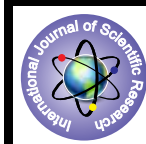


Study To Identify The Potentiality of Ornamental Fish Farming Opportunities in The River Churni With Special Reference To Socio-Economic Growth of The Fishers



Biological Science

KEYWORDS : River Churni, Ornamental fish, diversity, occupation opportunities, fishers

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ABSTRACT

Among all the environmental hazards, pollution is, undoubtedly, the most alarming issue of concern. It has been found out that, among all the types of ecosystems on the earth, aquatic ecosystem is the most affected by the impacts of pollution. Loss of biodiversity, to be more precise, loss of fish diversity is one of the commonest consequences of pollution in aquatic environment. It is a serious threat to those whose occupations are directly related to rivers, pond or other water bodies eg., fishers. Mention may be made of river Churni which is no exception. It has been reported by several authors that this river is being threatened by gradual degrading ecological conditions. Since, the productivity, especially fish yield, has decreased alarmingly, fishers, dependant on this river for long, are on the verge of altering their occupation. In this situation, Ornamental Fish Farming may be a help for them. It has been found to be an important component of aquaculture providing economic benefits, aesthetic requirements and up-keeping of environmental conditions. Now, this study has been undertaken to observe the potentiality of controlled ornamental fish-farming in river Churni. The main objective of the study is to explore the alternative occupation opportunities for those depending on this river, especially fishers, and to uplift their socio-economic condition. Results show that, several ornamental fishes are already present in this river. Proper scientific knowledge of Ornamental Fish Farming may be of help for the fishers in sustaining fish diversity in the river, and thereby, making possible their own economic growth.

INTRODUCTION

In India, the problem of pollution which is of great concern for environmentalists is also related to biodiversity loss of this country. According to a huge number of naturalists, the problem is more severe than the records as India is also facing the consequences of rapid population growth. Water, one of the basic components of environment, is essential to the existence of all living organisms, but this valued natural resource in increasingly being threatened as rapid growth in population demands more amount of high quality water for domestic purposes and economic activities.

Riverside villages of this country are predominantly inhabited by fishermen community. Thus, the loss of aquatic diversity exerts direct impact on the socio-economic growth of the riverside villages (Bhaumik and Pandit, 1994). Pollution problems of aquatic bodies have been casting adverse impact on the social life of the fishers with altering occupation option. Fishers are continuously leaving their prime occupation due to the decreasing productivity of pollution affected river system. Mention may be made of river Churni which is no exception. Panigrahi and Bakshi (2014) have reported that fishers are showing the tendencies to alter their prime occupation options with other laborious jobs like rikshaw pulling, vendoring etc.

River Churni and its status

River Churni, one of the important distributaries of River Mathabhanga, emerges at Krishnaganj, Nadia (West Bengal). Flowing about at 54 kms, it finally pours its content to River Bhagirathi- Hooghly near Mangaldeep, Payradanga of district Nadia. Bakshi and Panigrahi (2012) have reported that there are several point and non-point sources of pollution throughout the river stretch. They have agreed to the report of Das *et al.* (2007), stating that the main cause of pollution is anthropogenic. Various reasons of the pollution and their sources have been identified during the study. The river receives the effluent from Darshana Sugar Mill and Keru Wine Factory in the upper

stretch of the river (Ghosh, 2002; Ghosh and Konar, 1991) whereas, it receives the effluent from some small-scale industries, as well as sewage from the medium populated (0.14 mill) Ranaghat municipality (23.11°N, 88.73°E) in the lower stretch. Apart from these, bathing, washing of clothes and utensils, and other regular human activities also play an important role in pollution of this river. Contamination of agriwastes, fertilizers and pesticides from the river side cultivating fields, ashes from several burning ghats, fly ash dumping from brick manufacturing plants, effluents of dye-industries, jute retting and solid waste dumping at Boro bazar are the other identified source of pollution (Panigrahi *et al.*, 2015). The scenario has become much more complicated as the river lost its navigability. Thus, retarded water flow hampers the natural way of lessening the pollution load.

Status of Fish diversity in river Churni

Ecological degradation of any river leads to loss of its diversity. Sharp decrease in piscian diversity is found to be a sign to disturbances in aquatic ecosystem both lotic and lentic. Several authors have advocated earlier that River Churni has been cited as a river with ecological degradation. According to Das and Chakrabarty (2007), 63.6% of fish species appeared to have been eliminated from the polluted Churni River since 1983 in 20 years. The authors have informed about the presence of 44 species of fishes in both River Churni and River Jalangi in 1983. In 2007, the available amount of fish species has been found 16 in River Churni (Das and Chakrabarty, 2007). Though, Bakta and Bandyopadhyay (2007) has contradictorily reported that River Churni comprises 48 fish species under 29 genera, 18 families and 8 orders including 8 species of exotic fish under 3 orders, 4 families and 6 genera. But detailed descriptions of available fish species have not been given by the later. A long stretch of the lower part of River Ganga resides as the western boundary of this district. Ghosh (2008) has reported that River Ganga comprises about 156 fish species in its lower stretch. According to Bakta and Bandyopadhyay (2007), eight numbers of exotic or alien species *viz.*, *Oreochromis mossambicus*, *O. niloticus*, *Hypoph-*

thalmichthys molitrix, H. nobilis, Cyprinus carpio, Ctenopharyngodon idella, Clarias gariepinus, Pangasius sutchi, have been reported during an extensive survey. According to Das and Chakrabarty (2007), 28 number of fish species viz., *Labeo bata, Puntius sophore, Amblypahyngodon mola, Mystus aor etc.* have been reported to be eliminated. An extensive study has been carried out by Bakshi and Panigrahi (2015) to find the exact scenario of river Churni, which reflects the presence of maximum of 38 fish species in the lower part of the river.

Status of Ornamental fish farming in India

Ornamental fish can be defined as beautiful colourful fishes of peaceful by nature, reserved as pets in confined space of an aquarium or a pool with the purpose of pure enjoyment (Dutta *et al.*, 2013). Ornamental fish farming is an important commercial component of aquaculture providing aesthetic requirements and up-keeping of environment. This sector assumes special significance due to its huge potential in providing employment to the rural people and as a foreign exchange earner (Dutta, 2007). The most important attraction of the trade is low cost and high benefit in very short span of time (MPEDA report, 2013). Though, India is marginal player in global trade (with the market share of 0.007%) but there is huge potentiality to raise its share to a level of 0.1% in next 5 years accounting for exports worth Rs. 30.45 crore as against present turnover (around Rs. 3141 lakh). This may not be difficult considering our share in global fish production and untapped resource (Singh *et al.*, 2013). The major contribution of this state (90%) is that of West Bengal.

Present investigation has been done to identify the potentiality of Ornamental fish farming in the lower stretch of the river providing alternate occupation options for the fishers of the river-side area.

MATERIALS AND METHOD

Pre-tested interview schedule (Panigrahi and Bakshi, 2014) has been used for the collection of information after conducting a preliminary survey to construct a clear idea about the rate of occupational squirms among the fishermen families. The data have been collected directly from the fishermen families through personal discussions and interviews on the various aspects of the socio-economic conditions like religious composition, caste structure, age composition, education and income structure. The study has also been conducted to draw comparisons between the past and present socio-economic condition of the fishers. In the first part of the preliminary survey, general interviews of the old aged fishers help to understand the rate of the occupational twitching. In the later phase extensive survey have been done among 282 families though 240 was the actual number of respondents. Other 42 families have refused to entertain the interview. List of available piscian fauna have been constructed depending on the surveys and sample collections, undertaken at the major catchment sites at regular interval. Identifications are done on the spot or in the laboratory with the help of fishermen and/or following standard key (Jhingran, 1991).

RESULT

Identified Sources of Pollution in River Churni, West Bengal, India:

Point Sources: Sugar Mill Complex ,Bangladesh, Wine Factory ,Bangladesh, Dyeing Factories ,Ranaghat, Brick Manufacturing Plants, Wastes from Ranaghat Municipality, Solid wastes dumping at Boro Bazar , Ranaghat, Ashes and wastes from Burning ghats of Ranaghat.

Non-Point Sources: Agricultural wastes from different crop fields of river side areas, effluents from various drainages.

Table 1: Social status of river side villages of River Churni during 2012-2013

Table 1.1: Social Structure composition

Parameters	Measures
Total respondents	240
Religion distribution (%)	
Hindu	58.75
Muslims	37.91
Others	3.33
Caste composition (%)	
SC	36.25
ST	15.42
OBC (A & B)	40.83
General	7.50
Age Composition (%)	
12-18 yrs	8.75
19-40 yrs	50.83
41-60 yrs	26.25
Above 60 yrs	14.16
Literacy composition (%)	
Illiterate	31.16
Middle school educated	47.08
Madhyamik	16.25
Higher Secondary	2.08
Occupational composition (%)	
Only Fishing	17.50
Fishing and retailing	37.08
Fishing and other occupation	45.41
Addictions (%)	
Smoking	100
Alcohol consumption(regular)	67.41

Table 1.2: Knowledge dispersal status

Parameters	Regular	Occasional	Never
Listening of Radio/ watching TV (%)	36.25	52.25	11.5
Read Newspaper (%)	16.25	38.75	45.0
Actively participate in Social gathering (%)	21.66	36.25	42.08
Attend all the gatherings (%)			
Information collected directly from FEO (%)	10.83	73.75	15.41
	1.66	4.58	93.75

Table 2: List of available fish fauna (Class, Order, Family, Scientific Name, Common Name) during the survey (Jan, 2012- Dec, 2015)

Sl	Class	Order	Family	Scientific name	Common name	Ornamental (OF)/ Food Fish (FF)
1.	Actinopterygii	Cypriniformes	Cyprinidae	Catla catla	Catla	FF
2.	Actinopterygii	Cypriniformes	Cyprinidae	Labeo rohita	Rui/Rohu	FF
3.	Actinopterygii	Cypriniformes	Cyprinidae	Labeo bata	Bata	FF
4.	Actinopterygii	Cypriniformes	Cyprinidae	Labeo calbasu	Calbose	FF
5.	Actinopterygii	Cypriniformes	Cyprinidae	Cirrhinus mrigala	Mrigal	FF

6.	Ac-tinop-terygii	Cyprini-formes	Cyprini-dae	Amblyphar-nyngodon mola	Mola	OF
7.	Ac-tinop-terygii	Cyprini-formes	Cyprini-dae	Puntius sa-rana sarana	Sar Punt	OF/FF
8.	Ac-tinop-terygii	Cyprini-formes	Cyprini-dae	Puntius ticto	Tit Punt	OF
9.	Ac-tinop-terygii	Cyprini-formes	Cyprini-dae	Chela laubuca	Beki Chela	OF
10.	Ac-tinop-terygii	Cyprini-formes	Cyprini-dae	Securicula gora	Ghero	FF
11.	Ac-tinop-terygii	Cyprini-formes	Cyprini-dae	Cyprinus carpio	Ameri-can Rui	OF/FF
12.	Ac-tinop-terygii	Cyprini-formes	Cyprini-dae	Hypophthal-michthys molitrix	Silver Carp	FF
13.	Ac-tinop-terygii	Cyprini-formes	Cyprini-dae	Aristichthys nobilis	Boro-matha	FF
14.	Ac-tinop-terygii	Cyprini-formes	Cyprini-dae	Ctenophar-nyngodon idella	Grass Carp	FF
15.	Ac-tinop-terygii	Siluri-formes	Bagri-dae	Sperata aor	Aor	FF
16.	Ac-tinop-terygii	Siluri-formes	Bagri-dae	Sperata seenghala	Guizza	FF
17.	Ac-tinop-terygii	Siluri-formes	Bagri-dae	Rita rita	Rethe	OF/FF
18.	Ac-tinop-terygii	Siluri-formes	Siluri-dae	Wallago attu	Boal	FF
19.	Ac-tinop-terygii	Siluri-formes	Schilbei-dae	Ailia coila	Kajli	FF
20.	Ac-tinop-terygii	Siluri-formes	Schilbei-dae	Silonia silondia	Silinda	OF/FF
21.	Ac-tinop-terygii	Siluri-formes	Schilbei-dae	Eutropiich-thys vacha	Bancha	FF
22.	Ac-tinop-terygii	Siluri-formes	Clari-dae	Clarias batrachus	Magur	OF/FF
23.	Ac-tinop-terygii	Siluri-formes	Hetero-pneusti-dae	Heteropneu-stes fossilis	Singhi	OF/FF
24.	Ac-tinop-terygii	Perci-formes	Gobi-dae	Awaous grammepo-mus	Bele/ Balia	FF
25.	Ac-tinop-terygii	Perci-formes	Ana-bantidae	Anabas tes-tudineus	Koi	OF/FF
26.	Ac-tinop-terygii	Perci-formes	Os-phrone-midae	Colisa fas-ciata	Khali-sha	OF
27.	Ac-tinop-terygii	Perci-formes	Chan-nidae	Channa punctatus	Lata	OF/FF
28.	Ac-tinop-terygii	Perci-formes	Chan-nidae	Channa striata	Shol	FF
29.	Ac-tinop-terygii	Perci-formes	Chan-nidae	Channa gachua	Chang/ Gechua	FF
30.	Ac-tinop-terygii	Perci-formes	Cichli-dae	Oreochromis mossam-bicus	Tilapia	FF
31.	Ac-tinop-terygii	Perci-formes	Cichli-dae	Oreochromis niloticus	Nilot-ica/ Nilon-tica	FF
32.	Ac-tinop-terygii	Perci-formes	Nandi-dae	Nandus nandus	Veda/ Roina	OF

33	Ac-tinop-terygii	Syn-bran-chi-formes	Masta-cembeli-dae	Macrognathus pancalus	Pankal	OF/FF
34	Ac-tinop-terygii	Syn-bran-chi-formes	Syn-bran-chi-dae	Monopterus cuchia	Kunche	FF
35	Ac-tinop-terygii	Clupeiformes	Clupeid-ae	Nematalosa nasus	Khoira	FF
36	Ac-tinop-terygii	Clupeiformes	Engraul-idae	Setipinna phasa	Phasa	FF
37	Ac-tinop-terygii	Beloni-formes	Beloni-dae	Xenentodon cancila	Kankle/ Kakila	OF/FF
38	Ac-tinop-terygii	Osteo-glossi-formes	Notop-teridae	Notopterus notopterus	Foli/ Foloji	OF/FF

DISCUSSION

During the study we have found that River Churni has been facing serious threats on its piscian diversity as well as its productivity. The basic problems are diffused pollution sources- some are point sources and some are non-point sources. Fishers are altering their occupation options along with the productivity of the river. Fishers do not have any idea of Ornamental fish farming. Ornamental fish farming is a very good option of occupation offering good amount of income to the fishers. Ornamental fish farming is also useful technique to conserve bio-diversity along with economic benefits. River Churni contains 16 species of ornamental fishes at its lower stretch naturally. Depending up on the results of the study we have understood that there have an ample amount of scopes of ornamental fish farming and its fruitful implementation. We have relied on the following facts. Fishers can depend on the Ornamental fish farming as river Churni contains 16 fish species with ornamental values naturally. As, most of the fishers (47.08%) have a knowledge of upper-primary education or more (madhyamik- 16.25% and H.S. or above- 2.08%), the techniques of ornamental fish farming can be described to them through Paper leaflets. Another option of knowledge dispersion may be local TV/ Radio programmes as a total of 88.5% (36.25%+ 52.25%) of total fishers are regular/ occasional watcher/ listeners of TV. The techniques can be introduced to them through TV/ Radio programmes. Seminars/ personal discussion at grass root level may be fruitful as per survey result. Ornamental fishes can be cultured using cage or Hapa within the river water. This will help to uplift the economic condition of the fishers. More fishers will be engaged in this type of farming. This may be another way to conserve piscian diversity of the river along with economic benefit. River Churni, an important river of Nadia district, is situated within a high networking system of transport. Bus routes and railways are available for the easy transportation of livestock. Villages beside the lower stretch could avail the facility of National Highway-34 for their communication easily. The climate of the area is ideal for the ornamental fish farming. River naturally contains some ornamental fishes at different stretches. No risk of the introduction of alien or invasive species as fishes will be introduced into a closed system. Economic benefits of ornamental fish farming will attract the fishers towards this opening opportunity. Female fishers can also be used for the purpose. Low cost and high benefits may be an important factor behind the success. Fishers who already have alter their occupation but possess the fishing gears still now, will be attracted towards the opening option.

CONCLUSION

Thus, the recommendations have been identified for the implementation of the aforementioned idea. Fishers may be asked to prefer Cage culture, Hapa culture or Pen culture techniques for ornamental fish farming. Hapas can be introduced into the lower part of the river containing the native ornamental fishes which are naturally found in the river. Cage culture can be another option for the lower part of the river containing the native

ornamental fishes which are naturally found in the river.

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