

## Sewage-fed Fisheries under Private Ownership in the East Kolkata Wetlands: A Case Study

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### 1. Introduction

The East Kolkata Wetlands is located in the eastern part of Kolkata between the levee of the Hooghly river on the west and the Kulti Gong on the east (Fig 1). The uniqueness of these wetlands is that the sewage and wastewater of the city get treated in a natural way through the practice of sewage-fed pisciculture. Sewage-fed pisciculture is an important economic activity practiced in the East Kolkata Wetlands area.

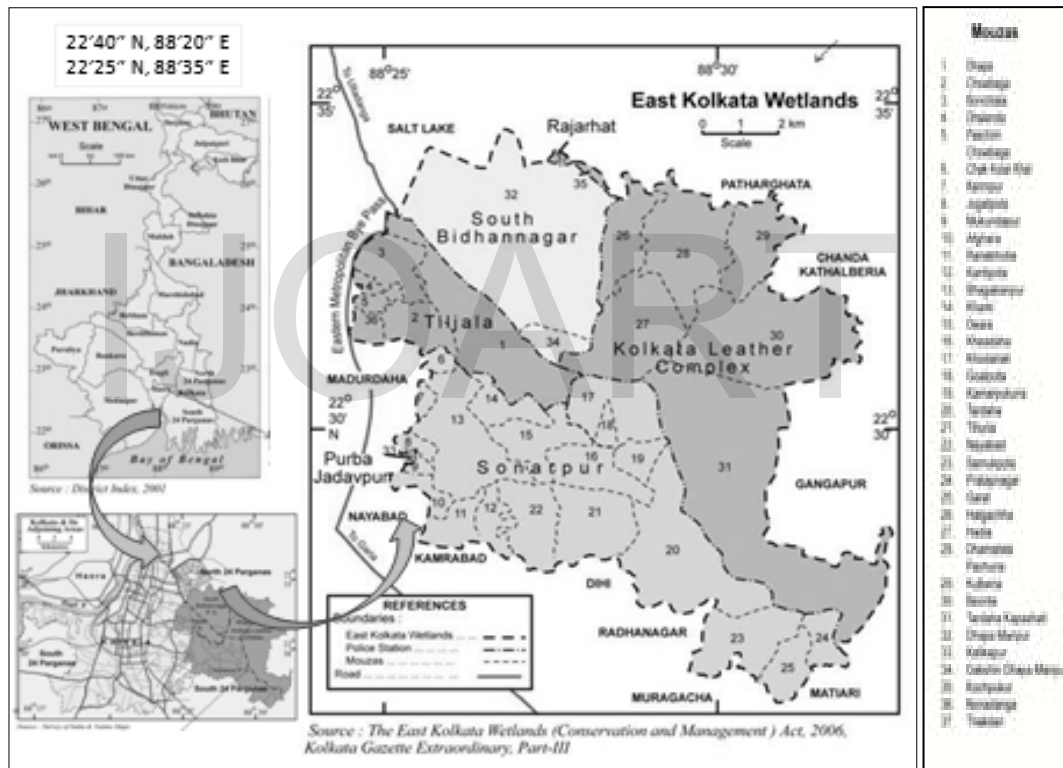
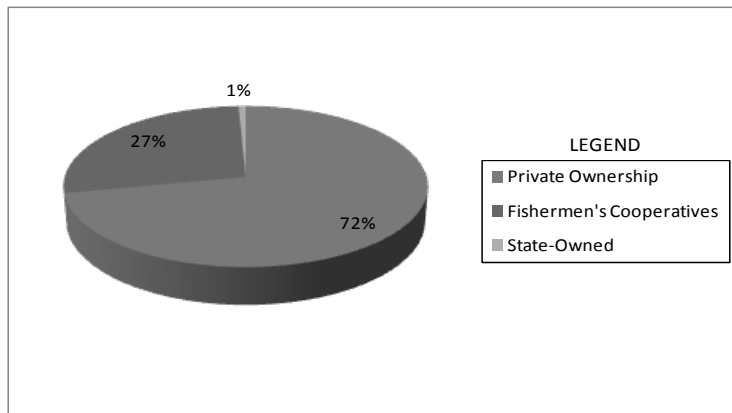


Figure 1. Location of East Kolkata Wetlands

Traditionally, natural wetlands in West Bengal are either state or community owned. But man-made wetlands, relatively smaller in size, are generally privately owned. Consequently, a large number of water bodies in West Bengal are under private management (Kundu, N., 2002). The pattern of ownership and management of the wetlands of East Kolkata is almost similar to that of West Bengal. Majority of the fisheries in the East Kolkata Wetlands area are under

private ownership. Though there are quite a few fishermen's cooperatives, the number of formal cooperatives is much less and the majority of cooperatives are run informally. There are only two State-owned fisheries run by the State Fisheries Development Corporation in the East Kolkata Wetlands area.



**Figure 2. Pattern of Management of Sewage-Fed Fisheries in the East Kolkata Wetlands Area. Adapted from Mukherjee and Maity (2002).**

72 per cent of the sewage-fed fisheries in the East Kolkata Wetlands area are under private ownership, 27 per cent under Fishermen's Cooperatives and 1 per cent State-owned (Fig 2). In case of private ownership, the fishery may be a) managed by the owner that constitutes 60.7 per cent of private ownership, b) leased out and run on a partnership basis that constitutes 36.8

per cent of private ownership, c) run as a Private Incorporated Company that constitutes 1.5 per cent of private ownership, or d) run on the basis of owner-worker participation that constitutes 1 per cent of private ownership. Among the Fishermen's Cooperatives, only 6.5 per cent are registered, and the rest are unregistered and managed informally (Mukherjee, M. and Maity, D. K., 2002).

### **Private Ownership**

One of the interesting aspects of private ownership and management of fisheries in the East Kolkata Wetlands is that the same person may be involved in a number of fisheries either as a partner or as a lessee; while he himself may also be the owner of a fishery. In case of private ownership, the fishery may be managed by the owner himself or he may be an absentee landlord. The absentee landlords may lease out their fisheries to a person or a group of persons, or enter into an agreement with them to run the business on a shared partnership basis. In the latter instance, the owner is paid an annual rent, in addition to a share of the total profits made by a fishery. The share of the profit given to the owner may vary from 25 per cent to 40 per cent, depending on the terms of the agreement with the owner. In those cases where the fisheries are leased out, the lease is for a stipulated period of time. In most cases there may not be a formal

agreement between the owner and the lessee. Generally the fisheries under private ownership employ a person as the manager/accountant to look after the day to day functioning of the fisheries and to maintain accounts; in addition several others are employed who work as fish catchers/net drawers, security guards, fish carriers and weed pickers. In addition to these categories who work as permanent staff, they also employ casual labourers as and when required.

While income of a typical privately-run fishery, as depicted in their documents, would include primarily the revenue earned from the sale of fish, the expenditures incurred would include not merely the wages paid to the various categories of workers (permanent and casual), the cost of dredging, cost of buying fish feed, fish seed and fingerlings, cost of generator and diesel, expenses for buying/repairing fishing nets and fishing boats, overall maintenance cost of the fishery, expenses for treatment of sewage water for removal of the chemical content, but also such items as the bonus paid to the permanent staffs every year, the cost of umbrellas and rugs given to the workers every two years and the cost of food given to the staff living in the *Ala* (office cum rest house for the pisciculturists working in the fish farm). Many of the fisheries under private management grow vegetables on their land; but these are not sold for commercial purposes, thereby giving up an opportunity of augmenting their income. Most of these vegetables/farm products are used for consumption of the workers who live in the *Ala*. As one of the owners in a privately-run fishery explained, this was a good-will gesture, to keep the workers happy. This would also reduce the expenditure on food supplied to the workers who live in the *Ala*. However, the income from selling such products in the market would have a marginal impact on the total income earned from pisciculture. The privately-run fisheries also look after the health of their permanent staffs and pay for their medical expenses, up to certain limits. They also make an annual payment to the Government as license fee as well as rents for the lands on which the fisheries are located. Besides there are several other items of expenditure which may be considered as hidden costs. For example, the *bheri*-owners are often required to make ex-gratia payments to workers on such occasions as family marriages. Moreover, they are also required to pay donations to the coffers of political parties, especially at the time of elections. Since elections are held at regular intervals, if one considers the different levels of election – from the Panchayat to the Parliament – the donations paid by the privately run fisheries add substantially to the total expenditure incurred by them. They are also required, at times, to donate

funds apparently for social welfare activities at the behest of local political leaders. The total costs incurred by these fisheries, therefore, keep on rising.

The present study seeks to make an estimate of the performance of one privately managed fishery- Har Hare (Part V) Fishery in terms of the commercial viability of the enterprise as well as its general contribution towards the conservationist goals.

## **2. Methods**

Both qualitative and quantitative methods have been followed for collection of data and analysis of the same. Opinions of twenty-one permanent workers of Har Hare (Part V) Fishery were elicited by using structured and semi-structured questionnaire. Firstly, the workers had been asked to enumerate the problems that were affecting production of the fishery. Secondly, perceptions of the workers about the desirability of filling up of the fishery for development activities were analysed. Moreover, their expectations from their owner for a better working condition were also studied.

Audit reports from 2002 to 2010 of Har Hare (Part V) Fishery were also reviewed for analysis of the income-expenditure and fish production of the respective fisheries. The per hectare production of fish for the four years immediately prior to dredging was compared with the next four years after dredging using the Student's t test (SPSS). P value <0.05 was considered to be statistically significant.

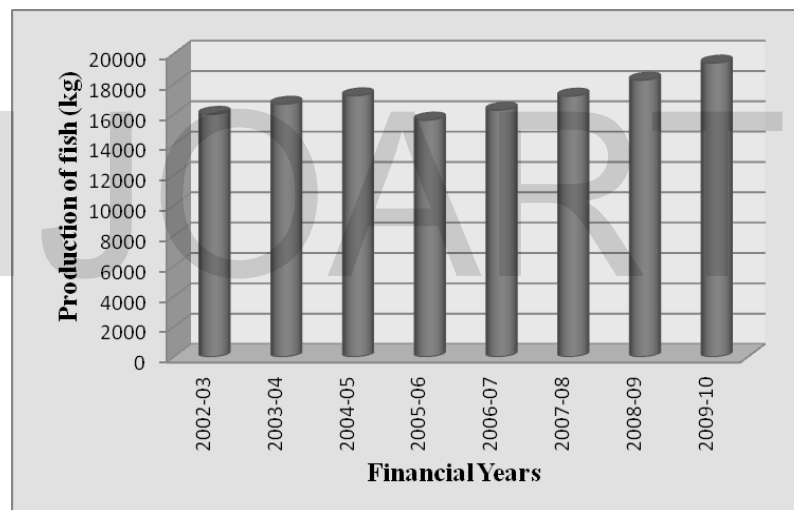
## **3. Results and Analysis**

Har Hare (Part V) Fishery, located in Dhapa Manpur Mouza of South Bidhan Nagar Police Station is managed by the owner himself. It is a relatively small fishery with a total area of 6.69 hectares out of which 5.352 hectares are used for pisciculture. This fishery was chosen for case study because it is a private fishery managed by the owner himself. The idea is to ascertain how successfully he is managing such a small fishery, since he himself is the manager.

In this fishery, 21 workers have been given permanent employments who work as fish catchers, night guards, fish carriers, accounts manager, and in other capacities. During the year 2009-10, the night guards and the fish catchers were paid at the rate of Rs 70 per day, those who carry the fish to the market were paid at the rate of Rs 65 per day and those who stay in the *Ala* for 24 hours got Rs 67 per day as their wages. The wages of the workers may vary from one fishery to another and every year the wages are increased, though the rate of increase may vary

from one fishery to another. Apart from these 21 permanent workers, casual workers were also employed on temporary basis depending on the requirement of the fishery.

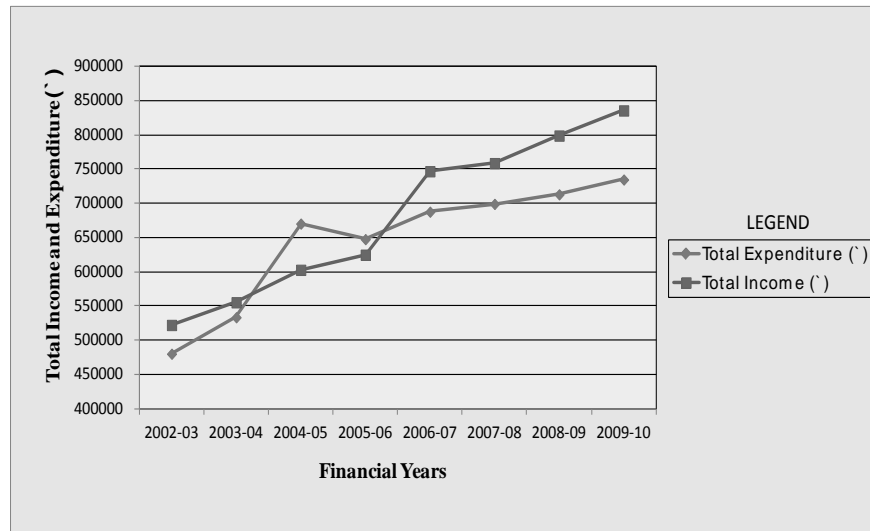
Production of fish at Har-Hare (Part-V) Fishery had been increasing till 2004-05 (Fig 3). But from Figure 4 it could be seen that during the year 2004-2005, the fishery incurred a loss of Rs 67,510 despite having high production of fish compared to the previous years. This is because during 2004-2005, Rs 50,000 was spent for dredging of two ponds of the Fishery and also a sum of Rs 17,000 was spent for repairing the *Ala* which is a permanent structure in Har-Hare (Part V) Fishery, thereby adding to the total expenditure. For dredging purposes, fishing activities had to be stopped for a few months and its impact on production could be seen even in the following year which recorded the minimum fish production for the period 2002-2010. During the period of stoppage of work for dredging, the workers had to be paid 50 per cent of their wages as per agreement with the labour unions.



**Figure 3. Production of Fish of Har Hare (Part V) Fishery, 2002-2010**

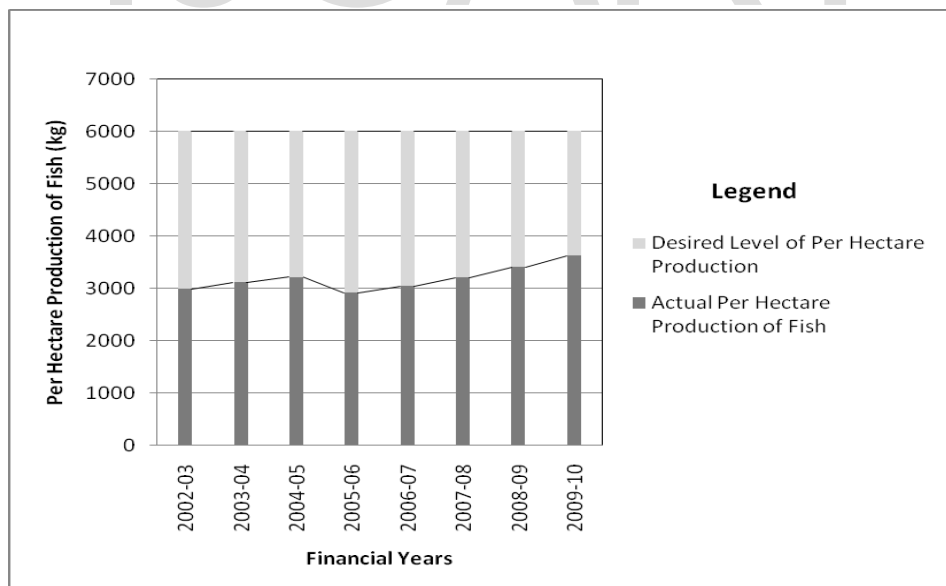
In the year 2006-2007, fish production increased because of dredging which resulted in the deepening of the *bheries* allowing more space for the fish to move. Despite the increase in production during the year, resulting in an increase in income, the profit earned was marginal (Rs 59080.00 only). This was because the increase in income did not keep pace with the rate of increase in expenditure. The main reasons for escalation in expenditure are: i) increase in the wages of workers every year, ii) increase in the cost of inputs such as fish feed, fish fingerlings

etc. However, after 2007-2008 till 2009-2010, there had been a gradual increase in the production of fish and there had also been a marginal increase in profit each year.



**Figure 4. Income Earned and Expenditure Incurred by Har-Hare (Part V) Fishery, 2002-2010**

Although per hectare production of fish varies from one fishery to another, ideally the production should be between 5,000 and 6,000 kg per hectare per year. Considered from this perspective



**Figure 5. Per Hectare Production of Fish (kg) Per Year of Har-Hare (Part V) Fishery, 2002-2010.**

per hectare production of fish at Har-Hare (Part V) Fishery per year had consistently been much less than the desired level of production (Fig 5).

Further, though after dredging there had been an increase in the per hectare production of fish (in kg) from 2006-07, on statistical analysis using T Test it is found that the increase from 2006-07 for the next 4 years as compared to the previous four years is not statistically significant ( $p=0.09$ ;  $p<0.05$  is considered to be statistically significant). This is shown in Table 1. However the closeness of the obtained p value to the cut off value of 0.05 does underline the need for proper dredging activities to boost fish production.

**Table:1 Per hectare production of fish (kg) of Har Hare (Part V) Fishery per year prior to and after completion of dredging**

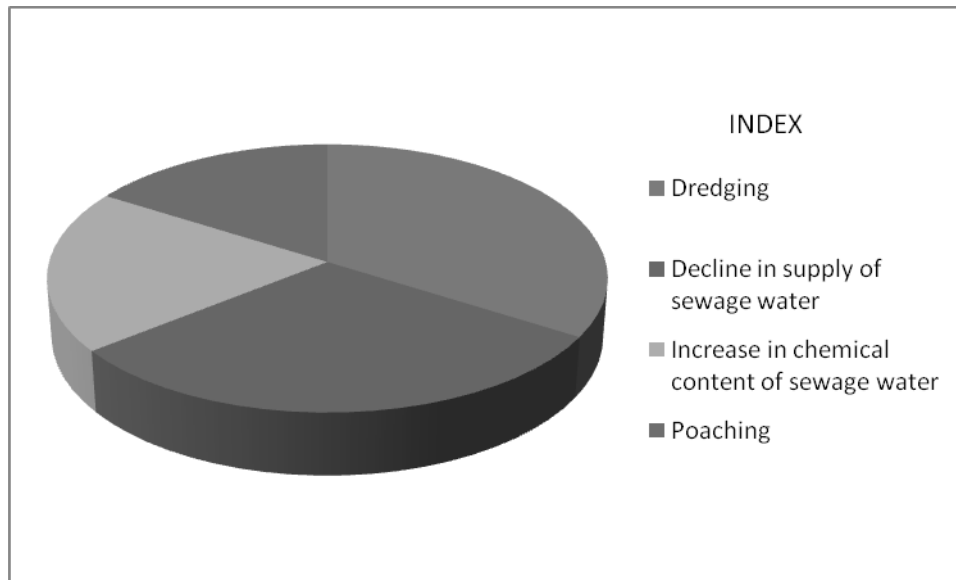
Per hectare production of fish (kg) per year in the four years prior to completion of dredging	Per hectare production of fish (kg) per year in the four years after completion of dredging	p-value using one tailed Student's T Test
2989.54	3039.99	<b>p = 0.090112</b>
3114.72	3213.75	
3217.49	3409.94	
2918.54	3621.08	

**Note:** Computed using SPSS version 11.  
 $p<0.05$  implies statistically significant

The slightly less than statistically significant increase in fish production post dredging can also be attributed to the declining nutrient content of the sewage water. This necessitates a larger quantity of fish feed of improved quality for increasing production thus adding to the operating cost. The costs for overall maintenance of the fishery – including the cost of acquiring new nets or, repairing them as well as the cost of maintaining the boats – had also increased.

According to the workers, Har-Hare (Part V) Fishery had been facing certain problems which were affecting production and as a result the fishery either ran at a loss or accrued marginal profits (Fig 6). 90 per cent of the respondents said that dredging was a major issue that was affecting per hectare production of fish and since dredging involved high costs, they blamed the Government for not providing any financial assistance for dredging activities to the fishery. 81 per cent pointed out that to overcome the problem of declining supply of sewage water,

purchase of the quantum of fish feed used for pisciculture increased leading to an increase in the cost of production especially because of the increase in the price of fish feed.



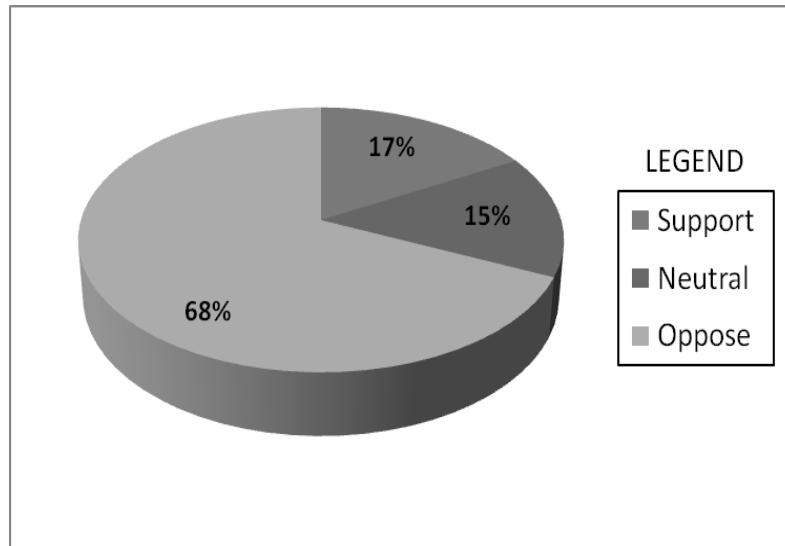
**Figure 5. Factors Affecting Production at Har Hare Part V Fishery**

According to 52 per cent of the respondents production was getting affected by the increase in chemical content in sewage water because of the discharge of industrial wastes, especially by the tanneries located in the Tiljala/Tangra area. 42 per cent of the workers also complained that since the fishery was located in an economically backward area, poaching was a serious problem faced by the fishery.

#### **Perceptions of Workers of Har-Hare (Part V) Fishery about Desirability of filling up of Fisheries for Development Activities**

17 per cent of the workers had supported filling up of sewage-fed fisheries for building highways/hospitals/industries/educational institutions because they felt that if they shift to some other occupation for their livelihood, they would be earning more. 15 per cent remained neutral. 68 per cent opposed the idea because sewage-fed pisciculture ensures their livelihood. They also felt that even if new employment opportunities be created, they may not fit in the new scheme of things (Fig 6).





**Figure 6. Problems Affecting Production at Har Hare (Part V) Fishery**

#### 4. Conclusion

Har-Hare (Part V) Fishery had been facing certain problems – decline in the supply of sewage water, increase in the chemical content of sewage water, the problem of dredging and the problem of poaching, none of which can be solved by the efforts of the owner alone. So far as dredging is concerned it becomes difficult for the small fisheries to meet the problem on their own due to the high costs involved. Moreover when dredging is conducted production has to be stopped which leads to a loss of income. According to the owner of the fishery a long term solution to this problem would require government intervention in the form of financial assistance or assistance in the matter of disposal of the silts that are removed from the bed of the fishery after dredging. For example, the Nalban State Fisheries Development Corporation could rope in the services of the HIDCO (Housing Infrastructure Development Corporation Ltd) for removal of the silts after dredging. Similar arrangements were also made for some of the fisheries run by the cooperative societies in the East Kolkata Wetlands area. Such assistance from the government will go a long way in improving the conditions of private fisheries especially the small units. The owner of Har Hare (Part V) Fishery felt that in the absence of government assistance in the areas mentioned above the prospects of survival of the fishery is bleak.

However, the workers of Har-Hare (Part V) Fishery had certain expectations from their owner and they felt if these were fulfilled, the owner-worker conflicts would lessen creating a better working condition and this would help in increasing production. According to them,

- i) their wages should be at par with the wages given to the workers who work in the fisheries under State Fisheries Development Corporation,
- ii) medical insurance facility should be given to them which would make it easier for them to undergo treatment in case of illness,
- iii) financial assistance should also be provided to the family members in case of untimely death of the workers.

Majority of the pisciculturists who had been interviewed were still optimistic about the future prospect of Har-Hare (Part V) Fishery and expected the government to take some ameliorative measures to enable the fishery to tide over the difficulties it was facing. Most of them were against the idea of filling up of sewage-fed fisheries for any kind of development activities even if they were given a handsome compensation. According to them the government should also take the initiative in imparting scientific education to the pisciculturists for improvements in the quality and quantity of fish production, and supply fish-feed and fish fingerlings at subsidized rates until the economic footing of the pisciculturists got strengthened to overcome market constraints. Last, but not the least, the pisciculturists themselves should take certain initiatives for preservation and sustainable development of the sewage-fed fishery with its biodiversity.

## References

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