RESEARCH ARTICLE

# PRESENT STATUS AND FUTURE PROSPECTS OF FISHERIES DEVELOPMENT IN BIHAR WITH SPECIAL REFERENCE TO SOME SELECTED OX-BOW LAKES OF MUZAFFARPUR DISTRICT

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*Received-09.01.2018, Revised-23.01.2018*

**Abstract:** Total fish Farmers Development agency (FFDA) working in the state is 33. Water area development through this is around 26,000 ha and average annual productivity of ponds /tanks under this 2175 kg/ha/yr. The main components of work under this centrally sponsored scheme are construction of new ponds, renovation of old derelict ponds through bank finance, training to farmers, supply of essential inputs and extension support. Total no. of ox-bow lakes in the state is 63 which become well. Besides these are many ox-bow lakes which have either become extinct due to certain bio-geological phenomenon or in the process of extinction. There are some lakes with process of formation has been halted due to the raising of earthen embankment, a measures of flood control, and as such these lakes remain in half formed state but still have opened connection with the parent river, resulting into complete inundation during monsoon months. However, they served as good resources for capture fisheries, being a collection sink of riverine stock during the flood

**Keywords:** Future prospects of fisheries, Development in Bihar and Muzaffarpur District

## INTRODUCTION

In the developing countries, fish constitutes one of the single largest cheap source of animal protein. Fish protein is a relatively high digestibility and biological value for human beings, as it contains all the essential amino acids in adequate amount and balanced proportion. There is no doubt that fish could make a more significant to nutrition, particularly among undernourished. Indian fisheries have made great strides during the past five decades. As a result, India now produces over 6.1 million tones of of fish and shellfish from capture fisheries and aquaculture, thereby contributing immensely to the food basket of the country. During this period, fish production has registered over eight- fold increase, from 0.75 million tonnes in 1950. Further, the share of inland fisheries sector in the total fish production, which was 29% in 1950-51, has gone up by 50% at present. India being the fourth largest global producer of fish, is playing an important role in world fisheries scenario. Further, with a production of over 2.2 metric million tonnes from aquaculture as in 2000, the country occupies second position in the world in inland fish production, only next to China. The aquaculture sector has shown overwhelming growth of 46.8% during the last two decades i.e., from 0.37 million tonne in 2002. Further, fresh water continues to have a major share out of total aquaculture production with contribution of over 95% in terms of quantity ( Ayyapan and Jena, 2003).

As far as inland fisheries resources is concerned, India is blessed with huge freshwater aquaculture resources consisting of 2.36 million ha of ponds and tanks, 1.07 million km of canals, 3.15 million ha of reservoirs and 0.72 million ha of upland lakes that could be put to different fish culture practices or even culture based capture fisheries in case of large water bodies. Available statistics show that only about 0.8-0.9 million ha of available water area under ponds and tanks have been put to use for aquaculture across the country at present. Inspite of availability of huge open inland water resources in the country, the contribution from inland capture fisheries is of the order of 0.7 million tonnes out of total inland production of a little over 2.2 million tonnes from freshwater aquaculture indicates that the sector in overall terms, possesses a potential of producing over 4.5 million tonnes annually, through adoption of appropriate technologies, effective transfer of scientific knowledge and provision of required critical inputs quantity (Ayyappan and Jena, 2003).

After creation of Jharkhand state (15$^{th}$ November 2000), Bihar has lost a sizeable extent of water areas in the form of reservoir. At present only 30% of large reservoir in the residual Bihar. As far as fisheries resources in the state of Bihar is concerned, they mainly comprise ponds, tanks, small reservoirs, rivers and water logged areas like ox-bow lakes and chaurs. Around 65,000 ha of water areas are covered by ponds and tanks and nearly 35,000 ha of water areas consists of ox-bow lakes and chaurs. At present annual production of fish in the state is 2.2-2.5 lakh tonne, while average annual production of fish seed is 350 million numbers against the requirement of 600 million fry per year. There are 18 hatcheries in the state; one in government sector, 03 in corporate sector and 14 in private sector. The functional FFDAs in the state is 33.

## MATERIAL AND METHOD

The present investigation of water resources and their fish production was conducted in the Muzaffarpur district of Bihar. This district has 16 numbers of

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blocks but the survey was done in Mushari , Motipur and Kanti block which are prominent in fish production . The town / village selected were Brahamputra and Manika under Mushari block and Haruna and Kanti Village Under Motipur Block respectively. Besides discussion with various officials in Fisheries Directorate, Bihar were also done to collect more information. The primary survey was conducted in Mushari, Motipur and Kanti block of Muzaffarpur district. This district is selected for the survey because it is bestowed withseries of ox-bow lakes and among them some lakes like Manika, Brahampura, Motipur and Kanti are highly significant from fisheries point of view. These ox-bow lakes have define bearing on socio-economic conditions of the area, being one of the major sources of livelihood for thousands of fisherman living in their vicinity. This district has second highest water area of ox-bow lakes after east and West Champaran district of Bihar. All above four selected ox-bow lakes are located in different corner of Muzaffarpur district. Manika lake is 13 km east of Muzaffarpur town, while Kanti and Motipur lake located in the 16 kmand 36 km respectively in the west of Muzaffarpur town on Muzaffarpur –Raxaul highway. The Brahampura lake is located in the city itself. In Mushari block, selected villages were Brahampura and Manika lake while in Motipur and Kanti block, the selected villages were Harayana and Kanti respectively. In above all four selected villages, direct contact to the fish farmers were done and information on the following matters were collected as per structured questionnaire.

## RESULT AND DISCUSSION

The primary data was collected from the four ox-bow lakes of Muzaffarpur district of Bihar and from Directorate of Fisheries, Govt of Bihar, Patna which represent different fisheries activities undergoing and resources available in the state. All these relevant data shows the present status of Fisheries in Bihar. The data during survey were presented in the form of tables and figures wherever necessary. Total no. of ponds and tanks of variable size is 40,520 which are distributed throughout the entire state covering a total water spread area of 68,821 ha comprising both government and private sector (2002-03). Total fish production in the state of Bihar is 2.61 lakh tonnes as against the total requirement of about 4.5 lakh tonnes per annum (2002-03, Up to March' 03). Per capita fish consumption in the state is one of the lowest in the country i.e., less than 1 kg/yr (Singh and Ahmad, 2003). Fishery development in ponds, tanks, reservoirs and lakes (Mauns and Chaurs) are the major area under inland fishery development. These water areas can be very well used for inland fish production. Most of these areas produced fish much below their potential. In order to get consistent fish yield through scientific management and also proper understanding of ecosystem is vital.

After studying the different aspects of fisheries in Bihar, it is apparent that the fish production from ponds and tanks at farmer's level managed by FFDA still remains at a low level of about 2275 kg/ha/yr. On the other hand, total catch of fish from reservoir is 18,217 i.e., 2.5 kg/ha/yr which is too less than the national average fish production from Indian reservoir (15 kg/ha/yr). The rate of fish yield has been reported by *Jha, 2004* to be at a desired level of 165-350 Kg/ha in flood plain lakes of Bihar and West Bengal. Though, the ecosystems are highly productive in nature. In the prevailing ecological condition, flood plain lakes in Bihar have a definite bearing on current yield pattern. There is a tremendous scope for fisheries development in flood plain lakes. Immediate adoption of scientific management species introduction, environmental and diversification of culture system. Effective and efficient management of resources, both physical as qell as biological of resources both physical as well as biological holds the key for sustainable and environmental friendly fisheries development in flood-plain lakes.

The main resources concerned with the very low level of fish production from ponds, tanks, mauns, reservoirs etc. is the lack and knowledge of the farmers regarding scientific fish farming. During the survey it was noticed that most of the farmers are unfamiliar with the use of lime, fertilizer, feed with definite dose and time interval in the fish ponds. They simply stock the fish seed in the ponds in the name of fish culture followed by harvesting. As far as mauns is connermed very few farmers stock the fish seed and most of the farmers leave it on the mercy of nature for auto stocking. Most of the farmers don't know that Department of Fisheries provides training and subsidy of 25% both on variable and non-variable inputs. This may be attributed to the inert and village phobic attitude of Government of Fisheries officials towards fish farmers. Besides, extension network in the state is poorly developed. They often visit the fish farm and suggest solution for the problems. They never take feedback from farmers based on existing agro-climatic conditions at the farm for redressal either by themselves or by sending it to research centres. It is generally seen that Fisheries officials of the department of fisheries after undergoing training in Central Fisheries Institute like CIFE or CIFA on latest developing fish farming technology, often reveal or unable to explain by visiting at the farm of fish farmers and these cause it concern may be regarded as the stumbing block in the awareness of farmers towards scientific fish farming in Bihar as well as low fish production in ponds, tanks and mauns. Besides, at present the average production of fish seed is just around 350 million nos. (2002-03) against the requirement of about 600 million nos. per

annum. The major reason of concern is that from last few years the state department of fisheries has stopped fish seed production work on the ground that it it has to be done by Fisheries Development Corporation. For this reason most of the departmental fish seed farms are now defunct. Unfortunately, the state Fisheries Development Corporation is presently not in position to cater to the fish seed requirement of the state due to absence of technical manpower. Presently the situation comes that farmers were fully dependent on reverie fish seed collected from rivers or the fish seed sold in the market comes from west Bengal, are mixed with spawns associated with weed as well as predatory fishes leading to mass mortality of fish seed after stocking in the pond. Also those farmers who manage to get hatchery produced seed, stock the seed in the pond without removing the weed and predatory fishes as well as aquatic weeds which really points the know-how of fish farming in Bihar.

In the state, there is very little bit of integration with livestock and particularly integration with piggery is not seen due to some religious feelings. Integration of fish with Makhana and trapa is one of the popular integrating system which is limited to north Bihar only. Though there is large scope of poultry integration in Bihar very few farmers adopted it due to lack of technical know-how. Also, the situation of Fisher Co-operative Society which is 370 in number in the state and is considered as a link between government and fish farmer and plays a major role in getting the different benefit and subsidy from government for both fish culture and socio-economic upliftment of fishery community has become bad to worst. Most of them have become functionless. Therefore, the government ponds, which are given on bid every year by Department of Fisheries, are generally taken by middleman persons due to their high approach and financially sound inspite of having provision of first priority to be given to Fishery Co-operative Society.

Besides after formations of Jharkhand state, the residual Bihar has lost a sizeable extent of water area in the form of reservoir. At present only 30% of the total reservoir area in the residual Bihar covering water spread area of 7286 ha. But unfortunately only 11 medium and small reservoirs covering water spread area of 3589 ha have been taken for reservoir fisheries management by the Department of Fisheries, Govt. of Bihar. At present the average fish production from these reservoirs is about 2.5 Kg/ha/yr which is less than national average fish production in Indian reservoirs. In addition, inspite of having restriction on catching brooders during breeding season i.e., mid June to September, indiscriminate killing of the is continued without any check. Besides, there is no regulation on mesh size inspite of having rule in fishery legislation of the state that a net having zero mesh size is not permitted and this has played a crucial role in the extinction of many important food fishes which are essential in maintaining the food chain in reservoir.

Reservoir as well as mauns and chaurs inspite of having first priority to be given to Fishery Co-operative Society, at the time of bidding by Fishery Department officials, are generally taken by financially sound leader type person. A particular reservoir which comes into the hand of Fishery Co-operative Society is often seen that due to poor financial condition of the member, they are bound to sell their catch to the middleman and just get a minor share of the price what the consumer pay in the market. From the study it is revealed that the fish catch of the reservoir were mostly dominated by minnows which not only breeds profusely in the reservoir but also keenly competes with major carp in feeding. Since the minnows are effectively caught by drag net only, the fisherman should be encouraged to use these nets with greater frequency for eradication of minnows, particularly during reduced water level of summer months (February-June) in lotic sector, facilitated through availability of more suitable fishing areas. Similarly observation is reported by Desai and Shrivastava while working on Ecology of Fisheries of Ravishankar Sagar Reservoir, M.P (2004).

**Table 1.** District wise fish production from all sources with targeted production (2002-03 up to March' 03)

| Name of district | Production target (in lakh tonnes) | Achievement (in lakh tonnes) |
|---|---|---|
| Madubani | 0.1270 | 0.13 |
| Darbhanga | 0.1170 | 0.1294 |
| Begusarai | 0.1260 | 0.1220 |
| Siwan | 0.1060 | 0.1180 |
| Saran | 0.1060 | 0.1128 |
| East Champaran | 0.1060 | 0.1060 |
| West Champaran | 0.1060 | 0.1058 |
| Muzaffarpur | 0.1060 | 0.1058 |
| Katihar | 0.1060 | 0.1042 |
| Vaishali | 0.1060 | 0.1 |
| Sitamarhi | 0.10 | 0.0980 |
| Nawada | 0.0950 | 0.0901 |
| Bhojpur | 0.0850 | 0.0884 |
| Saharsa | 0.0850 | 0.0875 |

| | | |
|---|---|---|
| Purnia | 0.0850 | 0.0850 |
| Munger | 0.0850 | 0.0836 |
| Khagaria | 0.0850 | 0.0810 |
| Nalanda | 0.0850 | 0.0810 |
| Madhepura | 0.0850 | 0.0800 |
| Bhagalpur | 0.0850 | 0.0750 |
| Samastipur | 0.1160 | 0.0630 |
| Patna | 0.0740 | 0.0612 |
| Gopalganj | 0.0740 | 0.0550 |
| Rohtas | 0.0530 | 0.0520 |
| Buxar | 0.0530 | 0.0516 |
| Jehanabad | 0.0515 | 0.05 |
| Gaya | 0.0635 | 0.0498 |
| Auragabad | 0.05 | 0.0427 |
| Baka | 0.0550 | 0.0425 |
| Araria | 0.0430 | 0.0384 |
| Kissanganj | 0.1060 | 0.1042 |
| Jamui | 0.0440 | 0.0303 |

**Table 2.** Details of quantity of fish landing and per capita income of fisher men.

| Name of lake | Productive area/ha | No. of active fishermen | Quantity of fish landed | Present annual income of one (in Rs.) |
|---|---|---|---|---|
| Manika | 108 | 210 | 5,088 | 727 |
| Brahampura | 45.5 | 100 | 2.502 | 751 |
| Motipur | 110 | 70 | 5,500 | 2,357 |
| Kanti | 100 | 125 | 4,700 | 1,128 |

**Note:** *Per capita income were calculated based on 5 members in each family*

**Table 3.** District wise fish seed production in Private and Govt. sector (2002-03)

| Name of district | Fish seed production (in lakh) | Achievement (in lakh tonnes) |
|---|---|---|
| | Private | Govt. |
| Madubani | 191.00 | -- |
| Darbhanga | 201.08 | -- |
| Begusarai | 174.80 | 1.30 |
| Siwan | 86.00 | 4.00 |
| Saran | 90.50 | 2.00 |
| East Champaran | 177.25 | 2.25 |
| West Champaran | 160.00 | 2.87 |
| Muzaffarpur | 193.91 | 6.50 |
| Katihar | 149.79 | -- |
| Vaishali | 127.00 | 2.35 |
| Sitamarhi | 115.00 | -- |
| Nawada | 125.00 | -- |
| Bhojpur | 67.88 | -- |
| Saharsa | 141.00 | -- |
| Purnia | 70.00 | 1.60 |
| Munger | 70.00 | -- |
| Khagaria | 130.00 | -- |
| Nalanda | 130 | -- |
| Madhepura | 110.00 | 1.15 |
| Bhagalpur | 96.00 | -- |
| Samastipur | 178.00 | -- |
| Patna | 80.00 | 4.0 |
| Gopalganj | 50.00 | -- |
| Rohtas | 140.00 | -- |
| Buxar | 52.20 | -- |
| Jehanabad | 85.00 | -- |
| Gaya | 112.50 | 1.50 |

| | | |
|---|---|---|
| Auragabad | 115.00 | 1.00 |
| Banka | 80.00 | -- |
| Araria | 26.00 | 1.0 |
| Kissanganj | 39.00 | -- |
| Jamui | 34.50 | -- |

**Table 4.** Location of some fish seed hatchery in Bihar:

| **Name of district** | **Private/Govt. corporation** | **Production capacity (in million)** | **Present annual production of spawn (in million)** |
|---|---|---|---|
| Danapur(Patna) | Fish development corporation | 150 | 95 |
| Sitamarhi | Fish development corporation | 150 | 190 |
| Madhubani | Fish development corporation | 40 | -- |
| Mangalgarh(Sitamarhi) | Pvt. | 25 | 11 |
| Mahawa(East Champaran) | Pvt. | 80 | 27 |
| Matasya priya Udyog (East Champaran) | Pvt. | 90 | 31 |
| Chhoti Dilahi | Pvt. | 30 | 5.0 |
| Yadavpur (Gopalganj) | Pvt. | 30 | -- |
| Motipur (Muzaffarpur) | Pvt. | 25 | 2.0 |
| Kaimur | Govt. (under construction) | -- | -- |

**Table 5.** Details of distribution of floodplain wetlands in India

| **State** | **Distribution(districtwise)** | **River basin** | **Local name** | **Area (ha)** |
|---|---|---|---|---|
| Arunachal Pradesh | East Kameng, Lower Subansiri, East Siang, dibang Valley, Lohit, Tirap and Changlang | Kameng, Subansiri, Dibang, Lohit Dihing Tirap | Beel | 2,500 |
| Assam | Brahmaputra and Barak valley district | Brahmaputra and Barak | Beel | 10,000 |
| Bihar | Saran, Champaran, Saharsa, Muzaffarpur, Darbhanga, Munger and Purnea | Gandak and Koshi and Dhar | Maun, Chaur | 40,000 |
| Manipur | Imphal, Thaubal and Bishnupur | Iral, Imphal and Thaubal | Pat | 16,500 |
| Meghalaya | West Khasi hills and East Karo hills | Somehswari and Jinjiram | Beel | 213 |
| Tripura | North, South and West Tripura district | Gumti | Beel | 500 |
| West Bengal | 24-Praganas north and South, Hooghly, Nadia, Malda, murshidabad, Maldah, CoochBihar, Burdawan, North and South Dinajpur and Midnapur | Hooghly, Ichamati, Bhagirathi, Chumi, Kalindi,Dharub, Dharala, Pagla, Jalangi, Behula, Torsa and Mahananda | Eel | 42,500 |
| Total | | | Charah and Baor | 202,213 |

**Table 6.** Distribution and area of existing of Ox-bow lake in Gandak basin of Muzaffarpur district.

| **Name of district** | **Area in ha** |
|---|---|
| Brahmpura | 45.50 |
| Manika | 105.50 |
| Motipur | 110.00 |
| Kanti | 100.00 |

| | |
|---|---|
| Jhapaha | 140.00 |
| Murra | 15.00 |
| Rahuwa | 30.00 |
| Bhoosra | 45.00 |
| Bachaha | 30.00 |
| Semera | 16.00 |
| Matiha | 20.00 |
| Rajwara | 12.00 |
| Morsandi | 60.00 |
| Ghosod | 50.00 |
| **Total** | **779** |

**Source :** *Department of Fisheries, Muzaffarpur, Bihar*

**Table 7.** Details of reservoirs in different district of Bihar

| Name of district | Name of the reservoirs | Type of reservoirs (Small : <1000 ha, Medium : 1000-5000 ha, Large : 5000-10,000 ha | Area (in ha) |
|---|---|---|---|
| Banka | Badua Jalasay | Medium | 1335.50 |
| | Amahara Jalasay | Small | 21.00 |
| | Madhyagiri Jalasay | Small | 269.00 |
| | Belharna Jalasay | Small | 20.00 |
| Bhagalpur | Chandan Jalasay | Medium | 1050.00 |
| Munger | Jalkund | Small | 5.00 |
| | Kharagpur Jalasay | Small | 210.00 |
| | Morvey Jalasay | Small | 40.50 |
| Jamui | Nagi Jalasay | Small | 439.00 |
| | Amrit Jalasay | Small | 20.00 |
| | Nakti Jalasay | Small | 179.00 |
| Total | | | 3,589.00 |

**Source:** *Statistical division of Directorate of Fisheries, Govt. of Bihar*

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