

# Shell fish abundance and fishing gears in Chalan beel area of Natore district

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**Abstract** - The study was conducted to know about the abundance of shellfishes and fishing gears used for catching of shellfish from April to September, 2022 in different spots of Chalan beel under Singra Upazila of Natore district. Field survey and interview method were applied for the data collection. Three catching seasons (pre-monsoon, monsoon, post monsoon) were observed. Available shellfish of Chalan beel were snail (apple snail and snail), mussel (freshwater mussel), crab (mud crab), shrimps (monsoon river prawn, kuncho river prawn, giant freshwater prawn and river prawn) and turtle (bengal roof turtle). A total of 16 types of fishing gears were recorded which were broadly classified into 5 major groups namely nets, traps, wounding gears another 2 method such as FAD (Fish Aggregating Devices) and others way (Dewatering, Hand fishing). Fishing gears included 9 types of net (Ber jal, Khepla jal, Puti jal, Thela jal, Current jal, Moi jal, Veshal jal, Suti jal and Dharma jal); 3 types of traps (Kholsun, Doair and Vair) and another 2 types of fishing methods were observed. Among the available nets used in Chalan beel maximum length was 363.33±109.70 fit (Ber jal) and minimum length was 15±5 fit (Dharma jal) whereas the maximum and minimum breadths were recorded as 106.67±15.27 fit (Sutijal) and 2.5±0.5 fit (Punti jal), respectively. Maximum and minimum mesh size recorded as 3±0.5cm (Suti jal) and 0.83±0.52 cm (Thela jal), respectively. Among the available traps, maximum length was 2.5±0.5 fit (Kholsun) and minimum length was 1.83±0.28 fit (Vair) whereas the maximum and minimum breadths were recorded as 1.17±0.37 (Vair) fit and 0.67±0.28 fit (Doair), respectively. The maximum and minimum height was recorded as 3.11±0.34 fit (Doair) and 1.75±0.25 fit (Kholsun), respectively. Among the shellfish, maximum catch of small prawn was 2±0.79 kg/day/gear (Ber jal) and minimum was 0.134±0.042 kg /day/gear (Khepla jal). In case of crab, maximum catch was 16.4±1.79 kg/day/gear (Ber jal) and minimum was 0.264±0.065 kg/day/gear (Moi jal). For snail maximum catch was recorded in Ber jal (3.5±0.5 kg/day/gear) and minimum in Khepla jal (0.142±0.03768 kg/day/gear). For mussel only Moi jal was used to catch and catch rate was 5.2±0.57 kg/day/gear. For crab maximum catch was recorded in Doair (1.76±0.25 kg/day/gear) and minimum in Kholsun (0.37±0.097 kg/day/gear). In case of snail, maximum catch was recorded in Kholsun (0.135±0.0238 kg/day/gear) and minimum was in Vair (0.108±0.0277 kg/day/gear).

**Keywords:** Shell fishes, fishing nets, traps, gears, abundance, chalan beel

## I. INTRODUCTION

Beel's have a great biological and environmental importance in the fisheries sector of Bangladesh specially Chalan beel is famous for its richness in fisheries resources. It contains about 100 plus fish species (Karim, 2003). It also contains prawn, shrimps and shellfishes. According to DoF (2022), there are 450 species of snails in Bangladesh of which *Pila globosa* is the most valuable and suitable for culture. According to Kibria (1983), 10 species of prawn and shrimps are inhabited the freshwater and only four (04) species of crabs found in the freshwaters of Bangladesh. Both prawns and crabs are consumed as food, providing rich amounts of proteins. The snails and mussels are used as fish shrimp feed, crab feed and duck feed (DoF, 2022). Beside that the indigenous population of north-west region of Bangladesh consumes these Mollusca's as food and uses other parts of the animal for other purposes. Among the vertebrates the turtles and tortoises are highly consumed as food, both at fresh and dry conditions. Khan (2015) reported 30 species of turtles are present in Bangladesh of which 23 are habitants of freshwater.

Though the Chalan beel is the largest wetland in Bangladesh and contributes a lot to country's economy but a few researches have been documented on different aspects of this wetland which are not sufficient such as on fish availability (Galib *et. al.* 2009), fishing gears, small indigenous fish species (Galib *et al.* 2010, Jahan and Perween 2023), fish drying (Samad *et. al* 2009) and socio-economic conditions of fishermen (Kostori, 2012).

However, a sharp decline in the fishery resources was experienced in past few year (Shahnaz 2005; Imteazzaman and Galib 2013; Galib 2016; Mohsin *et. al.* 2012;). This decline of fishery resources in the Chalan beel is largely by the habitat degradation and unsustainable exploitation by the use of some traditional, unscientific fishing methods and harmful modern gears and technological advancement gears (Von Brandt, 1962). Proper knowledge of fishing gear and method is essential to take decision which one to be controlled or allowed. To fulfill the gap of information of this section of fisheries is necessary for the ensuring food security of Bangladesh.

## II. MATERIALS AND METHODS

### *2.1 Location and study period*

This study was conducted different spots such as Chougram, Jolarbata, Nandigram and Singra in Singra upazila of Chalan beel of Natore district for a period of six months from April to September -2022.

### *2.2 Data Collection Method*

#### *Survey method:*

Information regarding different types of shellfish, different types of gears, operation time, total number of gears and its operating method, common species caught by gears in the study area were preliminary observed by survey method.

#### *Interview method:*

The required data were collected by personal interview and detailed discussion with local fishermen as well as direct observation using a prepared questionnaire which was pre-tested in field situation and updated before final use. The Upazila Fisheries Officers (UFOs) and other stakeholders including fishers were interviewed about the use, pattern and intensity of different gears in the water body to know the real situation as well as crosschecking the collected data.

### *2.3 Data analysis:*

All the collected data were summarized carefully and recorded. All the collected information were accumulated and analyzed by MS-Excel and then presented in textual, tabular and graphical forms to understand the present status of the shellfishes and fishing gears in the studied area.

## III. RESULT AND OBSERVATION

### *Fishing seasons*

Fishing seasons were divided into 3 categories; these were the pre-monsoon, monsoon and post monsoon. Duration of the season was March-June (Pre-monsoon), July-October (Monsoon) and November-February (Post monsoon) respectively (Fig-1).

### *Available shellfish*

Snails (apple snail and snail), mussel (freshwater mussel), crab (mud crab), shrimps (monsoon river prawn, kuncho river prawn, giant freshwater prawn and river prawn) and turtle (bengal roof turtle) were found in the study area (Table-1).

### *Fishing gears available in the Chalan beel*

In the study period, a total of 16 different types of fishing gears including 9 types of net, 3 types of traps, 1 types of wounding gears and fishing operation were observed in this area (Table-02). Another 1 types of FAD (Fish Aggregating Device) and others (02) were also recorded (Table-02) for catching shellfishes.

### *Fishing nets*

Different types of nets were used in the study area. There was nothing perfect nets for fishing as well as of them were prepared to operate certain condition of the weather and fishing grounds. The fiber used and the mesh size were very important for nets. Both the professional and non-professional fishermen used nets which have different characteristics. After dry season, the monsoon rain comes down and water level increased the use of all types of gear also increased simultaneously. When the water level started to decrease during post monsoon (November-February)

period the number of nets used also decreased only the exception was of current jal (Gill net) and Thela jal and hand method those were operated in increased numbers at the adjacent deep region of the beel. Among the available nets used in Chalan beel maximum length was  $363.33 \pm 109.70$  fit (Ber jal) and minimum length was  $15 \pm 5$  fit (Dharma jal) (Table-3, Fig.02). Whereas the maximum and minimum breadth were recorded as  $106.67 \pm 15.27$  fit and  $2.5 \pm 0.5$  fit (Suti jal and Punti jal), respectively (Table 03, Fig.03). Maximum and minimum mesh size  $3 \pm 0.5$  cm was recorded in Suti jal and  $0.83 \pm 0.52$  cm in Thela jal, respectively (Fig-02).

#### *Catch of shellfishes by different nets used in the study area*

Huge amounts of shellfishes including jinuk, chingri, kakra, choto shamuk and apple shamuk were caught additionally which are marketed for various purposes. In case of small prawn, maximum catch was recorded in Ber jal ( $2 \pm 0.79$  kg /day/gear) and minimum was in Khepla jal ( $0.134 \pm 0.042$  kg /day/gear). For crab, maximum catch was recorded in Ber jal ( $16.4 \pm 1.79$  kg /day/gear) and minimum was in Moi jal ( $0.264 \pm 0.065$  kg /day/gear). For snail maximum catch was recorded in Ber jal ( $3.5 \pm 0.5$  kg /day/gear) and minimum was in Khepla jal ( $0.142 \pm 0.03768$  kg /day/gear). For mussel only Moi jal was used and catch rate was  $5.2 \pm 0.57$  kg /day/gear (Fig-3).

#### *Fishing traps*

Among the available traps used in Chalan beel, maximum length was  $2.5 \pm 0.5$  fit recorded in khosun and minimum length was  $1.83 \pm 0.28$  fit in vair (Table-03). Whereas the maximum and minimum breadths were recorded as  $0.67 \pm 0.28$  in doair. The maximum and minimum height recorded as  $3.11 \pm 0.34$  fit in doair and  $1.75 \pm 0.25$  fit in kholsun, respectively. Among the fishing traps, vair was specially designed to trap large size fish and different shellfishes were also caught. Different fishing period of different fishing traps are shown in (Table-03).

#### *Catch of shellfishes by different traps used in the study area*

In case of, small prawn, maximum catch was recorded in Kholsun ( $0.49 \pm 0.074$  kg /day/gear) and minimum in Doair ( $0.16 \pm 0.836$  kg /day/gear). For crab maximum catch was recorded in Doair ( $1.76 \pm 0.25$  kg /day/gear) and minimum was in Kholsun ( $0.37 \pm 0.097$  kg /day/gear). For snail maximum catch was recorded in Kholsun ( $0.135 \pm 0.0238$  kg /day/gear) and minimum in Vair ( $0.108 \pm 0.0277$  kg /day/gear) (Fig-4).

#### *Wounding gears*

Only one wounding gear (koach) was found in Chalan beel used for fishing of shellfishes (mainly kachim).

#### *FAD (Fish Aggregating Device)*

Bana: Fishing traps like kholsun, vair were placed these point and trapped the fish and shellfish when they try to cross the barrier made by bana.

#### *Others way*

Dewatering and hand fishing were found in Chalan beel.

Table-1: Name and status of shellfish in the Chalan beel area

SI No.	Scientific name	Common name	Status in Bangladesh
1	<i>Pila globosa</i>	Apple snail	Least concern
2	<i>Filopulidina bengalensis</i>	Snail	Least concern
3	<i>Lamellidens marginalis</i>	Freshwater mussel	Least concern
4	<i>Sartoriana spiniger</i>	Wood meson crab	Least concern
5	<i>Macrobrachium spp.</i>	prawn	Vulnerable

6	<i>Batagur kachuga</i>	Bengal roof turtle	Critically endangered
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(IUCN, 2022)

Table-02: Different types of fishing gears used in Chalan beel

Sl. No.	Nets	Traps	Wounding gear	FAD	Others
1.	Khepla jal	Doair	Koach	Bana	Dewatering
2.	Ber jal	Kholson			Hand fishing
3.	Moi jal	Vair			
4.	Veshal jal				
5.	Suti jal				
6.	Dharma jal				
7.	Puti jal				
8.	Current jal				
9.	Thela jal				

 Table-03: Some related information about the different nets with shellfishes used in the study area (average  $\pm$ SD)

Sl. No.	Name of nets	Measurement (fit)		Mesh size
		Length	Breadth	
1	Ber jal	363 $\pm$ 109.70	50 $\pm$ 10	1.16 $\pm$ 0.38
2	Khepla jal	28.33 $\pm$ 2.88	17.67 $\pm$ 2.51	1.25 $\pm$ 0.25
3	Veshal jal	25 $\pm$ 5	25 $\pm$ 5	1.33 $\pm$ 0.76
4	Thela Jal	23.33 $\pm$ 2.88	12.33 $\pm$ 2.51	0.83 $\pm$ 0.52
5	Suti jal	1.83 $\pm$ 28	106.67 $\pm$ 15.27	3 $\pm$ 0.5
6	Puti jal	60 $\pm$ 30.56	2.5 $\pm$ 0.5	1.41 $\pm$ 0.52
7	Current jal	73.33 $\pm$ 25.16	4.5 $\pm$ 1.32	1.16 $\pm$ 0.28
8	Moi jal	95 $\pm$ 18.02	4.5 $\pm$ 2.17	1.5 $\pm$ 0.5
9	Dharma jal	15 $\pm$ 5	15 $\pm$ 5	1 $\pm$ 0.5

 Table-04: Some related information about the different traps with shellfishes used in the study area (average  $\pm$ SD)

SL. No.	Name of trap	Measurements (fit)			Using season	Major shellfish
		Length	Breadth	Height		
01.	Kholson	2.5 $\pm$ 0.5	0.75 $\pm$ 0.25	1.75 $\pm$ 0.25	Aug-Nov	Kakra, choto shamuk, chingri etc.
02.	Doair	1.91 $\pm$ 0.38	0.67 $\pm$ 0.28	3.11 $\pm$ 0.34	Jul-Oct	Kakra
03.	Vair	1.83 $\pm$ 0.28	1.17 $\pm$ 0.37	2.5 $\pm$ 0.5	Aug-Oct	Ckingri,kakra,choto shamuk, apple shamuk etc.

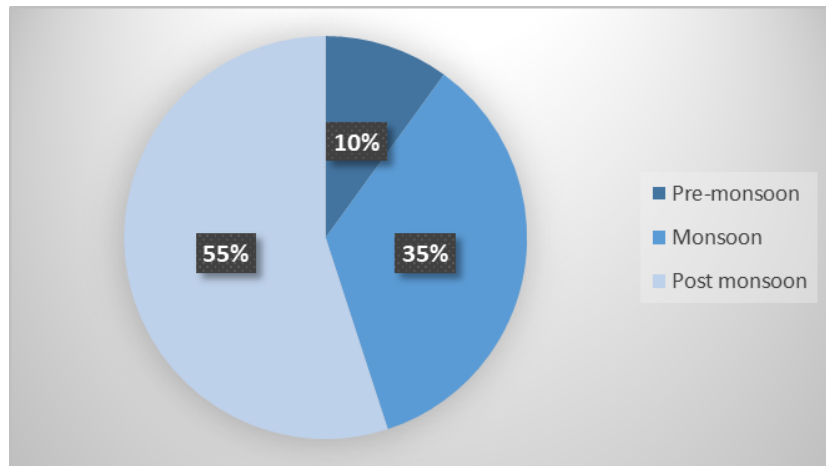


Figure.-01: Shell fish availability in Chalan beel area

Fig.-02: Length and breadth of different nets in Chalan beel

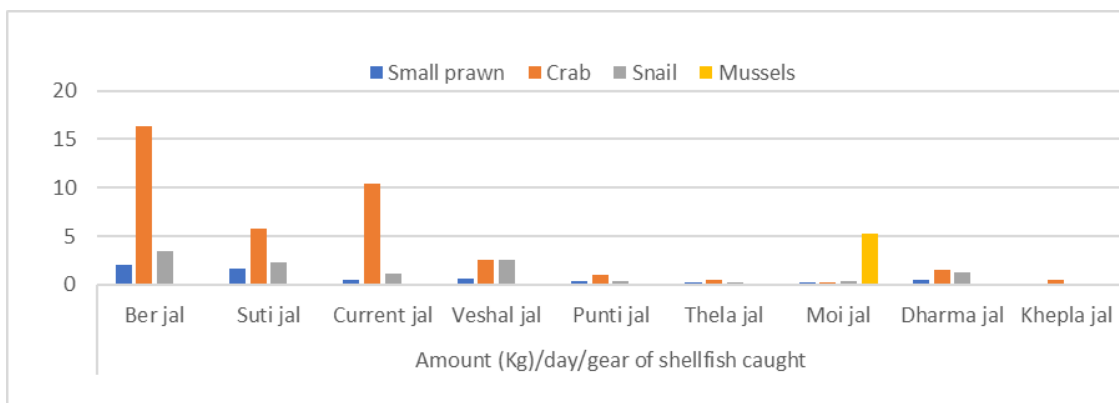
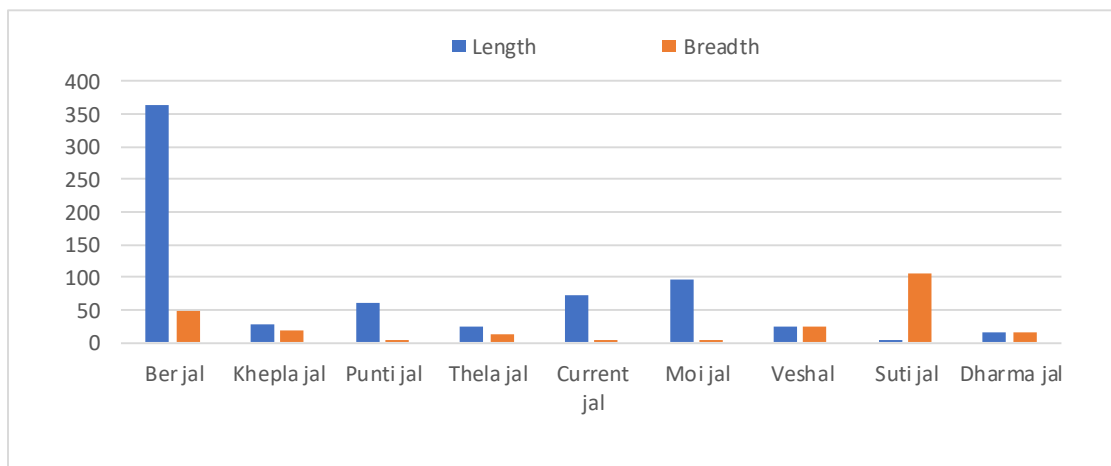


Fig.-03: Amounts of shellfishes in different fishing nets

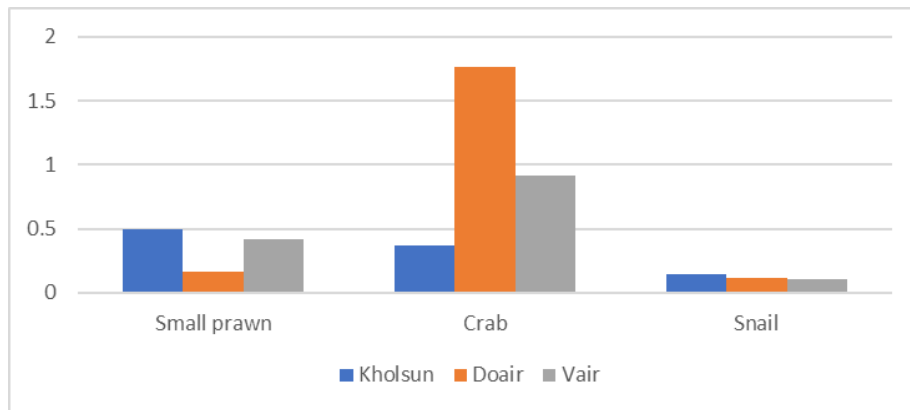


Fig.-04: Amounts of shellfishes caught by different fishing traps

#### IV. DISCUSSION

##### *Status of shellfishes*

A total of 9 shellfish species comprising snail (2 types), crab (1 type), mussel (1 type), small prawn (4 types) and turtle (1 type) were found and decreased in the study area. Those findings are more or less similar with the findings of Gain and Das (2014) who studied about the status and decreasing cause of shellfish diversity of Pasur river in Sundarban, Bangladesh. They found 14 shellfish species of 3 orders and 7 families and categorized 4 classes (available, less available, rare, very rare) based on their availability. Bhuiyan *et al.* (2013) studied 6 freshwater mussels under the family Unionidae from north-east Bangladesh. Shafi and Quddus (2001) described 148 species of freshwater fishes and 10 species of freshwater prawn in Bangladesh and the names of gears used to catch each species in their book "Bangladesh Mathshay Sampad" (Fisheries Resources Bangladesh). Kibria (1983) recorded a total 34 species of fish 7 species of prawn from jag fishery (brush park) in the dhakatia river. Siddique *et al.* (2017) recorded 4 freshwater small prawn under the family Palaemonidae in Chalan beel in Bangladesh which are similar to those findings.

##### *Fishing gears*

The present study reveals a total of 16 types of fishing gears were found to be used in the Chalan beel which were broadly classified into 5 major groups namely nets, traps, wounding gears another 2 method such as FAD (Fish Aggregating Devices) and others way (Dewatering, Hand fishing) (Table -02). Jahan and Perween (2023) observed that a total of 20 types of fishing gears were found in Chalan beel which were classified into 6 major groups such as-nets, traps, wounding gears, hooks and lines, another 2 methods such as FAD (Fish Aggregating Devices) and others way (Dewatering, Hand fishing) of fishing. It was observed that types of fishing gears were decreased.

Hussain (1999) studied the fishing gears in the river Atrai and recorded 7 types of nets, 2 types of traps, 5 types of hooks and lines and 4 types of wounding fishing gears and commonly used gears were Ber jal, Current jal, Khepla jal, Khora jal, Borshi, Kholson and Konch. Chakraborti (2011) found lift net, current jal, cast net, traps, hooks and lines to be used by fisherman in Punuria Beel. Khan *et al.* (2005) identified various types of nets and wounding gears used in capturing major carps in the Kaptai Reservoir. There are 30 types of seine net were reported in our country (Ghosh 2001) but, only the Ber Jal, was recorded in this study. Among the available nets used in Chalan beel maximum length was  $363.33 \pm 109.70$  fit (Ber Jal) and minimum length was  $15 \pm 5$  fit (Dharma Jal). Sultana and Islam (2016) found maximum length was  $332.20 \pm 202.77$  fit (Ber Jal) and minimum length was  $15.00 \pm 0.37$  fit (Khepla Jal). Whereas the maximum and minimum breadth were  $106.67 \pm 15.27$  fit and  $2.5 \pm 0.5$  fit for Suti Jal and Puntal Jal, respectively. Maximum and minimum mesh size was  $3 \pm 0.5$  cm (Suti Jal) and  $0.83 \pm 0.52$  cm (Thela Jal),

respectively. Sultana and Islam (2016) found maximum mesh size was  $2.97\pm 3.58$  cm (Suti Jal) and minimum mesh size was  $0.94\pm 0.42$  cm (Ber Jal). In the study area, nets were the dominating fishing gear followed by traps and wounding gears and the use of different types of fishing gears varies with the seasonal variation of water level in the beel. One types of seine net namely Ber jal were operated in the beel which also used in ponds. There were two types of lift nets used in the beel area such as triangular Veshal jal, rectangular Dharma jal. They are not destructive and could be allowed to operate round the year. Jhaki jal was less destructive to the fisheries items. Moi jal and Thela jal were found to be used widely for household consumption.

In general, fish traps were not destructive for the water body except fishing with setting up of barrier on the path/migratory route of fish movement. It was observed that several types of fish traps used in the Chalan beel such as Kholsun, vair, Dohair. The more or less similar type of traps was observed by Galib (2009) at Chalan beel. Among the available traps used in Chalan beel, maximum length  $2.5\pm 0.5$  fit was recorded for Kholsun and minimum length  $1.83\pm 0.28$  fit was for Vair. This finding was in agreed with Sultana and Islam (2016). They found maximum length  $2.50\pm 0.43$  fit was recorded for Kholsun and minimum length was  $1.78\pm 0.22$  fit for vair.

Among different wounding gears Koach was found in Chalan beel during the study. Both small and large fishes and shellfishes were caught by this gear. The wounding gears operated in the Chalan beel. This finding was in agreed with Ahmed (2008) and Hussain (1999).

### CONCLUSION

A large number of fishing gears and crafts are being used in the Chalan Beel. Snail and oyster collection is going on freely with water receding from different area of Chalan beel. Indiscriminate collection of shellfish and fish is harmful for Chalan beel ecosystem. Turtle is rarely found in this area which was available in earlier years. Chalan beel is a moderate productive water body with decreasing shellfish species diversity. Species selectivity of different gears differed considerably. If fish and shellfish catch in Chalan beel legally and illegally continued to increase without control, then a valuable resource like Chalan beel would be empty of fish in near future. For that reason, it is very important to find out the harmful gears which are used for fishing. It is the duty of concerned GOs, NGOs and the people of the country to control the gear efficiency, stop the destructive gears and provide alternative livelihood options to the resource-poor fishers along with other measures. Finally, it is imperative that efforts should be undertaken to develop ecosystem-based management strategies with inputs from scientists, resource managers, policy makers, government and non-government organizations and other stakeholders, with the objectives of enhancing production, maintaining biodiversity in a sustainable manner and improving the livelihoods of the marginal fishermen in the largest beel of Bangladesh.

### REFERENCES

- [1] M. S. Ahmed, "Assessment of Fishing Practices on the Exploitation of the Titas Floodplain in Brahmanbaria, Bangladesh", *Turkis Journal of Fisheries and Aquatic Sciences*, vol. 8, pp. 329-334, 2008.
- [2] M.M.S. Bhuiyan, M.R. Rahman, M. S. Jahan and M. Haque, "New Records of Some Freshwater Mussels (Bivalve:Unionidae) from North-East Bangladesh". *Bangladesh Journal of Zoology*, vol.41, No.1, pp. 29-42, 2013.
- [3] B. K. Chakraborty, "Present Status of Biodiversity in Punuria Beel in Northern Bangladesh and Prospect for Using Beel as Fish Nursery". *Journal of crop and weed*, Vol 7, No. 2, pp.6-19, 2011.
- [4] DoF, National Fish Week. 2022. Compendium (in Bangla). Department of Fisheries, Ministry of Fisheries and Livestock, Bangladesh.108, p.160, 2022.
- [5] D. Gain, and S. K. Das, "Present status and decreasing causes of shellfish diversity of Passur river, Sundar ban, Bangladesh", *Aquaculture, Aquarium, Conservation and Legislation International Journal of the Bioflux Society*, vol. 7, No. 6, pp.483-488. 2018.
- [6] S. M. Galib, M. A. Samad, A. B. M. Mohsin, F. A. Flowra and Alam, "Present status of fishes in the Chalan Beel- The largest beel (wetland) of Bangladesh", *Int. J. Ani. Fish. Sci.* vol.2, No. 3, pp. 214-218, 2009.
- [7] S. M. Galib, M. A. Samad, M. A. Hossain, A. B. M. Mohsin and S. M. M Hque, "Small indigenous species of fishes (SISF) in Chalan Beel with reference to their harvesting and marketing system". *Bangladesh Journal of Progressive Science and Tech.*, vol. 8, No. 2, pp. 251-254, 2010.
- [8] S. M. Galib, M. N. Hoque, S. Akter, N. Chaki and A. B. M. Mohsin, "Livelihood, climate change and fisheries: a case study of three fishing communities of northern Bangladesh". *International Research Journal of Social Sciences*, vol. 5, No. 8, pp. 18-25, 2016.
- [9] B. K. Ghosh, "Studies on the major characteristics of the Koratoa river at Shahjadpur and its fisheries". M. Sc Thesis (Unpublished), out of Zoology, Rajshahi University, 2001.
- [10] M. Hussain, "Design of two standard steel body fishing crafts for all season operation in the Bay of Bengal, National Marine Fisheries Seminar". Edited by Bhuiyan AL and Chowdhury AK, 1999.

- [11] M. Imteazzaman and S. M. Galib, "Fish Fauna of Haldi Beel, Bangladesh". *International Journal of Current Research*, vol. 5, No.1, pp. 187-190, 2013.
- [12] IUCN, "The IUCN Red List of Threatened Species". Version 2022-1, 2022.
- [13] S. N. Jahan and Perween, "Fishing gears and crafts used in Chalan beel, Bangladesh". *International Journal of Fisheries and Aquatic Studies*, vol. 11, No. 3, pp. 44-49, 2023.
- [14] M. F. A. Kostori, "Socio-economic condition of fishermen of the Chalan Beel under Tarash Thana of Sirajganj in Bangladesh", *Bangladesh Research Publications Journal*, vol. 6, No.4, pp. 393-402, 2012.
- [15] M.S. Karim, "Discussion on the Causes of Reduction of Fisheries Resources in Chalan Beel (in Bengali)", Mathsya Pakkha, 2003.
- [16] K.Khan, U.Ahmed and J. B. Hambrey, "Studies on the Fish Catch Efficiency of Different Types of Fishing Gear in Kaptai Reservoir", Bangladesh Fisheries Research Institute, Riverine Station, Baburhat Chandpur, Bangladesh and Port of Leith Edinburgh, UK, 2015.
- [17] G.Kibria, "The composition of jag fishery (brush shelter) of the Dhakatia river Bangladesh". *Bangladesh J Zoology*. vol. 11, No.2, pp .127-132, 1983.
- [18] B. M. Mohsin, M. N. Islam, M. A. Hossain and S. M. Galib, "Cost-benefit analyses of carp polyculture in ponds: a survey study in Rajshahi and Natore districts of Bangla Academy", Dhaka, Bangladesh, pp. 43-60, 2012.
- [19] M.A.B. Siddique, M.A. Hussain, M.M. Alam, and F.A. Flowra, "Fishes of Chalan Beel.CP-3557, Higher Education Quality Enhancement Project (HEQEP) UGC, Department of Fisheries University of Rajshahi Bangladesh", p.95, 2017.
- [20] N. Sultana and M. N. Islam, "Fishing methods in the Chalan Beel, Bangladesh", *Journal of Fisheries*, vol. 4, No.2, pp 377-384, 2016 a.
- [21] M. Shafi and M. M. A. Quddus, Bangladesh Matshaw Sampad (Bangla). Kobir Publication, Dhaka, Bangladesh, 2001.
- [22] M. A. Samad, S. M. Galib, and F. A. Flowra, "Fish Drying in Chalan Beel Areas". *Bangladesh Journal of Scientific and Industrial Research*, vol. 44, No.4, pp.461-466, 2009.
- [23] K. Shahnaz, "Drastic fall in Chalan Beel fish production", Holiday-Internet Edition, [www.weeklyholiday.net/2005/090905/env.html](http://www.weeklyholiday.net/2005/090905/env.html), 2005.
- [24] Von Brandt, "Classification of fishing gear: Modern fishing gear of the world". Fishing News (Books) Ltd., London, pp. 224-296, 1962.