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Production of Aquatic Lives and Biodiversity Status of Ubdhakhali River in Bangladesh

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Abstract

A total number of one hundred forty aquatic wild species (113 species of wild fishes, 09 species of prawn, 05 species of crabs, 1 species of snail and 12 species of turtles) were recorded from the Ubdhakhali River and its flood plain. About 10 types of operative fishing gear, craft, and Hook and line were found in the river. Increased rate of using Current jal (14.00-23.70%) and Bar jal (13.00-16.00%) were identified as detrimental gear used to kill the different species during four years. A common increasing trend of using Current jal, Bar jal and Fish trap were identified as detrimental gear killing different species between 2016 and 2020**.** The fish productivity decreased dramatically from 210.69±26.08 to 170.81±21.38 mt within five years and the total production percentage also sharply decreased from 4.20% to 18.93% over the same period. As a result, commercially important 4 aquatic species namely Mahashol, *Tot tor;* Pata Kachim, *Cyclemys oldhami;* Kali Kachhap, *Melanocheelys trjuuga* and Bengal Eyed Turtile, *Morenia petersi* were extinct, 16 commercially important aquatic species were at the edge of extinction (critically endangered, CR), 70 species endangered (EN), 23 species vulnerable status (VU), 13 species were identified as lower risk (LR), Least concern were 8 and only six species of the river were not threatened (NT) in position between 2016 and 2020 in the river. To save the existing aquatic species in the studied riverine ecosystem and ensure better livelihood of the fishes, a team of local management committee, similar to the Hilsa fisheries management technology is needed.

Key words : *Aquatic fauna, biodiversity, extinct, endangered, illegal fishing, over exploitation.*

Introduction

River ecosystems and biodiversity help in maintaining the ecological balance of the water body. There is a necessity of ecological balance for widespread biodiversity and the ecological balance is an indispensable need for human survival (1). The biodiversity conservation and environmental ethics both are required for sustainable development and survival of aquatic flora and fauna because biodiversity is the foundation of human life (2).

The study of biodiversity has become a major concern to the fishing biologists against the backdrop of rapid decline in the natural population of fish and aquatic biota across all the continents of the world. Biodiversity encompasses genetic species, assemblage, ecosystem and land cape levels of biological organization with structural, compositional and functional components (3,4). The genetic diversity acts as a buffer for biodiversity (5). Though loss of aquatic species has been occurring rapidly, the aquatic organisms have received comparatively little attention from conservation biologists (6). A rich diversity of fish species is critical to the ecology and sustainable productivity of the flood plains (7, 8). The resource of aquatic fauna in Bangladesh are under severe threat due to over-exploitation and environmental degradation, which includes human interventions through construction of flood control embankments, drainage structures and sluice gates, conversion of inundated land to cropland thereby reducing water area and indiscriminate use of pesticides. Pollution from domestic, industrial and agrochemicals wastes and run off have resulted in extinction of a considerable amount of aquatic biota in same stretches of the open water system (9).

The upper region of the Ubdhakali River is connected with Kangshow river. In its 20-22 km long course, the river flows across the Durgapur and Kolmakanda Upazilla of Netrokona district from Northern to Eastern Dharompasa Upazilla of Sunamgonj district, before joining the Dhonu River. The water flow is continuous in the river. During monsoon, the water flow comes down from the upper region of Kangshow River and water flow does not confine within the banks. As a result, it causes floods in some area of Kolmakanda Upazilla in every year.

Once upon a time, Updhakhali River was an abundance of native wild fishes, shrimp, crabs and reptiles. Due to over-exploitation and various ecological changes of the Updhakhali River, important fish species, and reptiles disappeared. Now this river is under great stress and its existence is endangered because of the changing aquatic ecosystems. The upper stream of the riverine system is siltated, which reduces the rate of water flow and causes habitat degradation. Like other floodplains, the feeding and breeding grounds of fishes in and around the river have been reducing drastically from

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various human created obstacles. Indiscriminate destructive fishing practices, soil erosion, siltation, construction of flood control and drainage structures, and agro-chemicals and pesticide have caused havoc to the aquatic biodiversity in Bangladesh.

Materials and Methods

Location and area of the river : The Ubdhakali River comprises an average length of 20-22 km long course. The river is surrounded by Basaura, Monthola sadar, Satrampur villages of Kalmakanda Upazilla under the district of Netrokona (Fig.-1).

primary data was made by field observation and other different methods: fishing in the river, survey of different fishing methods, survey of fish markets adjacent to river, monitoring of hydrological, meteorological, physico-chemical and biological characteristics of river and fishers' perception as well as secondary data were collected from the Department of Fisheries (DoF) and the fishers.

Study of meteorological and physico-chemical parameters and plankton : A bamboo made meter scale was used to measure water depth. Water temperature

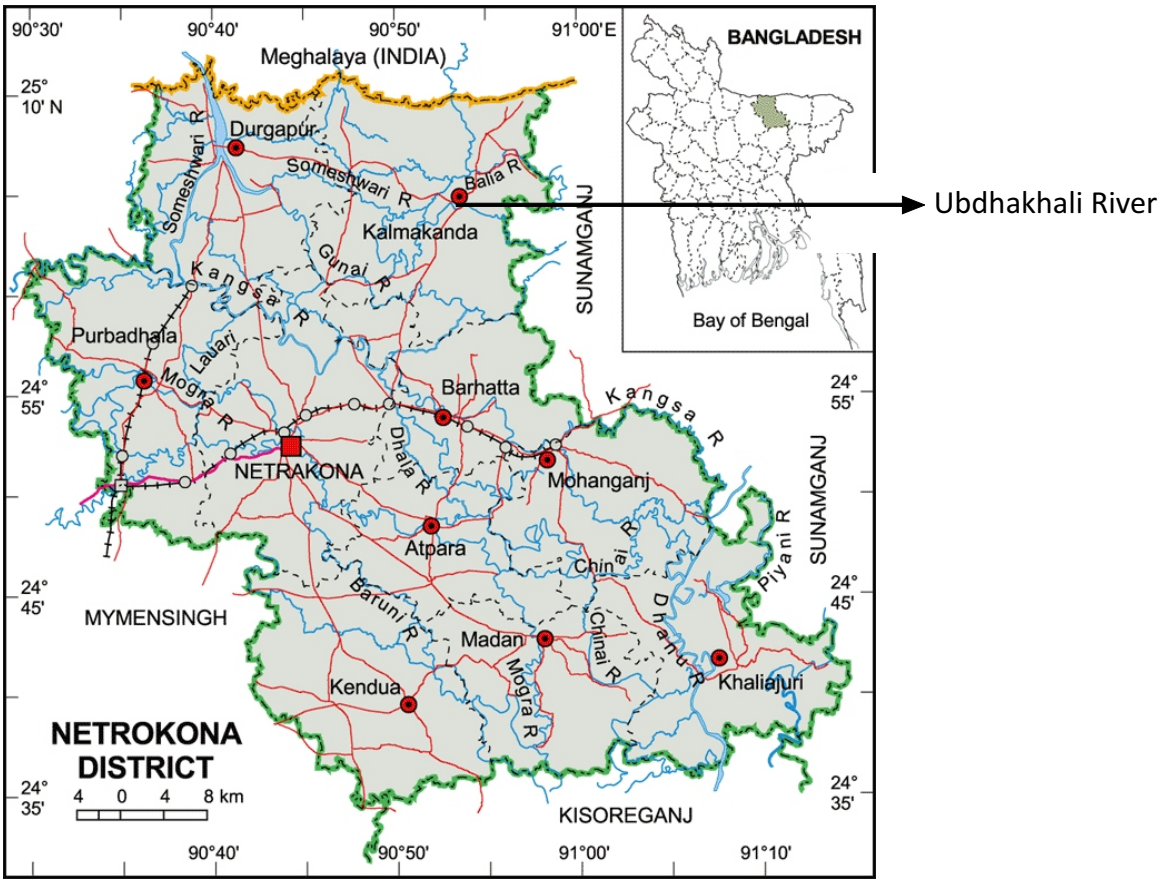

Fig.-1 : Map of Bangladesh and Netrokona district showing the location of Ubdhakhali River.

Experimental procedures : Survey of the Ubdhakali and its flood plains was conducted during 2016 to 2020 with particular emphasis on soil and water quality, biological productivity and status of fishery exploitation.

The Ubdhakali river was divided into upper (Basaura to Monthola sadar) and lower (Monthola to Satrampur, Sadar union) regions based on soil structure, water quality, biological productivity, fishing activities and river course.

The research was based on both primary and secondary data, comprehensive literature review and extracts of local knowledge and information. Collection of

was measured using a Celsius thermometer and transparency was recorded by using a Secchi disc of 20 cm diameter. Dissolved oxygen and pH were calculated directly using a digital electronic oxygen meter (YSI Model 58) and an electronic pH meter (Jenway Model 3020). Alkalinity was recorded by titrimetric method (10).

Data collection : The study was based on both primary and secondary data, comprehensive literature review and extracts of local knowledge and information. An organized sampling program spread over a reasonably long time is needed to get a true picture of the catch and composition. This study, being a rapid survey, gives only a broad

picture of the stock of fishes, prawn, crabs and turtiles that could be obtained through market survey (Sadar Kolmanda Bazar, Monthola Bazar, Modhyanagor Bazar) and interaction with fishers in the riverside and even in the river and secondary data were collected from the Department of Fisheries (DoF) and the internet. The number of six codes (CR, E, EN, VU, LR, LC and DD) of IUCN was followed to categorize the conservation of status of fishes recorded from the river and to compare the trend among Shannon index value of different years (11).

Shannon Diversity Index :

$$H = \sum_{i\ 1}^{s} (P_i * \ln P_i)$$

Where,

H = the Shannon diversity index, P_i = fraction of the entire population made up of species i, S = numbers of species encountered, = sum from species 1 to species S.

Note : The power to which the base e (e = 2.718281828.) must be raised to obtain a number is called the natural logarithm (ln) of the number.

Analysis of experimental data : The data were analyzed through one way ANOVA using MSTAT followed by Duncan's Multiple Range Test to find out whether any significant difference existed among different means (12, 13). Standard deviation in each parameter was calculated and expressed as mean ± S.D.

Results and Discussion

Morphometry and hydrodynamics of experimental river : Generally, there are three main sources of water input into the river ecosystem *viz.* overspill from the higher river channel, surface flow and regeneration. Water flows were determined by both rainfall and flooded water from the Meghaloya's hilly range, India. In upper rigion, this river is connected with Khongsa River. Flooding of the river originated from the Kangshow River. Surface run-off and increased in river height due to inflow of rainwater from the upper stretch, cause inundation of floodplains. The more water gain or exchange of water took place during southwest monsoon when floodplains were flooded. The early flood phase (April to early June) occurred in the early monsoon when the water level in basin was relatively low. The deep flood phase (June to September) began when the water level in the river, causing deep flooding in the four unions of Kendua Upazilla. Floodwater in flood plains started receding in the post-monsoon season (October to December). The water loss by various means caused shrinkage of the effective water area and lowering of depth in the river which is very similar to the study of (14).

Physical characteristics of river : Soil texture of Ubdhakhali River bed varied from loam sand to sandy.

Table-1 : Physical features (sediment) of the Ubdhakhali River.

Location	Soil texture of the bed of beel (%)		
	Sandy	Loam sand	Clay
Deeper bed	20.60 ± 2.82^{b}	58.10 ± 5.82^{a}	21.3 ± 3.11^{c}
Wet land bed	9.50 ± 0.86^{c}	30.10 ± 3.84^{b}	60.40 ± 6.03^{a}

Figures with different superscripts in the same row varied significantly (P>0.05).

Soil texture of river bed was 20.60±2.82% sandy, 58.10±5.82% loam sand and 21.3±3.11% clay, in which highest percentage of loam sand was recorded (Table-1). On the other hand, highest percentage of clay in the wet land bed of the river (60.40±6.03%) was identified.

Water depth of the Ubdhakhali River varied from 3.95±0.58 to 3.926±0.47 m during the2016 to 2020, respectively. The highest depth of the river was recorded in the year 2016 and lowest depth was found in the year 2020. There was a tendency to decrease the depth of the river bed shallow to shallower between 2016 and 2020 (Fig.-2) due to siltation and sedimentation.

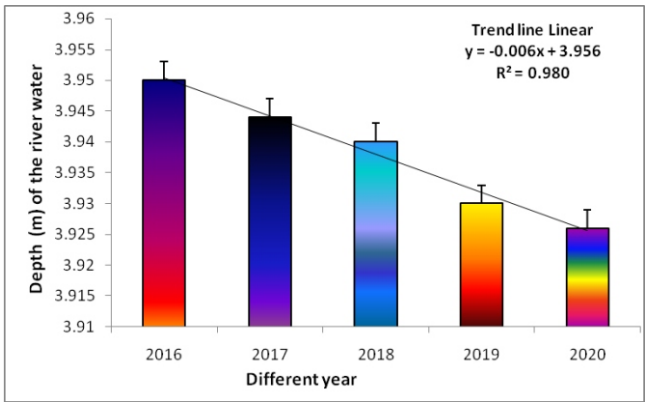

Fig.-2 : Water depth of the Ubdhakhali River between the year 2016 and 2020.

The results of the physico-chemical parameters of the river water are given in Table-2. The temperature, transparency, pH, dissolve oxygen and alkalinity of water were found to be more or less in a normal range. The mean water temperatures of the riverine was not statistically significant (*P*>0.05). Water temperature of the river showed increasing trend in monsoon and post monsoon and decreasing trend in winter which is supported by Mathew (15). Mean Secchi disk transparency differed significantly (*P*<0.05), during the year 2016-2019. Higher values occurred during post monsoon and summer months due to reduced flow and relatively stable conditions of water. The pH of the study area of the riverine did not differ significantly (*P*>0.05).

Table-2 : Physico-chemical parameters of Ubdhakhali River.

Parameters	Study years				
	2016	2017	2018	2019	2020
Temperature (°C)	26.22 ± 5.55 (14.30 - 32.05)	26.01 ± 6.01 (13.88 - 31.07)	26.42 ± 6.18 (14.08 - 31.92)	26.28 ± 6.26 (13.58 - 32.05)	26.48 ± 7.20 (13.46 - 32.22)
Transparency (cm)	40.36 ± 6.08^{d} (30.22 - 45.80)	25.11 ± 5.02^{a} (23.11 - 39.03)	45.17 ± 5.17^{e} (35.38 - 47.41)	30.71 ± 6.04^{b} (26.11 - 40.7)	35.55 ± 6.14^{c} (28.01 - 40.74)
pH	7.40 ± 1.06 (6.04 - 8.18)	7.32 ± 2.01 (6.22 - 8.11)	7.29 ± 2.04 (6.22 - 8.02)	7.31 ± 2.18 (6.15 - 8.07)	7.48 ± 2.28 (6.05 - 8.11)
Dissolve oxygen (mg.L^{-1})	6.84 ± 1.14 (5.18 - 7.02)	7.77 ± 1.66 (4.82 - 7.24)	7.11 ± 1.42 (4.51 - 7.68)	6.94 ± 1.84 (5.02 - 7.65)	7.04 ± 1.04 (5.02 - 7.25)
Alkalinity (mg.L^{-1})	120.05 ± 7.84^{d} (108.41 - 130.33)	158.11 ± 6.09^{a} (146.28 - 160.22)	109.49 ± 7.11^{e} (99.23 - 111.15)	130.02 ± 8.07^{c} (127.33 - 135.22)	140.32 ± 7.12^{b} (138.33 - 146.08)

Figures with different superscripts in the same row varied significantly (P>0.05). Figures in the parenthesis indicate the range.

Transparency was consistently higher in upper region, possibly due to running water of the river and higher in deeper portion of the river, possibly due to huge volume of water. A significant rise in pH during pre-monsoon followed by a drop in winter was noted in the experimental river. The mean dissolved oxygen (DO) of the experimental river was not also differed significantly (*P*>0.05). The pH and oxygen values of the river agreed more or less similar with the findings of Boyd (16). Total alkalinity of the experimental river was differed significantly (*P*<0.05). Lowest value of alkalinity was recorded in the in the winter during 2018. Alkalinity levels of the river were recorded medium to high (10).

Capture method : Fishers use boat for transport of nets and related materials as a major crafts. According to season and availability of different species of fishes, they used seine net (Bar jal, Komor jal, Thela jal, Bua jal, Lift net, Cast net, Current jaal and various type fish Traps, Hook and lines for fishing. During monsoon and post monsoon, fishers used Lift net, Current jal, Cast net, Traps, Hook and lines to catch fishes. Fishers also operated kata fishing by seine net (Bar jal and Komor jal) in the season of winter and spring. There are so many fish trap (vair, dugair, ghuni and pholo etc.) and hook and line (barshi, fulkuichi, Jhupi aikra etc.) were used to capture different groups of aquatic lives.

The percentage of catch statistics by using illegal (net) Current jal, Bar jal (Kaperi jal) and Fish trap were 14.00%, 16.00%, 17.10%, 19.80% and 23.70%; 13.00%, 13.50%, 14.10%, 15.00% and 16.00%; and 15.00%; 15.40%, 15.70%, 15.90% and 16.20% in the year 2016, 2017, 2018, 2019 and 2020, respectively (Fig.-3) and using of Current jal, Bar jal (Kaperi jal) and Fish trap differed significantly (*P*<0.05). Catch statistics by using of Komor jal was 13.50%, 12.00%, 11.80%, 10.80% and 10.00% in the year 2016, 2017, 2018, 2019 and 2020, respectively but use of Komor jaal was also differed significantly (*P*<0.05) in different year. According to

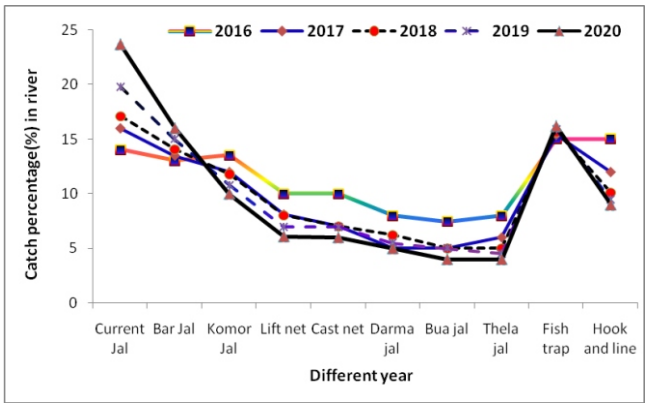

Fig.-3 : Percent of catch composition by different types of fishing gear between 2016 and 2020 in Ubdhakhali River.

Haroon *et al.* (17), eighteen types of fishing gears was recorded from the Sylhet sub-basin and thirteen types from Mymensingh sub-basin which are very similar to this study. The catch statistic by use of Thela jal, Dharma jal, Bua jal, Lift net, Cast net, Fish trap, and Hook and line was decreased and differed significantly (*P*<0.05) in the year 2016, 2017, 2018, 2019 and 2020. As a result, a significant reduction in fish abundance was noted in the river every year. Cast net (Jaki jal) was used whole year and it is a very popular fishing method and used in all over the Bangladesh (18). The fishing effort with various types of fishing gear such as Seine net (especially Kaperi jal), Gill net (Current jal) and Fish trap had been increasing between the year 2004 and 2006 but use of Current jaal was increased rapidly during same period. As a result, aquatic lives of the river and its flood plains were declined. These finding was very similar with the findings of (19, 20).

Catch and composition of the river : An organized sampling programme was run for a long time to get an actual picture of the catch and composition of Ubdhakhali River. The present investigation was given a wide picture

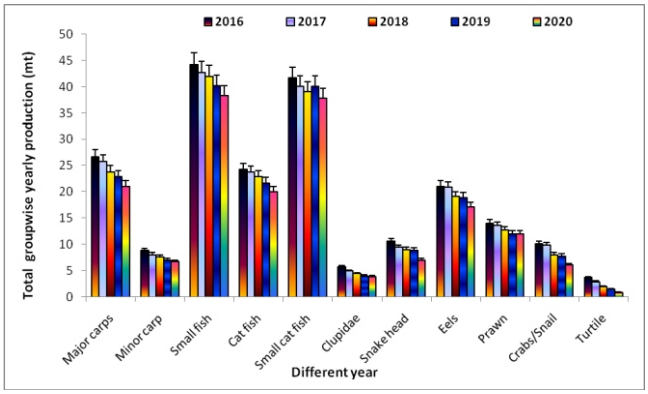

Fig.-4 : The production of different groups of aquatic wild lives in the Ubdhakhali River during the year 2016-2020.

of a stock of aquatic lives that obtained through landing center, market survey and interaction with fishers in the river. Present status and position of the investigated riverine is shown in the Table-2. In the present study, one hundred forty aquatic wild species (113 species of wild fishes, 09 species of prawn, 05 species of crabs, 1 species of snail and 12 species of turtles) were identified. These 140 species are belonging to 26 families. Yearly catch assessment of the experimental river was around 210.69±26.08; 201.84±25.58; 190.52±22.02, 184.85 ± 21.38 and 170.81±21.38 mt in the year 2016, 2017, 2018, 2019 and2020, respectively (Fig. 5) and the catch trend line was linear and the equation is y= -9.67x + 220.7 (R^2 = 0.987). The fish catch showed a decrease percentage at the rate of 4.20%, 9.57%, 12.26% and 18.93% of catch in the years 2016-2017, 2017-2018, 2018-2019 and 2019-2020, with respect to the catch of 2016 (Fig.-6) and which exhibited a linear trend line and the equation was y=4.688x - 0.48 (R^2 = 0.976).

A decrease trend in production from the river was clearly pronounced within the study period of five years which was similar to the study of (21, 22, 23).

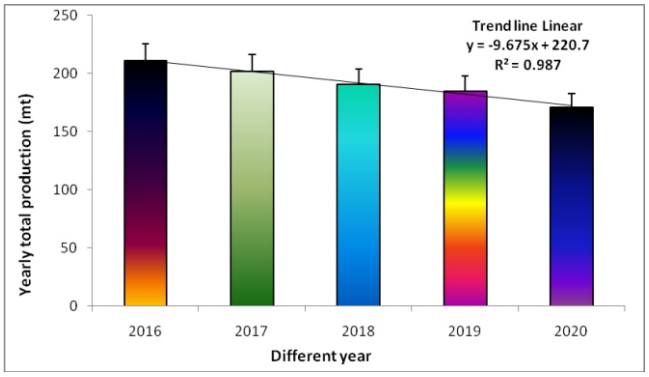

Fig.-5 : Decreasing trend in the total production of aquatic lives in the Ubdhakhali River during 2016 to 2020.

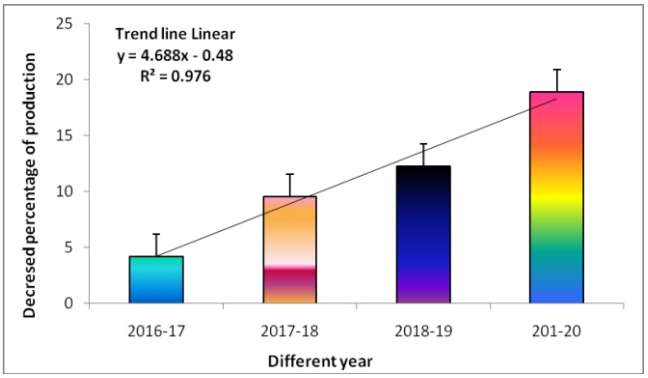

Fig.-6 : Decreasing percentage of total production of aquatic lives in the Ubdhakhali River during 2016 to 2019.

Although the production of all the recorded groups decreased during study, it was pronounced more for reptiles. Table-3 and Fig.-7 exhibited the conservation status of the 140 aquatic wild animals of the Ubdhakhali River and identified as E- 04 (3%), CR-16 (12%), EN-70 (50%), VU-23 (16%), LR-13 (9%), LC-06 (6%) and DD-06 (4%), respectively.

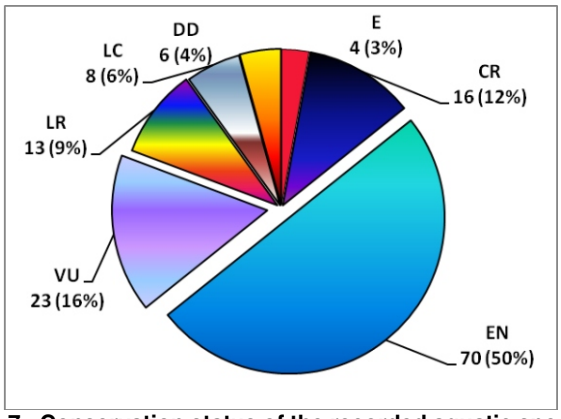

Fig.-7 : Conservation status of the recorded aquatic species in the Ubdhakhali River.

The total catch in different years differed significantly (P<0.05). Commercial important Mahashol, *Tot tor;* Pata Kachim, *Cyclemys oldhami;* Kali Kachhap, *Melanocheelys trjuuga* and Bengal Eyed Turtile*, Morenia petersi* were rarely found in the years 2016 to 2018 in the river. However these species were not recorded during 2019 to 2020. Gojar, *Channa marulius;* Mohashol, *Tot putitora;* Puda, *Puntius sarana;* Kachi Kholya, *Sicamugil casoasia;* Koksa, *Barilius tileo;* Dhela, Rohtee *cotio;* Guizza, *Mystus seenghala;* Baghair, *Bagarius yarrellii;* Futki bujuri, *Rama chandramara;* Chenua, *Sisor rabdophorus;;* Kani Tengra, *Pseudolaguvia inornata*; Chanua, Pseudolaguvia inornata; Elongated Tortoise, *Indotestudo elongata;* Bodo Kaitta, *Batagur baska;* Kala Kachim, *Geoclemys hamiltonii* and Kori Kaitta, *Pangshura*

Table-3 : Status of aquatic lives in the Shuthi-Shaiduli River.

Sl. No	Status	Name of the species
	E	Mahashol, Tot tor; Pata Kachim, Cyclemys oldhami; Kali Kachhap, Melanocheelys trjuuga; Bengal Eyed Turtile, Morenia petersi=4
	CR	Gojar, *Channa marulius*; Mohashol, Tot putitora; Puda, Puntius sarana; Kachi Kholya, Sicamugil casoasia; Koksa, *Barilius tileo;*; Dhela, Rohtee cotio; Guizza, Mystus seenghala; Baghair, Bagarius yarrellii; Futki bujuri, Rama chandramara; Chenua, *Sisor rabdophorus*; Kani Tengra, *Pseudolaguvia muricata;* Chanua, *Pseudolaguvia inornata*; Elongated Tortoise, Indotestudo elongata; Bodo Kaitta, Batagur baska; Kala Kachim, Geoclemys hamiltonii; Kori Kaitta, Pangshura tecta.=16
	EN	Chitol, Notopterus chitala; Foli, Notopterus notopterus; Soul, *Channa striata*; Catla, Catla catla; Rui, Labeo rohita; Mrigal, Cirrhinus mrigala; Kalbaus, Labeo calbasu; Ghonia, Labeo gonius; Reba, *Cirrhinus reba*; Bhangna bata, Labeo bata; Ghora muikha, Labeo pangusia; Jarua/Utti, Chagunius chagunio; Tila koksa, Barilius tileo; Bhol, Barilius tileo; Mola, Amblypharyngodon mola; Barna Baril; *Barilius barna*, Baril, *Barilius bendelisis;* Koksa, *Barilius shacra*; Morar, *Aspidoparia morar*, Chepchela, *Chela cachius*; Kashkhaira, Chela laubuca; Baspata, Danio devario; Chola punti, Puntius chola; Taka punti, Puntius conchonius; Phutani punti, Puntius phutunio; Jatpunti Punti, Puntius Sophore; Teri punti, Puntius terio; Fulchela, Salmostoma phulo; Balitora; *Psilorhunchus balitora*; River stone, *Psilorhynchus sucatio*; Bilturi, *Acanthocobitis botia*; Dari, *Sachistura scaturigina*; Hora loach, *Botia dayi*; Puiya, *Lepidocephaliththys goalparensis*; Goalpara loach, *Neoeucirrhichthys maydelli*; Rani, *Lepidocephalichthys annandalei*; Balichata, Nemachilus botia; Chanda, Pseudambasis bacuculis; Potka, Tetradon cutcutia; Chapila, Gadusia chapra; Gizzard shad, Gonialosa manmina; Kuicha, Monopterus cuchia; Tara baim, *Macrognathus aculeatus*; Barred spiny eel, *Macrognathus pancalus*; Ayre, Mystus aor; Shilong, Silonia silondia; Gangmagur, Mystus menoda; Rita, Rita rita; Gulsa, Mystus cavasius; Tengra, Mystus vitttus; Menoda catfish, *Hemibargus menoda*; Kerala mystus, *Mystus armatus*; Day's mystus, *Mystus bleekeri*; Kajuli, Ailia coila; Kani Pabda, Ompok bimaculatus; Pabo, Ompok pabo; Gharua, Clupisoma garua; Muri Bacha, Clupisoma murias; Bacha, Eutropiichthys vacha; Gobi, *Arius gagora*; Golda Isa, Machrobrachiu rosenbergii; Kakra, Austrotelphusa transversa; Chila Kachhap, Manouria emys; Dhoor Kachim, Batagur dongoka; Kali Kaitta, Hardella thurjii; Shila Kachhap, Melanocheelys tricarinata; Majhari Kaitta, Pangshura tentoria; Chitra Kachhim, Chitra indica; Spotted Flapshell, Lissemys punctata=70
	VU	Common carp, Cyprinus carpio; Grass carp, Ctenopharyngodon idella; Along, Bengala elanga; Tit Punti, Puntius ticto; Kanpona, Oryzias melastigma; Darkina, Esomus danricus; Balichata, *Acanthocobitis* zonalternans; Creek loach, *Schistura beavani*; Bou mach, *Botia dario*; Hilsa, Tenualosa ilisha; Ghar poia, Somileptes gongota; Baim, Mastacembalus armatus, Bujuri, Mystus tengra; Madhu Pabda, Ompok pabda; Batasi, Pseudeutropius atherinoides; Gang tengra, *Nangra nangra*; Kutakanti, *Erethistes pusillus*; Magur, *Clarias batrachus*; Gul Isa, Machrobrachium malcolmsnii; Icha, Macrobrachium kempi; Kakra, Acanthopotamon martensi; Bivalve, Lamellidens marginalis; Khalua Kachim, Aspideretes gangeticus=23
	LR	Kakila, Xenentodon cancila; Koirka, *Nemacheilus corica*; Corica Loach, Schistura corica; Savon khorka, *Schistura savona*; Rani, *Botia lohachata*; Chanda, Chanda nama; One-stripe spiny eel, *Macrognathus aral*; Boal, Wallago attu; Kutakanti, *Hara hara*; Kutakanti, *Hara jerdoni*; Cheka, *Chaca chaca*;; Kuncho chingri, Macrobrachium lamarrei; Common Kakra, Lobothelphusa woodmasoni = 13
	LC	Balitora, *Psilorhynchus rahmani*; Ranga chanda, Pseudambasis ranga; One-stripe spiny eel, Pseudambasis ranga; Shingi, *Heteropneustes fossilis*, Dimua icha, Macrobrachium villosimanus; Kaira icha, Macrobrachium dayanum; Chingri, Macrobrachium superbum; Kakra, Pyxidognathus fluviatilis=08
	DD	Kachki, Corica soborna; Baila, Glossogobus giuris; Conta catfish, *Conta conta*; Gura Isa, Machrobrachium biramanicus; Chikna chingri, Macrobrachium idella; Kakra, Sartoriana spinigera=06

(Status code : EX - Extinct, CR - Critically Endangered, EN - Endangered, VU - Vulnerable, LR - Lower risk, NT - Not threatened; followed as per (24).

tecta (16 species) were reported as critically endangered and facing an extremely high risk of extinction in the river system (Table-3). According to (25), in Bangladesh, about 56 freshwater fish species are critically or somewhat endangered. Due to overexploitation and various ecological changes in natural aquatic ecosystem of river and its floodplains, commercially important aquatic lives are in the verge of extinction which is in agreement with the findings of (26).

The total catch data of the river exhibited a constant sharp decrease during 2016 and 2020. Some of the important native species were noted to be losing their presence. The capture of fishes, crab and reptiles in the river was recorded highest in 2065-17, but decreased considerably in 2018-2019 and the similar situation continued in 2019-2020. Small fishes and small cat fishes were dominant groups caught from the river. The observation was similar to the findings of (7, 27, 28, 29). As a result, commercially important five aquatic lives of river were recorded to be disappearing during this short 5 years experimental period.

A decreasing trend in catch of the river was clearly recorded within five years which was similar to the report of (22, 23). A total of thirteen species of fresh water turtles were found in the Ubdhakhali River and its floodplain. (30) reported that *Pangshura tecta* are mainly distributed

between the stretches of the Ganges River and the Brahmaputra River. Bengal Eyed turtle, *Morenia petersi* was found in the rivers and its flood plains wetland. (31) mentioned its occurrence in Assam of India. *Morenia petersi* was regularly caught by fishermen and expert tribal hunters. Unfortunately, three important species of turtles became rare in their existence as per the catch data, within five years study period.

The population of bivalve, *Lamellidens marginalis* as found in the river and its flood plains has also been decreasing which is considered with the observation of (29, 32). During study period, fresh water pearl bearing mussels (Bivalve, *Lamellidens marginalis*) were identified in the river. Shells of bivalve were utilized by rural people for production of lime which was utilized in aquaculture and agriculture land, and consumed with betel leaves and nuts.

The wildlife comprises amphibians (*Bufo melanostictus*, *Rana tigerina*, *Rana limnocharis*, *Rana cyanophyctis* and *Salamandra salamandra* etc.) aves (whistling duck, great crested grebe, great cormorant, red crested pochard, water cock, swamphen, great black headed gull, gray-headed fish eagle, curlew, spotted redshank etc.) and mammals (musk shrew, fishing cat, small Indian jackal, flying fox etc.) were previously reported by (28).

The study clearly indicates that the aquatic lives of the river were subjected to over exploitation resulting in gradual decline in their catch. The stock of aquatic animals is reducing due to pollution and destructive fishing practices (21, 29, 33, 34). Indiscriminate killing of fish occurred due to the use of pesticides in improper doses (35), use of forbidden chemicals, and aerial spray of chemicals as used in paddy field which was very much similar to the observation of (24, 36. Intervention to control floods, adoption of new agricultural technologies and construction of road networks altered the ecology of rivers and its flood plains significantly which supported the views of (32, 37). Decreased stock of the wild brood fishes in their breeding ground also resulted in a reduction of biodiversity as noted by (38, 39).

Conclusion

To save the stock of aquatic species in the river, a team of local management committee like Hilsa fisheries management technology is needed to develope a working frame-work. The deeper area of the river must be declared as a sanctuary to protect the aquatic lives, stricked enforcement of fish Act-1950 in the river, ensured stopping unplanned construction of flood control embankments, drainage system and sluice gates, conversion of inundated land to cropland (reducing water area); and controlling use of pesticides and agrochemicals in the floodplains of the river can save the ecosystems. The sustained production level from the river will also ensure livelihood of the fishers.

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