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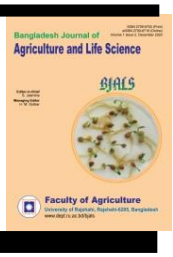

Alternative livelihood status of Hilsa fishers' in Chandpur district of Bangladesh

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ABSTRACT

An investigation was carried out via personal interview, focus group discussion and crosscheck interviews with key informants, to evaluate the income potential and livelihood status of alternative income generating activities of Hilsa fisher of Chandpur district in Bangladesh for a period of 12 months from January to December 2018. An initial snapshot we got from our surveys revealed, that the fishers were all male (100%), half were in the middle age group (53%), the overwhelming majority were married (84%) and muslim (86%). Of them most were from the nuclear family (67%). The minority religion was Hindu (14%). Most of the fishers did have primary education (67%), a minority of them were illiterate (17%). All of them had access to water via tube-well water (100%); however, a significant minority were using kacha latrine (16%) and deprived of electric facilities (29%). Only 3% of the fisherman enjoyed pakka housing facility. In the domain of health, a third of the fishers (31%) was uninformed on modern health facilities and was dependent on the village doctor or Kobiraj. Income per annum for majority of the fishers ranged between 80 thousand to 150 thousand BDT. We have found that the local fishers had multiple income sources and were not entirely dependent on their primary occupation for the maintenance of their livelihood. For further development of the lives of the fisherman, we recommend an expansion of education, loan facilities from both the government and private agencies and proper management of the local resources.

Introduction

Water bodies endowed to Bangladesh makes her exude with potential for fisheries and aquaculture (Rahman, 1994). The fishery is an indispensable part of life for many in Bangladesh and contributes to the culture that exists here. The earning of foreign exchanges, local employment, a prime source of animal nutrition are all reasons that give the fisheries sector her importance. Hilsa has the highest contribution of any single species to national fish production as a whole, making it the most important commercial fish in the country (Chantarasirii, 1994). More than 5 million metric tons of Hilsa were produced in the 2018-2019 year, making up 12% of total production nationally. Its contribution to the national GDP was about 1% (DoF, 2020). The livelihoods of an estimated 3 million fisherman are supported directly by catching hilsa or working in a Hilsa factory. Hilsa used to available in upstream rivers, along the Padma, Meghna, Karotoya, Rupsa,

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Shibsa and Para only a few decades ago. However, the fisheries have faced a severe decline in upstream rivers and are now available in downstream rivers, estuaries, coastal areas, and the sea (Mome, 2007). According to research (Amin et al., 2002), Hilsa fisheries resources have already achieved a maximum level of utilization. This is said to be because fishermen have been fishing in the same locations since time immemorial owing to open excess with crowding of fishing effort and a lack of effective management methods (Halder, 2004). As a result, catch per boat has been steadily falling in recent years. FAO (2012) stated that current river fishing is over exploiting Hilsa stock. In Bangladesh, Hilsa occurs in inland, marine and coastal waters and is harvested by the fishermen throughout the year. Ignoring the intense heat of the sun, the lack of securities and safety measures during monsoon and tidal waves, and having little or no food during fishing are the fishers struggle for their livelihood (Milton, 2010). Usually, it is told that the fishers are the poorest group of people in the country. Though fishing is the main source of income of the fishermen, they cannot catch fish properly due to economic, social and technical constraints (Islam et al., 2016). High rates of illiteracy, especially among women, poverty and dense population are some of the characteristics of fishing village in Bangladesh. Fish being the primary source of animal protein in the country, fishermen are quite important members of the community but are poor and deprived of the many amenities of life (Rana et al., 2018). Like other fishermen, Hilsa fishers are poor and deemed to be a most vulnerable community in terms of their livelihood opportunities and future prospects (Farhana and Naser, 2006).

The socio-economic conditions of the fisherman are in dire straits, the fisheries don't generate enough revenue to support their basic needs (Kostori, 2012). Only a minority of the fisherman can afford to have their own boat, most operate others boats. Boat owners pay for the fishing operation in advance, maintaining full control over the fisherman. Fishermen are the poorest among communities of Bangladesh (Hossain et al., 2015). During off season they have to resort to an advance provider. This chain means that they cannot sell their products to the open competitive market. They sell it to money providers which ultimately bind them to that provider. They become bonded laborers (Rana et al., 2018). Chandpur has earned itself the name 'City of Hilsa' with her abundant Hilsa supply. Hilsa capture remains an important income source for fisherman of the district.

Though authorities have paying considerably greater attention to the conservation of Hilsa fisheries, alternative livelihood sustainability for fisher communities has been ignored throughout the years. A few studies have just lately been done. A thorough description of alternative livelihood profiles of Hilsa-dependent fishers is yet lacking. The maintenance of good fisheries habitats requires a sustainable, healthy fishing community. As a result, preserving the health and well-being of fisher communities is essential for the long-term management of any fishery. The present study mostly concerns with this point as to consider the alternative livelihood of the fisherman of Chandpur district.

Materials and Methods

Study area

The study was conducted in four upazillas of the Chandpur district namely Chandpur Sadar, Haimchar, Matlab Uttar and Matlab Dakshin as hilsa related activities were limited here.

Data collection

For the collection of data both primary and secondary sources were taken into account. Three methodological tools were used to collect primary data - questionnaire interviews, Focus Group Discussions (FGD) and cross check interviews. A draft questionnaire was prepared and surveyed by the researcher on trial basis with some interviewees. The researcher filled in the questionnaire form by interviewing fishers to collect accurate info related to the objectives. The investigation utilized 12 questionnaire surveys and 4 FGDs with fishermen in 12 different spots of the study area. Interviews of 50 fishers were taken monthly and an FGD was conducted every quarter. Each group size of an FGD was 8 to 12 participants. Crosscheck interviews were carried out with local leaders, concerned government and non-government organizations, and school teachers wherever they could be reached (physically/ digitally). Web articles, journals, organization's reports and official documents were some sources of secondary data to get some fast hand information.

Data analysis

MS Excel and very simple statistical tools like average, percentages were used for the analysis of data.

Results

Human Capital Types of fishers

About 91% of the fishers were professionals who harvest other fish along with Hilsa all the year round and the rest (9%) were seasonal. Fig. 1(a) shows the types of Hilsa fishers of Chandpur district.

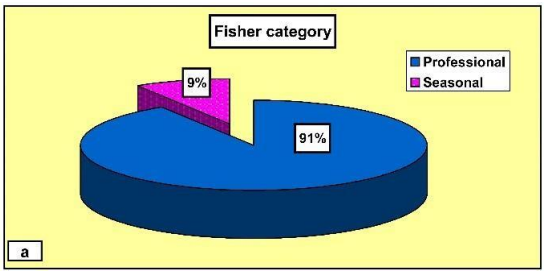

Fig. 1(a): Types of fishers' in Chandpur

Status of age and sex

The study revealed that most of the responders (about 31%) belong to the age group of 41-50 years followed by 31-40 (22%), 21-30 (18%), 51-60 (11%), 11-20 (10%) and above 60 (8%). We consider people under and including 30 years of age as a young group, 31 to 50 as middle group and more than 50 as old group the result indicated that more than 50% fisherman were middle aged group people (Table 1). All the fishermen were male found in the study area harvesting Hilsa. No female fishers were available (Fig. 1(b)).

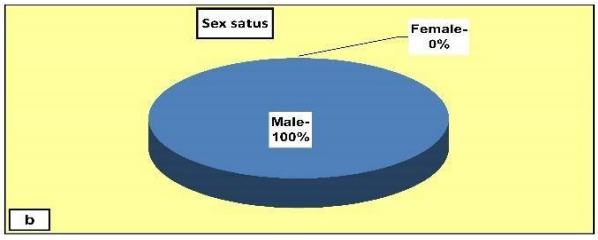

Fig. 1(b): Sex Status of fishers' in Chandpur

So the ratio of male: female was 100:0. Female were not counted as fishermen and hencewere not interviewed.

Table 1. Age status of Hilsa fishers of Chandpur district in Bangladesh

Age group (years)	Percentages of fishers
11-20	10
21-30	18
31-40	22
41-50	31
51-60	11
>60	8

Marital condition

During this investigation marital status of fishermen were inquired. Marital status is an indicator of socio-economic condition as it affects income. 84% of the fishermen were married while 16% was unmarried in the study area (Fig. 1(c)).

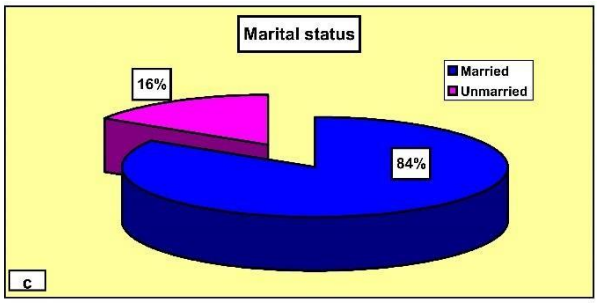

Fig. 1(c): Fishers' Marital Condition in Chandpur

Fishers' religious view and family condition

In the study area fishing was dominated by Muslims with 86% against 14% Hindu (Fig. 1(d)). Other religious people were not found in fishing during the investigation. It was also reported by the respondent that the number of fishermen were increasing day by day in the study area. Religion can have effect on socio-cultural life of people.

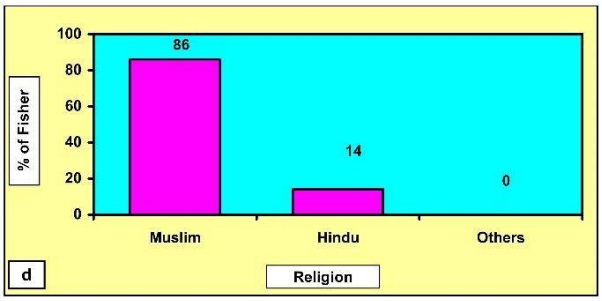

Fig. 1(d): Fishers' Religious view in Chandpur

In the study area fishing was dominated by Muslims with 86% against 14% Hindu. In the present study, most of the fishermen families were nuclear family which is about 67 % and rests were33% joint families. The four different upazilla of Chandpur district shows 5 members family was in the highest percentage which was about 33% and 2, 10, 11 and 12 members' family was in the lowest percentage which was 1%. However 3, 4, 6, 7, 8 and 9 members family were found 5%, 15%, 21%, 12%, 8% and 2%, respectively (Fig. 1(e)).

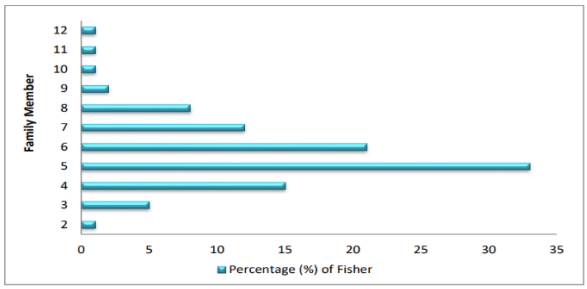

Fig. 1(e): Family condition of fishers' in Chandpur

Fishing assets and experience of fishing

In this investigation it was revealed that only 7% fishers had their own boat and fishing equipment while majority of fishers (93%) did not have any boat and net (Fig. 1(f)). The questionnaire survey includes the determination of the experience of fisher in fishing. Current study showed that minimum experience in fishing was 3 years while maximum 40 years with average 18 years of experience. Fishermen were reported to go for fishing during both day and night. Average harvest in peak season was 19 days/month and in off season it was 9 days/month with average harvesting duration 15 hours/day was recorded.

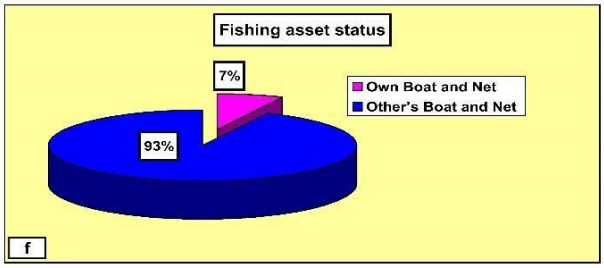

Fig. 1(f): Owner of Fishing Assets

Physical capital

Land ownership and educational Status

About 8% fishermen were landless and majority (49%) had up to 5 decimals. Besides 31% had >5 to 10 decimal, 8% > 10 to 15 decimal and 4% had > 15 decimal of lands (Fig. 2(a)). Landless fishermen were found to live in government land which is known as *khas* (government owned) landor in others land with rent. The fishers in the community had varying degree of educational status. The survey revealed that 67% fishers had received primary level, 14% secondary level, 2% more than secondary level education while 17% fishermen were found to be illiterate (Fig. 2(b)). 96% of the illiterate fishermen only can write their name while 4% are fully illiterate who cannot even write their name.

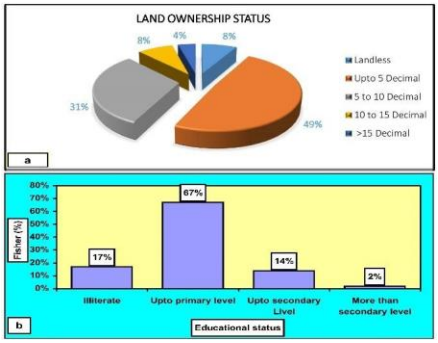

Fig. 2(a & b): Fishers' Land ownership & Educational status

Drinking water and sanitation facility

In the study area it was found that 16% Hilsa fisher used own tube-well, 43% neighbors, 15% community tube-well and remaining 26% government tube-well from school, Madrasah and office area to collect drinking water (Fig. 2(c)). Government tube-wells were provided by local government office while communities tube-well by some community members. It was observed that 16% of the respondent had *kacha* latrine while 65% had semi *pakka* and 19% had *pakka* toilet (Fig. 2(d)). Lack of awareness, lack of knowledge, less priority on health and environment issue, less income etc. are some factors that influences them using *kacha* or unhygienic toilet. One good side was that no fishermen were found to use open place or field for toilet purpose.

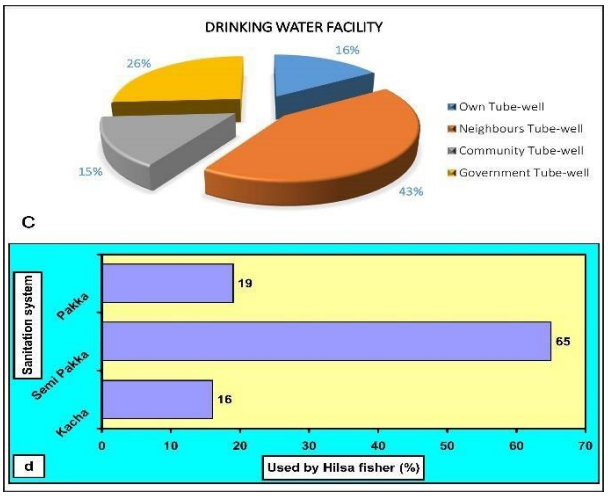

Fig. 2(c & d): Fishers' Drinking water facility Sanitation system

Housing condition and electricity facility

The majority of respondents about 58% had semi *pakka* building and 39% fishermen's housing conditions were *kacha* while only 3% were *pakka* housing. The study revealed that 71% fisher household enjoyed this facility while 29% did not (Table 2).

Table 2. Housing pattern and electricity facilities among Hilsa fishers of Chandpur district in Bangladesh

Housing pattern	Utilized by Hilsa fisher (%)	Electricity facility	Condition percentages
Kacha	39	Electrified	71
Semi-*pakka*	58	Non-electrified	29
Pakka	3		

Health facility

It was observed that 49% Hilsa fisher got health service from upazilla health complex in the initial stages of diseases and in case of severe stage 52% fisher also takes this department's service. A good number of fishers about 15% also takes MBBS doctor's service in the initial stage and in severe stage 17% takes the support. From village doctor and *kabiraj* 31% fishermen take medical support in the initial stage which is about one third of the fishing community but in the severe stage this percentage reduces to 18%. However, 1% and 4% Hilsa fisher were dependent on private clinic and district hospital service respectively in initial stage when 1% and 12% were found to take privateclinic and district hospital service respectively in service stage (Table 3).

Table 3. Percentage of fishermen taking medical support in different stages of diseases

Types of health facilities	Initial stage (%)	Severe stage (%)
Village doctor	22	12
Kabiraj	9	6
Upazilla health complex	49	52
Private clinic	1	1
MBBS doctor	15	17
District hospital	4	12

Financial capital

Credit access

From the current survey found that 96% fishermen were found to take loan from NGO and only 1% from bank. On the other hand, non-institutional loan was very easily accessible to them which was mainly offered by *aratdar* and *mahajan* and received by 97% fishermen in the study area (Fig. 2(e)).

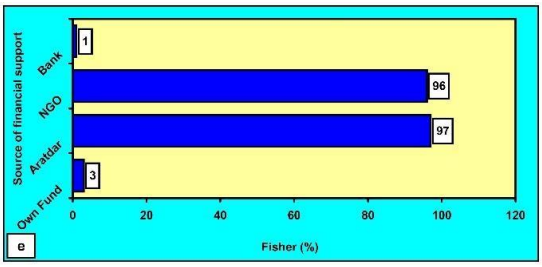

Fig. 2(e): Credit access of Fishers'

Income level

In the study fishermen's income level was categorized into 3 categories for the convenient of elastration of the reality. Table 4 shows the income level of fishermen. Maximum fishers' average income (54%) is remained between the range of 80,000 to 1,50,000 BDT. 33% fishers are in the range up to 80,000 BDT and least numbers (13%) have income above 1,50,000 BDT. Average income indicates the poor livelihood status.

Potential alternative income generating activities (AIGAs)

A significant number of fishers already adopted some income generating activities like cow, goat, poultry rearing, sewing, net making and repairing, vegetable cultivation etc. suitable for their skills and resources. Table 4 shows the potential alternative income generating activities (AIGAs) all the year round by the fisherman and their average income. 82, 73 and 71 percent fishers were involved in vegetable cultivation, net making and repairing, poultry rearing respectively as year-round alternative activities. Highest monthly income (2243 BDT) comes from cow rearing, however because of low capital only 10% fishers were involved. Goat rearing and sewing were the alternative occupation of 34 and 31 percent fishers respectively because for these works required comparatively less capital than cow rearing.

Table 4. Year-round potential alternative income generating activities (AIGAs) and monthly average income by Hilsa fishers of Chandpur district in Bangladesh

Potential (AIGAs)	Fishers (%)	Monthly average income (BDT)
Cow rearing	10	2243
Goat rearing	34	1096
Poultry rearing	71	1029
Sewing	31	1520
Net making and repairing	73	998
Vegetable cultivation	82	574
Fish farming	7	600

presented that the majority of Hilsa fisher were middle age (31-40 years) group which are more on less similar to the present findings. However, female was strongly engaged in net making and repairing. According to the responder, this is due to social barrier which was correspondents with the findings of Halder et al. (2011).

Marital and religious condition

Due to early marriage tendency maximum fishers are married.

In some cases, we found polygamy family in considered area but in present era the number of this type family is very poor. Among the fisher's polygamy family is higher in Muslim religion than Hindu. The finding is more or less similar to the findings of Halder et al. (2011). A few divorces were found during this investigation. Ali et al. (2014) reported that 75% fishermen were Muslim in Loalia River in Patuakhali and similar findings were presented by Fareque and Dewan (2014). Other religious peoplewere not found in fishing during the investigation.It was also reported by the respondent that the number of fishermen were increasing day by day in the study area. More or less similar findings were reported by Kabir et al. (2012) and Hossain et al. (2015). Fishing was mainly a profession taken by lower Hindu community as an ancestral occupation (Halder et al. 2011) when other religious people were not involved in fishing professionally.

Fishing assets and experience

Very few fishers have their own fishing equipment because of their low income. From the ancient period the fishers are bound to the middleman and they are deprived from fair price of their product. The study was correspondent with the result of Alam et al. (2009) who found similar results. Maximum fishers start their professional life at very early stage. Because of child laboring they accrued long time experience in fishing. However, the maximum fishers are depriving of their childhood pleasure. Another research work by Islam et al. (2013) presented 17.9+7.12 years of mean experience of fishing.

Physical capital educational status

Poor income of fishers' parents and lack of consciousness make them bound to be involved fishing profession at early stage of their life. Insufficient infrastructure was another cause of their illiteracy. The investigation also found that new generation of the fishermen families were mostly school going especially in primary and secondary level. Some fishermen possessing secondary and more than secondary level of education were found as seasonal fishermen and mainly they become involved in fishing during pick-season. Government incentive and NGO's different steps for the development of educational status of country people was found to be the cause of spreading the light of education in the new generation of this society. However, no graduate was found in the fishing community. Mahbubur (2001) and Rahman et al. (2012) reported that 68% *haor* and 66.66% *Dwip* fishermen were illiterate respectively.

Drinking water and sanitation Facility

Clean and safe drinking water facility is valued elements for a society which indicates sign of sound health. The present findings showed that 100% of Hilsa fishermen household of Chandpur district used tube-well water for drinking purposeeither used their own or tube-well of others which is almost identical to the finding of Kabir et al. (2012) and Pravakar et al. (2013). The result more or less matches the findings of Ali et al. (2014). In case of toilet facilities, maximum fishers have semi *pakka* toilet. The fishers which are used *pakka* toilet, have a sound economic condition than mass fishing community. Their income is higher than the others and basically they are the owner of the fishing boats, trawler etc. The fishers having very marginal income generally used *kacha* toilet. Local government and some NGOs were working here to ensure sanitary toilet facility in the study area.

Housing condition and electricity facility

The results are an index of living standard of the community involved in fishing. The findings do not coincide with the report mentioned by and where most of the respondents had *kacha* house. Most of the Hilsa fishermen had limited scope to develop their housing condition due to their less income and exposure to other essential living supporting things. Their low income and poverty do not allow them to get electricity support and char area fisherman get any electricity due to absence of infrastructure. Similar results were found by Sharker et al. (2015) in Mohipur fish landing site in Potuakali district where 64% fishermen get electricity facility. However, Rahman et al. (2012) stated that no electricity facilities were enjoyed by fisher in *Nijhum Dwip* Island. Completely a different picture of electricity facility of Padma river fisherman in Srinagar Munshiganj was reported by Shill et al. (2016) that 100% fisherman enjoyed thisfacility.

Health facility

Once fishers were totally depended on village doctors and *kabiraj* for their treatment. However, the situation changed day by day. From our study, we found that maximum fishers are dependent on Upazilla Health Complex. Rate of taking treatment in private clinic and district hospital is very low and in most cases they used to go to the hospital at severe stage. The result shows some similarities to the findings of Zaman et al. (2006). Fishers are most neglected community in case of health support in Chadpur district as well as Bangladesh (Islam et al., 2006).

Financial capital

Credit access

The survey evidences that two sources of finance were observed such as institutional and non-institutional. Institutional sources of finance for the fishermen were considered as bank and non-government organization of which bank loan was very limited for the fishing community. They did not have easy access to institutional appropriate credit due to lack of mortgage assets,much official paperwork and collateral arrangement. Boat owner also provided advance to fishermen who again took loan from *aratdar* or *mahajan* where they had to repay the loan hand covering their total catch to the money lender well below market price and with the commission of the money provider. Hilsa fishermen usually took loan for different purpose. Boat owner Hilsa fisher took loan for construction, buying and repairing of boat and net and for fishing operation (Mozumder et al., 2019). On the other hand fishermen searched loan for food, medicine, marriage on dowry, natural disaster and repayment of previous loan.

Income level and potential alternative income generating activities

In the study area fishers' were not dependent only on their primary occupation related to fishery for maintaining their livelihoods. For sustainable livelihoods, the fishers' had to supplement their house-hold income through alternative income generating activities (Rahman et al. 2012). Because of the syndicate of middlemen income level remains too weak day after day from ancient period of time (Mallick et al. 2011). This community was provided very poor government and NGO support (Ahmed et al. 1997). Government allocation was so limited, supporting only a small portion. It is necessary to create the action plan based on fishers' requirement that aimed to prevent the fisher to fishing during ban season (spawning and juvenile grow out period).

Conclusion and Recommendation

The investigation revealed that the pattern of livelihood and living status of fisher was still below of average in the study area. They were solely dependent on fishing for their livelihoods which made them most vulnerable communities in society. They cannot earn sufficient amount of money to meet their basic needs. Fishermen's yearly income was determined by their fishing assets, activity during the prohibition era,government subsidies, family members, other income sources, and loans obtained. They were not aware of education, proper health & sanitation system, housing and savings. Socio-economic abstractions such as low income, credit insolvency, lack of substitute earning flexibility made them vulnerable.

To improve the alternative livelihood status of Hilsa fishers in Chandpur district, the government and non-governmental organizations should take the necessary steps to assist the fishermen in adopting those alternative income- generating activities that they adopted during the ban season, as well as provide adequate financial support during the ban period and other unavoidable crises so that they can continue their prowess. A training and motivating program should be developed to raise resource users' knowledge and enhance their ability to use natural resources in a sustainable manner. Effective management initiatives, such as co-management, with the assistance of both government and non-government organizations, may result in the fast growth of fisher livelihood features and the current condition of natural resources. The NGO's must be helpful in determining the availability of a loan that may be utilized to improve the income procedure.

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Authors' contribution

Conceptualization, FT and MDH; methodology and investigation, FT and MAMA; supervision, MDH; formal analysis, FT and DAK; writing-original draft preparation, review and editing, FT. MAMA and DAK. All authors have read and agreed to the published version of the manuscript.

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