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HILSA FISHERIES AND CONSERVATION



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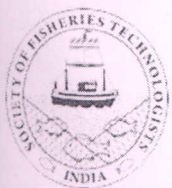
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2015



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Conservation of hilsa fishery *vis-à-vis* socio-economics of hilsa fishers

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Introduction

'Fish and rice make a Bengali' is an old proverb which portrays the social, cultural and religious importance of fish in the day to day life of the Bengali people. Among all the fishes, hilsa (*Tenualosailisha*) enjoys the highest attraction due to its unique taste, flavor and culinary properties and is popularly called as '*Machher Raja*' or 'the King of fishes'. A large number of people of fishermen community in lower stretch of River Ganga (also known as Hooghly- Bhagirathi river system) are engaged in hilsa fishing for their livelihood. But, during the last few decades, the hilsa catch has sharply declined especially in the riverine stretch of Hooghly-Bhagirathi river system due to various factors like siltation, pollution, over-exploitation, use of destructive fishing gears etc. Hilsa, an anadromous fish, migrates from its marine habitat to the freshwater stretch of the river for breeding and reportedly returns to the sea after breeding. The hilsa juveniles also travel to the sea from their freshwater breeding ground to attain maturity. Due to large scale mechanization during 1990s, hilsa brooders are now mostly caught at the sea mouth during start of their breeding migration. Hilsa fry and juveniles are also caught indiscriminately by the fishers during their return journey to the sea and sold in markets in the name of *Khoira* (*Gudusiachapra*). These two factors are mostly responsible for drastic reduction of hilsa catch in Hooghly-Bhagirathi river system. The livelihood of the fishers who are directly and indirectly involved in hilsa fishery, are also at stake. So, there is an urgent need to revamp the situation by adopting different conservation measures to save hilsa fishery. Conservation effort for hilsa was there in the tradition of the people of Bengal like not to eat hilsa from VijayaDasami (October) to VasantPanchami (February) as this period is part of the major breeding season for hilsa (Sharma et al, 2012). Unfortunately, this tradition is not followed now-a-days. For successful implementation of any conservation measure, information on socio-economic profile is a pre-requisite. Hence, the present study was undertaken in lower stretch of river Ganga to gather socio-economic information of the hilsa fishers.

Materials and method

The study was conducted along the lowermost stretch of 523.59 km of river Ganga in India after Farakka barrage, wherein eight sites (important fish landing centres) were selected as sampling sites, namely Farakka, Lalbagh, Nabadwip, Balagarh,

Nawabganj, Diamond Harbour, and Frazerganj. From each site, 20 hilsa fishers randomly selected. A total number of 160 fishers were interviewed personally semi-structured interview schedule to collect data related to socio-personal and economic variables. Data thus obtained were analyzed statistically. Livelihood diversification was measured with the help of Simpson index of diversity.

Simpson index of diversity is defined as:

$$SID = 1 - \sum_i P_i^2$$

Where, P_i as the proportion of income coming from source 'i'. The value of SID falls between 0 and 1. If there is just one source of income, $P_i = 1$, so $SID = 0$

Economic aspects of hilsa fishers

Analysis of collected data revealed that most of the hilsa fishers (62%) belong to the Malo community which comes under scheduled caste and most of them are migrants from Bangladesh. Most of the respondent hilsa fishers were of middle aged (20-40 years) and most of the hilsa fishers in Hooghly-Bhagirathi river system have ages of 6 to 40 years (average 20 years). About 20% of the fishers were found to be illiterate. According to census report of 2011, the average illiteracy in West Bengal is 15%. So, illiteracy level in fishers is lower than the state average.

Distribution of hilsa fishery to family income of the fishers

The main occupation of the respondents was hilsa fishery. Some of the fishers or their family members were also working as wage labour, agricultural labour, handicraft, rickshaw puller, vendors etc. during the off season. Hilsa fishing operation is carried out by the fishers during monsoon *i.e.* mid June to mid-September and in late winter from mid of January to mid of March. In the upper stretches of Hooghly-Bhagirathi river system (Farakka to Dakhineswar), hilsa fishers generally catch hilsa with small boat and a small group consist of two to three members and income sharing pattern is 50:50 (boat owner and labour) or the catch is divided into equal parts according to the number of members in a boat and also the boat owner. In lower stretches, a group of 8-10 fishers go for multiday fishing of 8-10 days per trip. They pay 30% of sale to the boat owner, 30% is spent towards fuel and repairing of the vessel/net and meeting food on-board. The rest 40% is divided among the co-fishers where 2% more are given to boat and engine drivers (Bhaumik and Sharma, 2012). The average monthly income of hilsa fishers of Hooghly Bhagirathi river was Rs. 9000/- during peak season (from mid June to Mid September), but the income also varies from year to year depending on the availability of the hilsa in the river system. The finding is also acquiescent to

the finding as the expense per family ranges between Rs. 2500-8000 (Nath, 2013). During some years, hilsa fishers earn good income during late winter *i.e.* middle of January to middle of March. The contribution of the hilsa fishery in the family income of a fishermen household was 38% annually.

Indebtedness of hilsa fishermen family

One of the major problems of fishermen family was indebtedness. This problem is just not related to one individual but is passed on from one generation to the next generation. Availing debt for productive and unproductive purpose is common phenomena in the fishers community. To meet the family needs or perform social functions (related to marriages, birth and death), etc. fishers are trapped in the vicious cycle of indebtedness. In the upper stretch, the fishers prefer to take loan from fish traders (42.5%) followed by money lenders (35%), boat owners (17.5%) and relatives (5%). In the lower stretch, fishermen take loans from fish traders (32.5%), followed by boat owners (30.23%), local money lenders (20.9%), relatives and friends (11.62%) and shop keepers (4.65%). The money taken from the lenders by the fishermen for business is usually known as '*Dadon*'. Since the fishermen are not in the habit of saving and in most of the cases income is not sufficient to cover day to day expenses as well as repayment of loan, they are forced to take further loans during lean season (Nath, 2013).

The marketing system and value chain analysis of hilsa fishery

Hilsa is an important fish, economically and emotionally in West Bengal. Due to decline in hilsa fishery over the decades, the price of hilsa fish has increased. During 2014-15, the price of hilsa was on an average Rs.100/- of 100g. There is a huge gap in demand and supply of hilsa fish. As per the survey done by Padiyaret *al.* (2012) the consumption of the fish is almost 100 tonnes per day in West Bengal and 70% requirement of hilsa in West Bengal is fulfilled by Bangladesh.

Hilsa fish marketing in Hooghly – Bhagirathi river system is quite large in terms of value and employment. Hilsa fish marketing also provides employment to various stakeholders like net makers, boat builders, fishing laborers, transporters, wholesalers, retailers, money lenders and ice plants owners. The hilsa fish marketing systems are traditional, complex, and less competitive but play a vital role in connecting the fishermen and consumers. The market chain from fishermen to consumers encompasses mainly primary, secondary and retail markets, involving sales agents, suppliers, wholesalers and retailers (Nesar, 2014).

The price spread (Table 1) is one of the major indicators to understand how efficient the supply chain is. An attempt was made to examine the marketing efficiency of the important market chains and it was found that less the number of players more the efficiency. The table shows that marketing channel III has better efficiency (3.61) than Channel I (2.95) and Channel II (3.09).

Table 1. Price spread of hilsa fishes in West Bengal markets

Particulars	Channel I	Channel II	Channel III
Prices received by fishermen	430 (66.15%)	440 (67.69%)	470 (72.30%)
Cost incurred by the local auctioneer		20 (3.07%)	
Margin		25 (3.85%)	
Price paid by local fish trader/local dealer			
Cost incurred	25 (3.84%)		
Margin	40 (6.15%)		
Price paid by auctioneer			
Cost incurred			
Margin			
Auctioned price/price paid by wholesaler	495	485	
Cost incurred by wholesaler	40.50 (6.23%)	42 (6.46%)	53 (8.15%)
Margin	45 (6.92%)	45.5 (7%)	55 (8.46%)
Wholesaler's price	580.50	572.5	578
Cost incurred by retailer	28.50 (4.38%)	30 (4.61%)	32 (4.92%)
Margin	41 (6.3%)	47.5 (7.3%)	40 (6.15%)
Retailer's price/price paid by consumer	650 (100%)	650 (100%)	650 (100%)
Index of marketing efficiency(ratio)	2.95	3.09	3.61

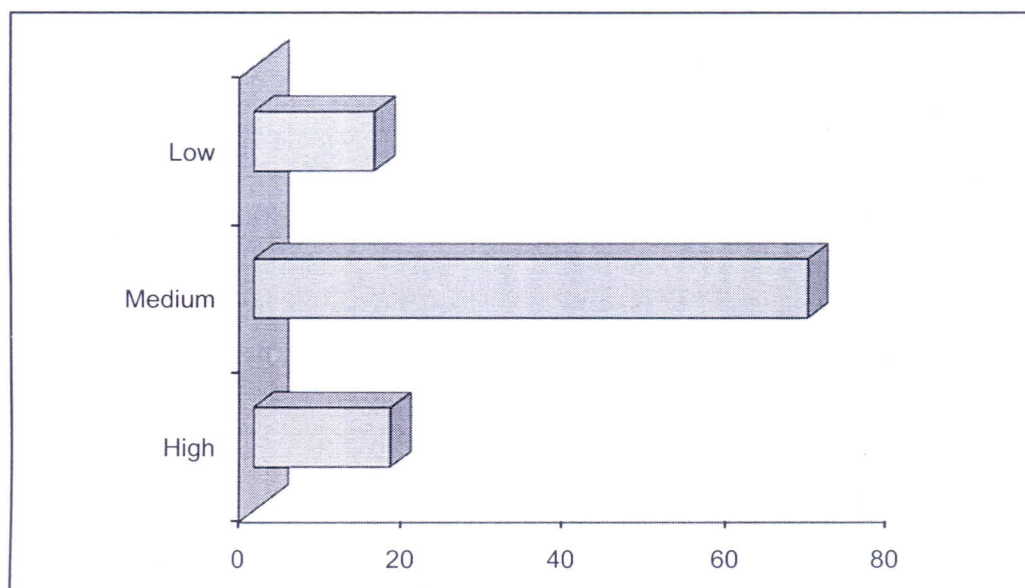
Livelihood diversification

Decline in hilsa fishes in Hooghly-Bhagirathi river system has made the situation vulnerable for the hilsa fishers. Livelihood diversification is a major issue in inland open water fishery particularly in hilsa fishery. Less and unpredictable hilsa catch in Hooghly river during last ten years led to large scale forced migration among the fishermen community. The younger generation of the fishermen community has lost their interest in the hilsa fishery due to uncertain income. A range of diversified activities was

observed in the study area by the fishermen community, for example, wage labour, agricultural labour, handicraftlabour, rickshaw puller, vendors etc.

Majority of the hilsa fishers (59.6%) had medium level of diversification index *i.e.* 0.35 to 0.69 as against only 12.7 per cent of diversifiers who had high level (>0.69) of diversification index (Fig. 1).

Fig. 1. Livelihood diversification index of the hilsa fishers



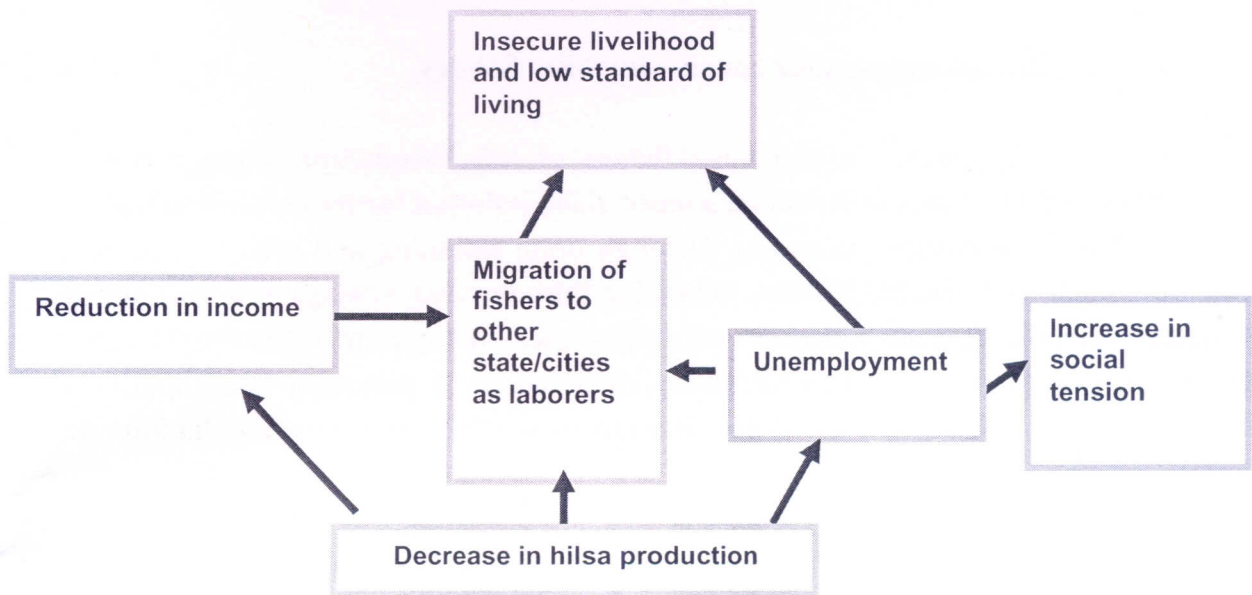
Due to less income or uncertain income, either hilsa fishers are switching over to other profession or they are migrated to other states as laborers, which is also a matter of concern for society as well as for economy.

Effect of decline in hilsa fishery in Hooghly-Bhagirathiriver

A survey was conducted with open-ended questionnaire regarding fishers' perception about the reasons behind decline of hilsa fishery in Hooghly-Bhagirathi river system over the decades. According to the fishers, use of destructive fishing gears, heavy trawling in the sea mouth, pollution due to sewage, industrial wastewater, plastic pollution, siltation etc. are the major reasons behind decline in hilsa fishery. Fishers are also well aware to the fact that the use of *MeenJaal* (shooting net) for collection of prawn seed from Hooghly estuary leads to huge destruction of other fish seeds. Use of *bintijaal* (bag net), *berjaal* (siene net), *charpatajaal* (barrier net), *nauka vassal* (lift net), *ghanochhandijaal* (small meshed gill net) are also causing massive loss of fish seed including hilsa juveniles but, fishers are compelled to operate such destructive gears just to earn some money for their livelihood as most of them do not have other livelihood options.

Catching of hilsa juveniles contribute significantly to decline of adult hilsa production from Hooghly-Bhagirathi river system. As a result, the livelihood of the associated fishers is threatened and this has brought a disequilibrium situation in hilsa fishermen community (Fig. 2).

Fig.2. Effect of decline in hilsafishery



Way forward

Poor implementation of mesh size regulation act, poor enforcement of closed season in rivers, ineffective extension services, recurring climatic hazards, hilsa overfishing and illegal fishing of juveniles and brooders, deterioration of physical-chemical characteristics of river water made the hilsa fishery more vulnerable. There is an urgent need for taking essential measures towards conservation of the species for sustaining hilsa fishery in Hooghly- Bhagirathi river system. But, conservation efforts will be successful only if incentives for hilsa fishers or alternative income generating activity or related programme can be introduced.

Incentive-based hilsaconservation

Fishing ban period during breeding season and implementation of mesh size regulation are essential for the hilsaconservation. However for effective implementation of the ban, particularly during breeding season, the incentives to the fishers in the form

of cash or kind need to be provided. There is a challenge of providing incentives in the form of cash/kind as all the hilsa fishers of this river system are not identified. Complete enumeration of hilsa fishers is a prerequisite for such schemes. In Bangladesh Jatka Fishers Rehabilitation Programme was started in 2007 and ended in 2010 with an expenditure of 60 million taka, covering 45698 families as beneficiaries (Naser, 2014). Adequate fund is required for such schemes in West Bengal. Moreover, till date no proper study has been carried out on understanding the impacts of the cash and in-kind support given to fishers during the long ban period. Hence, sustainability of incentive-based attempt towards conservation of hilsa fishery is to be assessed.

Alternative livelihood support for conserving hilsa fishery

The major problem of the hilsa fishers is low income or unemployment. Alternative livelihood options would be a more viable solution for implementing fishing ban and other conservation measures. Through brain storming and group discussion with the fishers of Farakka, Tribeni, Diamond Harbour and Fresaganj, a number of alternate livelihood options were arrived at, like back yard poultry; animal husbandry like goat rearing, piggery; ornamental fishery; duck rearing in polythene lined pond; cut flower; betel vine cultivation; horticultural nursery; weaving; net mending; handicraft, etc.

Providing subsidy or loan for petty business can also support the fishers for their economic development. The hilsa fishers are generally landless and also resource poor. Hence need based training and skill development of the fishers for employment generating activity can motivate them for abiding the ban period which will certainly help for conservation of hilsa fishery. Mode of selection of alternative livelihood could be in consultation with beneficiaries and based on location specific resources and opportunities with provision for financial support for infrastructure and operation.

Conclusion

The hilsa fishery is an important livelihood option for fishers in West Bengal. Declining catches due to various reasons have had a negative impact on the fishers incomes and it is important to evolve strategies to conserve the fishery as well as ensure the livelihood of the fishers. Fishing regulation and implementation of closed season needs a bottom-up management approach that can be administered by the government. A seasonal ban on destructive fishing gear like bag net, seine net, etc. can be implemented. There should be synergy between research organizations, state government, fishers, NGOs to minimize the knowledge gaps that impede hilsa conservation and management. Proper livelihood support to fishers is needed. Consumer awareness programmes also need to

be organized so that the sale of juveniles can be reduced. Better surveillance and monitoring can go a long way in conserving the hilsa fishery.

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References

- Bhaumik, U. and Sharma, A.P. 2012. Present status of hilsa in Hooghly- Bhagirathi river. *CIFRI Bulletin No. 179*. Central Inland Fisheries research Institute, Barrackpore, 42 p.
- Naser, A., 2014. Value Chain analysis for hilsa marketing in coastal Bangladesh. www.aqua.stir.ac.uk/public/aquanews/downloads/issue.../33P14_20
- Nath, A. K. 2013. Project Report on Studies on hilsa fisheries in Hooghly estuarine system of West Bengal, India under UGC major research project Ref. No. F. No. 38 - 198 / 2009 (SR).
- Naser, N.M., 2014. Conserving Trans-boundary Migratory Hilsa (*Tenualosailisha*) Fish: A review of Bangladesh Experience. In: Sinha, R. K and Ahmed Benazir (Eds). Rivers for life-proceedings of the International Symposium on River Biodiversity: Ganges-Brahmaputra river System, Ecosystems for life, A Bangladesh India Initiative, IUCN, International union for conservation of Nature, 215-221p.
- Sharma, A.P., Roy, N.C. and Barman, B.K. 2012. Hilsa: It's Social, Cultural and religious importance. In compendium of regional workshop on Hilsa: Status of Fishery and Potential for Aquaculture. 16-17, September, 2012. Dhaka, Bangladesh. 223p.