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Assessment of fish productivity of Gaya, Bihar, India

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Abstract: The present investigation describes the fish productivity of Gaya ponds, Bihar (India) pertaining to its geological, morphological, economical features, requires urgent modernization to increase the productivity. It is the fact the fisherman community is one of the poorest of the poor sector of our society who sustain their livelihood on fish production and marketing. The result obtained through this research may be useful for poor people of the area; those are depending on wetland resources. Diversity of fishes is significant for wetland study. Fisheries development from the open water is considered to be environment friendly, labour productive and from social and economic perspectives. Reservoirs that spread over the area can play a significant role in increasing the fish availability in the state and providing gainful employment to its rural people. It has long way to go towards optimum utilization of this important resources. The Gaya ponds have good potentiality of fishery including composite fish farming and integrated fish farming. However, socio-economic conditions of the people of this region may be changed if proper utilization of pond produce is made with caution. Thus, the process of fishery in the pond is very old and it requires urgent modernization to increase the productivity and enormous scope exists in this country to harvest the water economy. Taking into consideration of our water resources, there is need of serious developmental efforts, which should be directed towards increasing fish production.

Key words: Freshwater fishes, biodiversity, growth, pond ecosystem, Gaya

INTRODUCTION

Bihar, one of the poorest states in our country where more than 70% population are sustained their livelihood on agriculture and allied activities like aquaculture, dairy, poultry etc. At present time, in our state fishermen community constitutes about 14% of total population.¹ The fishermen community is one of the poorest of the poor sector of our society who sustain their livelihood on fish

production and marketing. Bihar has tremendous potential to be developed into a highly organized fish production centre. It is endowed with wet lands, water reservoir, several major rivers, many ponds, lakes etc. are the fishing operations. Only a small fraction of fish farming is presently under utilization.² The rank of Bihar regarding fisheries resources among all states is twelve and occupied third position in inland fish production. Fish production has been reported in the state of Bihar in year 2015-16, that is 50% of the total need. Fisheries play an important role in the economy of not only in Bihar but, in whole country. However, India is an agricultural based country

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in which contribution of fisheries in total Agricultural Gross Domestic Production is 4.2% (Source – Hindu Survey of India Agriculture 2004) fish protein (food) production and supply raising nutritional level, generating employment opportunity/revenue and earnings of foreign exchange.

Studies on wetlands of Bihar are inadequate and very fragmentary.^{3,4} The result obtained through this investigation may be useful for poor people of the area those are depending on lake and wetland resources. The data may also be helpful in understanding the structure and function of the pond ecosystem. Central Agricultural Minister of India stated that fish production was exceeded 20% i.e. 327 lakh tones during 2016-2017. Now Bihar is the second largest inland fish producing state in India, contributing 11% to the national production of 1.7 million tonnes in 1991-92. The track record of the state in the aquaculture sector is quite impressive. Total nursery of Bihar area is 350 hac is the largest in India and its annual fish seed production of 348 million fish is the third highest. Taking into consideration of our water resources, there is need of serious developmental efforts which should be directed towards increasing fish production. Considering that Bihar is poor state with a very low per capita income and poor intake of protein. Fisheries development from the open water is considered to be environment friendly, labour productive and from social and economic perspectives. Reservoirs that spread over an area of nearly one lac hac. can play a significant role in increasing the fish availability in the state and providing gainful employment to its rural poor people. The Gaya pond has good potentiality of fishery including composite fish farming and integrated fish farming. On the other land, this lake has a wide scope of aquaculture which can multiply the income of local fisherman into many folds.

MATERIALS AND METHODS

The estimation of fish productivity, the records of fish production from pond and area was collected from local society of fisherman. Monthly production of fish was recorded between November 2017 and October 2019. The data were generated after the collection, preservation and identification of fishes. The samples were collected with the help of bag net and were preserved in 10% formalin. Identifications were done with the help of available

literature of Jhingran (1991)⁵. The data of fish production estimated was obtained from fisheries department.

The fishermen have to take valid licenses from the fisheries department for operating their nets and tackles in the water reservoir. About 11 fishing gears and nets are applied in this region. With the scientific advancement there has been tremendous change in the nature. The application of gears varies with current, depth of water, nature of fish to be captured and local availability of raw construction materials. By and large the cotton and jute nets are being replaced by nylon nets. Application of bamboo reeds and strips for forming barriers (Bari) across the width are also very common. The gill net is the most common fishing gear used for commercial fishing. These nets vary in length from 80 to 100m, the width varying from 2.4 to 10.0 m. The mesh size operated almost throughout the year.

OBSERVATION AND RESULT

The pond has potentiality to support large number of fishes. The pond is dominated by weed fishes of small size which have very little economic importance. For estimation of productivity of fishes, the records of fish production from the pond area was collected from the local society of fishermen, which is well marked in the Table. Monthly production of fish was recorded during study period.

Annual fish production of the pond estimated and these data show that the pond has rich potentiality of fish production. There are many causes which are responsible for the higher production of fishes in the pond. Jhingran (1991)⁵ states that shallow ponds with light penetration up to the bottom is highly suitable for the growth of fishes. But the water of the pond with higher alkalinity does not influence the fish productivity. In the pond investigated oxygen level drops below 5mg/l which is unfavorable for fish production as also observed by Banerjee (1979)⁶. Low dissolved oxygen of the pond is unable to support the development of large fishes with high metabolic rate. Low dissolved oxygen level in water is responsible for abundance of small sized weed fishes with low metabolic rate. However, nitrate level in water was recorded always more than 0.2 mg/l which is favourable for fish production as also observed by Banerjee (1979)⁶. Soil of the pond where nitrogen level is in higher range may not be

considered good for fisher. Khanna (1988)⁷ stated that lacking of phosphorus in the ecosystem is the main cause of low productivity of fishes. Thus, it is clear that certain

properties of water and soil are favourable for fishes while others either do not effect or have inhibitory effect on the productivity of fishes.

Table 1-Monthly variation in production of fishes from Gaya pond, Bihar (Nov. 2017-October 2019)

Year	Months	Seasons	Production kg/month	Production kg/day	Seasons Average	Kg/ha/yr
2017	November	Winter	21008	700.27		
	December	Winter	26815	865.00		
2018	January	Winter	31260	1020.00	26677.75	
	February	Winter	27268	940.28		
	March	Summer	26146	843.42		
	April	Summer	24290	809.67		
	May	Summer	23684	764.00	24626.00	127.35
	June	Summer	22928	764.27		
	July	Monsoon	13175	425.00		
	August	Monsoon	7285	235.00		
	September	Monsoon	16170	539.00	13497.50	
	October	Monsoon	17360	560.00		
	November	Winter	20100	670.00		
	December	Winter	26040	840.00		
2019	January	Winter	35036	1130.19	27595.00	
	February	Winter	29204	1043.00		
	March	Summer	288830	930.00		
	April	Summer	25880	862.67		
	May	Summer	26630	859.03	24310.00	132.50
	June	Summer	15900	530.00		
	July	Monsoon	14266	460.19		
	August	Monsoon	9510	310.00		
	September	Monsoon	15900	530.00	15138.00	
	October	Monsoon	20776	670.19		

Table 2- Systematic list of fishes recorded from Gaya ponds, Bihar

Sl. no.	Order	Family	Species	Local name
1.	Cypriniformes	Cyprinidae	<i>Catla catla</i> (Ham)	Catla
2.	Cypriniformes	Cyprinidae	<i>Cirrhinus mrigala</i> (Ham)	Naini
3.	Cypriniformes	Cyprinidae	<i>Labeo rohita</i> (Ham)	Rohu
4.	Cypriniformes	Cyprinidae	<i>Puntius chola</i> (Ham)	Pothia
5.	Siluriformes	Bagridae	<i>Mystus aor</i> (Ham)	DaraiTengra
6.	Siluriformes	Clariidae	<i>Clarias batrachus</i> (Linn)	Mangur
7.	Siluriformes	Heteropneustidae	<i>Heteropneustes fossilis</i> (Bloch)	Singhi
8.	Channiformes	Channidae	<i>Channa gachua</i> (Ham)	Chenga
9.	Channiformes	Channidae	<i>Channa punctatus</i> (Bloch)	Garai
10.	Mastacembeliformes	Mastacembelidae	<i>Macrognathus aculeatus</i> (Bloch)	Gaichi
11.	Perciformes	Anabantidae	<i>Anabas testudineus</i> (Bloch)	Kabai

CONCLUSION

Landed fish fetches maximum price when sold in fresh condition worthy of human consumption, for several reasons including non-availability of a ready market, non-nearness of market, lack of facilities for fast transport or refrigerated transport etc. an appreciable amount of fish is preserved for long term storage. This preserved fish is also meant for human consumption as food. But there is yet other utilization of fish in which protein, fat and other useful contents in the body of fish are processed into a number of valuable products and by-products for a variety of usages. Important fish products are fish liver oil, fish meal and other uses like fish flour, fish silage etc. However, fat and vitamin in content of liver vary from fish to fish and from season to season. In general, fish liver oil when taken will ensure good growth of bone, teeth, skin and vision and will develop more resistance to counter bacterial attack and so forth. At present time, fishes play important role in the production of insulin, biscuits, bread, cakes, soup, sweets etc. However, the Gaya pond has good potentiality of fishery including composite fish farming and integrated fish farming. The pond has a wide scope of aquaculture, which can multiply the income of local fisherman into many folds. The process of fishery practiced in this pond is very old and it requires urgent modernization to increase the productivity. It is clear that certain properties of water and soil are favourable for good productivity of fishes while others either do not effect or have inhibitory effect on the productivity of fishes.

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