Exploration of fishing gears and temporal distribution of fish species at Shibsa River, Paikgachha, Bangladesh

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ARTICLE INFO	ABSTRACT
	The present study was undertaken to ascertain fishing gear and craft uses, fish catch composition of the particular gear along with the identification of available fish species of Shibsa River, South-Western Bangladesh for a period of 12months from January to December, 2018.From the present study, 15 distinct fishing gears under 8 major groups including berj al, chandi jal and current jal were dominantly encountered. Precisely 60 fish species (55 finfish and 5 shellfish) were listed covering 28 families of which Cyprinidae was found as most dominant having 13 species followed by Bagridae, Channidae, Clupeidae, Siluridae, Gobiidae, Palaemonidae, Ambassidae, Cichlidae and the rest of the families having only one single species under a single genera for each. This study also depicted 8 endangered (14%), 5 vulnerable (8%), 33 least concern (55%), 8 near threatened (13%) and 6 not evaluated (10%) species out of 55 finfish and 5 shellfish species. Due to incognizance and over exploitation on fish with small mesh size net, species diversity of this river is under threat. So, public awareness and compatible knowledge on use of suitable fishing gears with suitable mesh size could contribute to sustainable fisheries in this river and betterment in livelihood of the fishermen in the surrounding area.

Introduction

Bangladesh is blessed with abundant fisheries resources and these have immense potentiality in the sector of national economy. It has about 700 rivers where, each river has its own geographical, hydrological, sedimentary and biological characteristics (Alam *et al*., 2013). But the number differs widely due to changes in rivers flow and names in different geographical regions. Fisheries sector of Bangladesh is the most dynamic sector which has great contribution to national income, nutritional demand and earning foreign currency. This sector therefore contributes about 3.57% in GDP and 25.30% in agricultural GDP and supplies about 60% animal protein consumption (DoF, 2018). Therefore, more than 11% of the total population of Bangladesh is engaged with this sector in full time and part time basis for their livelihoods (DoF, 2018). In Paikgachha upazila, one of the most prominent fresh water resources is Shibsa River contributing huge aquatic resources for dramatic changes of lifeline of thousands of fisher folk community. Fisheries of Shibsa River in terms of food supply and source of income has a great support for many riverine fishermen living around the coast of the river. But at the present time, reduction in the abundance and fish species from the river water is a combusting issue which has great detrimental impression on fishermen. A large number of fishing crafts and gears are operated in the Shibsa River for commercial exploitation of the fishery resources. Fishing gears are equipment's or mechanical devices or tools are being used to harvest fishes (Banglapedia, 2014). Intensity of fishing gears in a river is fully depends of the intensity of targeted fish population presumed to be attainable in that river. Fishing gear intensity, sizes and catch composition are good benchmarking of the status of exploitation level of river (Hoque *et al.,* 2019). Over exploitation, indiscriminant killing of fishes, unplanned and destructive gears are being used by fishermen of Sibsa River. The harmful modern gears and technological advancement have negative impact over the situation (Sayeed *et al.,* 2014). For this reason fish

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biodiversity are being declining day by day. However, there was no conducted on fishing exploitation and fisheries biodiversity based on scientific management and investigation of Sibsa River due to its public awareness. Therefore, it would be worth to conduct scientific investigation on fishing exploitation as well as catch composition and biodiversity of fishes in this river. Considering the present study, the objectives were to identify fishing exploitation, fishing crafts, catch composition, fish diversity and their conservation status of Shibsa River has become pivotal aspect. Finally, this study investigated the fish fauna of the river to present fish species diversity for the improvement, sustainable exploitation and management of the fisheries resources.

Materials and Methods

Study area and duration

The present investigation was carried out in the Shibsa River located at Paikgachha, Khulna beside fish landing center (Fig. 1). Geographical location of the study area is 22°35′18″ N latitudes and 89°20′12″ E longitudes. About 27 km of the Shibsa River crosses Paikgachha upazila and it connects with the Pasur River inside the Sundarbans Reserve Forest. The study was conducted for a period of 12 months from January to December, 2018. Data was collected personally through face to face interviews.
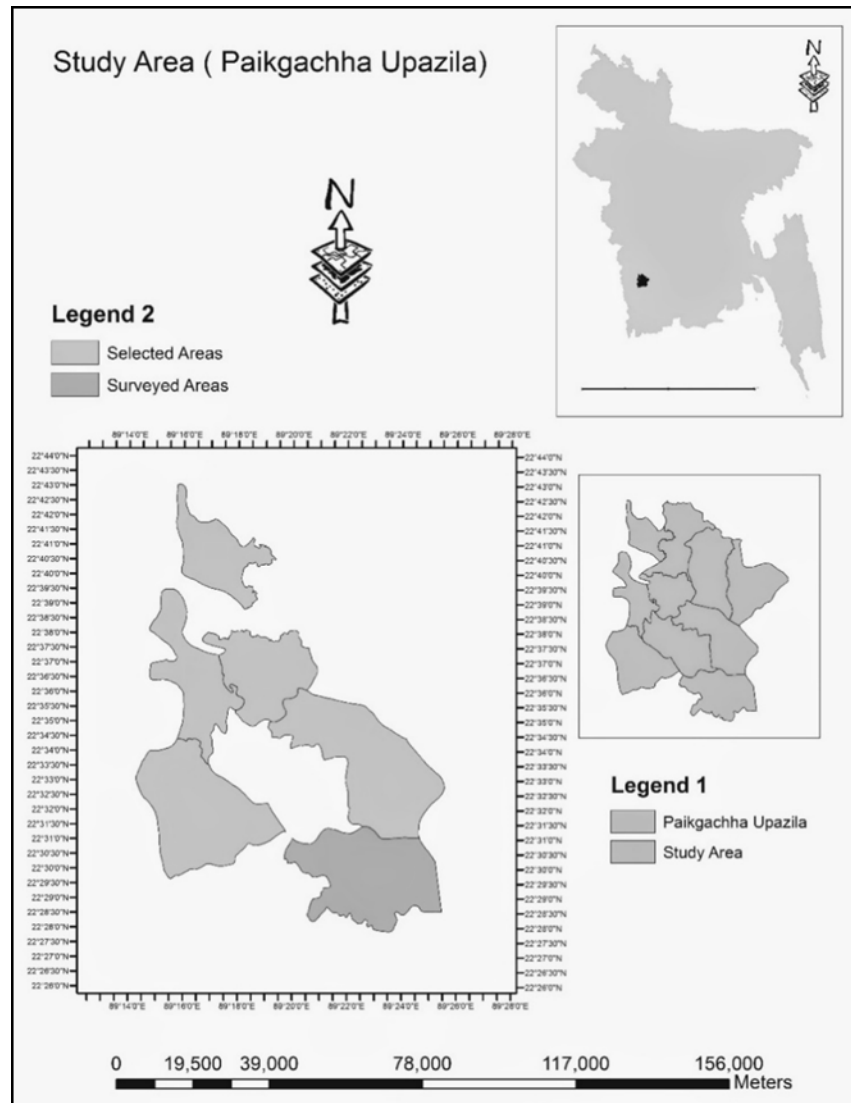

Fig. 1 Geographical location of the study area

Data collection

A total number of 200 fisher's fishing in the Shibsa River of different locations was selected for questionnaire

interview. Data collection section was divided into two terms named as primary and secondary data considering to accomplish the work precisely.

Primary data collection

For collecting primary data, a well-structured questionnaire having two parts (fishing gears and fishing crafts and fish diversity) was designed.

Study of fishing gears and crafts

Fishing gears and fishing crafts operated at Shibsa River by fisher's were studied by direct physical observation. The process of direct observation was attending with the fishermen in their fishing crafts during fishing gears operation to catch fish diversity. A 30 cm long measuring scale was used as a tool to measure mesh size of existing fishing gears. Shape of fishing gears were also observed when the gears left at the ground for drying purpose. Price per square foot of specific and presented gears were studied from the fishermen as well as local fishing gears trader for more specifications of data on pricing. Data were also noted on fish species by direct observation during collecting gears from river water with fish and then measured all species without sorting with a digital balance to know catch composition of specific gear in Kilogram. During collecting info on fishing gears, records were also through on the fishing crafts as a media of operating fishing gears. Direct observation was conducted to record data on fishing crafts like shape (length, weight and height in cm), constructions material, durability and purpose of crafts.

Fish diversity study

Freshly caught unsorted samples of different gears were collected and then sorted species wise with the help of fisher's. Local name of each individual freshly samples were recorded from the fishermen as well as from Aradtar.

Secondary data

After regular field study, the primary data were compared with the available secondary data to make a precise and composite picture of the present study area. Books, journals, Upazila Fisheries Officer (UFO) etc. were used to modify and accurate the information. The collected fishing gears were categorized under different major groups following Ahmed (1961). Fish sample of different gears were identified and classified into two major group's finfish and shellfish group and then taxonomically characteristics followed by Talwar and Jhingran (1991) and Rahman (2000). Scientific name, habitat and life pattern were studied with the help of Froese and Pauly (2019).

Data processing and analysis

All collected data were accumulated to analyze. Tabular technique was applied by using simple statistical tools like averages and percentages. For processing and analyzing the data "Microsoft Excel-2013" was used.

After processing and calculating carefully, most acceptable data was transferred to a master sheet from which classified tables were prepared revealing the finding of the study. Then it was presented in textual, tabular and graphical form for easy understanding of present findings.

Results

Fishing gears

From the study, total 15 different types of fishing gear were listed under 8 major groups described as gill net (current jal, chandi jal, sutar jal), seine net (ber jal, indian net jal), lift net (dharma jal, khora jal), cast net (jhaki jal), push net (thela jal, moia jal), traps (pangus chai, anta, chhara barshi), hook and line (chingri barshi) and wounding gear (koach) (Table 1). There was no previous finding on fishing gear in Shibsa River was available and thus comparison of the present findings with the previous ones was not possible. However, the present findings are supported by Flowra *et al.* (2011) and Rahman *et al.* (2015) who also identified 16 different gears under 7 major categorizes. Nonetheless Ali *et al.* (2014) observed 11 fishing gears under 7 major groups from Lohalia River which were of lower numbers than existing results. Although Rahman *et al.* (2016) found that total seven major types of fishing gears defined in the Payra River, but Hoque *et al.* (2019) recorded more than the present study where they found a total of 18 types of fishing gear under nine major categorize. Rahman *et al.* (2017) also conducted on the exploration of fishing gear and fisheries diversity of Agunmukha River at Galachipa and revealed nineteen different types of fishing gear were listed under nine major groups. However, eight major types of fishing gears were detected in the Ramnabad River (Ali *et al.,* 2015).

Furthermore, a total of six types of fishing nets recorded from Shitalakshya River (Miah *et al.,* 2010), Rubel *et al.* (2014) identified eight types of nets as behundi jal, jhaki jal, ber jal, moia jal, thela jal, current jal, tana jal and sain jal and two types of traps as chai and borshi in the Lohalia River, Khan *et al.* (2013) recorded total seven gear namely current jal, cast net, jhayet jal, thela jal, dharma jal, borshi and long line in the Tista River. Siddiq *et al.* (2013) identified five types of nets (current jal, ber jal, thela jal, jakhi jal and dharma jal), 3 traps (unta chai, bitte chai and icha chai), 2 hooks (chip borshi and chara borshi), 2 spears (teta without hooks and teta with hooks) from Dogger beel. But the study of Sayeed *et al.* (2014) per behind the present study and revealed that 34 different types of fishing gears including nets (11), traps (11), hook and lines (4), wounding gears (4), Fish Aggregating Devices (FADs) (3) and hand-fishing (1).

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Fishing gears fish species at Shibsa River, Paikgachha, Bangladesh

Table 1. Specification of fishing gear with their mesh size, shape, price, and major species caught and average catch composition recorded from Shibsa River, 2018

Gear type	Local name	Mesh size (cm)	Net shape	Price of gear **BDT	Major species caught	CC/day/gear (kg)
Gill net	Current jal	6.35	RS	4,000-5,000	*Liza parsia, Mystus vittatus, Oreochromis mossambicus, Oreochromis niloticus, Anabas testudineus*	25
	Chandi jal	7.5	RS	10,000-15,000	*Tenualosa ilisha*, but all types of fish species	30
	Sutar jal	6	RS	4,000-5,000	*Tenualosa ilisha*	20
Seine net	Ber jal	<2.54-5.08	RS	60,000-1,50,000	*Macrobrachium rosenbargii, Penaeus monodon, Scylla serrata*	50
	Indian net jal	2.54	CS	5,000-15,000	*Macrobrachium rosenbargii* (pona), *Penaeus monodon* (pona), *Lates calcarifer* (pona), *Liza parsia* (pona)	15
Lift net	Dharma jal	0.5-1	SS	5,000-6,000	*Macrobrachium rosenbargii, Glossogobius giuris, Puntius sarana*	16
	Khora jal	0.8-2	SS	7,000-8,000	*Macrobrachium rosenbargii, Gudusia chapra, Puntius sarana*	10
Cast net	Jhaki jal	0.5	CS	3,000-5,000	*Chela cachius, Apocryptes bato, Mystus vittatus, Labeo rohita, Gebalion catla, Macrobrachium rosenbargii, Wallago attu*	14
Push net	Thela jal	0.5	TS	5,000-6,000	*Chela cachius, Apocryptes bato, Mystus vittatus,*	8
	Moia jal	0.5	RS	2,000-3,000	*Macrobrachium rosenbargii, Penaeus monodon, Puntius sarana, Gudusia chapra*	7
Traps	Pangus chai	MO: 20 cm	DS	450-500	*Pangasius pangasius, Monopterus cuchia*	2
	Anta	MO: 2.4 cm	RS	250-300	*Anabas testudineus, Puntius sarana*	4
	Chhara barshi	-		200-250	*Anabas testudineus, Lates calcarifer, Channa punctatus*	6
Hook and line	Chingri barshi	-		350-400	*Macrobrachium rosenbargii, Penaeus monodon, Puntius sarana*	1
Wounding gear	Koach	-		150-200	*Macrobrachium rosenbargii, Penaeus monodon, Channa punctatus*	3

** Jal= Fishing Net, MO= Mouth Opening, RS= Rectangular Shape, SS= Square Shape, CS= Conical Shape, DS= Drum-Shape, TS= Triangular shaped, CC= Catch Composition.
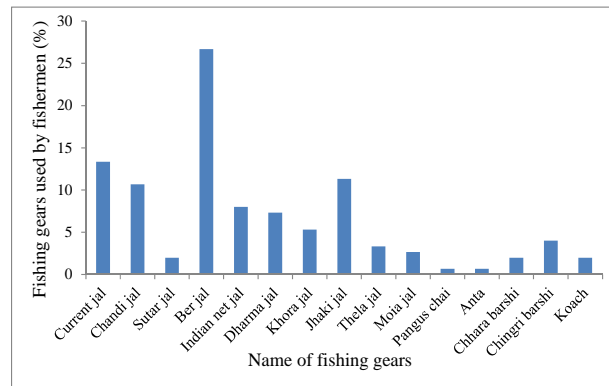

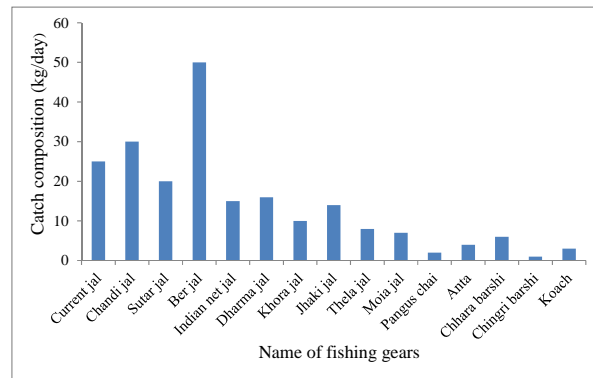Fig. 2 Gear used by fishermen in Shibsa River, 2018

Fig. 3 Catch composition (kg/day) by different fishing gears in the Shibsa River, 2018

The fishermen of the Shibsa River used different types of fishing gear (Fig. 2). On the basis of the use, the ber jal was the most dominant gear used by the fishermen constituting 26.67% followed by current jal (13.33%) among total gear type. The result stated that the seine net was the highest constituents used by the fishermen. The fishermen also used jhaki jal (11.33%), chandi jal (10.67%), indian net jal (8%), dharma jal (7.33%), khora jal (5.33%), chingri barshi (4%), thela jal (3.33%) and moia jal (2.67%). Moreover, sutar jal, chhara barshi and koach were used similarly comprising of 2% and pangus chai and anta comprising of 0.67%. Ali *et al.* (2015) also found the highest use of seine net and gill net comprising of 60% and 20%, respectively and the lower uses were found in case of lift net (0.6%), cast net (1.2%), push net (1.8%) and trap (0.6%) from Ramnabad River which supports similar results obtained from the present study. Maximum 6.35 cm and minimum 0.5 cm mesh size was found in 5 groups comprising 10 different net in the present study (Table 1). This study was close to the finding of Rahman *et al.* (2017) who found the highest mesh size (10 cm) for gill net and the lowest size (0.5 cm) in seine net, cast net, push net and fixed purse net in the Agunmukha River. The highest price was observed in case of ber jal (60,000-1, 50,000 Tk) followed by chandi jal (10,000-15,000 Tk) and the lowest price was for koach (150-200 Tk) (Table 1). In the present study, the price of fishing gears were ranged

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from 150-1,50,000 Tk (DoF, 2018) and the findings were lower than the findings of Rahman *et al.* (2017) who found the highest and lowest price of fishing gears 86,285 and 162 Tk, respectively.

The highest catch composition was found for ber jal 50 kg/day. The catch composition of chandi jal, current jal, sutar jal, dharma jal, indian net jal, jhaki jal, khora jal was 30, 25, 20, 16, 15, 14, and 10 kg/day, respectively which was lower than that of seine net and higher than any other gear used in the Shibsa River. The lower catch composition was observed for thela jal (8 kg/day), moia jal (7 kg/day) and chhara barshi (6 kg/day), anta (4 kg/day), koach (3 kg/day), pangus chai (2 kg/day), chingri barshi (1 kg/day) (Fig. 3). On the other hand, maximum using of ber jal, current jal, chandi jal and jhaki jal were correlated with the maximum catch composition of the net. Most of the fishermen catches fish by ber jal and current jal as well as with the highest catch composition. The values of the catch composition were higher than the findings of Rahman *et al.* (2017) who found ranging from 0.5 to 20 kg/day by different gears.

Table 2. List of fishing crafts with size, construction materials, durability and major used in the Shibsa River, 2018

| Name of the Crafts	Size (m)	Construction materials	Durability	Purpose
Trawler	Length: 16-20; Width: 2.5-3; Height: 12-15	Wood of sundori, white teak, khoi, babla, pasur, looking glass mangrove and bamboo etc. are used.	8-10 years	To handle gill net and seine net etc.
Dingi nouka	Length: 4-7; Width: 3-5; Height: 0.5-1.5	Mainly native trees like big leaf mahogony, khoi, rain tree, blackberry, etc are used.	4-5 years	To operate jhaki jal, anta, cast, chai, barshi, hooks and lines etc.
Vhela (raft)	Length: 3-5; Width: 0.5-1.2; Height: 0.2-0.5	Banana trees, bamboo spilts etc. are used.	5-6 months	To operate chingri barshi, cast barshi, jhaki jal, koach, trap etc.
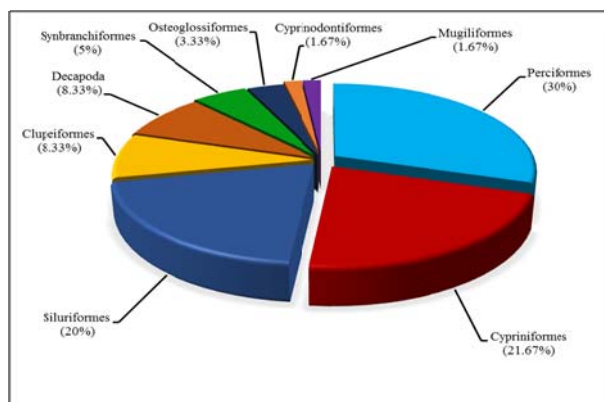
Fig. 4 Fish species richness percentage on the basis of order in the study area
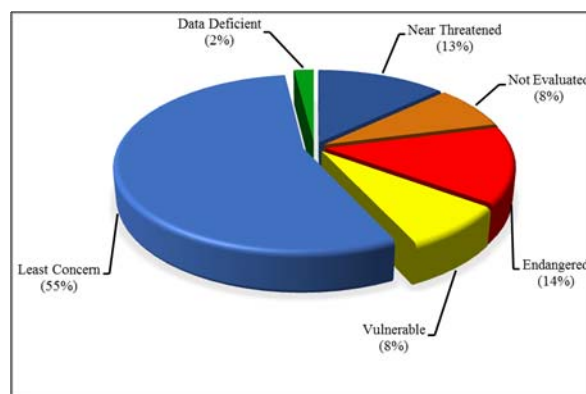

Fig. 5 IUCN status and percentage (%) of threatened fish found in Shibsa River, 2018

Table 3. Systematic position of finfish species with their local name and scientific name, habitat, life pattern and IUCN red list status recorded from Shibsa River, 2018

Order	Family	Local name	Scientific name	Habitat	Life pattern	IUCN red list status (2015)
Cypriniformes	Cyprinidae	Rui	*Labeo rohita*	FW, BW	Potamodromous	LC
		Catla	*Gabelion catla*	FW, BW	Potamodromous	LC
		Mrigal	*Cirrhinus cirrhosus*	FW, BW	Potamodromous	NT
		Kalibaos, Kalia	*Labeo calbasu*	FW, BW	Potamodromous	LC
		Bhangon, Bata	*Labeo bata*	FW	Potamodromous	LC
		Mola	*Amblypharyngodon mola*	FW	Potamodromous	LC
		Sarpunti	*Systomus sarana*	FW, BW	Potamodromous	NT
		Tit punti	*Pethia ticto*	FW, BW	Potamodromous	VU
		Jat/vandipunti	*Puntius sophore*	FW, BW	Amphidromous	LC
		Gonia	*Labeo gonius*	FW	Potamodromous	NT
		Dhela	*Osteobrama cotio*	FW	Potamodromous	NT
		Darkina	*Rasbora daniconius*	FW	Potamodromous	LC
		Saplapata	*Dasyatis zugei*	FW	Potamodromous	NE
Cyprinodontiformes	Aplocheilidae	Kanpona	*Aplocheilus panchax*	FW	Potamodromous	LC
Siluriformes	Siluridae	Boal	*Wallago attu*	FW, BW	Potamodromous	VU
		Pabda	*Ompok pabda*	FW	Potamodromous	EN
		Kanipabda	*Ompok bimaculatus*	FW	Potamodromous	EN
	Pangasiidae	Pangas	*Pangasius pangasius*	FW, BW	Potamodromous	EN
	Claridae	Magur	*Clarious batrachus*	FW, BW	Potamodromous	NE
	Heteropneustidae	Shing	*Heteropneustes fossilis*	FW, BW	Potamodromous	LC
	Schilbeidae	Bashpata, Kajuli	*Ailia punctata*	FW	Potamodromous	LC
		Ghaura, Gharua	*Clupisoma garua*	FW, BW, MW	Amphidromous	EN
	Bagridae	Rita	*Rita rita*	FW, BW	Potamodromous	EN
		Tengra	*Mystus vittatus*	FW, BW	Potamodromous	LC
		Bujuritengra	*Mystus tengara*	FW, BW	Potamodromous	LC
		Gulshatengra	*Mystus bleekeri*	FW, BW	Potamodromous	LC
Osteoglossiformes	Notopteridae	Chital	*Chitala chitala*	FW	Potamodromous	EN
		Foli	*Notopterus notopterus*	FW	Potamodromous	VU
Clupeiformes	Clupeidae	Chapila/Khaira	*Gudusia chapra*	FW, BW	Potamodromous	VU
		Ilish, Ilsha	*Tenualosa ilisha*	FW, BW, MW	Anadromous	LC
		Chandanailish	*Tenualosa toli*	FW, BW, MW	Anadromous	LC
		Kachki	*Corica soborna*	FW, BW	Potamodromous	LC
	Engraulidae	Phasa, Phaissa	*Setipinna phasa*	FW, BW	Amphidromous	LC
Synbranchiformes	Mastacembelidae	Tara baim	*Macrognathus aculeatus*	FW, BW	Potamodromous	NT
		Sal baim	*Mastacembelus armatus*	FW, BW	Potamodromous	EN
	Synbranchidae	Kuchia, Cuchia	*Monopterus cuchia*	FW, BW	Potamodromous	VU
Perciformes	Anabantidae	Koi	*Anabas testudineas*	FW	Potamodromous	LC
	Nandidae	Napit koi	*Badisbadis*	FW	Potamodromous	NT
	Osphronemidae	Khalisha	*Trichogaster labiosus*	FW	Potamodromous	LC
	Gobiidae	Bele, Baila	*Glossogobiusgiuris*	FW, BW, MW	Amphidromous	LC
		Chewa, Chiring	*Apocryptes bato*	FW, BW, MW	Amphidromous	LC
		Lalchewa	*Odontamblyopus rubicundus*	BW, MW	Amphidromous	LC
	Latidae	Vetki	*Lates calcarifer*	FW, BW, MW	Catadromous	NE
	Ambassidae	Lombachanda	*Chanda nama*	FW, BW	Potamodromous	LC
		Phopachanda	*Pseudambassis baculis*	FW, BW	Potamodromous	NT
	Polynemidae	Taposi, Tapsi	*Polynemous paradiseus*	FW, BW, MW	Amphidromous	LC
	Cichlidae	Tilapia	*Oreochromismossambicus*	FW, BW	Amphidromous	NE
		Nilotica	*Oreochromisniloticus*	FW, BW	Amphidromous	NE
	Nandidae	Bheda	*Nandus nandus*	FW, BW	Catadromous	NT
	Haemulidae	Datina	*Pomadasys argenteus*	FW, MW	Catadromous	NE
	Channidae	Shol	*Channa striatus*	FW	Potamodromous	LC
		Taki	*Channa punctatus*	FW	Potamodromous	LC
		Gajar, Gajal	*Channa marulius*	FW	Potamodromous	EN
		Cheng, Telotaki	*Channa orientalis*	FW	Potamodromous	LC
Mugiliformes	Mugilidae	Parse, Parsia	*Liza parsia*	FW, BW, MW	Catadromous	LC

Anadromous - the fish which migrates from salt water to spawn in freshwater or up rivers; **Catadromous -** the fish which migrates from freshwater towards the sea to spawn; **Amphidromous -**the fish which are born in freshwater/estuaries and then migrates into the ocean as larvae but migrating back into freshwater to grow into adults and spawn; **Potamodromous -** the fish which migrates only within the freshwater; **Oceanodromous -** the fish which migrates only within the sea water; **MW=Marine Water, FW=Fresh Water, BW=Brackish Water, EN=Endangered, VU=Vulnerable, LC= Least Concern, DD= Data Deficient, NT=Near Threatened, NE=Not Evaluated.

Table 4. Systematic position of shellfish species with their common English name, scientific name, habitat and IUCN red list status recorded from Shibsa River, 2018

Order	Family	Local name	English name	Scientific name	Habitat	IUCN red list status (2015)
Decapoda	Palaemonidae	Golda chingri	Giant fresh water prawn	*Macrobrachium rosenbergii*	FW	LC
		Dimua icha/chingri	Dimuariver prawn	*Macrobrachium villosimanus*	FW	LC
	Penaeidae	Kunchu/gura chingri	Kunchuriver prawn	*Macrobrachium lamarrei*	FW, BW	LC
		Bagda chingri	Giant tiger shrimp	*Penaeus monodon*	BW, MW	LC
	Portunidae	Shila kakra	Giant mud crab, Mangrove crab	*Scylla serrata*	FW, BW	LC

Fisheries diversity

The following study depicts presence of total 60 species (55 from finfish and 5 from shellfish) in 28 families under 9 orders (Table 3 and 4). Perciformes (30%) found to be the dominant order followed by Cypriniformes (21.67%), Siluriformes (20%), Clupeiformes (8.33%), Decapoda (8.33%), Synbranchiformes (5%), Osteoglossiformes (3.33%), Cyprinodontiformes (1.67%) and Mugiliformes (1.67%). Fishes of Cyprinodontiformes and Mugiliformes orders were found rarely in study area (Fig. 4). Total 60 species in 28 families (Table 3 and 4) were recorded during the present study and almost similar outcomes were detected by Chakraboty and Mirza (2007) at about 70 species of fishes from the Gharia beel but by Rahman (2000), who found total 47 species of fish from Bskbbeel (floodplain) and Galib *et al.* (2014) reported 53 fish species belonging to 10 orders, 28 families and 47 genera were collected and identified in Andharmanik River in Patuakhali where the dominant order of fishes was Perciformes (18 species) followed by Siluriformes (12 species) and Clupeiformes (9 species). Ehshan *et al.* (2007) reported a total of 40 species of fish including three exotic species in Chanda beel which was lower than the present findings. The findings of Hossain *et al.* (2012) showed that Meghna river estuary is habitat with 53 fish species and *Oxyurichthys microlepis, Hemiarius sona Arius thalassinus, Batrachocephalus mino* and *Arius* caelatus are the major contributory species (>6%) for both spatio-temporal scales.

In the Shibsa River, about 8 endangered (14%), 5 vulnerable (8%), 33 least concern (55%), 8 near threatened (13%) and 6 not evaluated (10%) species were observed during the study (Fig. 5, Table 3 and 4). Eight species which were marked as endangered species by the IUCN red list status of Bangladesh (2015) were found in good quantities in the Shibsa River. These species are also decreasing in number day by day from the river due to over exploitation. Galib *et al.* (2014) observed two critically endangered 3 endangered and 5 vulnerable fish species of Bangladesh were also recorded along with one alien carp species. But Rahman *et al.* (2015) identified 7 vulnerable, 7 endangered and 2 critically endangered species from Rabnabad channel which was lower than that of the current study. Galib *et al.* (2013) also recorded 10 vulnerable, 10 endangered

and 6 critically endangered species from river the Choto Jamuna which was higher than that of the current study.

Conclusion

The Shibsa River is very important for fisheries resources in the South - Western part of Bangladesh. The river plays a vital role for maintaining the fisheries diversity. Under the group of gill net, seine net, push net, cast net, ber jal, current jal, chandi jal, sutar jal, jhaki jal were the most available and prominent fishing gear used by the fishermen. Among the different fishing gear, ber jal, current jal, chandi jal, could be considered as commercial fishing gear due to their maximum catch composition and being higher in size and price. Incisively, 60 fish species including 55 finfish and 5 shellfish were recorded covering 28 families. However, different smaller mesh size and non-selected fishing gears especially current jal and jagat ber jal were responsible for destroying fishing habitats in this river. As a consequence, biodiversity is decreasing gradually in the Shibsa River. Proper initiatives should be taken into consideration by Government, stakeholder, NGOs and local policy makers for effective fisheries diversity management of the Shibsa River.

Acknowledgement

References

Ahmed, N., 1961. Government of East Pakistan, Directorate of Fisheries: Fishing Gear of East Pakistan. East Pakistan Fishery Department, East Pakistan, East Pakistan Government Press, Dhacca, pp. 01-40.

Alam, M.S., Hossain, M.S., Monwar, M.M. and Hoque, M.E., 2013. Assessment of Fish Distribution and Biodiversity Status in Upper Halda River, Chittagong, Bangladesh. *International Journal of Biodiversity and Conservation,* 5(6): 349-357.

Ali, M.M., Das, B.C., Islam, S.M.A., Masud, M.A. and Rahman, M.Z., 2014. Fishing Gears and Crafts Used by the Fishers at Lohalia River in Patuakhali. *Journal of Environmental Science & Natural Resources,* 7(2): 169-175. https://doi.org/10.3329/jesnr.v7i2.22227

Ali, M.M., Hossain, M.B., Masud, M.A. and Alam, M.A.W., 2015. Fish Species Availability and Fishing Gears Used in the Ramnabad River, Southern Bangladesh. *Asian Journal of Agricultural Research*, 9 (1): 12-22. https://doi.org/10.3923/ajar.2015.12.22

Banglapedia, 2014. National Encyclopedia of Bangladesh. 2nd Rev. Edn., Asiatic Society of Bangladesh, Dhaka, Bangladesh.

Chakraborty, B.K. and Mirza M.J.A., 2007. Study of aquatic biodiversity of Gharia beel of Bangladesh. *Journal of Crop and Weed*, 3(1): 23-34.

DoF (Department of Fisheries), 2018. Jatio Motshow Soptaha Sankalon. Department of Fisheries, Ministry of Fisheries and Livestock, Government of the People's Republic of Bangladesh, Ramna, Dhaka, Bangladesh. pp. 145-151.

Ehshan, M.A., Hossain, M.S., Razzaque, A. and Alam, M.S., 2007. An unusual but important fishing of Chanda beel. *Bangladesh Journal of Zoology*, 28(1): 69-74.

Flowra, F.A., Islam, M.A., Jahan, S.N., Samad, M.A. and Alam, M.M., 2011. Status and Decline Causes of Fishing Activities of the Baral River, Natore, Bangladeh. *Journl of Science Foundation,* 9(1&2): 115-124. https://doi.org/10.3329/jsf.v9i1-2.14654

Froese, R. and D. Pauly. Editors. 2019. Fish Base. World Wide Web electronic publication. www.fishbase.org, version (08/2019).

Galib, S.M., Naser, S.M.A., Mohsin A.B.M., Chaki, N. and Fahad, F.H., 2013. Fish diversity of the River Choto Jamuna, Bangladesh: Present status and conservation needs. *International Journal of Biodiversity and Conservation,* 5(6): 389-395.

Galib, S.M., Mohsin, A.B.M., Yeasmin, F., Alam B and Haque, S.M.M, 2014. Fish Fauna of the Andharmanik River in Patuakhali, Bangladesh. *Middle-East Journal of Scientific Research*, 21 (5): 802-807.

Hossain, M.S., Das, N.G., Sarker, S. and Rahman, M.Z., 2012. Fish diversity and habitat relationship with environmental variables at Meghna River estuary, Bangladesh. *Egyptian Journal of Aquatic Research*, 38: 213-226. https://doi.org/10.1016/j.ejar.2012.12.006

Hoque, M.S., Jaman, M.N., Hasan, M.M., Ripon, M.A.S. and Debnath, S.K., 2019. Efficiency of Fishing Gears used in the Paira River at Patuakhali District in Bangladesh. *International Journal of Oceanography & Aquaculture,* 3(1): 01-10. https://doi.org/10.23880/ijoac-16000157

IUCN (International Union for Conservation of Nature) of Bangladesh, 2000. Red list of Bangladesh: Freshwater fishes. IUCN-The world conservation Union. pp. 3-314.

Khan, M.A.R., Miah, M.I., Hossain, M.B., Begum, A., Minar, M.H. and Karim, R., 2013. Fish biodiversity and livelihood status of fishing community of Tista River, Bangladesh. *Global Veterinaria*, 10(4): 417-423.

Miah, M.I., Ferdausi, R., Hasan, K.R., Siddiq, M.A. and Farid, S.M., 2010. Species composition and gear used in fishing during pre-monsoon period in the Shitalakshya River at Siddirgonj area, Narayangonj. *Journal of Agroforestry and Environment*, 4(1):71-73.

Rahman, M.B., Hoque, M.S. and Hasan, M.M., 2015. Selectivity of Fishing Gears and Their Effects on Fisheries Diversity of Rabnabad Channel of Patuakhali district in Bangladesh. *Academic Research International,* 6(6): 184-196.

Rahman, M.B., Hoque, M.S., Rahman, M.M. and Nahar, A., 2017. Exploration of Fishing Gear and Fisheries Diversity of Agunmukha River at Galachipa Upazila in Patuakhali District of Bangladesh. *Iranian Journal of Fisheries Sciences,* 16(1): 108-126.

Rahman, M.M., Rahman M.B., Rithu, M.N.A., 2016. Observation on selectivity of fishing gears and ichthyofaunal diversity in the Paira River of Southern Bangladesh. International Journal of Fisheries and Aquatic Studies, 4(1): 95-100.

Rahman, S., 2000.Studies on the Selectivity and Effects of Fishing Gears on the Fishes of BSKB Beel. An M.S. Thesis, Department of Fisheries Technology, Bangladesh Agricultural University, Mymensingh, pp. 112-113.

Rubel, M.R.I., Hashem, S., Hasan, M.R., Rahmatullah, S.M., Ferdousi, K. and Bornali, J.J., 2014. Catch composition of fishes by using different types of fishing gear in Lohalia river of Bangladesh. *International Journal of Research in Fisheries and Aquaculture*, 4(4): 161-170.

Sayeed, M.A., Hashem, S., Salam, M.A., Hossain, M.A.R. and Wahab, M.A., 2014. Efficiency of fishing gears and their effects on fish biodiversity and production in the Chalan beel of Bangladesh. *European Scientific Journal,* 10(*30*): 294-309.

Siddiq, M.A., Miah, M.I., Ahmed, Z.F. and Asadujjaman, M., 2013. Present Status of Fish, Fishers and Fisheries of Dogger Beel in Hajigonj Upazila, Chandpur, Bangladesh. *Journal of Aquatic Science,*1(2):39-45.

Talwar, P.K. and Jhingran, A.G., 1991. Inland Fishes of India and Adjacent Countries, Oxford & IBH Publishing Company, New Delhi.1158, vol. 2.