

## Comparative Study of Fish Diversity and fishery Potential of Perennial Tanks of Kolhapur District (Maharashtra)

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### ABSTRACT

The present attempt was made to study the faunal diversity of fishes and fishery potential at three major wetlands of Kolhapur district viz. Tamadage, Laxmiwadi and Vadgaon. The Fish diversity and Fishery potential of the perennial tanks was studied by monthly during June 2008 to May 2009. The water of the tank is used for domestic, agriculture and fishery activities. Fish collections were done with net of several mesh sizes. 12 fish species were identified during the study, belongs to family 5 families namely, Cyprinidae 7 species, Siluridae 1 species, Bagaridae 01 species, Channidae 2 species and Cichlidae 1 species. Besides diversity, fishery potential showed moderately beneficial to fishermen community by the means of economic strengthening. Finally the study can be concluded that the diversity of fishes was moderately rich and due to which fishermen were socio-economically sound at some extent.

**Keywords:** Fish fauna, fishery potential, wetlands, socio-economic status.

### INTRODUCTION

Fresh water bodies present a good opportunity for studying the effect of scale on the relative importance of factors that determine diversity on a broad scale. Fresh water bodies are recent and their communities are a combination of species from the former fresh water bodies fish fauna as well as introduced species (Fernando and Holick 1991, Oliveira et. al. 2004) India is one of the mega biodiversity countries in the world and occupies the ninth position in terms of fresh water mega biodiversity (Mittermeier and Mittermeier, 1997) The Indian fish population represents 11.72 % of species, 23.96% of genera, 57% of families and 80% of the global fishes. Out of the 2200 species so far listed, 73 (3.32%) belong to the cold freshwater regime 544 (24.73%) to the warm fresh waters domain, 143(6.50%) to the brackish waters and 1440 (65.45%) to the marine ecosystem. (ICBD1994).

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The Condrichthyes are represented by 131 species under 67 genera, 28 families and 10 orders in the Indian region. The Indian Osteichthyes are represented by 2,415 species belonging to 902 genera, 226 families and 30 orders of which five families, notably the family Parapsilornychidae are endemic to India. The country is endowed with vast and varied resources possessing river ecological heritage and rich biodiversity. Freshwater fishery sites are varied like 45,000 km of rivers, 1,26,334 km of canals, ponds and tanks 2.36 million ha, 2.05 million ha of reservoirs ( Ayyapan, 2004)

India's inland water resources are diversified, as they are plentiful and reservoirs contribute the single largest inland fishery resources both in terms of size & production potential. Fish fauna of a reservoir basically represents the fish diversity and their abundance. Indian reservoir preserve a rich variety of fish species, which supports to the commercial fisheries (Kantaraj et. al 2011).

Fresh water bodies in kolhapur district of Maharashtra state have not been studied in detail except the sporadic work of Sawant (1978), Angadi (1985) Gaikwad (1996), Pailwan (2005) etc. Therefore the present investigation is formulated to assemble the information regarding ichthyofauna and fisheries potential of these tanks namely Tamdalage,

Laxmiwadi and Vadgaon of Kolhapur district of Maharashtra state.

## Material and Methods

### Study Area:-

The Tamdalage, Laxmiwadi and Vadgaon wetlands are perennial freshwater bodies located 16° 46' 35" 05" N latitude, 74° 27'48.71 E longitude , 16° 47'23 19" N latitude, 74° 22'56.44"11 E and 16° 49'45" N latitude, 74° 18'22.50" E latitude respectively, in the vicinity of Hatkanangle Tashil. These are basically used for drinking, domestic and fishery purposes by local people and fisherman communities. These tanks are auctioned on lease for the period of 3-5 years by Zilla Parishad Kolhapur for harvesting fishes. These tanks are situated in hilly region and hence the source of water is only rain water. These tanks exhibit more fluctuations in its water level and characterized by more anthropogenic activities, silty bottom and algal bottom throughout the year.

### Fish Diversity:

The fishes were collected from these tanks with help of local fisherman monthly basis during the year June 2008 to May 2009. The fishes were preserved in 10% formaldehyde Solution for taxonomic analysis. Identification and Economic importance of fishes were carried out with the help of standard literature (Day 1958, Datta & Shrivastara 1988, Jhingran 1991 & Jayaram1981).

### Fishery potential:

For fishery potential frequent visits were made to attend the commercial catches of these tanks and analyzed in order to obtain information regarding fish species, minimum and maximum length & weight species wise, total weight & dominant species in the catches. The approximate annual productivity were calculated considering 200 operations per year excluding off season & closed period.

The fishery potential status of these tanks were estimated based on information regarding the capital and operational investments, approximate annual fish production wholesale rates /kg of fish. The fish production per acre was estimated considering the average water spread area in hectares, multiplied by 2.5 provides an area gives fish production per acre. This is turn multiplied by wholesale rate of Rs. 60 per Kg of fish resulted in to per acre income from fish production of these tanks.

## Results & Discussion

The Ichthyofauna is mainly depends upon the biotic, abiotic factors and types of the ecosystem, age of water bodies, depth, water level fluctuations, morphometric features and bottom have great

implications. The physico-chemical and biological features of the collection centers also play an effective role in fisheries output to a greater extent. In present investigation, among 12 species of fishes the family Cyprinidae was most dominant in the assemblage composition with 65.25% followed by Cichlidae 22.45% with Channidae 7.12 and Bagaridae and Silurian 5.18% respectively. The present results get support from other workers like Kantaraj et al (2011) Venkatshwarlu et. al (2007) Wakid and Biswas (2005).

The monthly commercial catches observed at Tamdalge tank the fish species such as *Oriochromis Mossambicus*, *Channa punctatus*, *Puntius sarana*, *Cirrhinus mrigala*, *Labeo rohita*, *Catla catla* and *Cyprinus carpio* caught throughout the study period. However, Species like *Wallago attu*, *Mystus Seenghala*, *Channa striatus* are moderately observed from the catches. In Laxmiwadi tank predominant of carp's species such as *Cirrhinus mrigala*, *Labeo rohita*, *Catla catla* and *Cyprinus carpio*, with infrequent occurrence of predatory fishes such as *Wallago attu*, *Channa striatus* was observed. From commercial catches of Vadgaon tank represented mostly the predominance of introduced species such as *Cirrhinus mrigala*, *Catla catla* and *Cyprinus carpio* with minor contribution of fishes like *Wallago attu*, *Channa striatus*, *Mystus seenghala* and *Puntius sarana*, *Puntius sophore* *Channa punctatus* are less dominant species.

Similar pattern of fish diversity was observed by Lagler (1953) classified the fish species on the basis of their economic importance in Bhadra reservoir of Karnataka. Ahirrao and Mane (2000) recorded 52 fish species belongs to 8 families from fresh waters of Parbhani district of Marathwada region of Maharashtra state. Sakhare (2001) identified 23 fish species belonging to 7 orders in Jawalgaon reservoir in Solapur district. Pailwan (2005) also reported that 23 fish species belonging to 11 orders from freshwater tanks in Kolhapur district of Maharashtra.

The present study of fish fauna in these tanks showed that most of the fish species recorded were widely distributed in various region of Kolhapur district. The fish species like carp groups were more dominant. Therefore the present investigation reveals that Cyprinide fishes are found to be more dominant group than others which is supported by other studies also (Singh et al 2006).

From commercial fish catches revealed that, the minimum average length and weight for naturally occurring fish species was (22.48 cm and 219.39 gm), (26.23 cm and 195.34 gm) during Jun. 2008-May 2009 at Tamdalge, Laxmiwadi and Vadgaon tanks respectively.

Similarly the average maximum length and weight for naturally occurring was recorded as (35.47 cm and 463.21 gm), (48.5 cm and 670 gm) and (40.64 cm and 544.14 gm) during 2008-2009 at Tamdalage, Laxmiwadi and Vadgaon tank.

**Table-1. Economic status in terms of expenditure, fish production and net profit per acre at Tamdalage, Laxmiwadi & Vadgaon Tanks (Jun2008-May2009)**

Sr. No.	Economical status	Tamdalge	Laxmiwadi	Vadgaon
A	Capital cost	Amount in Rs.	Amount in Rs.	Amount in Rs.
1	Lease amount	40,000	25,000	35000
2	Expenditure on fish seed including transportation	20,000	15000	20000
B	Operational cost			
3	Expenditure on nets & gears	5,000	10,000	10,000
4	Cost of harvesting	30,000	15,000	15,000
5	Expenditure on harvesting	3,000	3,000	3,000
6	Miscellaneous	2,000	2500	2000
	Total (A+B)	1,00,000	70,500	82,000
C	Production			
7	Fish production with an average catch 30.87 & 34.88 kg/ operation	6.174 tones	6.466 tones	4.486 tones
8	Total income from the sale of fish with the wholesale rate (Rs.60/kg)	3,70,440	3,87,960	2,69,160
9	Net profit from fish production (A+B-C)	2,70,440	3,17,460	1,87,160
10	Net income per acre	24,187	14,187	9,928

From commercial fish catches revealed that, the minimum average length and weight for carp fish species was (48.62 cm and 215.79 gm), (35.27 cm and 747.18 gm) and (30.53 cm and 214.98 gm) during 2008-2009 at Tamdalge, Laxmiwadi and Vadgaon tanks respectively.

Similarly the average maximum length and weight for carp fish species was recorded as (55.65 cm and 496.08gm), (49.15 cm and 1539.64 gm) and (41.06 cm and 658.93 gm) during 2008-2009 at Tamdalge, Laxmiwadi and Vadgaon tanks.

Based on the commercial catches the average mean catch was estimated as 30.87 kg at Tamdalge tank. It was recorded 32.33 kg and 22.43 kg at Laxmiwadi and Vadgaon tank during the year 2008-2009 respectively. However, based on available information, the economic status of these tanks was estimated considering the capital and operational cost invested for fish culture as mentioned in economic status.

In Tamdalge tank the capital and operational cost was estimated up to Rs 1, 00, 000, the seasonal commercial catches revealed the approximate fish production up to 6.17 tons and annual income from the sale of fish was estimated up to Rs 3, 70, 200 Excluding the cost of production the net profit was estimated to about Rs 2, 70, 200 year 2008 - 2009 respectively (Table- 1).

In Laxmiwadi tank the capital and operational cost was estimated up to Rs 70,500. The seasonal commercial catches revealed the approximate fish production up to 6.46 tons and annual income from the sale of fish was estimated up to Rs 3, 87,600 excluding the cost of production the net profit was estimated to about Rs 3, 17,400 during year 2008 - 2009 respectively (Table-1).

In Vadgaon tank the capital and operation cost was estimated up to Rs 82, 000 the seasonal commercial catches revealed the approximate fish production up to 4.48 tons and annual income from the sale of fish was estimated up to Rs 2, 68, 800 Excluding the cost of production the net profit was estimated to about Rs 1, 86, 800 during year Jun.2008 – May 2009 respectively (Table- 1).

Considering the average water spread area, approximate fish production, no. of catches and net income/acre Laxmiwadi tank represented maximum fish production, followed by Tamdalge & Vadgaon tanks. However, scientific management including proper stocking density, supplementary feeding, manuring and preservation were observed as ill-considered in these tanks.

## Conflict of Interests

Authors declare that there is no conflict of interests regarding the publication of this paper.

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