

Livelihood Status of Fishing Communities and Fish Biodiversity of Galachipa River in the Southern Coastal Area of Bangladesh

Md. Rabiul Islam Rubel¹, Shib Nath Pattadar¹, Suprakash Chakma²
and Md Rushna Alam^{1,*}

1. Department of Aquaculture, Patuakhali Science and Technology University, Patuakhali-8602, Bangladesh.
2. Department of Fisheries Technology, Patuakhali Science and Technology University, Patuakhali-8602, Bangladesh.

*Corresponding Author: rushna_alam@pstu.ac.bd

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ABSTRACT

The present study was conducted to address the living status of the fishing community and fish biodiversity of the Galachipa River in the Patuakhali district of Bangladesh. For data collection, thirty people involved in fishing activities were interviewed through PRA tools and techniques. Results revealed that 43% of fishermen were young (age < 35). It was found that 90% of fishers were Muslim and 10% were Hindus; among them 53% were illiterate, 30% could only give a signature, and 17% received primary education. Early marriage (between 16 to 20 years) was very common in the fisher community due to illiteracy and unconsciousness. The number of joint family-led fishermen was 70%. Eighty percent utilized huts as dwellings, with an average of 31.45 ± 22.39 decimal land area, including the homestead. In most cases, they received health services from village doctors and rarely from medical doctors. The usual per capita monthly income of the local fishermen was BDT 7160 ± 844.75 , while 65% of them possess their own fishing nets and boats. During the study period, 46 fish species under 31 families were identified from the different catches of fishermen, among which four were critically endangered, five were endangered, whereas 17 species were vulnerable. The current study revealed that fishermen of Galachipa River were dependent exclusively on fishing for their food source as they have no alternate earnings. Illiteracy and the lack of both technical knowledge and proper support were the foremost impediments to the uplifting of their sub-standard lifestyle.

INTRODUCTION

Bangladesh, one of the most resourceful countries in terms of fisheries resources, is blessed with vast freshwater and marine aquatic biodiversity. Among 1,093 marine organisms, finfish comprised 44.35%, shellfish covered 32.23%, seaweeds formed 15.10% while other species constituted 8.32% (Ghose, 2014). Among 289 freshwater fish species, the major portion of fishes were carp, catfish, perch, eels, gobies and prawns (Hossain, 2001; Ahsan *et al.*, 2014). During the period from 2012 to 2018, the inland

capture fisheries production showed an estimated growth of 4.55%, increasing from 0.69 million tons to 1.22 million tons (**FRSS, 2018**). However, the contribution of capture fisheries to the country's total fish production has been reduced from 55.7% to 28.44% over the last three decades. As a result, government has demonstrated improved biological management strategies, with a priority in its development policy for the fish sector to restrict the declination of resources and enhance production (**FRSS, 2018**).

Fisheries resources are the second most valuable export-oriented products in Bangladesh, and this sector supports the livelihood and employment of millions of people. It is considered the primary source of animal protein for Bangladeshi people. The farming and consumption of fish, henceforth, plays a crucial role in employment, food security, foreign currency earnings as well as socioeconomic advancement (**Rahman *et al.*, 2012; Ali *et al.*, 2014; Pattadar *et al.*, 2020**). Besides, contributing 4.37% GDP, the fisheries sector provides almost 60% of the country's daily animal protein consumption. Almost 10% of the total population of the country depends on fisheries for their living (**DoF, 2014**). According to a FAO report in 2018, Bangladesh ranked third in the world for inland fisheries production.

Some members from particular lower caste Hindus were involved in fishing, but recently more Muslims have become involved in this profession in recent years. The fishermen community is one of the most susceptible in Bangladesh due to limited livelihood opportunities (**Farhana & Naser, 2006**). **Chambers and Convey (1992)** defined livelihood as capabilities, the assets (natural, physical, and human financial and social), the activities and the accesses to these that together determine the living gained by the individual household. The status of these assets of Bangladesh fishers' communities are not properly represented and need in-depth study.

For the present study, the Galachipa River of the Patuakhali district has been chosen for its geographical location in the estuarine area and strong semi-diurnal influence of sea tides. As the coastal river of the southern part of Bangladesh, the Galachipa River has plenty of tidal activities that carry inland nutrient-enriched water to the estuary, and ultimately provide shelter for a wide range of biodiversity in this area. The tidal influence and river nutrient-rich water discharge make the estuarine environment a suitable place for fish in this part of the sea. The depth of the sea and varying topography of coastal water can be attributed to the difference of tidal level in the coastal areas (**Hossain, 2001**). Fishermen perform different fishing activities on a regular basis in the river, which plays a very crucial role in the livelihood and income of the fishermen community. Nevertheless, the socio-economic condition of this fishermen community has yet to be extensively studied with an emphasis on fish biodiversity of their exploited natural resources.

Therefore, the present work was undertaken with the specific objectives of investigating basic profile of the fishermen community, including ages, sexes, educational status, marital status, family condition, housing condition, health and

sanitation condition, land ownership, source of income, information of fishing and woman participation in decision making. In addition, fish biodiversity of the Galachipa River was specifically focused on for its indispensable effect on the livelihood of the local fisher community.

MATERIALS AND METHODS

1. Study Area

The present study was carried out in Galachipa Upazila (sub-district) of the Patuakhali District (22°19'60" N and 90°19'60" E) from July 2017 to June 2018 (Fig. 1). To determine the livelihood condition of the local fishers, geographical areas of Balaikathi Village of Auliapur Union Council was covered for data collection using stratified random sampling. Different stratification criteria such as religion, location and communication, GO and NGO intervention were taken into consideration. The area of Galachipa River was chosen for its diverse aquatic resources and seasonal brackish water environment which, situated in the lower part of the district, flows into southward with the name 'Agunmukha' and falls to the Bay of Bengal.

2. Data collection

The actual data was collected between July 2017 and June 2018, involving participatory, qualitative and quantitative survey techniques. Participatory rural appraisal (PRA) techniques, such as group-wise interviewing, property status, mapping, bisect walks and partial market visiting techniques, through semi-structured interviewing, and participatory mapping of commodity chains were mainly used. Both raw and processed data were used during this study. For the identification of the livelihood status of the fishing community, a total of 30 fishermen (N = 30) were randomly chosen and interviewed. Before collecting the initial data, a draft survey form was developed, which was pre-checked among a group of fishermen. To accomplish the objectives of the study, pre-testing of the draft questionnaire was done with much attention.

The final questionnaire was improved, rearranged and modified according to the experience of the pre-testing of the draft questionnaire. Data were collected through community survey using some participatory rural appraisal (PRA) tools, such as focus group discussion (FGD) and direct interviews (DI) with key informants. For the study of fish biodiversity of Galachipa River, a weekly survey of total catches and their sampling was performed throughout the study period. The total catches were gathered in a bamboo basket without repetition of the same gear in every sampling day. Every species in the total catches was then identified and categorized. The species were counted by hand, and counting and the percentage of composition were determined. Fish species were identified according to the taxonomic guide at aquaculture laboratory of Patuakhali Science and Technology University, Patuakhali, Bangladesh.

3. Processing and Analysis Data

Collected data were arranged in a well-structured format using Microsoft Office Software Package. The livelihood related data were categorized according the framework presented in Fig. (2) to meet the study ends. The processed data were relocated to a master sheet, and consequently classified tables and graphs were prepared to express the

findings of the study. Lastly, MS-Excel was used to analyze data, presented in textual, tabular and graphical forms to illuminate the present status of the livelihood and constraints of the fishermen of the Galachipa River.

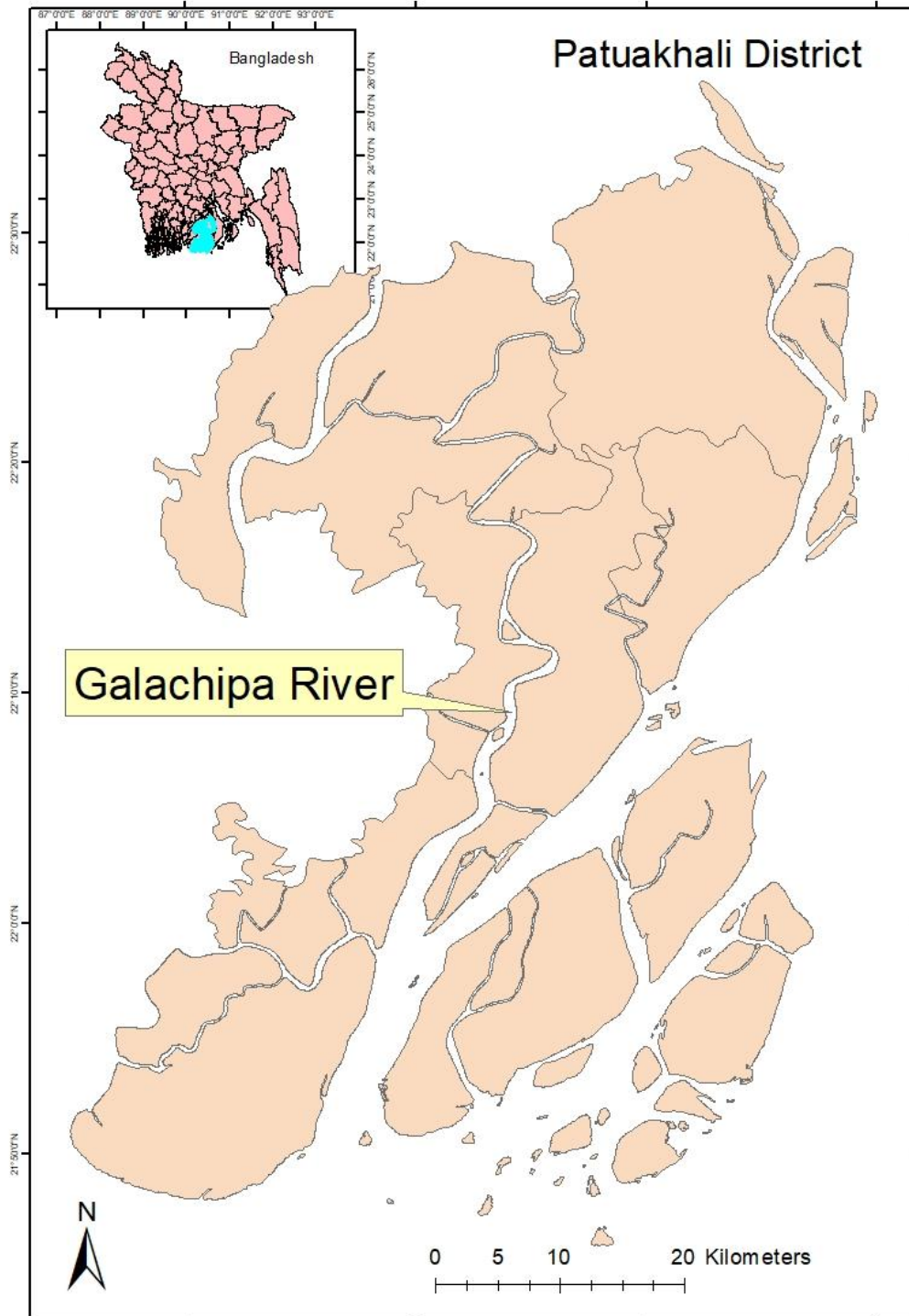


Fig. 1. Study area map showing the Galachipa river in the coastal Patuakhali district of Bangladesh

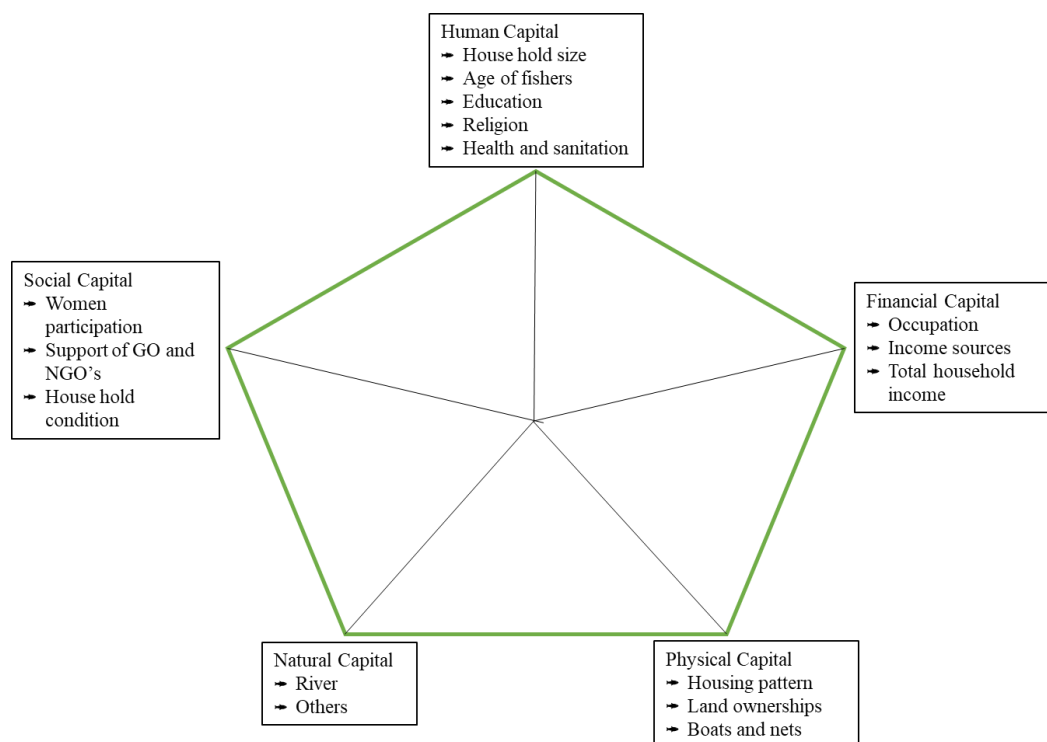


Fig. 2. Framework for assessing the livelihood status of fisher's community of the Galachipa river

RESULTS

1. Socioeconomic condition and living status of the fishing community

1.1. Human capital

Most respondents were parts of a joint family (70%), while the rest (30%) belonged to a nuclear family (Fig. 3a). The age of respondents in the fisher community was in the range of 20 to 75 years. Out of 30 all-male (Fig. 3d) respondents, about 43% of fishers were young (age < 35), 30% were middle-aged (age between 35 and 60), and 27% were older adults (age > 60) (Fig. 3b). Around 53% were illiterate, 30% can use sign language only, and 17% passed the primary level of education (Fig. 3c). Almost 100% of fishermen drink deep tube well water (Fig. 3e), but merely 10% use it for daily household purposes, including cooking, cleaning, bathing and other domestic usages. Among other sources of water, almost 60% of fishermen used pond and the remaining (30%) used river water to meet their daily needs (Fig. 3f). A respondent percentage of 55 reported using makeshift latrines, 15% used semi-permanent latrines, 10% used cemented latrines; whereas, 20% reported no access to any kind of latrine (Fig. 3g). Almost 90 percent of the respondents were Muslims, and 10 percent were Hindus (Fig. 3h).

1.2. Financial and physical capital

The recorded average income of a fisherman per month was BDT 7160±844.75. Out of 30 respondents, 85% of fishermen lived in tin shade houses (mud floor, walls made of palm leaves and a tin roof), 10% lived in semi-cemented houses (RCC floor, walls and roof are made of tin), and 5% lived in huts (polyethylene walls and rice husk roof) (Fig. 4a). The average land area of the fishermen community was 31.45±22.39 decimal, including their homesteads (**Fig. 4b**).

The fishermen used different types of nets (8 types), traps (1 type), and hooks (3 types) for the purpose of fishing in the Galachipa River. The majority of the fishermen reported using their own nets and boats for fishing (65%), while a few fishermen had their own nets, but they did not have a boat (25%). They sometimes borrowed a boat from their colleagues or rented one. A small number of fishermen were found to catch fish with other fishermen who had their own nets and boats (10%). Among different types of nets, 20% of fishermen had set bag nets (Behundi Jal), 30% had gill nets (Sainjal), 10% had seine nets (Ber Jal), 30% had cast nets (Jhaki Jal), 10% had current nets (Current Jal), 5% had pull nets (Moia jal), and 15% had push nets (Thella jal). For traps, 20% of fishermen had hooks (Borshi) and 30% had bamboo traps (Chai) (Table 1).

Table 1. The percentage of fishermen using different types of fishing gears in the Galachipa River

Type of gear	Local Name of gear	English name of gear	Respondent %
Net	Behundijal	Set bag net	20%
	Sainjal	Gill net	30%
	Berjal	Seine net	10%
	Jhakijal	Cast net	30%
	Current jal	Current net	10%
	Tanajal	Troll net	5%
	Moiajal	Pull net	5%
	Thellajal	Push net	15%
Trap	Borshi	Hooks	20%
	Chai	Bamboo Trap	30%

1.3. Natural and social capital

The natural capital included the river, canals, and other waterbodies with their associated fisheries resources. The present study found 46 species of fish and crustaceans in the Galachipa River (Table 2).

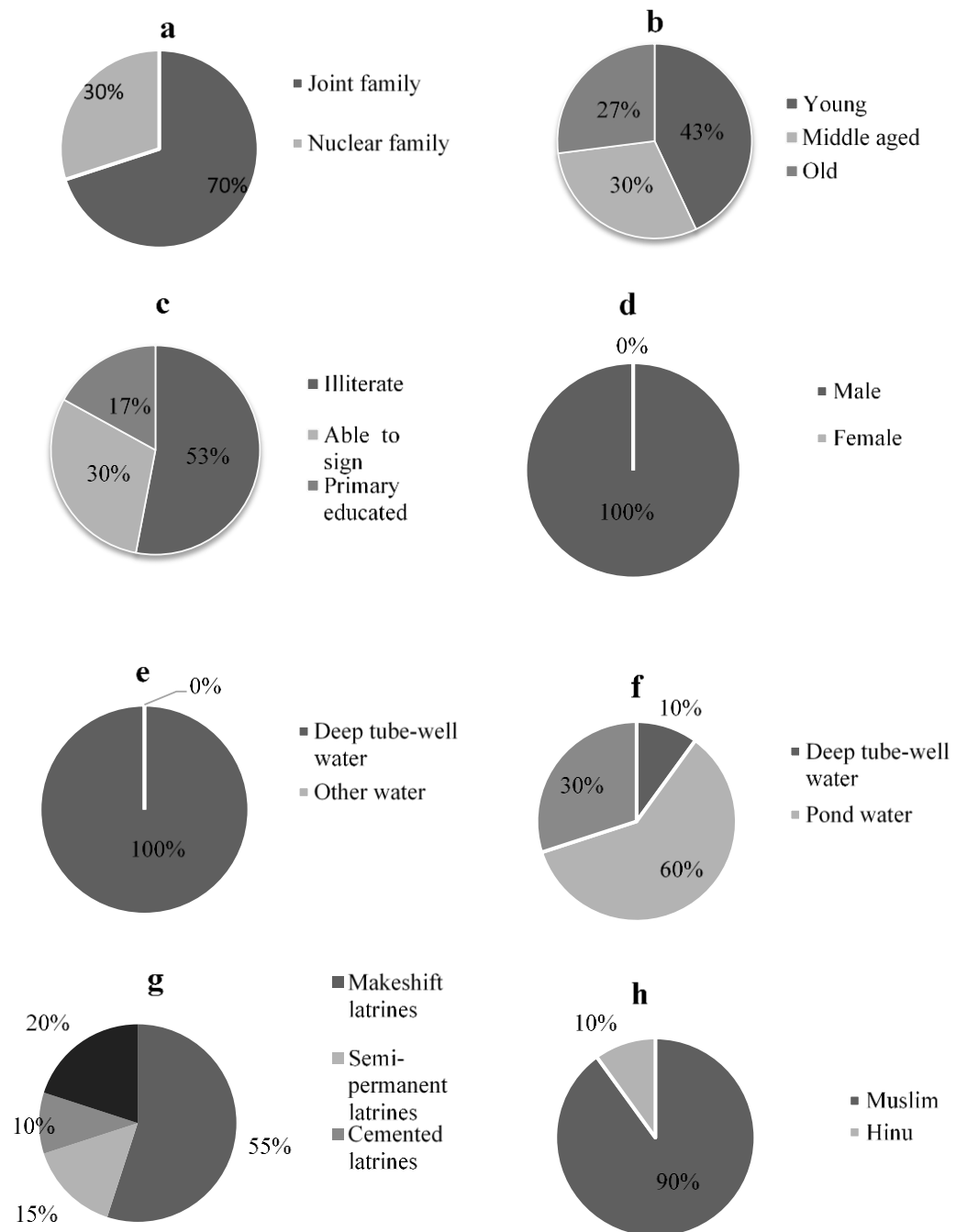


Fig. 3. Human capital status of fishermen community of Galachipa River showing: a) Family condition, b) Age distribution, c) Education status, d) Sex status, e) Sources of water for drinking, f) Sources of water for household activities, g) Sanitation status and h) Religious status. (N=30)

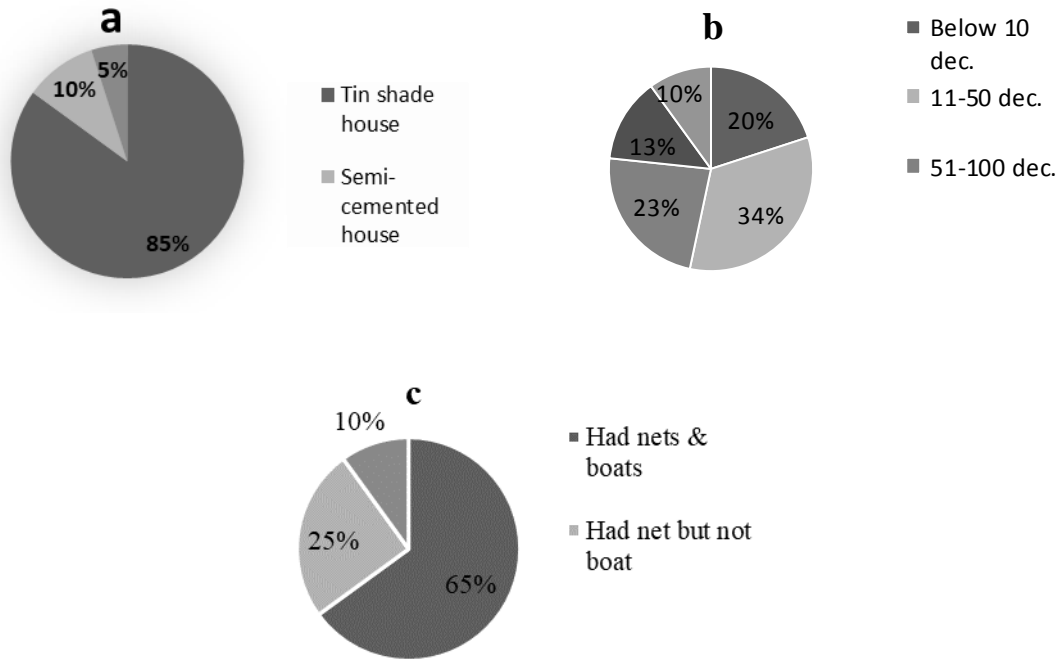


Fig. 4. Physical capital status of fishermen community of Galachipa River showing: a) Housing condition, b) Ownership of land and c) Ownership of fishing gears. (N=30)

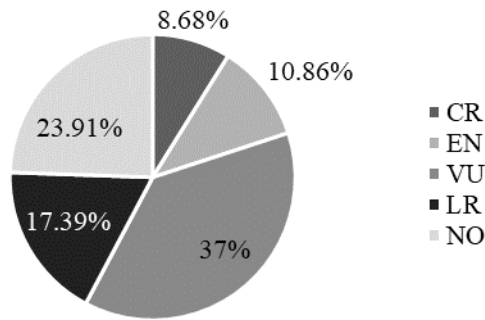


Fig. 5. Status of threat of fish biodiversity of Galachipa River (Status code: CR: Critically Endangered, EN- Endangered, VU-Vulnerable, LR- Lower risk, NO- Not threatened; followed as per IUCN, 2000). (N=46)

Table 2. Fish Biodiversity of Galachipa River

No.	Local name	English name	Scientific name	Family	Status
1	Cheua	Burrowing gobby	<i>Trypauchen vagina</i>	Gobiidae	NO
2	Bele	Tank gobby	<i>Glossogobius giuris</i>	Gobiidae	VU
3	Dogri	Bearded eel gobby	<i>Taeniooides cirratus</i>	Gobiidae	VU
4	Kukurjib	Large scale tounge sole	<i>Cynoglossus arel</i>	Cynoglossidae	VU
5	Golda	Giant fresh water prawn	<i>Macrobrachium rosenbergii</i>	Macrobranchidae	VU
6	Motka Chingri	Monsoon river prawn	<i>Macrobrachium malcomsoni</i>	Macrobranchidae	NO
7	Kathali chingri	Freshwater prawn	<i>Macrobrachium rosenbergii</i>	Macrobranchidae	LR
8	Taki	Spotted snakehead	<i>Channa punctata</i>	Channidae	NO
9	Cheng	Dwarf snakehead	<i>Channa gachua</i>	Channidae	NO
10	Shol	Snakehead murrel	<i>Channa striata</i>	Channidae	NO
11	Boal	Freshwater shark	<i>Wallago attu</i>	Suliridae	EN
12	Pabda	Pabda catfish	<i>Ompok pabda</i>	Suliridae	VU
13	Air	Long whiskered catfish	<i>Mystus aor</i>	Bagridae	CR
14	Tengra	Striped dwarf catfish	<i>Mystus vittatus</i>	Bagridae	CR
15	Gulsha	Day's mystus	<i>Mystus bleekery</i>	Bagridae	NO
16	Ramsos	Oblique jaw thryssa	<i>Polynemus paradiseus</i>	Polynemidae	EN
17	Baim	Zigzag eel	<i>Mastacembelus armatus</i>	Mastacembelidae	VU
18	Koral/Vetki	Giant pearch	<i>Lates calcarifer</i>	Centropomidae	CR
19	Mola	Molacarplet	<i>Amblypharyngodon mola</i>	Cyprinidae	NO
20	Jatputi	Pool barb	<i>Puntius sophore</i>	Cyprinidae	VU
21	Chela	Silver razerbelly minnow	<i>Salmostoma acinaces</i>	Cyprinidae	LR
22	Dhela	Cotio barb	<i>Osteobrama cotio</i>	Cyprinidae	CR
23	Rui	Rohu carp	<i>Labeo rohita</i>	Cyprinidae	NO
24	Titputi	Ticto barb	<i>Puntius ticto</i>	Cyprinidae	VU
25	Sorputi	Olive barb	<i>Puntius sarana</i>	Cyprinidae	EN
26	Magur	Walking catfish	<i>Clarias batrachus</i>	Clariidae	VU
27	Cuchia	Mud eel	<i>Monopterusuchia</i>	Synbranchidae	VU
28	Koi	Climbing pearch	<i>Anabas testudineus</i>	Anabantidae	NO
29	Veda	Gangetic leaf fish	<i>Nandana nandas</i>	Nandidae	VU
30	Kakila	Asian needle fish	<i>Xenentodon cancila</i>	Belontiidae	VU
31	Faissa	Coromandel ilisha	<i>Mugil corsula</i>	Mugilidae	LR
32	Poa	Pama croaker	<i>Otolithoides pama</i>	Sciaenidae	VU
33	Kolisha	Banded gourami	<i>Colisha fasciata</i>	Osphronemidae	VU
34	Rupchanda	Black pomfret	<i>Parastromateus aniger</i>	Stromatidae	VU
35	Chanda	Elongate glass perchlet	<i>Chanda nama</i>	Ambassidae	NO
36	Foli	Bronze Feather back	<i>Notopterus notopterus</i>	Notopteridae	EN
37	Bou	Queen loach	<i>Botia dario</i>	Cobitidae	LR
38	Shing	Stringing Catfish	<i>Heteropneustes fossilis</i>	Heteropneustidae	LR
39	Chama chingri	Shrimp	<i>Penaeus indicus</i>	Penaeidae	NO
40	Bagda	Black Tiger shrimp	<i>Penaeus monodon</i>	Penaeidae	LR
41	Chapila	Ganges river gizzard shad	<i>Gudusia chapra</i>	Clupeidae	LR
42	Ilish	Hilsha shad	<i>Tenulosa ilisha</i>	Clupeidae	EN
43	Pangus	Yellowtail catfish	<i>Pangasius pangasius</i>	Pangasidae	VU
44	Potka	Milk spotted puffer	<i>Tetraodon patoca</i>	Tetraodontidae	VU
45	Tulardandi	Flathead sillago	<i>Sillaginopsis panijus</i>	Sillaginidae	LR
46	Khorsul	Corsula mullet	<i>Rhinomugil corsula</i>	Mugilidae	CR

(Status code: CR: Critically Endangered, EN- Endangered, VU-Vulnerable, LR- Lower risk, NO- Not threatened; followed as per IUCN, 2000).

DISCUSSION

The information about the livelihood conditions of the fishermen and the biodiversity of the area were collected from the local fishermen who fish in and live beside the Galachipa River.

1. Living status of the Galachipa River fisher community

1.1. Human capital

In terms of human capital, the fisher community was recorded below standard living conditions. Most of the fishermen live in joint families (70%) in a traditional manner with a higher number of family members (up to 10), compared to the national average (4.3 members per family) according to the 2011 population census. The lack of education, unconsciousness with the problems related to high rate of population, and the avoidance of birth control measures, all of which are factors contributing to the emergence of large families in the study area. **Rahman *et al.* (2012)** found that, 58.33% was joint families and 41.67% was nuclear families, with an average family member of 8 in the fishers' community of Nijhumdwip under Hatiya Upazilla of Noakhali district in Bangladesh, which coincides with the present study. More nuclear family children were accustomed to go to school, compared to those living in joint families. Only one income-earning member was found in the nuclear families, whereas a minimum of two, but no more than three, income-earning members were found in joint families.

The present findings revealed that young people under the age of 35 are increasingly involved in fishing activities. This finding is in an agreement with that of **(Kostori, 2012)** who addressed the age distribution of fishers in different parts of Bangladesh. The previous author found that, most (56%) of the fishermen in the Chalan Beel area of Bangladesh were in the 20 to 30 years of age group.

Education is an important factor in changing the attitude and motivation of a society. Most of the fishermen were illiterate (55%); a few number could write only their names, and even fewer passed the primary school level. Compared to the national literacy rate of 72.3%, the literacy rate among the fishing community of the present study was much lower than that of the mainstream population **(Bangladesh Economic Review, 2020)**. Due to poverty and lack of awareness, it was noticed that the fishermen preferred their children involving in economic activities rather than fully enthusiastic to sending them to school. **Kostori (2012)** mentioned similar results while studying the Chalan Beel fishermen communities of Bangladesh. This result concurs with that of **Halder *et al.* (2011)**, who reported that 52.78% of fish sellers had not been to any institutional education.

It is not surprising that all the fishermen were male. Direct involvement of female in fishing activities is rare in Bangladesh but they might play role in processing and marketing their catch. The participation of woman in direct fishing activities of this community is absent for social and religious restrictions. Similar results were recognized

in the study of **Islam *et al.* (2013)** while studying the livelihood status of the fishermen in the Monirampur area under the Jessore district of Bangladesh, where all respondents were male in the study area. According to the economic review of 2020, 68.5% of total working population was male and 31.5% was female (**Bangladesh Economic Review, 2020**). The present result deviates from the national review because of the type of work. Fishing is conducted on water vessel, and it's a group work in most case, which makes it a laborious work. Therefore, female workers couldn't show their interest to participate in the fishing activities. In addition to the afore- mentioned reasons, the social and religious bindings that do not allow females to take part in direct fishing activities in this community is another effective factor.

Health condition is the reflection of the livelihood status of the fishermen. Health and sanitation facilities of the fishermen communities were very poor. They usually go to the village doctor for treatment of common diseases, such as cold, fever, headache etc. However, they visit professional doctors in the Patuakhali town in case of severe complexity. Few of them reported going to village quack doctor locally known as “*Kabiraj*” for treatment purposes, and they notified that they went to “*Ojha*” or snake charmers to avoid the effect of ill paranormal entities. According to the economic review 2020, only 1 doctor is available for 1724 individuals. But in case of the studied community, the number of people per doctor might exceed several thousands (**Bangladesh Economic Review, 2020**).

Fortunately, all fishermen have access to safe drinking water (100%). This finding is reflecting the latest economic review (**Bangladesh economic review 2020**), that represented 98% of the total population with access to pure water for their drinking and other household purposes. Though fishing community had enough deep tube well facility, they use pond and river water for household use other than drinking for the lack of clean water concerns.

Most of the respondents were totally unaware of sanitation facilities using makeshift latrine (55%). This condition is much better than that previously reported by **Rahman *et al.* (2012)** in Nijhumdwip under Hatiya Upazila. The previous study found that 95% of toilets were makeshift, while 3% and 2% were semi-permanent and cemented, respectively. But the study outcome did not show vicinity with the national standard. The latest economic review 2020 showed that, 76.8% of total population used sanitary latrine across the country. The present study had a great deviation with the national scenario in this essence since most of the fishermen families did not know about personal hygiene and many added they could never afford building a sanitary latrine. Most of the fishermen families did not know about personal hygiene and suffered from several contiguous diseases. The unawareness of personal hygiene, inadequate sanitation facility and scarce access to safe drinking water were determined factors making their livelihoods vulnerable.

Greater participation of Muslim community in the fishing activities in the studied area was observed. This might be related to the demographic pattern of the locale. The Islam religion is most prominent in the southern part of Bangladesh, especially in Barisal division in terms of higher percentage, compared to the other parts of Bangladesh. On the other hand, traditionally, low caste Hindu communities, including the Malos, Jaladas, Malla Burmans cast people were engaged in the fishing profession. But recently, many Muslims have been engaged in fishing activities besides the Hindus. **Alam (1996)** reported that in recent years, poor members of Muslim communities have been involved in this profession, and many are searching for new income opportunities. Furthermore, the investment of wealthy individuals in the marine fisheries sector is another major reason. Additionally, the current investigation reflects similar findings of the population census 2011, which represented 86.6% Muslims, 12.1% Hindus, 0.6% Buddhists, 0.4% Christians and 0.3% adopting other religions.

1.2. Financial capital and physical capital

The major income source of the fishermen was fishing, and the recorded average monthly earning was 7160 BDT. Similar income pattern was observed previously. The mean monthly income was 9470 ± 4806.89 BDT (5000 BDT to 24000 BDT) in the study of **Islam *et al.* (2013)** and **Kostori (2012)** who mentioned that, at the time of the highest fishing, most of the fishermen (almost 50%) earn 200-250 BDT per day. The **Bangladesh Economic Review (2020)** stated the average monthly income for an individual by 14574 BDT. The present study found significantly low income (almost two-thirds) in investigating the fishermen. Getting under estimated price for their catch and the lower fish catch were the reasons behind the low-income level of a fisherman compared to the other part of the society. When the availability of fishes reduced, they used to search for alternative income source, such as day labouring, small business or working to other people land etc... The fishermen who had their own agricultural land work in their field in rice planting seasons. Many fishermen operate their fishing gear 6-8 months in a year and the rest of the time, they stay Dhaka for income. About 40% of fishermen reported that they borrowed loan from Grameen bank or other microcredit organizations. Only 5% of fishermen saved in Grameen bank, co-operative society or their own hand made pot. They did not have any pond to culture fish. Few fishermen claimed that river took out their only pond which they used to culture fish by rapid erosion. It was notable that, due to ever-reducing size of fish production and biodiversity of natural water bodies including Galachipa River, many of the local fishers have already been moved from this profession and shifted to larger economical hub, including Dhaka and Chittagong, searching for alternative source of earning.

All the fishermen lived in their own house in the study area. The majority of houses were tin shaded, few respondents had semi-cemented house, and a very few fishermen lived in temporary houses. Similar result was found in the study of **Rahman *et***

al. (2012) in Nijhumdwip under Hatiya upazila, which detected no cemented house for any fisherman. Only 7-8 fishermen had tin shaded building and the remaining had houses made of locally available materials such as rice husk, bamboo poles etc...

The fishermen community of the Galachipa River had a very minimum amount of land. Few of them did not have any land except their homestead only. Some fishermen had their own cultivable agricultural land beside their homestead. Most of the fishermen lost their majority of agricultural land in river erosion, and most of them were even in the risk of losing their homestead land, which is their only last resource. Few fishermen were found to be in danger of losing their house. The similar result found in the recent study in Monirampur Upazila of Jessore district, Bangladesh by **Islam *et al.* (2013)** that the mean land owned by the fishermen was 0.24 ± 0.36 ha (0.02 to 1.57 ha). This study finding is reflecting the recent agricultural census of Bangladesh. The agricultural census 2019 stated that almost 11.34% of total population had no land of their own to live let alone cultivation. The present study represented similar result in this part with the national scenario. The fishermen were usually from marginalized group of people, so they had a small land only to build their houses and, in some cases, not at all. **Mia (2009)** found diversified types of fishing gears were operated in Meghna River; among them, a total of six types of fishing nets were used by the fishermen.

1.3. Natural and social capital

Galachipa River bears enormous importance among the local fishing community of Patuakhali region for its great diversity of both fresh water and estuarine fishes and another organism of economic importance. Strong tidal activity is one of the salient features of the river and plays a very important role in the movement of water and nutrients which was believed to be the main reason of the wide range of biodiversity in this river (**Mahmood, 1986** and **Mredul *et al.*, 2020**). Apart from tidal action, different hydrographic parameters of the Galachipa river were found to be suitable for the aquatic biodiversity both freshwater and estuarine species. Previous studies showed mean annual surface water temperature $<30^{\circ}\text{C}$ and dissolved oxygen around 6.0 ppm (**Mahmood, 1986**). A positive relationship between dissolved oxygen and pH, and an inverse relationship between dissolved oxygen and water temperature of the coastal river water has been reported by **Mahmood *et al.* (1978)**. The salinity of the estuary fell during the monsoon season due to heavy precipitation and freshwater discharge (**Alam *et al.* 2020**). It was also a very important breeding ground of both fresh water and marine fishes which enriched the diversity of fish of this river many more. The salinity level varied between 0.5-3.0 ppt. The highest salinity level was found in February (3.0 ppt) and lowest in June (0.5 ppt). Present study recoded 46 species of fishes in the catches of different gears by the fishermen in the Galachipa River (**Table, 3**). **Islam (2009)** found 35 fish species of 13-15 major groups in the Kali River. **Mia (2009)** found a total of 20 species of fishes in the same river. The present study found that among 46 fish species of 31 families, four

species were critically endangered, five species were endangered, and 17 species were vulnerable (**Fig. 6**). A similar result was noted by **Galib *et al.* (2013)**, which found that 41.27% species were threatened in Bangladesh, including 15.87% vulnerable, 15.87% endangered and 9.52% critically endangered species.

Women participations in the decision-making process were very low or in some cases absent. They usually did homestead chores like cooking foods, looking after children, petting hens and ducks etc. Sometimes they helped their husbands to prepare nets for fishing, sewing nets and sorting fish for marketing. Although government took different initiatives to empowering women, but that couldn't impose any impact on this community. This was because of lack of education and social consciousness among the group. Early marriage has been revealed in this study. Through, the Bangladesh economic review 2020 showed the average age of marriage for male was 24.2 and 18.5 for female. The ages of getting married for both male and female individual of the studied community were much lower in contrast to the national scenario ($p = 0.01$, $t = -9.051$). As because of social unconsciousness, illiteracy and poverty, they did not know about the risk and complication of childhood or early marriage. In the case of the daughter, their parents thought that early marriage would give them social security and reduce the expenses.

CONCLUSION

Findings of the present study proposed that the livelihood of fishermen community in Galachipa River was increasingly under threat because of the poor livelihood status and flimsy ecosystem services of the river. The total catch of the river was declined due to some factors including over-fishing, indiscriminate use of harmful fishing gears, water pollution, siltation and environmental degradation, poor management policy and little presence of existing law enforcement. Moreover, vulnerable condition like shocks, market trends and seasonal variation often make this situation worse. Therefore, community participation in fisheries resource conservation, sustainable catch practice, law enforcement and mass campaign program to raise public consciousness must be needed to resolve the situation.

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