

Fish Fauna, Fishing Methods and Gears of Pabna and Sirajgonj Districts of Chalan Beel, Bangladesh

Mosammat Rasheda Chowdhury¹, Munira Nasiruddin¹, M. A. Azadi^{1,*},
Md. Saiful Islam², Md. Nazmul Haque Nayeem¹, Sunil Kumer Mahato

¹Department of Zoology, University of Chittagong, Chattogram

²Assistant Registrar, Bangladesh University of Professionals (BUP), Dhaka

Abstract An investigation was conducted to record the fish fauna, fishing gears, methods, and crafts used in Pabna and Sirajgonj districts of Chalan beel, the largest inland wetland of Bangladesh during July 2020 to December 2020. A total of 88 species of fin fish, including 78 native and 10 exotic, belonging to 9 orders, 24 families and 58 genera and 2 species of shell fish under one order were recorded from the study areas. Of the recorded orders, Order Cypriniformes was the most abundant followed by orders Perciformes and Siluriformes. Among the studied fishing gears and crafts, 8 types of nets, 6 types of traps, 2 types of hooks and lines and 2 types of wounding gears and 4 types of fishing crafts were recorded. The study showed that the water body of Chalan beel is a very important wet land of Bangladesh which supported a wide range of freshwater and estuarine fishes, which are inhabitants of both lentic and lotic water habitats, indicating that the running and stagnant water conditions prevailed in this important water body.

Keywords Fish fauna, Fishing gears and crafts, Chalan beel, Sirajgonj, Pabna, Bangladesh

1. Introduction

Fish and Fisheries play a significant role in the economy of Bangladesh. Before commercially high establishment of culture fishery, freshwater capture fishery was the main sources of commercial fish production in the country. Aquatic water bodies like beels, rivers, swamps, marshy lands, haors, and baors are the abodes of all kind of freshwater capture fishery. Among the aquatic freshwater fisheries resources Chalan beel is an extensive and biggest lowland area in the North-western region of Bangladesh, which extends over four adjacent districts i.e. Pabna, Sirajgonj, Rajshahi and Natore. The major portion of the Chalan beel occupies an extensive area of Pabna and Sirajgonj Districts and these two extensive areas are the spots of the present study. Harvestable sized commercially important fish, fishing gears and crafts are very important for smooth operating of any commercial fisheries. In this respect earlier available information on Chalan beel fish and fisheries are those of Galib *et al.* [1] on present status of the fishes, Galib *et al.* [2] on the fishing gears and methods, Hossain *et al.* [3] on the habitat and biodiversity degradation and future management of Chalan beel, Galib *et al.* [4] on the small indigenous species of fishes (SISF), Kostori *et al.* [5]

on the small indigenous species (SIS) of fish, Sultana and Islam [6] on the fishing gears and methods, Sultana and Islam [7] on the fishing crafts in Chalan beel, and Karim *et al.* [8] on species composition in Chalan beel. Other than Chalan beel some important works on fishes of other rivers are those of Halda River [9,10], Sangu River [11], Padma-Megna River confluence [12], five linked rivers of Chittagong [13]. As previous works were not emphasized extensively on the two largest parts of the Chalan beel (Sirajgonj and Pabna areas), so in the present study an attempt was made to study the fish species, fishing methods and gears and fishing crafts in the two biggest parts of Chalan beel situated in the Pabna and Sirajgonj districts.

2. Materials and Methods

2.1. Description of Chalan Beel

The Chalan beel is the largest wetland of Bangladesh situated in the north-western region of the country. Forty-seven rivers and other waterways flow into the Chalan beel. It is an extensive lowland area and spreads across the adjacent districts of Pabna, Sirajgonj, Rajshahi and Natore between 24.35° to 24.70°N Latitude and between 89.10° to 89.35°E Longitude. It has an area of about 300 Km² in monsoon season and of about 75 Km² in dry season. The average depth is more than 2m during dry season and more than 4m during rainy season. It consists of a series of beels connected with each other by various channels to form a

* Corresponding author:

maazadi@yahoo.com (M. A. Azadi)

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continuous water body during the rainy season but dries up in the winter months, leaving only patches of water in the central region. It is a large inland depression, marshy in nature with rich flora and fauna.

2.2. Methodology

The study was conducted in the Pabna and Sirajgonj (Districts) parts of the Chalan beel. Fortnightly sampling was done for a period of six months from July 2020 to December 2020. Study was conducted to record the fish species and fishing gears and crafts used for fishing in the Pabna and Sirajgonj parts of the Chalan beel area. Fishes were investigated from the fishermen, fishing communities as well as from the local markets in both the areas. Direct observations were made on the fishing gears and crafts and their operation techniques in the spot during the study period. The recorded fishing gears were categorized into nets, traps, hooks and lines and wounding gears along with fishing crafts. The recorded fish species were identified up to species level both in the field and laboratory based on their morphometric and meristic characters following Talwar and Jhingran [14], Rahman [15] and IUCN [16].

3. Results and Discussion

During the study period, in the Chalan beel of Pabna area, a total of 78 species of fish were recorded which included 69 indigenous and 9 exotic species under nine orders and 24 families and two crustacean species *Macrobrachium rosenbergii* and *M. malcolmsonii* under the order Decapoda (Table 1). Of the recorded fish orders, Cypriniformes was the most dominant order comprising of 26 species within two families and of the two families Cyprinidae alone comprised of 24 species. The orders Perciformes (8 families and 18 species) and Siluriformes (7 families and 21 species) were the next dominant orders. Orders Clupeiformes (1 family and 4 species) and Synbranchioformes (2 families and 3 species) were the lowest abundant orders. The orders Osteoglossiformes (1 family and 2 species), Tetradontiformes (1 family and 2 species), Anguiliformes (1 family and 1 species) and Cypridontiformes (1 family and 1 species) were the least abundant orders.

The exclusive fish species in this area of Chalan beel were *Amblypharyngodon microlepis*, *Aristichthys nobilis*, *Danio rerio*, *Pethia phutunio* and *Salmonella phulo* (Order Cypriniformes), *Anabas cobajius* and *Trichogaster lalius* (Order Perciformes), *Clupisoma garua*, *Myxus tengara* and *Rita rita* (Order Siluriformes), *Macrognathus pancalus* (Order Synbranchioformes) and *Chelonodon patoca* (Order Tetradontiformes).

In the Sirajgonj district of Chalan beel area, a total of 76 fish species were recorded under 9 orders and 24 families including 67 indigenous and 9 exotic species and the two crustacean species *Macrobrachium rosenbergii* and *M. malcolmsonii* under the order Decapoda (Table 1). Here also Cypriniformes was the most abundant order with 2 families

and 24 species, of which 22 species belonged to the family Cyprinidae. The next two abundant orders were Perciformes (8 family, 18 species) and Siluriformes (7 family, 20 species). The order Clupeiformes was somewhat abundant order with only 5 species under one family. However, the orders Synbranchioformes (2 family and 3 species), Osteoglossiformes and Tetradontiformes (1 family and 2 species each) and Anguiliformes and Cyprinidontiformes (1 family and 1 species each) were the least abundant orders.

The exclusive fish species in this area of Chalan beel were *Tenualosa ilisha* (Order Clupeiformes), *Cirrhinus reba*, *Osteobrama cotio* and *Puntius terio* (Order Cypriniformes), *Oreochromis niloticus* and *Awaous grammepomus* (Order Perciformes), *Batasio batasio* and *Myxus vittatus* (Order Siluriformes), *Mastacembalus armatus* (Order Synbranchioformes) and *Tetraodon fluviatilis* (Order Tetradontiformes).

During the observation period a total of 78 fish species from Pabna area and 76 fish species from Sirajgonj area of Chalan beel and altogether a total of 88 finfish and 2 shell fish species were recorded from both the areas of Chalan beel, out of which 78 species of fish were native and 10 exotic, of which the top three orders were Cypriniformes (2 families, 29 species), Siluriformes (7 families, 23 species) and Perciformes (8 families, 20 species). Here it is to be noted that exotic fishes are cultured fish. Galib *et al.* [1] recorded a total of 81 fish species including 72 indigenous and 9 exotic species under 12 fish orders, 27 families and 59 genera from Chalan beel, whereby the top three populated orders were Cypriniformes (3 families, 30 species), Siluriformes (8 families, 22 species) and Perciformes (7 families, 12 species), which bears a close agreement with the present study. Saha *et al.* [17] recorded a total of 40 fish species from Saldu beel of Tangail, Bangladesh and Ahmed *et al.* [18] recorded a total of 52 fish species from Shakla beel in Brahmanbaria, Bangladesh. Azadi and Arshad-UI-Alam [9] recorded 83 species of fin fish belonging to 13 orders, 35 families and 69 genera including 3 exotic species and 10 species of shell fish under one Order, 3 families and 3 genera from Halda River. Karim *et al.* [8] identified a total of 38 fish species belonging to 24 Genus, 17 families and 8 orders (7 fish and 1 prawn) from Ruhul beel and 37 species from Bamonji beel of Pabna district, Bangladesh, whereby largest orders recorded were Cypriniformes and Perciformes contributing 14 species and 12 species for Ruhul beel and Bamonji beel respectively and the third and fourth largest orders were Siluriformes and Channiformes contributing 4 and 3 species respectively to each of the beels.

Of the recorded 78 fish species from Pabna area of Chalan beel, as per global status [16], 53 species (67.95%) were least concerned, 5 (6.41%) were vulnerable, 7 (8.97%) were near threatened, 1 (1.28%) was endangered, 9 (11.54%) were not evaluated, and 3 (3.85%) were data deficient categories. Whilst in the status of local categories [16], 37 (47.44%) were least concerned, 11 (14.10%) vulnerable, 9 (11.54%) near threatened, 9 (11.54%) endangered, 1 (1.28%) critically endangered, 8 (10.26%) not evaluated, and 3 (3.85%) were

data deficient.

Of the recorded 76 fish species from Sirajgonj area of Chalan beel, according to global status [16], 53 (69.74%) were least concerned, 5 (6.58%) vulnerable, 7(9.21%) near threatened, 1 (1.32%) endangered, 8 (10.53%) not evaluated, 1 (1.32%) data deficient and 1 (1.32%) was unknown categories. In the local status, 35 (46.05%) were least concerned, 12 (15.79%) vulnerable, 10 (13.16%) near threatened, 8 (10.53%) endangered, 1(1.32%) critically endangered, 8 (10.53%) not evaluated, 1(1.32%) data deficient and 1(1.32%) not known categories.

Among the total recorded 88 fish species, according to

IUCN [16], 61 (69.32%) were least concerned, 5 (5.68%) vulnerable, 7 (7.95%) near threatened, 1 (1.14%) endangered, 10 (11.36%) not evaluated, 3 (3.41%) data deficient and 1 (1.14%) not known. Whereas, according to IUCN [19], of the total recorded 81 fish species in Chalan beel [1], 28 species were in the list of threatened fishes which included 11 vulnerable, 12 endangered and 5 critically endangered species and Karim *et al.* [8] listed 5.26% endangered, 18.42% vulnerable, 5.26% data deficient and 71.05% not threatened fish species in Chalan beel, which were dissimilar with the present study, which might be due to different sampling techniques and smaller sampling area.

Table 1. Fish species recorded from Pabna and Sirajganj part of Chalan Beel area. (**Abbreviation used:** N-Native, E-Exotic, LC-Least Concern, VU-Vulnerable, NT-Near Threatened, EN-Endangered, CR-Critically Endangered, NE-Not Evaluated, DD-Data Deficient, NK-Not Known, ✓-Found, X-Not Found, PCB-Pabna Chalan Beel, SCB- Sirajgonj Chalan Beel)

Order	Family	Scientific Name	Local Name	English Name	Origin	Local Status	IUCN Status	PCB	SCB
Anguiliformes	Anguillidae	<i>Anguila bengalensis</i>	Boro bain	Mottled Eel	N	VU	NT	✓	✓
Clupeiformes	Clupeidae	<i>Corica soborna</i>	Kachki	Ganges River sprat	N	LC	LC	✓	✓
		<i>Gonialosa manmina</i>	Chapila	Ganges River Gizzard Shad	N	LC	LC	✓	✓
		<i>Gudusia chapra</i>	Chapila	Indian River Shad	N	VU	LC	✓	✓
		<i>Setipinna phasa</i>	Faishha	Hair Fin Anchovy	N	LC	LC	✓	✓
		<i>Tenaluosa ilisha</i>	Ilish	Hilsha shad	N	LC	LC	X	✓
Cypriniformes	Cyprinidae	<i>Amblypharyngodon mola</i>	Mola/Moa	Indian carplet	N	LC	LC	✓	✓
		<i>Amblypharyngodon microlepis</i>	Mola	Indian carplet	N	LC	NE	✓	X
		<i>Aristichthys nobilis</i>	Bighead	Bighead carp	E	NE	DD	✓	X
		<i>Barbonemus gonionotus</i>	Rajputi	Thai Sarputi	E	NE	LC	✓	✓
		<i>Catla catla</i>	Katla	Catla	N	LC	NE	✓	✓
		<i>Chela cachius</i>	Chela	Silver hatchlet barb	N	VU	LC	✓	✓
		<i>Cirrhinus cirrhosis</i>	Mrigal	Mrigal carp	N	NT	VU	✓	✓
		<i>Cirrhinus reba</i>	Bhagna	Reba	N	NT	LC	X	✓
		<i>Ctenopharyngodon idella</i>	Grass carp	Grass carp	E	NE	LC	✓	✓
		<i>Cyprinus carpio vars communis</i>	Curfu	Common carp	E	LC	VU	✓	✓
		<i>Cyprinus carpio vars specularis</i>	Curfu	Mirror carp	E	VU	VU	✓	✓
		<i>Danio rerio</i>	Anju	Zebra Dario	N	NT	LC	✓	X
		<i>Esomus lineatus</i>	Darkina	Striped flying barb	N	DD	NE	✓	✓
		<i>Esomus danricus</i>	Darkina	Flying barb	N	LC	LC	✓	✓
		<i>Hypophthalmichthys molitrix</i>	Silver carp	Silver carp	E	NE	LC	✓	✓
		<i>Labeo bata</i>	Bata	Bata labeo	N	LC	LC	✓	✓
		<i>Labeo calbasu</i>	Kalibaus	Orange fin Labeo	N	LC	LC	✓	✓
		<i>Labeo rohita</i>	Rui	Rohu	N	LC	LC	✓	✓
		<i>Labeo ariza</i>	Tatkin	Ariza Labeo	N	VU	LC	✓	✓

Order	Family	Scientific Name	Local Name	English Name	Origin	Local Status	IUCN Status	PCB	SCB
		<i>Osteobrama cotio</i>	Dhela	Cotio	N	NT	LC	X	✓
		<i>Pethia ticto</i>	Titputi	Two-spot barb	N	VU	LC	✓	✓
		<i>Pethia phutunio</i>	Phutani puti	Dwarf barb	N	LC	LC	✓	X
		<i>Puntius sophore</i>	Jat puti	Pool barb	N	LC	LC	✓	✓
		<i>Puntius sarana</i>	Sar puti	Olive barb	N	NT	LC	✓	✓
		<i>Puntius terio</i>	Teri puti	One spot barb	N	LC	LC	X	✓
		<i>Rasbora daniconius</i>	Dankin	Striped Rasbora	N	LC	LC	✓	✓
		<i>Salmostoma phulo</i>	Ful chela	Finescale Razorbelly Minnow	N	NT	LC	✓	X
	Cobitidae	<i>Botia Dario</i>	Bou Mach	Queen Loach	N	EN	LC	✓	✓
		<i>Lepidocephalichthys guntea</i>	Gutum	Guntea Loach	N	LC	LC	✓	✓
Cypridontiformes	Aplocheilidae	<i>Aplocheilus panchax</i>	Kaspona	Panchax Minnow	N	LC	LC	✓	✓
Osteoglossiformes	Notopteridae	<i>Chitala chitala</i>	Chitol	Humped Feather back	N	EN	NT	✓	✓
		<i>Notopterus notopterus</i>	Foli	Grey Feather back	N	VU	LC	✓	✓
Perciformes	Ambassidae	<i>Nandus nandus</i>	Veda	Mud perch	N	NT	LC	✓	✓
		<i>Nandus meni</i>	Veda	Perch	N	NE	NE	✓	✓
		<i>Pseudambassis lala</i>	Lal Chanda	High fin Glassy perch	N	LC	NE	✓	✓
		<i>Pseudambassis ranga</i>	Ranga Chanda	Indian Glassy Perch	N	LC	LC	✓	✓
		<i>Chanda nama</i>	Chanda	Etanga Grass Perch	N	LC	LC	✓	✓
	Anabantidae	<i>Anabas testudineus</i>	Desi Koi	Climbing Perch	N	LC	DD	✓	✓
		<i>Anabas cobojus</i>	Gangetic Koi	Gangetic Koi	N	DD	DD	✓	X
	Batidae	<i>Badis badis</i>	Napit Koi	Mud Perch	N	NT	LC	✓	✓
	Belonidae	<i>Xenentodon cancila</i>	Kakila	Freshwater Gar fish	N	LC	NE	✓	✓
	Channidae	<i>Channa marulius</i>	Gajar	Giant snake head	N	EN	LC	✓	✓
		<i>Channa orientalis</i>	Gachua	Asiatic snake head	N	LC	LC	✓	✓
		<i>Channa punctatus</i>	Taki	Spotted snake head	N	LC	LC	✓	✓
		<i>Channa striatus</i>	Shol	Striped snake head	N	LC	LC	✓	✓
	Cichlidae	<i>Oreochromis mossambicus</i>	Tilapia	Mossabique Tilapia	E	NE	VU	✓	✓
		<i>Oreochromis niloticus</i>	Nilotica	Nile Tilapia	E	NE	NK	X	✓
	Gobiidae	<i>Glossogobius giuris</i>	Boro choka Bele	Freshwater Goby	N	LC	LC	✓	✓
		<i>Awaous grammepomus</i>	Bele	Scribbled Goby	N	VU	LC	X	✓
	Osphronemidae	<i>Trichogaster chuna</i>	Chuna Khalisa	Honey Gourami	N	LC	LC	✓	✓
		<i>Trichogaster lalius</i>	Lal Khalisa	Red Gourami	N	LC	LC	✓	X
		<i>Trichogaster fasciata</i>	Khalisa	Banded Gourami	N	LC	LC	✓	✓
Siluriformes	Bagridae	<i>Batasio tengara</i>	Tengra	Dwarf Catfish	N	EN	LC	✓	✓
		<i>Batasio batasio</i>	Batasi	Tista batasi	N	NT	LC	X	✓

Order	Family	Scientific Name	Local Name	English Name	Origin	Local Status	IUCN Status	PCB	SCB
		<i>Mystus tengra</i>	Balari Tengra	Tengra Mystus	N	LC	LC	✓	X
		<i>Mystus vittatus</i>	Tengra	Striped Dwarf Catfish	N	LC	LC	X	✓
		<i>Mystus bleekeri</i>	Gulsha Tengra	Bleekeri Mystus	N	LC	LC	✓	✓
		<i>Mystus cavasius</i>	Kabashi Tengra	Gangetic Mystus	N	NT	LC	✓	✓
		<i>Mystus gulio</i>	Nuna tengra	Gulio Catfish	N	NT	LC	✓	✓
		<i>Sperata aor</i>	Ayre	Longwhiskered Catfish	N	VU	LC	✓	✓
		<i>Sperata seenghala</i>	Guizza Ayre	Giant River catfish	N	VU	LC	✓	✓
		<i>Rita rita</i>	Rita	Rita	N	EN	LC	✓	X
	Clariidae	<i>Clarius batrachus</i>	Desi Magur	Freshwater Catfish	N	LC	LC	✓	✓
		<i>Clarius garipinus</i>	African Magur	North African catfish	E	NE	LC	✓	✓
	Heteropneustidae	<i>Heteropneustes fossilis</i>	Shinghi	Stringing Catfish	N	LC	LC	✓	✓
		<i>Heteropneustes nani</i>	Jil Shinghi	Stinging Catfish	N	LC	NE	✓	✓
	Pangasidae	<i>Pangasius pangasius</i>	Pangus	Pangus Catfish	N	EN	LC	✓	✓
		<i>Pangasius hypophthalmus</i>	Thai Pangus	Striped Catfish	E	NE	EN	✓	✓
	Schilbeidae	<i>Eutropiichthys vacha</i>	Bacha	Batchura Vacha	N	LC	LC	✓	✓
		<i>Ailia coila</i>	Kajuli	Gangetic Ailia	N	LC	NT	✓	✓
		<i>Clupisoma garua</i>	Ghaura	Garua Bacha	N	EN	NE	✓	X
	Siluridae	<i>Ompok pabda</i>	Pabda	Pabda Catfish	N	EN	NT	✓	✓
		<i>Ompok bimaculatus</i>	Kani Pabda	Butter Catfish	N	EN	NT	✓	✓
		<i>Wallago attu</i>	Boal	Freshwater Shark	N	VU	NT	✓	✓
	Sisoridae	<i>Bagarius bagarius</i>	Bagha Air	Devil Catfish	N	CR	NT	✓	✓
Synbranchiformes	Synbranchidae	<i>Monopterus albus</i>	Kuchia	Gangetic mud eel	N	VU	VU	✓	✓
	Mastacembelidae	<i>Macrognathus aculeatus</i>	Tara Bain	One stripe spiny eel	N	NT	NE	✓	✓
		<i>Macrognathus pancalus</i>	Guchi Bain	striped spiny eel	N	LC	LC	✓	X
		<i>Mastacembalus armatus</i>	Baim	Tire-tracked Spinyeel	N	EN	NE	X	✓
Tetraodontiformes	Tetraodontidae	<i>Tetraodon lineatus</i>	Topa	Ocellated Puffer fish	N	LC	LC	✓	✓
		<i>Tetraodon fluviatilis</i>	Potka	Green Puffer fish	N	NK	LC	X	✓
		<i>Chelonodon patoca</i>	Potka	Milkspotted Puffer fish	N	DD	LC	✓	X
Decapoda	Palaemonidae	<i>Macrobrachium roosebergii</i>	Chowa Icha	Giant freshwater Prawn	N	LC	LC	✓	✓
		<i>Macrobrachium malcolmsoni</i>	Tora Icha	Moonsoon River Prawn	N	LC	LC	✓	✓

3.1. Fishing Gears and Crafts of Chalan Beel

In both the areas of Chalan beel eight types of nets, six types of traps, two types of hooks and lines and two types of wounding gears and four types of crafts were recorded.

3.1.1. Fishing Nets and Techniques of Fishing

The eight types of nets found in the study areas were categorized as:

(1) **Trap net:** A horizontal net fixed in water from a

moving boat and used to catch the jumping fish out of water when excited or in danger, and hence get trapped in the net when they fall back.

- (2) **Dip or Lift nets:** These nets are triangular, rectangular or square shaped, fitted around a frame, lowered into the water so that the fish would swim into it and then lifted out of water and is operated by one person only. There are three types of Dip or lift nets:

(a) 'Wucha jal'-A triangular shaped net made of cotton consisting of two bamboo sticks crossing each other near one end, supporting the net. A short cross stick is fixed near the apex of the triangle and a bamboo pole works as a handle. To operate, the broad end of the net is pushed along the bottom to catch the bottom dwelling fish and then lifted with a jerk.

(b) 'Veshal jal'- Large sized triangular deep net constructed as the 'Wucha jal', operated from a platform made of bamboo pieces, which is implanted from the bank bed. The net is operated by the fisherman using a bamboo pole as a lever which is used to lower or lift up the net.

(c) 'Dhormo jal'-A square shaped dip net, frame of which is made of bamboo with a long bamboo pole as a handle, may be operated in stationary or in moving condition, being operated from a fixed platform.

- (3) **Cast net ('Khepla jal'):** Circular umbrella shaped net. A strong cord is tied to the apex of the umbrella and a number of lead weights are fitted along the margin. The fisherman throws the net in spread condition over the water, holding the long rope in his left hand. The net then sinks down and the circumference close due to the attached weight. The fish are entangled in the net which is then pulled out with the help of the cord.
- (4) **Purse net ('Kharki jal'):** Rectangular shaped net made of tanned cotton. The wide mouth is made up of flexible bamboo rods, hinged at two angles, thus forming upper and lower lips. When a fish enters, the net mouth is closed by releasing pressure on the bamboo pole.
- (5) **Push net ('Thela jal'):** Triangular in shape, the frame and handles being made of bamboo poles to which the net is attached. Operated by a single fisherman pushing the net in water with low current for some distance and then lifting it up.
- (6) **Drag net ('Moi /Tana jal'):** The upper margin of the net is supported by a strong rope and is provided with a large number of floats. Along the lower margin is the foot rope which is tied to a number of weights so as to keep the net in position. One end of the net remains on one bank, while a boat carries the other end of the net to another bank. The two ends of the net are then slowly dragged by two groups of fishermen.
- (7) **Gill net ('Curent jal'):** A wall like net made of nylon of various mesh size, with floats attached to the head rope and sinkers fixed to the foot rope. The net is

placed in a transverse direction of the migrating fish and when the fish try to swim through the net, the fish head get stuck. As the fish tries to escape, it gets stuck behind the opercula.

- (8) **Seine net ('Ber jal'):** Length of the net varies from 100-600 feet and the breadth from 25-75 feet. Mesh size of the net varies from 0.5-1.5 cm. The net is operated by two groups of fishermen from two boats. One of the boats remains fixed and the other boat along with the net encircles around a large area around the fixed boat.

3.1.2. Fishing Traps

Recorded fishing traps were of six types as follows:

- (1) **'Doary':** Fish trap made of split bamboo, with two openings, the outer entrance wider and the inner opening narrower, such that the trapped fish cannot escape.
- (2) **'Char':** Rectangular shaped fish trap with one opening and one compartment.
- (3) **'Ghuni':** Larger than chars, has several compartments, having separate opening so facilitating fish entrance.
- (4) **'Hagra':** Large sized triangular fish trap, being plunged in water for a few days and then dragged up and the fish get trapped.
- (5) **'Chong':** Large, hollow and cylindrical shaped trap made of iron rod and net bag.
- (6) **'Polo':** Made up of split bamboo piece in the form of a conical basket with a circular opening at the top. The trap is dropped in water with the wider mouth pressed in the soft mud. The fisherman puts his hand through the small openings so as to catch the live fish inside.

3.1.3. Hooks and Lines were of Two Types

- (1) **Hand line** consisting of a long bamboo stick at the end of which a thread and bend hook is tied along with bait and used to catch single fish.
- (2) **Long line** consisting of several hooks to catch many fish at the same time.

3.1.4. Wounding Gears

Large fish are caught by hunting using weapons like spear and harpoon, especially when the fish concentrate in an area and float. These were of two types-

- (1) **'Teta':** Wounding gears used to catch medium to large sized fish in shallow water.
- (2) **'Konch':** The iron fork is few in number but larger and used to catch large sized fish.

3.1.5. Fishing Crafts Operated in the Chalan Beel for Catching Fish were of Four Types-

- (1) **'Dingi':** Wooden made small boat operated manually.
- (2) **'Vot-voti' (Trawler):** Same as 'Dingi' but operated

through an engine.

- (3) **Tube:** Tube of car/bus-tyres pumped with air, which float on water. Mainly used by fishers engaged in line fishing.
- (4) **'Vela':** It is made by tying several banana plants together and mainly used by fishers who catch fishes by gill net or dip net.

Men have been using various methods to catch fish from water bodies and accordingly the fishing gears operated for such purpose have been modified to serve the purpose. However, the fishing methods being used in a particular place depend on the types and occurrence of fish being caught, requirement, types of fishing methods used, cost and capital. In the present study, eight types of nets were found to use to catch fish. All of these nets were operated by a fisherman or a group of fishermen according to the size of the nets, personal requirement for operation as well as cost. Among the different types of nets trap net, cast net, push net, drag net were extensively used.

The present study enlisted eight types of nets, six types of traps, two types of hooks and lines and two types of wounding gears and four types of crafts in the study areas. However, Galib *et al.* [2] recorded twelve types of fishing nets, five types of fishing traps, six types of hooks and lines and four types of wounding gears from Chalan beel. Whereas, Sultana and Islam [6] recorded eleven types of nets, ten types of traps, five types of gears and six types of hooks and lines from Chalan beel and Sultana and Islam [7] recorded six types of crafts based on shape, size, construction pattern, carrying capacity and gears used from Chalan beel. On the other hand, Rahman *et al.* [20] recorded seven types of nets, five types of traps, five types of hooks and lines and four types of wounding gears from Chanda BSKB and Haldi Beel floodplain. Six types of nets, four types of fish traps, and one type of wounding gears were identified by Jewel [21] from Padma River, Rajshahi. Azadi and Arshad-ul-Alam [22] recorded a total of twenty eight types of fishing gears belonging to thirteen categories in the Halda River, Chittagong.

4. Conclusions

Among the huge number of aquatic bodies in Bangladesh, Chalan beel wetland is the largest one and very important in context of presence of large number of fish species and significant contribution through fish production in the country's fisheries sector. It is remarkable that the wetland is created due to defunct of some rivers, but during rainy season some riverine habitats again revive due to flow of water through the old defunct channels. Thus this aquatic body has provided abode for both lentic and lotic water fishes. The wetland is found to be a good habitat for both native (78) and exotic (10) fish species. However, all the exotic species are produced from culture system, not reproduced and auto stocked like some native fishes. Thus, the exotic fishes were not found to be harmful for the habitat.

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