemade feed made of mustard, ground nut, or palm cake, rice husks and grain etc. Earlier they didn’t get any ‘experts’ to help them about diseases but since they formed the union, through the union they have had contact with the fisheries officer who has been prescribing medicines. But these are difficult to obtain in the local market. The Fisheries Department has been promoting marketed feed and medicines. At least in Howrah district, this seems to have made them feel ambivalent about traditional feed; they seem to

47 Howrah District Gazetteer, 1909.

think that there is something lacking in their traditional systems. Similarly when it comes to treating fish diseases, they say they have no system to tackle this, there are no experts to advise them. They add lime or potash to the pond and hope it works. In Hooghly district they were quite emphatic that branded feed was not necessarily better and was certainly far more expensive.

In Hooghly district, fishers said that they mostly use potassium permanganate (KMnO_4), potash, potassium sulphate and salt for various diseases. They said that at this time of the year (February), fish get abscesses which are treated with KMnO_4 though recently they tried potassium sulphate and it worked well too. For abscesses in the gills, salt is used. The diseased fish are placed in an urn, salt is added and the water churned well. After a while it is emptied back into the pond. Fishers said that some fingerlings that develop from the bought seeds remain stunted, irrespective of the feed given. Such fish must be treated with KMnO_4 , then they will grow. But if treated with potassium sulphate they die. They do not get quality fish seed from the hatcheries. Often they get seed that is produced by immature fish through hormone treatment, they claimed. So these seeds don't grow properly. The government has passed an order that hatcheries have to be accredited but DISHA notes that there has been no further progress on this issue.

Pre-harvest and Post-harvest

Bihar

Earlier the ponds were stocked naturally (from floods etc); now hatcheries in the state are producing 450 million seed annually. The remainder of the demand of 900 million seeds comes from West Bengal from commercial hatcheries.

Suman Singh, head of Sakhi, noted that the state government has supported the setting up of nurseries and hatcheries by private entrepreneurs, as well as by a few fishers. But getting the subsidy is a very long process—it can take years for any of the schemes to fructify; the bureaucracy is slow in moving; and bribes have to be given at all levels. In this district, she says, only 2 people from the fishing community have got subsidies to set up hatcheries.

A hatchery owner from Jhanjarpur said he sells about 1000 kg of fry a year and that depends on size, the cost per kg is Rs 250 to 400. He said there are about 6-7 hatcheries in Jhanjarpur. He noted that sometimes they do have diseased fish. It is the hatchery owners who advise the fishers as well on how to deal with this and help them procure medicines from the market. The government is not involved in any of this.

Fishers said that to harvest the fish crop, they need at least 15 men and the labour is within the family or they hire (Rs 200 plus food) locally or barter labour. The harvested fish is placed in plastic bags with some water and supplied with some oxygen which is bought in Jhanjarpur market.

The demand for fish in the state is high (0.52 million tonnes)⁴⁸ against a production of 0.288 million tonnes and so there is no movement of fish out of the region; fish caught/cultured in the area is invariably sold locally by women at the local *baat* or doing the rounds of their village and nearby villages. Live fish are preferred here and fetch about Rs 230 per kg. In the last few years, however, there has been an influx of pangasius from Andhra Pradesh. And in spite of the preference for live fish, pangasius now constitutes about 50 per cent of the fish intake in the Madhubani region, as the pangasius sells for about Rs 110 per kg. Being easy to fillet, these are also popular in urban areas in restaurants. Thanks to the pangasius, even in the rural areas, people are getting used to the idea of 'ice'. Ice is available in Darbhanga town and now some of the fishers feel it would be good to be able to preserve their catch since their customers have started accepting the idea of fish being iced and preserved.

West Bengal

Those fishers who do manage to lease ponds, also use it to rear fingerlings and sell them. They stock the growth or nursery pond with one day-old fry (bought from hatcheries) and sell the fingerlings raised. West Bengal is the largest producer of fingerlings and supplies to other states. When the fishers go to other states to sell fingerlings, they say the police and local musclemen hassle them and so have to be paid off. Normally cost of transporting the fingerlings etc would be Rs 2000 per trip, but with having to pay the police, the cost can go up to Rs 20,000. Earlier customers would come looking for them but due to troubles with the police, customers do not bother. The fingerling business is for about 120 days and for the rest of the time they rear table fish. Unlike fishers in Howrah district, in Hooghly district, they said they don't sell the fingerlings outside; it is sold to fishers nearby or distributed into their own pond. The fry, they buy from Ramsagar in Bankura district costs Rs 500/*bati* (about 16,000 fry in one *bati*) plus transportation costs of Rs 600/*bati*. Per *bigha*, the stocking intensity is 10 *batis* of fry spread out over four times in 90 days. Each time, they remove the grown fingerlings and distribute them into other ponds or sell them.

Fish catch is sold to traders at the fish depot (who usually double as money lenders as well). This is true for both capture fisheries and aquaculture. The women

48 Handbook on Fisheries Statistics (2011-2012), Fisheries Directorate, Government of Bihar

vendors then buy the fish from the depot. Several issues regarding marketing, competition from cultured fish from other states/regions, loss of fish catch due to various reasons came up. Problems relating to transport, preservation of fish, access to credit, etc were also mentioned.

Nowadays, a lot of fish comes from Andhra Pradesh and from Moyna (in West Midnapore district) between Karthik (October-November) and Falgun (February-March). This fish is sold at much lower rates and so local produce is not in demand.

Fishers also say that birds (a particular species—*pankowri* or the little cormorant, *Phalacrocorax niger*) come in large numbers and ravage the fish stock in the ponds. This species is protected and so the fishers cannot kill them and so the bird numbers have gone up as well.

According to the fishers and the fisheries department, poisoning of ponds and stealing of fish are also major problems. The fisheries department said that this is why the crop insurance scheme has not been implemented; insurance companies are wary of entering this sector.

Live fish fetches a better price (Rs 80-120/kg) than fish carcass. The price difference between the two is about Rs 10-15/kg. But often reaching the depot in time to get the best possible price is difficult as depots are at least 5 kms away and transporting catch is difficult. Sometimes fishers reach the depot late in the day, after the depots are closed. Then they give the fish to the vendors directly.

Both fishers and vendors say that the depots are difficult to access (at least 5 kms away if not more); transportation is a problem and for the vendors taking the fish from the depot to the market is also fraught with difficulties as buses refuse to let them in. Deciding to wait and try their luck with the next bus (or the next) is also risky since if they are forced to finally walk to the market, the fish would have begun to spoil after several hours of exposure to the heat. Distances and lack of transport often means the fish spoils and they do not have access to ice or insulated boxes. Most of the vendors are women (about 60 per cent) though there are some men vendors. The men too, buy fish at the depot but have an advantage in that they often have cycles. The women however have to walk to the depot.

In this region, the vendors said there are no fish markets as such. Mostly they sell on the roadside but this is fraught with problems of harassment from those who own the land not to mention the lack of facilities. For example, they sit outside the railway gate where the CRPF, RPF (the Central Reserve Police Force and the Railway Police Force) harass them; they have to pay them weekly in fish or get chased away. The women have to use the facilities in the railway station for

which they have to pay. The land they sit on is the property of the railways and the space is very narrow with lots of trucks, buses driving through.

The other location where they sell fish is 10 minutes away from the railway station. Here there is a shed and some built up area. It is a privately-owned shed built on land leased for 99 years. To get allotted a space inside, vendors have to pay a one-time, non-refundable amount of about Rs 6000 to 8000 and a per day payment of Rs 25. However, there are few vendors inside as customers tend to buy from those sitting outside. Those sitting outside are actually on the roadside in front of shops so they have to pay the shopkeeper Rs 40 per day.

The women said they needed ice boxes and digital weighing scales since accuracy of measurements is a point of dispute with customers.

Like in Bihar, access to credit is an issue. Loans from private lenders are at exorbitant rates. Loans (against gold) are popular here though the interest is nearly Rs120 per cent annually. They receive no government assistance in the form of credit or insurance schemes. Whatever schemes are available, the fishers say they are unable to access; the bureaucracy is complex and they don't know how to navigate it.

Vendors buy fish from the fish depot. For this they of course borrow money at high interest rates. For example, if a vendor borrows Rs 100 in the morning, she has to pay Rs 110 in the evening. If they are unable to repay the loan in time, the interest rate doubles.

Gender equality

Bihar

The women in this region, with support from the organisation Sakhi, had over a decade ago fought for their right to be a part of the cooperative(s). After several years of protracted battle to change the mindset of the community, the women managed to gain acceptance as members of the cooperative; some of them were elected as cooperative secretaries. However, the cooperative does not seem involved in any aspect of the women's contribution to fisheries and therefore the women now seem a bit uninterested in being involved in the cooperative.

Disasters and climate change

Bihar

Floods continue to be a risk in this region of Bihar. The area is flood prone but, as mentioned before, people had coping mechanisms for floods in the past. Now with the rivers being embanked, the floods are rarer but when they do occur

are extreme events for which people have no coping mechanisms. The state's Action Plan for Climate Change (draft) notes that aquaculture is growing annually at the rate of 7.97 per cent and is an important sub-sector in terms of livelihood, nutrition and poverty alleviation. The plan envisages dealing with climate change impacts on fisheries by putting in place an end-to-end approach to aquaculture, ensuring adequate supply of inputs, promoting public-private partnerships, capacity building for fishing community on managing fishing activities in the context of climate change, etc.

West Bengal

The fishers said that the region being a flood prone area (42 per cent of the state is flood prone), they are often faced with complete disaster; the fish are lost and the ponds require work before any restocking can be considered which of course is not affordable. Flooding problems have been exacerbated with the high levels of road construction (raised on embankments), disrupting natural water drainage. With the high initial investment required and the uncertain output, the younger generation does not want to take up aquaculture.

The state action plan on climate change notes an increase in minimum temperature and a decrease in maximum temperature as well an increase in the intensity of extreme events. Some of the action points the plan suggests is to increase surface water storage potential; desilt reservoirs; revive old drainage channels; improve drainage systems; and undertake community based census of minor irrigation structures. In terms of fisheries and climate change, the plan lists these adaptation strategies:

1. Undertake real time monitoring of fish shoals to assess quantum of fish arrival at various points of rivers and in different times of the year
2. Disseminate real time climate information to inland fishers, to help them cast appropriate fish seeds in appropriate climate conditions to realise maximum produce
3. Develop climate forecasting and simulation modelling for better management of fisheries in the state
4. Protect and extend mangrove cover to enhance nutrient content in brackish water and enhance fish production and safeguard livelihoods of fishermen in the coastal areas
5. For enhancing the adaptive capacity of the fishery industry, assess the impacts of climate change on both inland and marine fish harvested in West Bengal. This will enable mapping of fish schools as water

temperatures change, and help identify new species that may enter the waters in this region (inland and marine) from other regions due to climate change.

Policies, schemes

Bihar

The state government, like the Centre, focuses on production. Therefore the policy thrust is on aquaculture and within that on showing that there is a steady increase in production; the department is not concerned about what species are cultured/captured/eaten; or, who has rights over fishing. The fisheries department would like, by 2017, to increase production to 0.886 million tonnes so as to have a surplus.

The fisheries department, of course, sees its schemes as supporting fishers and helping them. However, fishers say they have not been the beneficiary of any schemes (at least in the Jhanjarpur area). Also the official is at district level and is never seen at the local level so there is little chance of benefitting from the schemes. The schemes cover various aspects—to develop new ponds, renovate ponds, buy fingerlings/seed, feed, crop insurance, solar pump sets, and accident insurance to name a few. It seemed that these were being used more by private entrepreneurs and not necessarily by fishers, because developing ponds would require one to have land. Most fishers depend on the government ponds on lease through the cooperative. And while schemes on buying inputs can be accessed by them (there is no requirement that the pond be owned by the fisher for these schemes), they do not have easy access to the fisheries department. It might also be that since ponds are allotted annually, there is no major incentive to work on the pond. However, the reason given by the fishers was lack of contact with the department official.

The fisheries department does not differentiate between fishers from the fishing community and entrepreneurs in terms of who can avail of the schemes. The centrally sponsored schemes are administered through FISHCOPFED, New Delhi.

West Bengal

The fisheries department provides training to fishers at different levels—*panchayat*, block, state on various subjects. This is tagged to relevant NFDB schemes so fishers can access the schemes and get started on improving their income. Women groups are a particular target group for ornamental fish rearing. Training subjects include ornamental fish rearing, intensive fish farming and appropriate use of feed. In addition exposure visits to Andhra Pradesh are organised.

Most state schemes allow almost 80 per cent as a grant (see Annexure II for list of schemes).

However, the state does not have a crop insurance scheme. It is being discussed with insurance companies but companies are wary because of the high incidence of poaching and poisoning due to enmity. Hence the department is promoting the idea of harvesting every three months once the fish has reached a reasonable size (400 g which fetches Rs 80-100) and stocking again. That way the farmer can buffer against loss (due to poaching/poisoning) where he loses the entire crop. This scheme falls under RKVY.

The fisheries department also gives the cooperatives a subsidy as an incentive to improve any aspect of management. The cooperative can apply for this fund and based on their recent performance the department takes a call.

Irrigation needs have priority when it comes to water use, acknowledged the fisheries department. The department is in dialogue with the irrigation department to find an amicable solution.

CONCLUSION

In capture fisheries, tenure rights are not defined as they are open access resources. It is assumed that fishers are unhindered in their use of riverine resources and therefore the State sees no reason to codify their rights. Even in areas where feudal systems of rights over water existed (such as in Bhagalpur area of Bihar), the State believes that by the mere act of abolishing such a system (*panidari*), the fishers have been empowered. After all, the river is there, fish are there, the *panidars* have been stripped of their rights, so all that is needed is to declare river fisheries to be open access, is the attitude. There is no need to either explicitly recognize fishers' tenure rights or think about impact of other users of the river on fishing such as increasing numbers of non-fishers coming into fishing.

The lack of revenue from an open access system for the State also makes the State disinterested in protecting fishers' tenure rights and so they become more invisible. Fishers having only usufruct rights and no title over the land or water are therefore also not consulted when development plans that impact the river and its resources are discussed.

In reality, access is 'free' only in some regions—there are places where access is restricted or denied, for example, on religious grounds or for conservation reasons. In addition, colonial era laws like the Canal and Drainage Act of 1873 associate water rights with land rights so people with rights over the riverfront have rights over the water. Therefore there are communities and/or individuals who extract a payment from fishers if they wish to fish in the river stretch near the village/individual's land or dock their boats or land their fish in the given stretch of riverfront.

In culture fisheries, the government-owned water bodies are leased through cooperatives to members whereas, private water bodies are leased to the highest bidder. In both, leases are short term; in private ponds, it is usually for a year while in government ponds it varies depending on the state. Whatever the duration of the lease, since the cooperatives barely function, with rampant corruption by the 'elected' office bearers, there is no system for fishers to invest in pond development in an equitable fashion. In private ponds, of the other hand, there is no incentive for the lessee to invest in the pond. In West Bengal, ownership of a pond of at least 1 bigha is essential to become a cooperative member and since the cooperative (and therefore its members) are given priority when government ponds are leased, those fishers who do not own a pond of the required size, perforce can only take private ponds on lease.

So there is a need to enumerate inland fishing communities and in the case of capture fisheries, recognize their customary rights, empower them to claim these rights and ensure that they have legal recourse when faced with water mafias. These would also contribute to making fishers more visible as a stakeholder to be involved in any decision making process regarding rivers (and ox bow lakes etc) and their resources.

In private ponds, it must be ensured that agreements are written down with relevant revenue numbers so that the water body is identifiable in government records if needed; fishers are provided support and capacity building so that they may work collectively to ensure better terms with the pond owner. In government water bodies, lease periods need to be optimised (to at least 5 years, based on consultations with fishers) so that lessees are incentivised to invest in the pond and therefore also gain better returns on their investment. The cooperatives need a review and rehaul; currently they are dysfunctional or extremely corrupt, aiding only a few middlemen.

The minimum wage terms need to be fixed for those fishers hired as wage labour in private ponds; capacity building for supplementing income is required as they do not have a full day's work in the pond(s).

In terms of education, fishers are mostly able to access only primary level schools. Sanitation and housing is poor. There are government schemes on housing (such as Gitanjali in West Bengal) but these have not covered many of the villages.

In capture fisheries, there is no management as such of resources except for a 2-month fishing ban in rivers, and declaring sections of the river as a sanctuary though these are usually for other species such as the dolphin sanctuary in Bihar and the hilsa sanctuaries in West Bengal. Presumably these protect the fish though fishing continues in these areas 'illegally'. The only other measure is that the West Bengal government periodically releases fingerlings of indigenous carps into the rivers.

In culture fisheries in Bihar, whether in government or private ponds, fishers do little management as they do not have access to required information and resources and the leases being for short durations, they are not incentivised to invest in the water bodies. In West Bengal, traditional management measures are being abandoned for packaged products/supplements suggested by the feed companies and at the urging of the fisheries department though the fishers themselves are ambivalent about such a move.

There were concerns expressed in Bihar about the quality of the fish seed that is sourced from West Bengal. While the West Bengal fisheries department says

such concerns are baseless, it has put out an order requiring all hatcheries to be registered so that they can be monitored and has also drafted a bill to regulate this aspect of fisheries.

Transport to and from markets and fish depots (in the case of West Bengal) is an issue for the vendors and the fishers as well. In Bihar, at least in the area visited, this is not such an issue though access to ice is still a problem as the nearest source is Darbhanga, travelling to which takes at least a couple of hours. The Bihar fisheries department is thinking of introducing bicycles fitted with ice boxes for women vendors. However, the women were not sure they would find those useful as they typically sell fish in and around their village, so their travel is limited to short distances. On the other hand, in West Bengal, though urban mobile fish vending is being promoted, the women in the villages require support in transporting the fish from the depot to the market. So perhaps a bicycle-icebox scheme would be of greater use here. Overall, the role of women in fisheries in both states is low. Women are mostly confined to selling the fish locally or at markets; they have no voice in decision-making and do not participate in fishing.

Indigenous species are highly prized in the local market and the demand is greater than supply and they fetch a better price than carps. A mechanism to organize this would improve income and promote indigenous species which have great nutritional value in terms of micronutrients. CIFRI is contemplating a pilot project in the North East where the market linkages are organized at a local level so the fish are consumed locally, the fish fetch a good price for the fisher, and the number of middlemen are minimised. However, CIFRI is looking for partners to implement this idea; their forte being R&D.

These regions, in both states, are flood-prone. In West Bengal, the flooding problem has been exacerbated due to roads being built on embankments, which is disrupting natural drainage of the land. While the West Bengal action plan on climate change lists measures such as climate modelling, tracking fish shoals, there is no indication that fishers have been consulted on what problems they are facing due to climate change and what measures they feel are required; for example, fishers say a crop insurance scheme would be of use.

A census on inland fishers is essential; this has been in the pipeline for a long time but has been stalled for various reasons such as monetary requirements, the enormity and complexity of the work involved and the lack of one organization capable of handling the enumeration for the entire country.

Bihar draft bill on fisheries which focuses on monitoring hatcheries and sale of fish seed and fingerlings is available for comment. The Director of Fisheries would like stakeholders to send their comments.

A national-level holistic approach to policy and coordination between institutes and departments is required on fisheries, biodiversity conservation, pollution, irrigation, power generation, sanitation etc, which affect management and use of surface water resources. A river basin approach is required and must transcend international boundaries; currently there are no such collaborations between Nepal, India and Bangladesh except for the hilsa conservation plans developed with IUCN for India and Bangladesh.

The fisheries department schemes need to be reviewed to see how they are benefitting fishers and how to address the gaps. Several of the current policies may not be of use to fishers; fishers would like to see a crop insurance scheme as well as a boat insurance one.

RECOMMENDATIONS

- Recognize tenure rights of fishers in a formal structure keeping in mind customary rights, empowering them to claim these rights and ensure that they have legal recourse when faced with water mafias, and recognize the need to consult fishers when development plans that impact the river and its resources are discussed;
- Enumerate inland fishing communities along the lines of the CMFRI marine fisheries census. This would also contribute to making fishers more visible as stakeholders to be involved in any decision-making process regarding water bodies and their resources.
- Ensure lease agreements in private water bodies are written down with relevant revenue numbers so that the water body is identifiable in government records if needed;
- Optimise lease periods in government waterbodies (to at least 5 years, based on consultations with fishers) so that lessees are incentivised to invest in the pond and therefore also gain better returns on their investment;
- Review and rehaul cooperatives;
- Fix minimum wage terms for fishers hired as wage labour in private ponds;
- Ensure better coverage of fishers in government schemes (such as education, sanitation and housing) and introduce a crop insurance scheme for aquaculture and a boat insurance scheme;
- Put in place schemes for improved access to markets for vendors such as bicycles, ice boxes as the need may be (fishers need to be consulted on what would be useful in each region) and review existing schemes;
- Promote conservation and sustainable harvest of indigenous species;
- A national-level holistic approach to policy and coordination between institutes and departments is required on fisheries, biodiversity conservation, pollution, irrigation, power generation, sanitation etc, which affect management and use of surface water resources. A river basin approach is required and must transcend international boundaries; currently there are no such collaborations between Nepal, India and Bangladesh except for the hilsa conservation plans developed with IUCN for India and Bangladesh.

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ANNEXURE I

Schemes of the Bihar Fisheries Department

Current schemes for fish farming

All the schemes have a 50 per cent subsidy from the state (and 90 per cent for Scheduled Castes and Scheduled Tribes). They are:

- Fish seed/fingerling scheme: Two groups of fishers are chosen—one for fish seed production and one for fingerling rearing, the idea being that no outside suppliers are needed. The fish seed producers will sell to the group who rear fingerlings and they will in turn sell to the fishers. The scheme has an outlay of Rs 80.05 million. Interested fishers can answer the advertisement put out by the department. They must have one ha of land for a nursery. Currently there are 17,000 ha under this scheme. The species reared are rohu (*Labeo rohita*), catla (*Catla catla*), mrigal (*Cirrhinus cirrhosus*), and grass (*Ctenopharyngodon idella*), silver carp (*Hypophthalmichthys molitrix*), and common carp (*Cyprinus carpio*).
- Fish feed scheme: A farmer can buy up to 5000 kg of feed/ha at the rate of Rs 25/kg. More expensive feeds can be bought but the state will only subsidise Rs 12.5/kg (50 per cent subsidy).
- Seed hatchery scheme: The estimated unit cost is Rs 1.5 million for a hatchery with a capacity of 8-10 million fish fry per year. The farmer should have three acres of land.
- New pond construction scheme: Cost to excavate 5ft of earth is estimated at Rs 697,000/ha.
- Old pond renovation scheme: At a cost of Rs 150,000/ha.
- Wetland development scheme: Excavation of 2-2.5ft of earth can be done in a wetland area at an estimated cost of Rs 0.388 million/ha.
- Tube well/pump set scheme: Since the ponds lose water in the summer, solar-powered tube well and pump sets can be installed. Cost estimated at Rs 50,000 and Rs. 25,000 respectively.
- SC/ST scheme: The scheme was started in 2014-15. The farmer must have 2,000 sq.m of land to develop a nursery at a cost of Rs 0.151 million. The state gives a 90 per cent subsidy. Along with this, the farmer can avail of the previous scheme but at 90 per cent subsidy (instead of the usual 50 per cent).

- The department also conducts training programmes at three levels—district (local fisheries office), state (at Patna), outside state (Kakinada, Calcutta, CIFRI, Pantnagar, CIFE centre in Madhya Pradesh, CIFA Bhubaneswar). Fishers get 10 days training on seed production, hatchery management etc. Specific training, if requested by fishers, is also done.
- The fisheries department also implemented a two year scheme (NFDB supported) to culture pangasius in the state. Thereafter, it was left to entrepreneurs to take it up; a few people did so.

Schemes in the pipeline for fish farming

- Crop insurance scheme: Fish crop can be insured against theft, poison, floods, and drought. The premium is Rs 3200, shared between the state and the farmer. A maximum coverage of Rs 0.25 million is allowed. The scheme was launched 4-5 years ago but ran into trouble with the insurance company (Oriental Insurance) and so was stopped. The department plans to revive the scheme and bring in more insurance companies.
- Tank scheme: A scheme for renovation of government ponds where the settlement has been done under the Jalkar Act. Fishers get a 7-year lease.

Schemes in the pipeline for fishers

These schemes are being planned so the details are not available as of now.

- Net/ boat scheme: To purchase nets and boat at 50 per cent subsidy.
- Insurance scheme: This is the central scheme on life insurance which has been mooted but details are not out yet. A health insurance scheme wherein a fisher can be insured up to Rs 10,000 has just been started.
- Housing scheme: This too is a central scheme for all fishers where the centre and state equally share the cost.
- Accident compensation scheme: This is also a central scheme. This began in December 2014 and has already covered 300,000 fishers. The scheme is implemented through the cooperatives and so the claimant must be a member of a cooperative. The scheme gives coverage of up to Rs 200,000.
- Compensation for the 3-month ban period is also being planned. This is the centrally sponsored scheme which has not been implemented in inland waters. Under this scheme, the Centre, state and the beneficiary will contribute Rs 900/year each. This Rs 2700 plus the interest on Rs 2500 (which will be deposited initially in the account by the government)

will constitute the compensation each year. In the first phase the state hopes to cover riverine fishers, those who are permanently dependent on fisheries for their livelihood and those falling within the BPL category.

- Bihar has no schemes for women but is thinking of starting one, with NFDB funds, to provide vendors with iceboxes and mopeds.

ANNEXURE II

Schemes of the West Bengal Fisheries Department

- Rashtriya Krishi Vikas Yojana (RKVY): schemes to obtain quality brood stock; iceboxes and bicycles with insulated boxes for door to door vending and mobile carts (it is called a cycle van) for vending in urban areas; cooperative development; increase production by following a system of multiple stocking and multiple harvesting; extensive culture of *Penaeus monodon*; access formulated feed; access extension services to test soil etc; and a hilsa conservation programme with a hilsa resource centre
- Tribal development: to give training and access to feed etc to tribal communities so that they might become fishers
- NFDB: brings various NFDB schemes to fishers such as to promote intensive aquaculture in ponds/tanks; ornamental fisheries; domestic fish marketing i.e. setting up of retail outlets; fish drying and processing; establishment of hatcheries etc
- National Mission on Food Processing: tapping into the central scheme to set up cold chains, and ensure value addition of fish products
- NABARD: bringing NABARD schemes to revive ponds in varied conditions and to ensure 'scientific management' of the ponds is done by correct stocking, feeding, application of potash etc.

In addition to these are central schemes on group accident insurance and pensions that are handled by Benfish.

ICSF Occasional Paper

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ICSF is an international NGO working on issues that concern fishworkers the world over. It is in status with the Economic and Social Council of the UN and is on ILO's Special List of Non-Governmental International Organizations. It also has Liaison Status with FAO. As a global network of community organizers, teachers, technicians, researchers and scientists, ICSF's activities encompass monitoring and research, exchange and training, campaigns and action, as well as communications.

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