Potential of Economic Fish Diversity Study at Selected Wetlands Around Ahmedabad, Gujarat

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ABSTRACT:

The paper discusses about the study of fish production and fish diversity for three important wetlands around Ahmedabad, Gujarat. The study sites are also important bird diversity spots for local and migratory bird species which in turn reflects the health of natural ecosystem. It has been reported that Goblej wetland is with maximum species diversity where as other two sites show presence of only few species of fishes. Though decline in production in all three sites is a major concern and need serious attention for its conservation.

Key words: Ahmedabad, Fish diversity, Catla, Rohu, Catfish, fish production

I. Introduction:

Wetland are amongst the most productive ecosystems on the earth (A. Ghermandi, 2008), besides having great importance as a natural system wetland also provides many important services to humans (P. ten Brink, 2012). However, they are also amongst the most sensitive and adaptive ecosystems in the world (R.K. Turner, 2000) Wetland is a generic term for water bodies of various types and includes diverse hydrological entities like lakes, marshes, swamps, estuaries, tidal flats, river flood plains and mangroves. The most accepted definition of the wetland.

The ecosystem services of wetland are a) gas regulation, b) disturbance regulation such as flood control, c) water storage and supply, including groundwater recharge, d) habitat refuge, e) food production, f) raw material, g) recreation, including tourism, and h) cultural.

India has, according to a very conservative figure, around 13.1 million ha of wetlands, including inland, coastal, mangroves and rivers. Total intangible service values of these ecosystems, using the global average as reported by (Costanza, 1997) would be around Rs. 7,151.08 billion per year.

Only relatively recently have we begun to understand the many ecological functions associated with wetlands and their significance to society. Wetlands were once considered useless, disease-ridden places (e.g., malaria and yellow fever) that were to be avoided. We now realize that wetlands provide many benefits to society – such as fish and wildlife habitats, natural water quality improvement, flood storage, shoreline erosion protection, opportunities for recreation and aesthetic appreciation, and natural products for our use at little or no cost. Protecting wetlands can, in turn, protect our health and safety by reducing flood damage and preserving water quality.

II METHODS AND MATERIAL

Standardized sampling is necessary to assess the various fish species in ponds, lakes, rivers, canals and streams. Standardized fish sampling and data comparison methodologies are used in a wide variety of fields such as medicine, finance, education and agriculture.

Quantitative methods for sampling fish populations in vegetated areas include portable drop nets, pull up traps and drop traps in both marine and freshwater habitats. Hellier (1959) surrounded large (up to 930-m2) areas by a drop net which was suspended above water. A trigger mechanism released the netting which enclosed the area. Fish were then removed by seining. Hoese and Jones (1963) Nelson, (1981). adapted this method to sample smaller areas (229-m2, 420-m2, 10-m2 respectively). However, these methods required large permanent pilings from which to drop the enclosing net; thus, a single area was repeatedly sampled throughout these studies. The use of large drop net methods lacks mobility and thus replicability for the estimation of spatial variability between samples. Some workers (e.g., Moseley and Copeland 1969) have successfully used a large portable drop net with a floating frame on which a drop net is hung electromagnetically.

In this survey the sampling time was selected at morning 6.00 to 18.00 hours and 20.00 to 06.00 hours. The nets, are generally set up at night, so that catch can be gathered early in the morning; twilight and sun rising are the ideal moments for good catch. Sampling types depended on using different kinds of gears at what depth in different water body sources and how many times net casting in same place for recording replicates.

Fish collection methods from Lakes from Cast net

- Selection of water body
- Selection of minimum 5-7 sampling sites in lake 1) Right Bank 2) Left bank and 3) Deep water 4) Back water 5) inflow point (In canal 1. Base flow 2. Mid flow and 3. End flow for every 200 Meters)
- Selecting the cast net
    - Cast nets are circular nylon nets with weight tied around their edges
    - Cast net are cast into water falls into the bottom in a circular trap which capture all fishes, which are, get trapped inside it and retrieve the net
- Collect the fish from net and sort out
- Identify the fish species
- Weigh each fish species
- Record in the data in the format

Collected fishes from net are placed in water-contained bucket with the help of dip nets or stop nets. Quickly fishes were sorted out on their sizes and species wise into wet containers. And then, fishes were identified to species level. Fish morphology is a good starting place for identification. To appreciate, as well as to understand the diversity of fresh water fish, it is important to first be able to identify features that are common to most fish.

When covering fish morphology include:

- Body forms of fish
- Fin function, location, and types-dorsal, caudal, anal, pelvic, pectoral
- The operculum, nostril, gills, eyes, and lateral line
- Mouth shape, size, and location

III RESULTS AND DISCUSSION:

1. Fish Diversity:

Catla, Rohu, Mrigal, Wallago attu, Catfishes are found present in all study sites. whereas Calbasu, Murrels, Mullet and Eel are present only at Goblej site and absent in Lavarpur and Adhana wetland sites. (Table 1)

Name of Fish	Goblej	Lavarpur	Adhana

Catla	√	√	√
Rohu	√	√	√
Mrigal	√	√	√
Calbasu	√		
Wallago Attu	√	√	√
Murrels	√		
Catfishes	√	√	√
Mullet	√		
EEL	√		
Miscellaneous	√	√	√

Table 1 Fish diversity in Selected 3 Wetlands

2. Fish production:

a. Catla Fish Data for Selected Wetland

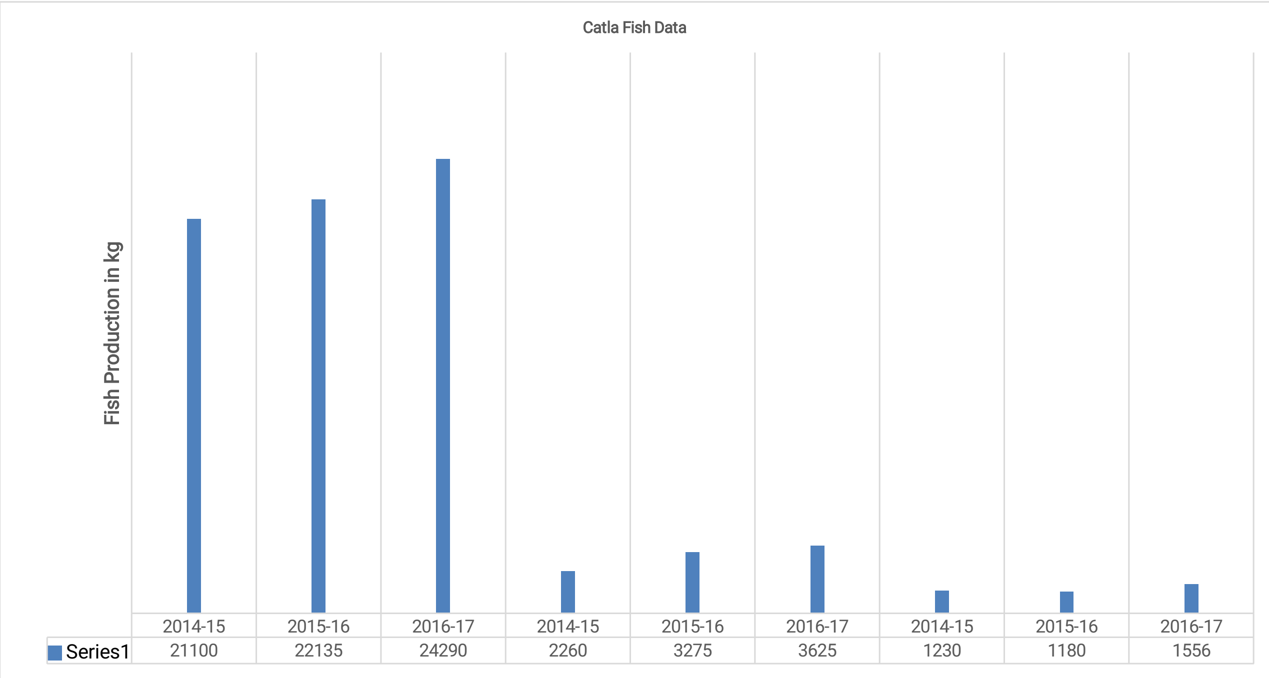

Figure 1 Comparative Graph of Catla Fish Production

Catla (Labeo catla), also known as the major South Asian carp, is an economically important South Asian freshwater fish in the carp family Cyprinidae. It is native to rivers and lakes in northern India, Bangladesh, Myanmar, Nepal, and Pakistan, but has also been introduced elsewhere in South Asia and is commonly farmed.

The survey conducted at the wetland suggests that maximum population is observed in the Goblej wetland with an average production of 22508 kg fishes recorded. Adhana recorded a population of 3053 kg and at Adhana 1322 kg fish were recorded.

b. Rohu Fish Data for Selected Wetlands

The rohu, rui, or roho labeo (Labeo rohita) is a species of fish of the carp family, found in rivers in South Asia. It is a large omnivore and extensively used in aquaculture. The rohu occurs in rivers throughout much of northern and central and eastern India, Pakistan, Bangladesh, Nepal and Myanmar, and has been introduced into some of the rivers of Peninsular India and Sri Lanka.

The species is an omnivore with specific food preferences at different life stages. During the early stages of its lifecycle, it eats mainly zooplankton, but as it grows, it eats more and more phytoplankton.

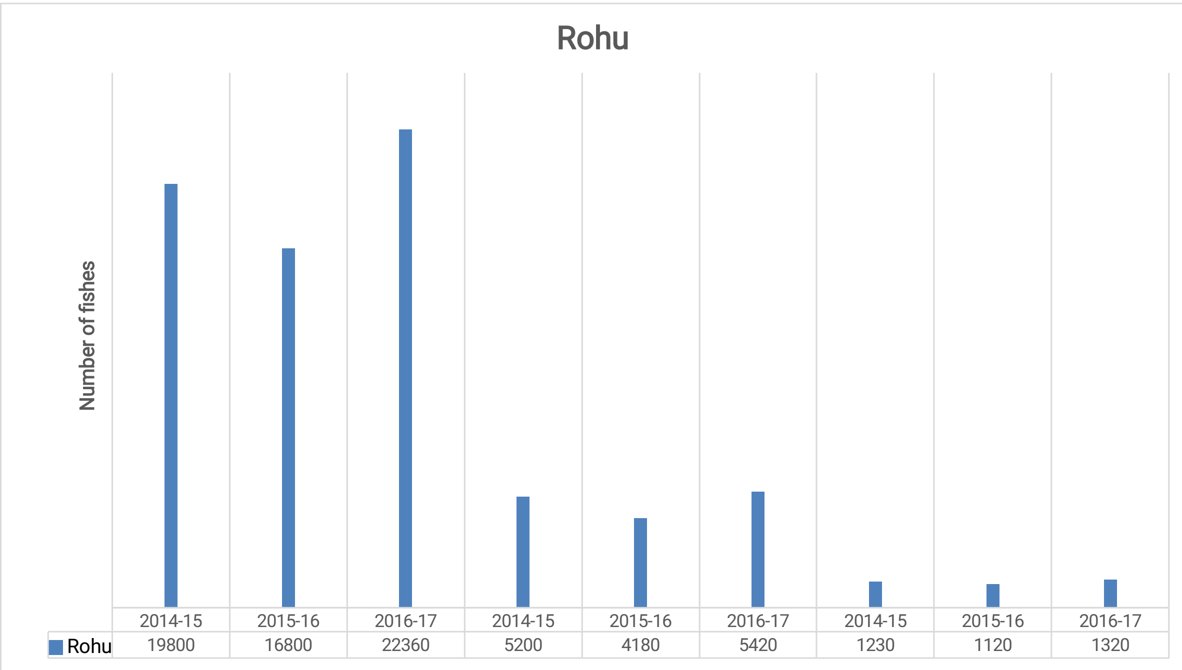

Figure 2 Comparative Graph of Rohu Fish Production

Maximum production of Rohu was recorded in Goblej wetland with an average of 19653 kg of production recorded for the three year of the project period. Lavarpur produced 4933 kg of Rohu while Adhana produced 1223 kg of fish on an average for 3 years.

c. Mrigal Fish Data for Selected Wetlands

The mrigal carp (Cirrhinus cirrhosus), also known as the white carp, is a species of ray-finned fish in the carp family. Native to streams and rivers in India, the only surviving wild population is in the Cauvery River, leading to its IUCN rating as vulnerable. It is widely aqua-farmed and introduced populations exist outside its native range. It reaches a maximum length of 1 m (3.3 ft). This species and Cirrhinus mrigala are considered distinct.

Mrigal is the benthopelagic and potamodromous plankton feeder. It inhabits fast flowing streams and rivers, but can tolerate high levels of salinity. Spawning occurs in marginal areas of the water bodies with a depth of 50 to 100 centimetres (20 to 39 in) over a sand or clay substrate.

for the 3 years which is also maximum production amongst all the 3 wetlands. Lavarpur had an average production of 6155 kg of Mrigal fish produced for an average of 3 years and Adhana produced 1278 kg of fish during the research period.

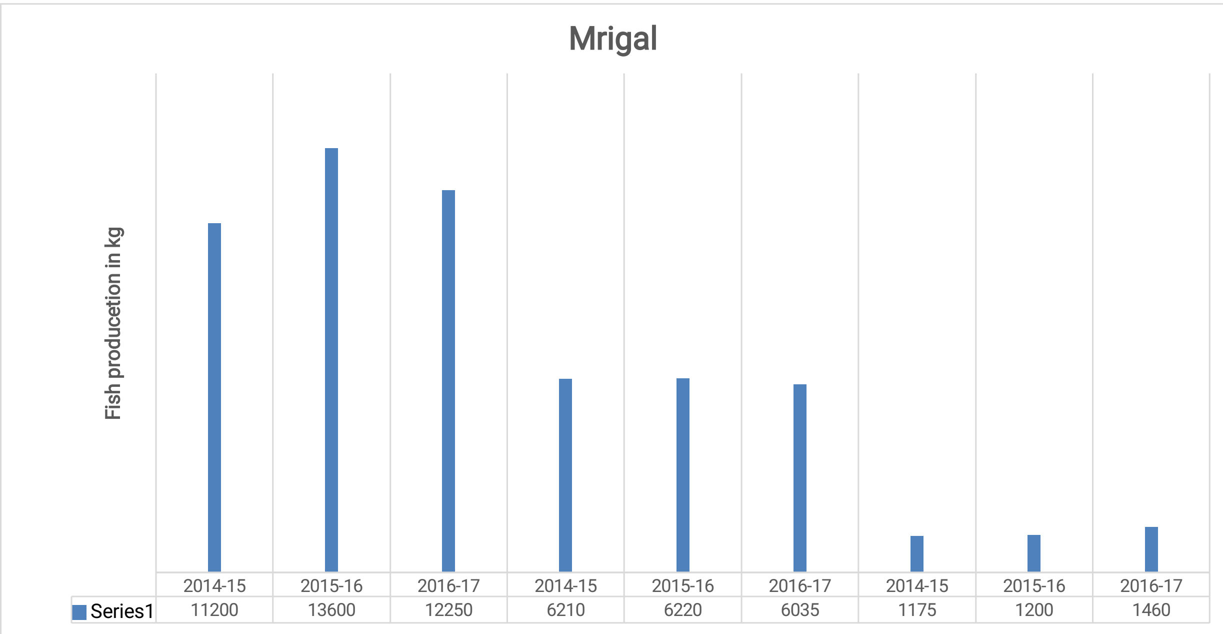

Figure 3 Comparative Graph of Mrigal Fish Production

Mrigal production from Goblej wetland was estimated to be around 12350 kg on an average

d. Wallago Attu Data for Selected Wetland

Wallago attu is a freshwater catfish of the family Siluridae, native to South and Southeast Asia. It is commonly known as helicopter catfish or wallago catfish. Some regional designations, such as the Indian Sareng, the Bengal Boal, the Sylheti Gual or the Malaysian and Indonesian Tapah are also occasionally used in English. W. attu is found in large rivers and lakes in two geographically disconnected regions (disjunct distribution), with one population living over much of the Indian Subcontinent and the other in parts of Southeast Asia.

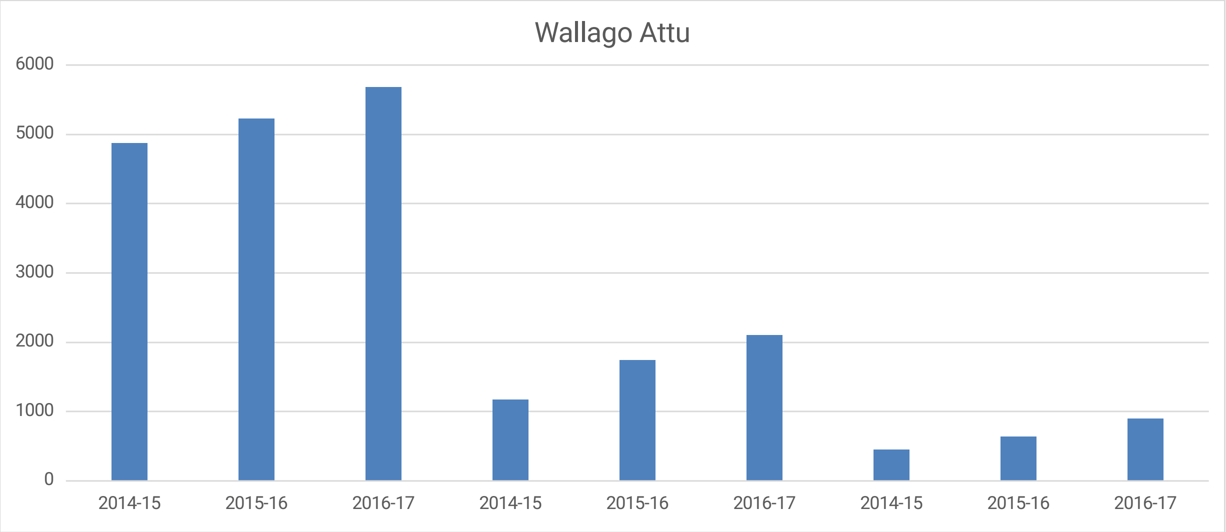

Figure 4 Comparative Graph of Wallago Attu Fish Production

Maximum production of Wallago Attu is observed at Goblej wetland on an average of 5261 kg of fish production for 3 years. Lavarpur had an average production for 3 years is 1673 kg and Adhana wetland's fish production was recorded to be 661 kg for 3 years.

e. Catfish Data for Selected Wetland

Catfish are named for their prominent barbels, which resemble a cat's whiskers, catfish range in size and behaviour from the three largest species alive, the Mekong giant catfish from Southeast Asia.

Catfish have inhabited all continents at one time or another. They are most diverse in tropical South America, Asia, and Africa, with one family native to North America and one family in Europe. They are found in freshwater environments, though most inhabit shallow, running water

In Asia, many catfish species are important as food. Several walking catfish (Clariidae) and shark catfish (Pangasiidae) species are heavily cultured in Africa and Asia.

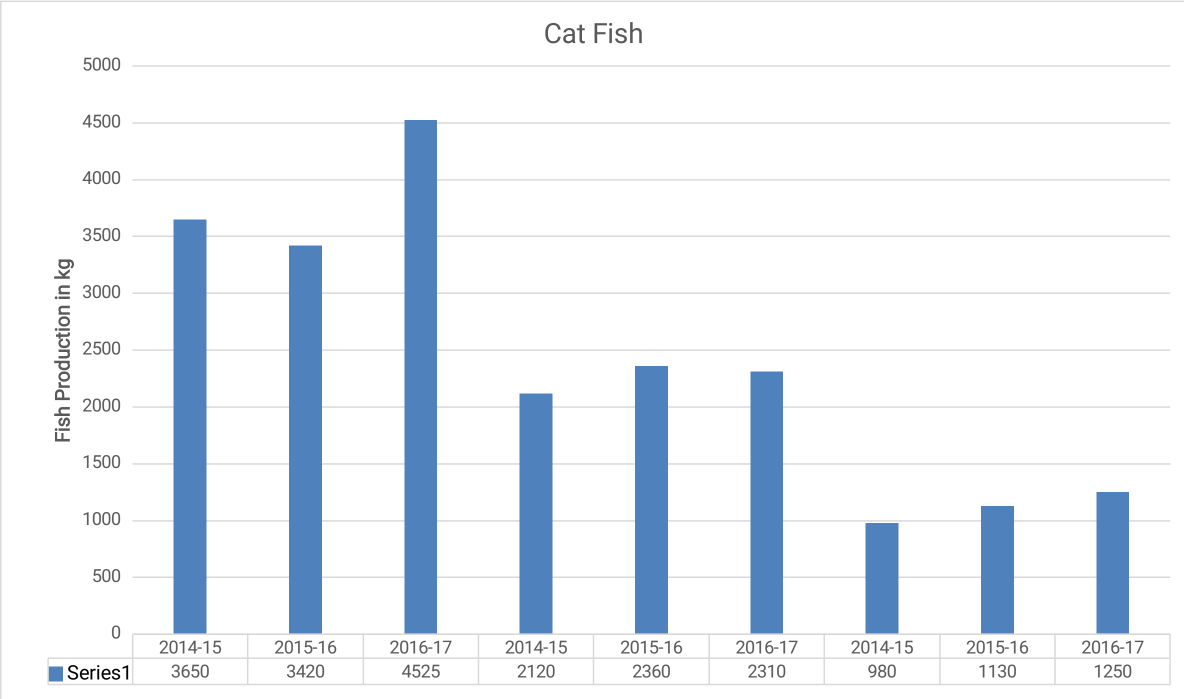

Figure 5 Comparative Graph of Cat Fish Production

Maximum production of the catfish was recorded at Goblej Wetland with an average production of 3420 kg of fish for 3 years of research study. Lavarpur had an average production of 2263 kg of catfish while Adhana had 1120 kg of fish produced.

IV CONCLUSION:

- Catla fish is found as the dominant species in the term of fish production values compare to all 3-study site.
- Goblej is the site where it inhabits all representative of fish species amongst three study sites.
- Presence of Catfish at all 3-sites considered as a kind of warning. This is not only harm the diversity and density of other fish species but may inversely affect both the local and migratory bird population.
- Fish production data may show drastic decline in output values in coming years at all three study sites if Catfish production is not checked. Careful observation on the density of Catfish is needed to understand to maintain the equilibrium of other species at all three study sites.
- Thereby introduction of a greater number of Major Indian Carps (Catla, Rohu and Mrigal) at all three-study site for ecological balance of each wetland.

- o Goblej wetland is found as one of the potential sites for fish production but still need utmost attention to improve production.
- o Lavarpur and Adhana wetland sites needs serious attention for better productivity.

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