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RESEARCH ARTICLE

STUDY ON FISH BIODIVERSITY IN SHERUDANGA BEEL UNDER MITHAPUKUR UPAZILLA, RANGPUR, BANGLADESH

***Md. Abdul Halim, Debashis Kumar Mondal, Abu Rayhan, Sharmin, S.and Sonia Sku**

Bangladesh Agricultural University, Mymensingh, Bangladesh

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ABSTRACT

The present study was conducted to observe the fish biodiversityin Sherudangabeel under Mithapukur Upazilla, Rangpur, Bangladesh during the period fromJanuaryto March 2017. A definite structured questionnaire had used to collect the important data from 50randomly selectedboth temporaryand permanent fishermen from the study areas. The present study had found46 species of fish from the Sherudangabeel. Among the recorded 46 species; four species were highly endangered (8.70%), twenty eightspecies common (60.87%), sevenspecies locally extinct (15.22%) and sevenspecies were rare (15.22%) respectively. Miscellaneous (23.91%) were the most dominant group followed by Catfishes (15.22%), Carps (15.22%), Barbs and Minnows (17.39%), Perches (8.70%), Snakeheads (8.70%), Eels (6.52%) and Clupeids (4.34%) respectively. In the study area species are classified into four types such as endanger (12.77%), vulnerable (6.38%), near threat (6.38%) and least concern (74.47%).This study will be very helpful to indicate areas of high fish biodiversity and make fish sanctuary to reduce the loss of fish biodiversity in the Sherudangabeel.

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INTRODUCTION

Bangladesh is an agricultural country (Banglapedia, 2015). Agricultural is included as agriculture, fisheries, livestock (Halim *et al*., 2017) Fisheries and aquaculture play a crucial role as a source of animal protein for billions of people worldwide and support the livelihoods of 10-12 % inhabitants in the world (FAO 2012). In 2011, global aquaculture production was increased to 62.7 from 59 million tons in 2010 of which 89% came from Asia where Bangladesh achieved 5th position (FAO 2012) which was replaced by 4th position through advancement in 2013 (FAO 2014). Demand for fish is leaping with the population increase in Bangladesh for the last three decades ((FAO 2012) which has increased the land use competition between agricultural crop production and fish farming (Ahmed and Garnett 2011).Bangladesh is blessed with a vast extensive water resources in the form of ponds, natural depressions (*haors*and *beels*), lakes, canals, rivers and estuaries covering an area of 4.56 million ha and 2,640 sq nautical miles area in Bay of Bengal (DoF 2011). The country is represented by the great combined delta and flood plains crisscrossed by numerous rivers and their tributaries. In Bangladesh, total fish production has increased about 1.5 folds in 10 years, from just over 24,40,011 metric tons in 2006-07 to 36,84,245 metric tons in 2014-2015 (DoF 2015). About 6 million peoples are directly or indirectly engage in this sector (DoF 2015). The 'Beel' is a term, used for large surface water body that accumulates surface runoff water through internal drainage channel (Banglapedia, 2004). A large portion of rural family members are engaged in fishing from the beels and other open water bodies. Beels are large surface water bodies that accumulate surface runoff water through internal drainage channels; these depressions are mostly topographic lows produced by erosions and are seen all over the country. Bangladesh has a total of about 4,500 beels covering an area of about 1,14,161 ha which is 2.91% of total inland water bodies (DoF 2015). These provide nearly 2.51% of total inland fish production. The overall production of beels is about 88,911 mt which is rather low.The study area of the *beel*is about 83 acres, while it becomes about 510 acres during rainy season. About 46 different species fish have been found in this beel similar to (Halim *el al*., 2017; Raushon *el al*., 2017 andMajumder*el al*., 2017) Bangladesh ranked third in Asia, with approximately 260 indigenous fresh water species with 143 small indigenous species (Rahman, 2005). The inland aquatic habitats of Bangladesh are rich in faunal biodiversity containing at least 265 species of finfish, 63 species of prawn, several species of turtles, tortoises, freshwater mussels and other living aquatic organisms (Rahman *et al*., 1998). Fish biodiversity has been degraded due to many reasons such as overfishing, aquaculture

Corresponding author:* **Md. Abdul Halim,
Bangladesh Agricultural University, Mymensingh, Bangladesh.

practice, exotic species, habitat loss and degradation, segmentation, pollution, alterations to hydrology, dredging etc. thus the availability of our indigenous freshwater fish species have declined to a great extent over the years and many of them are either rare or at the verge of extinction (Halim *et al*., 2017). Among the 260 freshwater fish species 54 are threatened in Bangladesh (IUCN Bangladesh 2000). Sherudangabeelhas a great contribution to remove rural poverty and to supply food to the poor fishing community. Considering the above these facts, the present study was carried out to assess fish biodiversity in this beel.

MATERIALS AND METHODS

The study was carried out in Sherudangabeelsituated in the northern part of Bangladeshunder Mithapukur Upazilla in Rangpur district (Figure 1). The study was conducted during January to March 2017.The area of the *beel*is about 83 acres, while it becomes about 510 acres during rainy season. The *beel*is located in Mithapukur Upazila of Rangpur district, Bangladesh. Its geographical coordinates are 25° 34' 30" North, 89° 16' 00" East. There are several *beels*are scattered in this upazila including Kafrikhalbeel, Chandagaribeel, Chatra*beel*, Salinir*beel*, Chaitali*beel*, BoroPhaliar*beel*, Bororuher*beel*, 26-bigha DublaChori*beel*, TulshiDanga*beel* and Sherudanga*beel*. Among them, Sherudanga*beel*is largest which is situated to the western side from the Upazila office having 8 km distance. The *beel*area usually flooded every year. It remained under water most time of the year. From the month of June to September, the depth of water of the *beel*becomes 3.5 to 4.5 m. At the dry season (January to April), some portion of the *beel* wasdried.

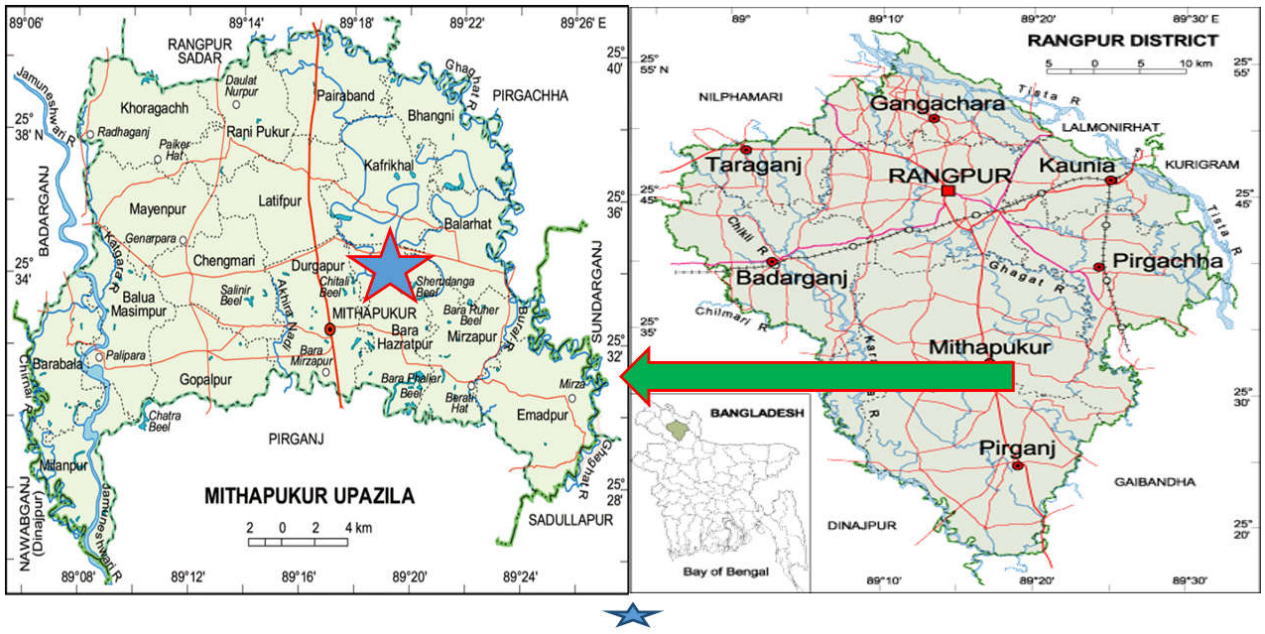

Fig. 1. Study area (Sherudangabeel)

In the study, a total of 50 fishermen (both permanent and temporary) were randomly selected from surrounding the beel.At first, primary information was collected from Senior Upazila Fisheries Officer, Mithapukur regarding the fish biodiversity and fish availability in Sherudangabeel.During collection of data, both primary and secondary sources were considered. For the study a combination of interview schedule, participatory rural appraisal (PRA) tool such as, focus group discussion (FGD), social mapping and cross interviews with key informants were used for fishermen. The collected data were summarized and processed for analysis by using MS Excel and SPSS-20 version. Tables and graph had been used for data presentation.

RESULTS

A variety of fishes which comprising of 46 species were recorded at Sherudangabeel described bycatfishes, carps, snakehead, perch, eels, barbs and minnows, clupeids and other miscellaneous species which are described below.

Catfishes

Sevenspecies of catfish (15.22%) were recorded in study areas during the period of investigation (Table 1).

Carps

During the period of present investigation seven species of carps (15.22%) were recorded (Table 2).

Snakehead

Four species of snakehead (8.70%) were recorded during study period (Table 3).

Perches

In case of perch four speciesof perches (8.70%) were recorded (Table 4).

Eels

Three species of eels (6.52%) were found (Table 5).

Barbs and minnows

During study period barbs and minnows (17.39%)were found (Table 6).

Table 1. A list of catfishes as recoded during the period of present study

SI No.	Family	Common name	Scientific name	As Survey report	As IUCN (2015a, b)
1	Bagridae	Catfish	*Mystuscavasius* (Hamilton, 1822)	Highly endangered	Least Concern
2	Bagridae	Striped dwarf catfish	*Mystusvittatus* (Bloch, 1794)	Common	Least Concern
3	Bagridae	Catfish	*Mystusaor* (Hamilton, 1822)	Locally extinct	Least Concern
4	Clariidae	Catfish	*Clariusbatrachus*(Linnaeus,1758)	Common	Least Concern
5	Heteropneustidae	Stinging catfish	*Heteropneustesfossilis* (Bloch, 1794)	Common	Least Concern
6	Siluridae	Catfish	*Ompokpabda* (Hamilton, 1822)	Highly endangered	Endanger
7	Siluridae	Catfish	*Ompakbimaculatus* (Bloch, 1794)	Highly endangered	Endanger

Table 2. A list of carp species as recorded during the period of study

SI No.	Family	Common name	Scientific name	As Survey report	As IUCN (2015a, b)
1	Cyprinidae	Indian major carp	*Labeorohita* (Hamiltom, 1822)	Common	Least Concern
2	Cyprinidae	Common carp	*Cyprinuscarpio var. communis* (Linneaus, 1758)	Common	Least Concern
3	Cyprinidae	Chines carp	*Hypophthalmicthys molitrix* (Valenciennes in Cuvier and Valenciennes, 1844)	Common	Least Concern
4	Cyprinidae	Chines carp	*Ctenopharyngodonidella* (Valenciennes in Cuvier and Valenciennes, 1844)	Common	Least Concern
5	Cyprinidae	Indian major carp	*Catlacatla* (Hamiltom, 1822)	Common	Least Concern
6	Cyprinidae	Indian major carp	*Cirrhinuscirrhosus* (Bloch, 1795)	Common	Near Threat
7	Cyprinidae	Exotic carp	*Aristichthysnobilis* (J. Richardson, 1845)	Common	Least Concern

Table 3. A list of snakeheads as recorded during the period of study

SI No.	Family	Common name	Scientific name	As Survey report	As IUCN (2015a, b)
1	Channidae	Snakehead	*Channastriatus* (Bloch, 173)	Common	Least Concern
2	Channidae	Snakehead	*Channa punctatus* (Bloch, 173)	Common	Least Concern
3	Channidae	Asiatic snakehead	*Channaorientalis* (Bloch and Schneider, 1801)	Common	Least Concern
4	Channidae	Giant snakehead	*Channamarulius* (Hamilton, 1822)	Common	Endanger

Table 4. A list of perch species as recorded during the period of study

SI No.	Family	Common name	Scientific name	As Survey report	As IUCN (2015a, b)
1	Anabantidae	Striped gourami	*Colisafasciatus* (Bloch and Schneider 1801	Common	Least Concern
2	Anabantidae	Gourami	*Colisalalius* (Hamilton, 1822)	Highly endangered	Least Concern
3	Anabantidae	Climbing perch	*Anabas testudineus* (Bloch, 1792)	Common	Least Concern
4	Centropomidae	Elongated glass perchlet	*Chanda nama* (Hamilton, 1822)	Common	Least Concern

Table 5. A list of eel species as recoded during the period of present study

SI No.	Family	Common name	Scientific name	As Survey report	As IUCN (2015a, b)
1	Mastacembelidae	Striped spiny eel	*Macrognathuspancalus* (Hamilton, 1822)	Common	Least Concern
2	Mastacembelidae	One-Striped spiny eel	*Macrognathusaculeatus* (Bloch, 1786)	Rare	Near Threat
3	Mastacembelidae	Tire-track striped spiny eel	*Macrognathusarmatus* (Lacepede, 1800)	Rare	Endanger

Table 6. A list of barbs and minnows as recoded during the period of study

SI No.	Family	Common name	Scientific name	As Survey report	As IUCN (2015a, b)
1	Cyprinidae	Barb	*Amblypharyngodonmola*(Hamilton, 1822)	Common	Least Concern
2	Cyprinidae	Cotio	*Rohteecotio* (Day, 1878)	Locally extinct	Least Concern
3	Cyprinidae	Indian glass barb	*Chela laubuca* (Hamilton, 1822)	Locally extinct	Vulnerable
4	Cyprinidae	Minnow/barb	*Salmostomabacaila* (Hamilton, 1822)	Common	Least Concern
5	Cyprinidae	Spot fin swamp barb	*Puntius sophore* (Hamilton ,1822)	Common	Least Concern
6	Cyprinidae	Fire-fin barb	*Puntius ticto* (Hamilton, 1822)	Common	Least Concern
7	Cyprinidae	Olive barb	*Puntius sarana* (Hamilton, 1822)	Locally extinct	Least Concern
8	Cyprinodontidae	Barb	*Esomusdanricus* (Hamilton, 1822)	Common	Least Concern

Table 7. A list of clupeid fish species as recorded during the period of study

SI No.	Family	Common name	Scientific name	As Survey report	As IUCN (2015a, b)
1	Clupeidae	Ganga river sprat	*Coricasoborna* (Hamilton, 1822)	Rare	Least Concern
2	Clupeidae	Shad/Herring	*Gaduasiachapra* (Hamilton, 1822)	Locally extinct	Vulnerable

Table 8. A list of miscellaneous fish species as recorded during the period of study

SI No.	Family	Common name	Scientific name	As Survey report	As IUCN (2015a, b)
1	Belonidae	Needle fish	*Xenentodoncancila* (Hamilton, 1822)	Common	Least Concern
2	Belonidae	Wrestling half breaks	*Dermogenvspusilla* (Kuhl& van Hasselt, 1823)	Locally extinct	Endanger
3	Chacidae	Indian chaca	*Chacachaca* (Hamilton, 1822)	Locally extinct	Endanger
4	Nandidae	Meni/Bheda	*Nandusnandus* (Hamilton, 1822)	Rare	Endanger
5	Cobitidae	Loach	*Lepidocephalusguntea*(Hamilton, 1822)	Rare	Vulnerable
6	Gobiidae	Goby	*Glossogobiousgiuris* (Hamilton 1822)	Common	Least Concern
7	Notopteridae	Humped feather back	*Notopteruschitala* (Hamilton 1822)	Common	Endanger
8	Notopteridae	Humped feather back	*Notopterusnotopterus* (Pallas, 1769)	Rare	Endanger
9	Cichlidae	Cichlid fish	*Oreochromisnilotica* (Linnaeus, 1758)	Common	Least Concern
10	Cichlidae	Cichlid fish	*Oreochromismossambicus* (W. K. H. Peters, 1852)	Common	Least Concern
11	Synbranchiade	Mud eel	*Monopleruscnuchia*(Hamilton, 1822)	Rare	Near threat

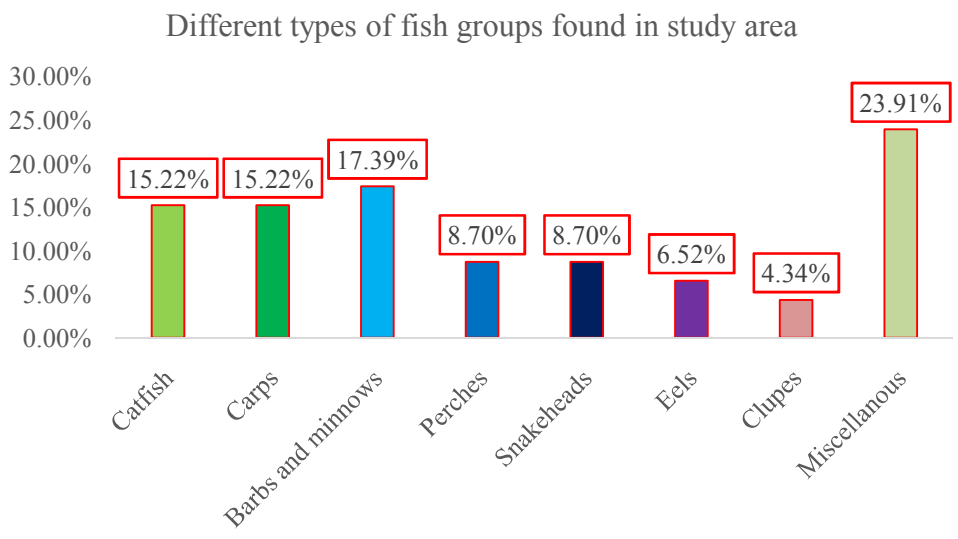

Fig. 2. Different types of fish groups recorded during the period of study

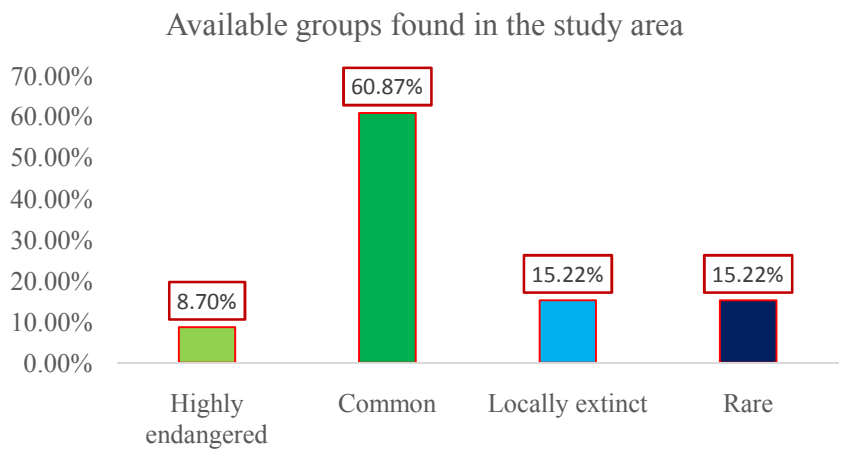

Fig. 3. Available groups found in study area

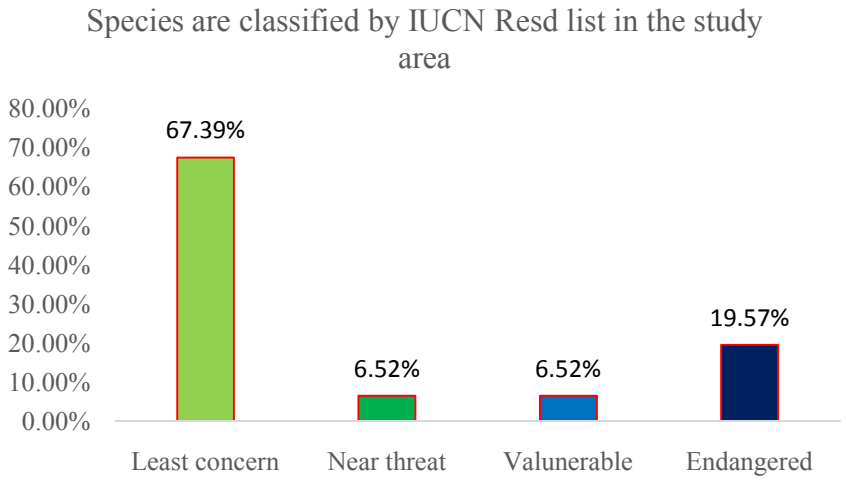

Fig. 4. Species are classified by IUCN Red list

Clupeids

In case of clupeids, two species (4.34%) fish were found in the study areas (Table 7).

Miscellaneous

Eleven other miscellaneous (23.91%) fish species (Table 8) were recorded during study period.

According to their availability, all the species were classified into four types such as Highly endangered, Common, Locally extinct and Rare (Fig: 3).

According to IUCN (2015 a, b) Species are classified a. Extinct (EX), b. Extinct in the wild, c. Threatened (1. Critically endanger, 2. Endanger and 3. Vulnerable), d. Near threatened, e. Least concern, f. Data deficient and g. Not evaluate. In the study area species are classified into four types such as endanger (19.57%), vulnerable (6.52%), near threat (6.52%) and Least concern (67.39%) (Fig: 4).

DISCUSSION

Bangladesh having vast and diversified water resources of 4.34 million ha is unique in term of valuable wetland ecosystem and associated aquatic biodiversity ranking third in Asia with approximately 260 indigenous fresh water species (Rahman, 2005).During the period of study 46 species of the fish fauna were recorded. Among them, 7 catfishes, 7 species of carps, 4 species of snakeheads, 4 species of perches, 3 species of eels, 8 species of barbs and minnows, 2 species of clupeid species, and other miscellaneous 11 species were found in varying level of abundance similar to (Halim *et al*., 2017). According to the abundance of fish species, they were categorized into 4 groups like, highly endangered (8.70%), common (60.87%), locally extinct (15.22%) and rare (15.22%) similar to (Halim *et al*., 2017). Among 46 species the highest numbers of fishes were miscellaneous (23.91%) and the lowest (4.35%) were clupeid. A total of 68 species recorded of fish in water bodies of Itna, Kishoregonj (Sakawat, 2002). A total of 54 species recorded of fish in water bodies of Kafrikhalbeel (Halim *et al*., 2017) similarly 52 species were found inshorupdahbeel, Manirumpur, Jessore (Majumder *et al*., 2017) and 55 species were found in the old Brahmaputra river, Mymensingh(Raushon*et al.,* 2017). A total number of 70 species of fishes were identified so far from the GhariaBeel (Chakraborty and Mirza, 2007). A total number of 40 species of fish including three exotic species from Chanda Beel (Ehshan *et al.,* 2000). About 260 species of freshwater fish recorded belonging to 55 families in Bangladesh (Rahman *et al.,* 1998). A total number 101 species of fish from the Baralbeel under Chalanbeel flood plain system in Rajshahireagion (Rana 2003). Asurvey in the Nailbeel and identified atotal of 79 fish species including 38 rare species (Nishat *et al*., 2005). This was because only the observed fishes were recorded. The regular presence of freshwater catfish recorded belonging to the family Siluridae in the beels, haor, baors, flooded water bodies, ponds, streams and rivers of

Bangladesh (Siddique, 2001). A total of 92 species of fish and prawn identified from Sylhet-Mymensingh sub-basins (Haroon 2002). A total of 14 species of non-resident fish and resident species identified which 30 were common, 9 rare and 5 highly endangered in Pirlabeel under Netrokona district (Siddique 2001). A list of 106 fish species published belonging to 68 genera from the district of Mymensingh and Tangail (Doha 1973). About 105 fish species recorded from Chalanbeel (Ahsan, 2008). There were some rare species which were very incidentally or occasionally available, such as- *Botiadario, Clupisomagarua, Puntius ticto, Osteobramaacotio*etc. Once upon a time, small fishes were abundant in the rivers, *beels, jheels*, canals, streams, ponds etc. in Bangladesh (Ahsan 2008), (Jhingran and Talwar, 1991) and (Shafi and Quddus, 1982). In the study area 46species are classified into four types such as endanger (19.57%), vulnerable (6.52%), near threat (6.52%) and Least concern (67.39%). A total of 105 fish species where 45 where threatened including 25 endangered, 14 vulnerable and 6 critically endangered fish species in theChalanbeel (Ahsan 2008). A total 106 species of fishes belonging to 10 orders, 31 families and 71 genera including critically endangered (6), endangered (20),vulnerable (10) and threatened (18) from Chalanbeel (Sayeed, 2010). But now-a-days, these species of fish are going to be disappeared despite of their ability to reproduce naturally due to environmental degradation. Fish habitat destruction by roads, embankments, drainage and flood control, and natural siltation along with over-fishing, have been commonly cited as causes of the deterioration of the country's resources (Ali, 1997) and (Hughes, 1994).

Conclusion

Sherudangabeel has a rich fish biodiversity. But now a days it has been faced large threat due to huge fishing pressure, overfishing, environmental pollution, siltation, urbanization and human intervention. All these threat have been created a great impact on beel ecology and ecosystem. As a result, the water quality is deteriorating day by day and the availability of fish species and another aquatic biodiversity is decreasing gradually. The complete drying up in many parts of this beel is a common scenario during lean season, which is detrimental to fish populations and ecosystem.The findings of the study will be applicable to the management of this beel. Our govt. should take proper steps to save fish biodiversity in this beel. People in adjacent areas should awareness. Moreover, the findings will to be useful to students, researchers and policy makers.

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