ESTABLISHMENT OF SANCTUARY IN BELUA RIVER FOR FISH EXPLOITATION AND ITS IMPACTS ON FISHERIES BIODIVERSITY IN THE COASTAL REGION OF BANGLADESH

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ABSTRACT

An investigation was carried out to acquire the knowledge of fish sanctuary establishment, harvesting system and its impact on fisheries biodiversity in the coastal region of Bangladesh over a period of 6 months between July and December 2016. Combination of questionnaire interview, focus group discussions and crosscheck interviews were accomplished with key informants during data collection. Sanctuary installation for harvesting of fish is a common feature in the study area. A total of 86 species including finfish, freshwater prawn, crabs and mollusk was recorded under 29 families including 42 SIS and 26 threatened species during the study period. The recorded species was 63 finfish, 17 prawn, 4 mollusk and 2 crabs. Indian major carps were the main species among finfish while aire, boal, and tengra were the dominant species among catfish, galda (*Macrobrachium rosenbargii*) was foremost with prawn and tara baim, punti, shol, gajar, foli, goda chingri and SIS were the leading species among others. Sanctuary created a friendly environment for fisheries organisms inside it due to use a large amount of tree branches. In our country, the main breeding season of freshwater species is September and October when sanctuaries provide breeding place, food and protection for aquatic organisms which have positive impacts for regenerating and increasing biodiversity as well as threatened species in the coastal region of Bangladesh.

Keywords: Sanctuary; fish harvesting; biodiversity; catch composition.

INTRODUCTION

Bangladesh is one of the most compactly populated countries in the world covering an area of 147500 square kilometer with a population of 164 million (Ahmed *et al.*, 2012). It is called a land of rivers as it has about 700 rivers including tributaries with the total length is about 24,140 km (DOF, 2015). It is blessed with rich extensive inland and marine fisheries potential resources with a wide variety of indigenous and exotic fish fauna (Hasan *et al.*, 2014). A sub-tropical climate and immense areas of shallow water make it idyllic conditions for fish production (Hossain *et al.*, 2016). Fisheries sector signifies one of the most productive and dynamic sectors in Bangladesh. In the economy of Bangladesh, fisheries sector contributes about 60% animal protein to the daily diets of the population, about 3.65%

to the GDP and 23.81% to the agriculture while 18.2 million people directly and indirectly involved in this sector which is about 11% of total population of Bangladesh (DOF, 2016). The fisheries sector is decisive for socio-economic development, nutrition supplementation, employment creation, poverty alleviation and foreign exchange earning of Bangladesh (Hasan *et al.*, 2011). Coastal region of Bangladesh is standing as valuable natural aquatic ecosystem due to the presence of appropriate natural feeding, spawning and nursery grounds for many commercially important fish species (Hanif *et al.*, 2015). Belua River is situated in Pirojpur district with huge fishery resources of the southern part of Bangladesh. The upper portion of this river is connected to the Sandha River and the lower portion is linked to the Kalliganga River in Pirojpur district. This river flows down over three upazilas namely Banaripara, Swarupkati and Nazirpur and then falls to the Bay of Bengal over through two important coastal districts named Barisal and Pirujpur. Moreover, most of the agricultural lands of Barisal and Pirojpur districts inundated for 6-8 months from April to November and contain 5-7 feet water which makes huge area of water resources when growth rate of native fish species are very high and available in the open water bodies (Hossain *et al.*, 2016). Overfishing, indiscriminate killing of fish larvae and damage eggs during PL collection, habitat loss and degradation, sedimentation and unplanned establishment of flood control drainage (FCD) are some key factors for declining of inland riverine fisheries (Svobodová, 1993; Chakraborty *et al.*, 1995; Alam and Thomson, 2001; Rahman *et al.*, 2016). Among the 265 freshwater fish species in Bangladesh (Rahman, 2005), 54 indigenous fish become threatened within a very short period of time (IUCN 2000). In the coastal region, there is a tendency to harvest fish from natural sources especially from rivers by the fishermen and even by the local people due to existence of plentiful rivers, canals, inundated floodplains and high availability of fish species. The establishment of fish sanctuary and fish exploitation from the rivers is one kind of fish harvesting approach in this region. The selected river is represented the common picture of the total fish sanctuary installation in Nazirpur, Shawrupkati and Banaripara upazila. Several studies have been done to explore the biodiversity and fish species availability in different parts of Bangladesh (Shahjahan *et al.*, 2001; Haroon *et al.*, 2002; Galib *et al.*, 2013; Hanif *et al.*, 2015; Mia *et al.*, 2015; Ullah *et al.*, 2016), but have no information or limited information is documented about the establishment of fish sanctuary to harvest fish from the rivers and its impact on fisheries biodiversity. The aim of this study is to explore the establishment of fish sanctuary for fishing and its impact on fisheries biodiversity in the coastal region of Bangladesh.

MATERIALS AND METHOD

Study area

The study was undertaken in *Belua River* of Nazirpur upazila under Pirojpur district located between latitude 22°42´ to 22°45´ north and longitude 90°00´ to 90°05´ east in the coastal region of Bangladesh (Figure 1). The study was carried out for a period of 6 months from July to December, 2016.

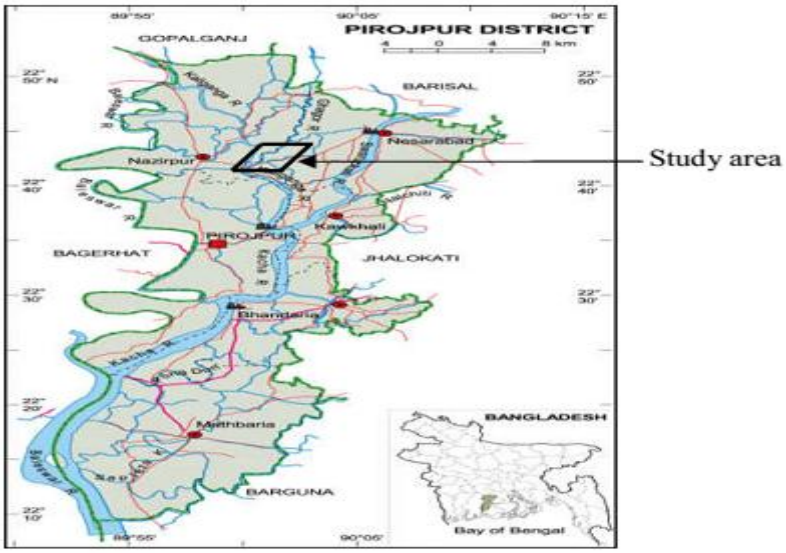

Figure 1. Map of Bangladesh and Pirojpur district showing the study area

Methodology

For this study, a combination of questionnaire interview, focus group discussions and crosscheck interviews were accompanied with key informants such as Upazila Fisheries Officer, local leaders, NGOs workers and teachers according to Ahmed *et al.* (2010 and 2012). A total of 15 fish sanctuary was observed to collect the data and contacted with informants, fishermen and fish sanctuary owners. Samples were identified up to the species level based on morphometric and meristic characteristics.

Establishment of fish sanctuary

Fish sanctuaries are established to the rivers' side in the coastal region of Bangladesh where water depth is abruptly increased at least 6-7 meter from the agriculture land level. Installation of fish sanctuary is started in the month between May and June each year and fishes are caught in November to December in the same year. Bamboo, tree branch and water hyacinths (*Eichhornia crassipes*) are required to make sanctuary. The length of the sanctuary may be 20-25 meter and width may be 8-10 meter depending of the place while it shape made parabola from the land side (Figure 2). Water depth is automatically changed 0.8-1.2 meter daily due to tidal action. 1.0-1.5 tons of tree branch is kept (placed) in each sanctuary as shelter for fishes before penetrated middle bamboo pools in the sanctuary. Three rows of bamboo pools (two rows in the middle and one row in side make parabola form) are vertically penetrated to the bottom soil as much as possible preferably at 1 to 1.5 meter distance each other.

A B

Figure 2. Picture A and B is the established fish sanctuary in the Belua River

These vertically penetrated bamboo pools are tied properly with others two horizontal setting full bamboos by plastic rope while one is setup in the tips of the vertical penetrated bamboos and another is setup in the middle portion of the bamboo pools upon the tree branches by creating pressure to hold the tree branches too compact in the sanctuary to move by the action of water current. Numerous types of tree branches are used as shelter, but mango tree, guava tree, mangosteen tree (locally known as gab) and jhill tree are commonly used due to their high longevity in water. On the other hand, the using tree branches are sustained to reuse for 2 to 3 times in the subsequent years by sun drying. After completion of all works for sanctuary establishment, water hyacinths (*Eichhornia crassipes*) is placed to the water surface permanently and kept them here before catching of fish from the sanctuary. The catch composition from the sanctuary varied depending on the type of tree branches used during installation and the availability and abundance of fish in the river.

Fish exploitation system

After 6 to 7 months of sanctuaries installation in the river side, fishes believe that these sanctuaries are their permanent living, feeding and breeding place. Various types of natural grow on the surface of used tree branches which attract more fish in the sanctuary to live on. During neap tide (mid time of two high tide), fishermen enclosed sanctuaries from outside by using small mesh size (mesh size: 0.5 to 1cm) net properly for fishing. Strong and heavy nylon ropes are used on two edges (upper and lower portion of net) that necessitate setup the net vertically to enclose the sanctuary properly. During enclosing the sanctuary by the net, especial type of bamboo pools containing hooks are used on the lower portion for setting the net on the bottom soil while artificial hooks made by mangosteen tree branch or iron are also used among the gapes of two bamboo pools to setup lower portion of net on bottom soil too compact to escape fish from the sanctuary during harvesting. Upper portion of covering net is also tied with bamboo pools by plastic rope on 1-1.5m height from the water surface. After enclosing the sanctuary by the net completely, water hyacinth is removed and then tree branches are pulled up out from the sanctuary (Figure 3). After removing of all materials (water hyacinth, middle bamboo pools, tree branch etc) from the sanctuary, fishes are caught by the cast net. A total of 10-12 fishermen require 5 to 6 hours to complete fish exploitation from each sanctuary. During fish exploitation, a boat is kept in the sanctuary to maintain the whole exploitation system like operation of cast net to catch fish, keep fish into the boat and to maintain the overall harvesting system by the fishermen.

A B

Figure 3. Picture A enclosed fish sanctuary by net and remove tree branch from the sanctuary to harvest fish and B catch composition of fish sanctuary in Belua River

Data analysis

Data from questionnaires and species identification sheets were coded and entered into a database system using tabular technique like sum, average and percentage by Microsoft Excel to summarize and process for analysis from which tables and figures were prepared for revealing the objectives of the study.

RESULT

Catch composition

A total of 86 species including finfish, freshwater prawn, crabs and mollusk was recorded during the observation of fish sanctuary operational system in Belua River is shown in Table 1. It was found that the highest number of species was contributed by finfish (63 species) followed by freshwater prawns (17 species), mollusk (4 species) and crabs (2 species). There were 23 families recorded from 63 fish species while the highest 20 species was found in Cyprinidae followed by 6 speices of Bagridae, 4 species of Mastacembelidae, 3 species each of Schilbeidae, Siluridae, Channidae and Osphronemidae, 2 species each of Notopteridae, Cynoglossidae, Soleidae, Ambassidae and Cobitidae and single species represent each of Gobiidae, Belonidae, Tetraodontidae, Nandidae, Heteropneustidae, Clariidae, Synbranchidae, Eleotridae, Chacidae, Pangasiidae and Anabantidae family (Table 1). A total of 17 species of freshwater prawn was identified from 3 families which represented palaemonidae 13 speces, atyidae 3 speices and hyppolytidae 1 species (Table 1).

Table 1. List of finfish, prawn, crab and mollusk species in the sanctuaries of the Belua River

SL No.	Family name	Local name	English name	Scientific name
1	Cyprinidae	Rui	Indian major carp	*Labeo rohita*
2	’’	Catla	Katol	*Catla catla*
3	’’	Mrigal	Mrigal carp	*Cirrhinus cirrhosus*
4	’’	Grass carp	Grass carp	*Ctenopharyngodon idella*
5	’’	Kalibaus	Orange-fin labeo	*Labeo calbasu*
6	’’	Sarputi	Olive barb	*Puntious sarana*
7	’’	Jatputi	Pool barb	*Puntius sophore*
8	’’	Dorgi	Gobi	*Apocryptes bato*
9	’’	Gonia	Kuria labeo	*Labeo gonius*
10	’’	Chela	Large razorbelly minnow	*Salmophasia bacaila*
11	’’	Chela	Fine scale razorbelly minnow	*Salmophasia phulo*
12	’’	Ghora chela	-	*Securicula gora*
13	’’	Mola	Mola carplet	*Amblypharyngodon mola*

14	’’	Dhela	-	*Osteobrama cotio*
15	’’	Teri puti	Onespot barb	*Puntius terio*
16	’’	Tit puti	Ticto barb	*Puntius ticto*
17	’’	Gili puti	Golden barb	*Puntius gelius*
18	’’	Phutani puti	Spotted sail barb	*Puntius phutunio*
19	’’	Chebli	Giant danio	*Devario aequipinnatus*
20	’’	Darkina	Flying barb	*Esomus danricus*
21	Ambassidae	Lomba chanda	Elongate glass-perchlet	*Chanda nama*
22	’’	Ranga chanda	Indian glassy fish	*Parambassis ranga*
23	Cobitidae	Rani/boumach	Bengal loach	*Botia dario*
24	’’	Gutum	Guntea loach	*Lepidocephalichthys guntea*
25	Osphronemidae	Chuna khailsha	Honey gourami	*Trichogaster chuna*
26	’’	Khalisha	Banded gourami	*Trichogaster fasciata*
27	’’	Neftani	Frail gourami	*Ctenops nobilis*
28	Schilbeidae	Silong	Silong catfish	*Silonia silondia*
29	’’	Batasi	Indian potasi	*Neotropius atherinoides*
30	’’	Kajuli/Baspata	Gangetic ailia	*Ailia coila*
31	Gobiidae	Bele	Scribbled goby	*Awaous grammepomus*
32	Belonidae	Kakila	Asian needle fish	*Xenentodon cancila*
33	Notopteridae	Foli	Bronze feather back	*Notopterus notopterus*
34	’’	Chital	Clown knife fish	*Chitala chitala*
35	Bagridae	Gura tengra	Humming bard catfish	*Chandramara chandramara*
36	’’	Tengra	Striped dwarf catfish	*Mystus vittatus*
37	’’	Kalobuzuri	Striped dwarf catfish	*Mystus tengara*
38	’’	Gulsa tengra	Gangetic tengra	*Mystus cavasius*
39	’’	Aire	Giant river catfish	*Sperata seenghala*
40	’’	Rita	Whale catfish	*Rita rita*
41	Mastacembelidae	Baim/salbaim	Zig-zag eel	*Mastacembelus armatus*
42	’’	Tara baim	One-stripe spiny eel	*Macrognathus aral*
43	’’	Tara baim	Lesser spiny eel	*Macrognathus aculeatus*
44	’’	Gusi baim	Barred spiny eel	*Macrognathus pancalus*
45	Tetraodontidae	Patka	Green puffer fish	*Tetraodon fluviatilis*
46	Nandidae	Bheda/mini	Gangetic leaf fish	*Nandus nandus*
47	Siluridae	Madhu pabda	Pabdah catfish	*Ompok pabda*
48	’’	Pabda	Pabo catfish	*Ompok pabo*
49	’’	Boal	Fresh water shark	*Wallago attu*
50	Channidae	Shol	Snakehead murrel	*Channa striata*
51	’’	Gajar	Giant snakehead	*Channa marulius*
52	’’	Taki	Spotted snakehead	*Channa punctata*
53	Heteropneustidae	Shing	Stinging catfish	*Heteropneustes fossilis*
54	Clariidae	Magur	Walking catfish	*Clarias batrachus*
55	Synbranchidae	Kuchia	Cuchia	*Monopterus cuchia*
56	Eleotridae	Kaldi/Nundi	Bhut bele	*Eleotris fusca*
57	Cynoglossidae	Kukur jib	Bengal tongue sole	*Cynoglossus cynoglossus*
58	’’	Tongue fish	long tongue sole	*Cynoglossus lingua*
59	Soleidae	Kathal pata	Pan sole	*Brachirus pan*
60	’’	Kukurjib	Sole fish	*Brachirus nigra*
61	Chacidae	Cheka	Squarehead catfish	*Chaka chaka*
62	Pangasiidae	Pangas	Pangas catfish	*Pangasius pangasius*
63	Anabantidae	Koi	Climbing perch	*Anabus testudineus*
Prawn				
1	Palaemonidae	Golda chingri	Giant fresh water prawn	*Macrobrachium rosenbargii*
2	’’	Goda chingri	Goda river prawn	*Macrobrachium scabriculum*
3	’’	Dimua chingri	Dimua river prawn	*Macrobrachium villosimanus*
4	’’	Kunchu chingri	Kuncho river prawn	*Macrobrachium lamaerrei*
5	’’	Goda chingri	Orana river prawn	*Macrobrachium idea*
6	’’	Chikon chingri	Slender river prawn	*Macrobrachium idella*

7	’’	Chatka chingri	Monsoon river prawn	*Macrobrachium palaemonoides*
8	’’	Lothia ischa	Short leg river prawn	*Macrobrachium mirabile*
9	’’	Dhanua chingri	Rice land prawn	*Macrobrachium lanchesteri*
10	’’	Chatka chingri	Birma river prawn	*Macrobrachium malcolmsonii*
11	’’	Choprai chingri	Ganges river prawn	*Macrobrachium choprai*
12	’’	Beel chingri	Kaira river prawn	*Macrobrachium dayanum*
13	’’	Paitta icha	Hairy river prawn	*Macrobrachium rude*
14	Hyppolytidae	Gura chingri	Siberian prawn	*Exopalaemon modestus*
15	Atyidae	Gusha chingri	Needlenose caridina	*Caridina nilotica*
16	’’	Gusha chingri	Common caridina	*Caridina gracilirostris*
17	’’	Chain icha	Bengal caridina	*Caridina propinqua*
Crabs				
1	Portunidae	Sataru kakra	Swimmer crab	*Portunus sanguinolentus*
2	Gecarcinucidae	Field crab	Brown crab	*Parathelphusa convexa*
Mollusk				
1	Melanoidae	Apple Samuk	Round snail	*Pila globosa*
2	,,	Lomba samuk	Small long snail	*Melanoides tuberculata*
3	,,	Shoto samuk	Round small snail	*Viviparous bengalensis*
4	Lamellidae	zinuk	bivalve	*Lamelliden smarginalis*

4 species of mollusk recorded from 2 families like Melanoidae 3 species and Lamellidae 1species while 2 species of crabs from 2 families namely Portunidae and Gecarcinucidae were found during the observation period. The recorded catches were mainly Indian major carp, catfish, snakehead, punti, SIS (Small Indigenous Species) and prawn. The percent of species composition from the catches is shown in the figure 4A. The availability and catch of fish and prawn in the sanctuary depend on mainly the location, size, amount and type of tree branch used in the sanctuary. Water current, water depth and duration of the sanctuary installation were also important factors for the availability of fish and amount of catch composition in the sanctuary. On an average 25-30kg finfish and 8-10 kg prawn were found to catch from each sanctuary while *Macrobrachium rosenbargii* was the most prevailing species in each sanctuary. The average catch composition in each sanctuary is shown in the figure 4B. Among the finfish, Indian major carps were the dominant species while aire, boal, and tengra were the foremost species among catfish. Moreover, tara baim, punti, shol, gajar, foli, goda chingri and SIS were the leading species among others.

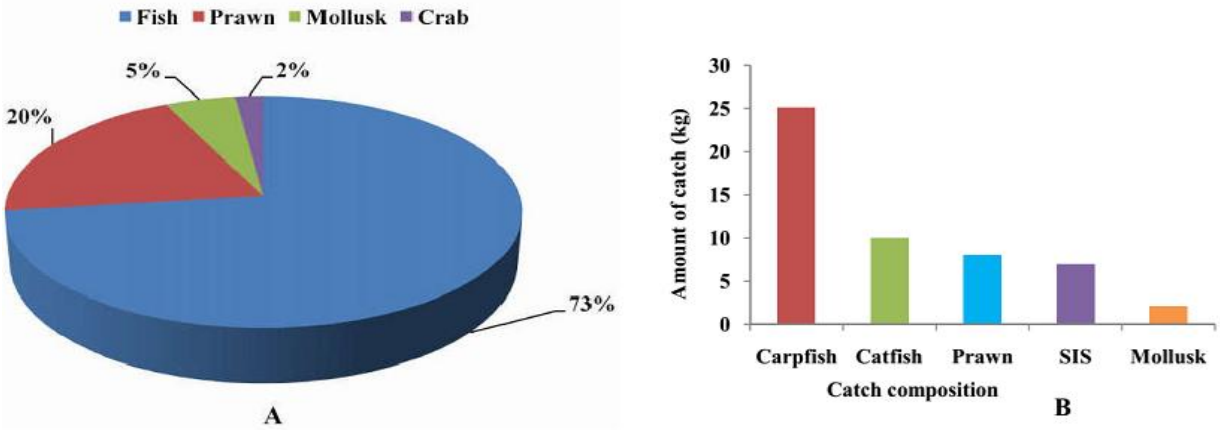

Figure 4. A. Percent of recorded species in the fish sanctuary B. Average catch composition in the fish sanctuary of Belua River

Threatened species

A total of 26 threatened species was recorded from the catch composition of sanctuary in the Belua River. Among the threatened species, the highest 13 endangered species was found

followed by vulnerable species (10) and critically endangered species (3). According to the family, the critically endangered, endangered and vulnerable species are shown in Table 2. A comparative study of the recorded critically endangered, endangered and vulnerable species to the IUCN 2000 list in Bangladesh is shown in figure 5.

Table 2. List of threatened species recorded from the catch composition of fish sanctuary in the Belua River

Family	Recorded species	Critically endangered species	Endangered species	Vulnerable species
Cyprinidae	20	1(Sarputi)	4 (Kalibaus, Dhela, Darkina, Ghonia)	1 (Teri puti)
Schilbeidae	3	-	1(Silong)	1 (Kajuli)
Siluridae	3	-	2 (Pabda, Madhu pabda)	-
Mastacembelidae	4	-	1 (Baim)	1 (Tara baim)
Bagridae	6	1 (Rita)	1 (Tengra)	2 (Aire, Gulsa tengra)
Osphronemidae	3	-	-	1 (Neftani)
Ambassidae	2	-	-	1 (Chanda, Ranga chanda)
Gobiidae	1	-	-	-
Belonidae	1	-	-	-
Cobitidae	2	-	1 (Rani)	-
Notopteredae	2	-	1(Chital)	1 (Foli)
Tetraodontidae	1	-	-	-
Nandidae	1	-	-	1(Bheda)
Channidae	3	-	1 (Gajar)	-
Heteropneustidae	1	-	-	-
Clariidae	1	-	-	-
Synbranchidae	1	-	-	1 (Kuchia)
Eleotridae	1	-	-	-
Cynoglossidae	2	-	-	-
Soleidae	2	-	-	-
Chacidae	1	-	1 (Cheka)	-
Pangasidae	1	1 (Pangas)	-	-
Anabantidae	1	-	-	-
Total	63	3	13	10

DISCUSSION

The present study was conducted to acquire the knowledge regarding establishment of fish sanctuary to harvest fish from the rivers and its impact on fisheries biodiversity in the coastal region of Bangladesh. A total of 86 species including finfish, freshwater prawn, crabs and mollusk was recorded under 29 families including 42 SIS and 26 threatened species. Many authors worked on fish sanctuary and mentioned their identified species such as Azher *et al*. (2007) investigated the impacts of sanctuary on fish biodiversity over a period of two years and identified 60 species in first year and 62 species in second year; Dev (2010) worked on sanctuary and recorded 42 species and Aziz (2014) studied the impact of sanctuary on biodiversity in the old Brahmaputra River and identified twenty-nine species in 2013 and thirty-four species in 2014. In comparison with the mentioned number of fish species in and around the fish sanctuary, the recorded number of fish species from the sanctuary in Belua River is very rich in fish diversity. Moreover, several investigations were carried out by different authors in different time and recorded diverse numbers of species such as Kibria *et al*. (1989) recorded 50 species of fish and 7 species of prawn from the Meghna River and estuarine; Mohsin *et al.* (2014) observed 53 fish species under 10 orders and 28 families by

conducting a comprehensive study on the fish fauna of the Andharmanik River in Patuakhali; Hanif *et al.* (2015) identified 76 species including 20 threatened species and 30 SIS during studied on fish biodiversity in the Sandha River in Pirojpur and Ullah *et al*. (2016) recorded 47 species by conducting a survey on fish diversity in three selected areas of mid-coastal region of Bangladesh which indicate that the findings of the present study are very rich. One of the most important reasons here for recording higher species availability are the presence and connection of plentiful rivers, canals and inundated agricultural lands during the monsoon season which make a congenial environment for fisheries resources in the coastal region. Hossain *et al.* (2016) reported that indigenous species especially shing, magur, baim, snakehead, prawn, SIS and other native species are highly availability in the coastal region due to the presence and connection of immense rivers, small canals and inundated agricultural lands. Moreover, sanctuary created a friendly environment for fisheries organisms inside it due to use a large amount of tree branches as shelter which provide not only shelter for aquatic organisms but also food for them. Aziz (2014) reported that the sanctuary ecosystem acts as the eco-friendly habitat by providing facilities for shelter, suitable breeding habitat, abundance of natural food and good quality water remained in suitable condition for fish growth within the sanctuary. Sanctuary is an important fisheries management device and being used worldwide for the conservation, protection and restoration of aquatic organisms. In our country, the main breeding season of freshwater fish species is September and October when sanctuaries provide breeding place, food and protection for aquatic organisms which have positive impacts for regenerating and increasing biodiversity as well as threatened species in this region. During the observation period, 26 threatened species (13 endangered, 10 vulnerable and 3critically endangered) were recorded out of 64 finfish species which was a very positive impact of establishing sanctuaries in the open water system for regenerating and increasing threatened species in this region. Many authors scrutinized threatened species during their studied such as Rahman *et al*. (2016) identified 15 threatened species (8 endangered, 3 critically endangered and 4 threatened) out of 57 fish species; Rahman *et al*. (2015) recorded 16 threatened species (7 endangered, 2 critically endangered and 7 vulnerable) from the Rabnabad Channel of Patuakhali District; Islam *et al.* (2015) identified 16 threatened species (6 vulnerable, 6 endangered and 4 critically endangered) out of 52 recorded species in the Payra river and Hanif *et al.* (2015) scrutinized 20 threatened species and 30 SIS out of 76 recorded species. In comparison with the above mentioned threatened species, the present findings indicate that establishment of sanctuaries in Belua River have positive impacts to regenerate and increase the threatened species. Ahmed and Ahmed (2002) and Aziz (2014) reported that establishment of fish sanctuary and its' proper management system create positive impact on biodiversity which regenerate and increase aquatic organisms as well as threatened species in the aquatic environment. Although, in the Belua River, sanctuaries are established for the purpose of natural fish harvesting, but a certain period of time (6 to 7 months) stay after installation for accumulating fish in the sanctuary which have positive impacts to grow natural food, provide space for feeding, breeding and protection which make a congenial environment for aquatic biodiversity to regenerate and increase in the aquatic environment of this region. Many authors reported that establishment of sanctuaries in natural water bodies have positive impacts to increase aquatic biodiversity and regenerate aquatic flora and fauna in the aquatic ecosystem (Chowdhury, 2003; Islam and Kaiya, 2003; Rahman, 2003; Aziz, 2014) that are similar to the findings of present study.

CONCLUSION

The present study was carried out to obtain the knowledge of fish sanctuary establishment, harvesting system of fish and its impact on biodiversity in the coastal region of Bangladesh. Sanctuary installation to harvest fish from the rivers is a common phenomenon in this region by the middle to upper class people who have land opportunity is a trend here. From the present study, it was observed that sanctuaries have positive impacts to grow natural food, provide space for feeding, breeding and protection and make a congenial environment to regenerate and increase aquatic biodiversity in the coastal region. We suggest to establish more sanctuaries and to apply proper management system in the open water bodies which conserve the fisheries resources and facilitate to sustain the indigenous, threatened as well as other aquatic organisms in the coastal region of Bangladesh.

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