

## A Study of Khepla Jal (Cast Net) in the Chalan Beel, Bangladesh

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**ABSTRACT:** The present study on fishing technique using Khepla jal (cast net) in the Chalan Beel was conducted for a period of 3 years from July 2011 to June 2014. Net description, operation details and catch composition were studied through field survey in different parts of studied wetland. A total of Fish and Fisheries items (Groups name) were caught in cast name in the study period during the study period it was observed that major carps was the dominants species contributed (43.70%) of total catch (by number basis). The second dominant basis was minor carp contributed (16.30%) of the total catch (by number basis). In weight basis major carp was dominant contributed (26.40%). Catch composition revealed that all types of aquatic organisms are being caught by this net. Benefit-cost ratio of studied fishing net was also calculated. Cast net is a eco-friendly fishing gear.

**Keywords:** Cast net, Chalan Beel, Catch composition, Eco-friendly fishing, Bangladesh, Benefit Cost Ration

### I. INTRODUCTION

The Chalan Beel in Bangladesh lies between 24.23° north latitude and 89.05 to 89.180 east longitude. It is the largest wetland in Bangladesh (Galibet *al.* 2009a). This water body is at distance of about 50 km, towards southeast from Rajshahi city. The Chalan Beel is a large drainage system. This vast drainage network endows rich diversity of fishes providing livelihood for large number of people living in remote areas of Chalan Beel. However, a sharp decline in the fishery resources are experienced in past few year (Shahnaz 2005). 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 gears (Von Brandt 1962). Different kinds of nets are used for fishing in the Chalan Beel. Various types of nets used in different grounds for fishing purpose (Ahmed 1954). In Bangladesh, both professional and non-professional fishermen use nets to catch fishes in different fishing grounds. Hossain (1995) classified fishing nets into different categories: (a) special type of gear net, or fixed purse net- locally called *Kheplajal*; (b) seine net; (c) drag net; (d) dip net; (e) lift net; and (f) cast net.

The cast net is the one of the most widely used artisanal fishing in Bangladesh (FAO, 1969). The cast nets are falling gear, conical in shape with lead sunken or weights attracted at regular intervals on the lead rope forming the circumference of the cone. Cast nets vary in lengths ranging from 4.20 to 7.11 m (Azeez, 1997). Some cast nets are designed such that the lead rope per net is tucked under neath and attached at intervals to the innerside of the net to form pockets for trapping fish especially *Tilapia* spp. (Udolisa and Solarin, 1979). Cast nets are cast from the shore or from a boat and they catch the fish by falling and closing in on them. These nets are usually used in shallow waters. Throwing a cast net requires a great skill such that it will fold in the form of a large circle and this cover the largest possible area. The nets are usually cast at random in depths of up to four metres. When fishing for certain species of fish, the fisherman remains poised at alert until the tell-tale whirl of a fish is seen and then throws the net which encircles the exact spot (Azeez, 1997). The fishermen allows the net to sink to the bottom and entangles the fish, after which the net is retrieved with the aid of a line while the leads/sinkers close together thus capturing the fish (Azeez, 1997; Emmanuel and Kusemiju, 2005).

Fishermen often cast nets in groups in one place for one or more, then move to another area a mile or so way (Reed *et al.*, 1967). For an efficient fishing operation, the fishermen must be strong enough to throw the size of the cast net in use. In the Chalan Beel, the cast net line is held by the fishermen for retrieving the net; while the net is folded its length looped under the arm with the sinkers being free.

Group cast netting is practiced in Chalan Beel mainly by the migrant Beninois fishermen using 8 to 15 canoes each manned by at least two men. The canoes are maneuvered to form a big circle and the net throwers one from each canoe throw simultaneously either in clockwise or in anticlockwise manner. In some few occasion, fishermen arrange in two lines facing each other and cast their nets into the area between one ends to the other. The share per fishermen at the end of the fishing operation can be 5 – 8 kg (Udolisa and Solarin, 1979). Udolisa and Solarin (1979) also reported the use of “garrri” (processed cassava, *Manihotutilisima*) as bait to entice and

concentrate fishes to marked fishing spots. Azeez (1997) reported the use of light in cast net operations. It was reported further that Alladin lamps was hung on a row of poles fixed in the beel at about 4-6 m above the water surface before the fishing operation commenced.

Cast net operation was described by Udolisa and Solarin (1979) as throughout the year and that fishing during the day was more common than light fishing at night. Emmanuel and Kusemiju (2005) reported that more fish were caught using cast net in the dry season than rainy season because of a more conducive environment created for euryhaline species. They reported further that cast net was an active gear, capturing live fish in its pockets. Despite the importance of the cast net to the artisanal fishery in Bangladesh, very few information is available on its design details, cost of construction, durability and selectivity. Therefore, this study investigate the design details, construction costs, durability, catch compositions, selectivity, efficiency and economic importance of cast net and its impacts on the Chalan Beel fishery.

The fishing methods used in different water bodies of Bangladesh is poorly worked out by several researchers (Galibet *al.* 2009a, 2009b; Chakrabartiet *al.* 1995; Ahmed 1954; Dewan and Mazid 1994; Rahman *et al.* 1993; Khaleque and Islam 1985; Doha 1965). There are few studies carried out on different aspects of the Chalan Beel like fish diversity (Galibet *al.* 2009a), fishing gears (Galibet *al.* 2009b), and small indigenous fish species (Galibet *al.* 2010; Kostoriet *al.* 2011). However, no study has been carried out on status of fishing by Khepla jal not only in the Chalan Beel but also in Bangladesh and thus efforts have been taken to reveal the present status of fishing by Khepla jal in the Chalan Beel.

## II. METHODOLOGY

**Study area and duration:** The present study has been carried out study in Chalan Beel- the largest wetland of Bangladesh situated in the northwest region (Figure 1). This research was conducted between July 2011 and June 2014.

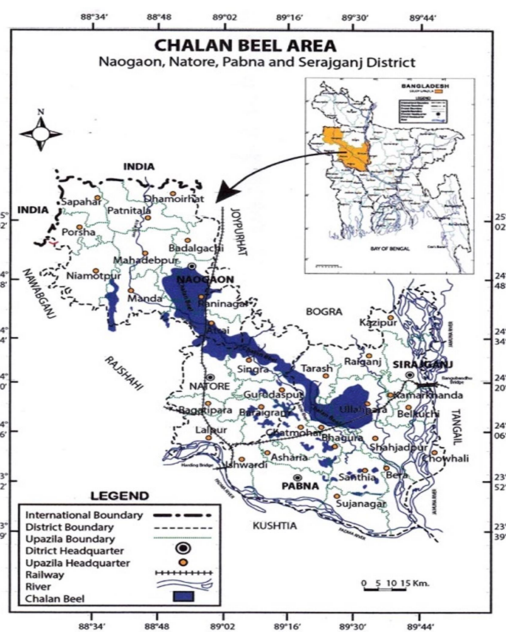


Figure 1: The location map of Chalan Beel.

**Sampling framework:** Extensive field surveys were made for the collection of primary data. Information regarding the gear structure, fishing technique, mode of operation and catch composition were collected through personal interview and detailed discussion with local fishermen as well as direct observation. Interviews were carried out using a prepared questionnaire which was pre-tested in field situation and updated before final use. Amount of catch was measured in kilogram (kg) and weight was determined using a pan balance. Species in the catch were identified following published literatures (Rahman 1989, 2005; Talwar and Jhingran 1991). Benefit cost ratio (BCR) of net was calculated using the following formula:  $BCR = B/K$  (FAO 1991); where B is the net benefit and K is the sum of cost. Standard market price of fishes was considered during this calculation.

**Data analysis:** Collected data were accumulated, grouped and interpreted according to the objective. Data were subjected to simple descriptive analysis using computer software Microsoft Excel 2010.

### III. RESULTS AND DISCUSSION

#### Cast net (Kheplajal)

These are conical nets and bag like structure. Only one person can operate this net. This net is used throughout the year. There are different kinds of casting net in our country. But khepla jal or Jhaki jal is commonly used in the study area of Chalan Beel.



**Kheplajal**

**Shape and construction pattern:** This is conical like net having a circular mouth in shape of a large umbrella. A strong cord is attached to the apex of the umbrella and a number of lead or iron weights is fixed along with the margin that is the sinker.

**Materials used for making of Kheplajal:** Commonly used materials to make the studied fishing net in the study area were as follows: (a) nylon thread, (b) polythylene (PE) (c) polyester (PES), all white is colour kaechi (A twisted rigid and thick rope made of plastic), (c) bamboo, (d) tarkata (knobbed wire), (e) nail, and (f) sacful of sand and pieces of stones.

**Size:** The length of the khepla jal varies from 10-20' and in average as  $15 \pm 3.74$  feet. The breadth varies from 5 to 25' and in average as  $20 \pm 4.09$  in feet.

**Mesh size:** Mesh size varies from 1 to 1.5 cm and in average as  $1.25 \pm 0.19$  cm.

**Mode of operation:** Fishermen through the net full spread over the water keeping the long rope in his hand. The net sinks to the bottom and the circumference closes due to the weights attached to it. Then it is pulled out of water by means of cord and caught fish.



Fishing with Kheplajal of pic season in study area Chalanbeel



Fishing with Kheplajal in off-pic season in study area Chalanbeel

**Figure 2:** Operation of Cast net (Kheplajal)

#### Species of fish caught

The fishes gripped within the net cannot be escaped and hence all types of fishes irrespective of large and small sizes are caught with this net. The common fishes caught are Puti, Chanda, Kholisha, Bheda, Boal, Ayre, Catal, Mrigel, Ghaura, Pangus, Jatka-ilish, Pholi, Chitol, Potka/tepa, Patasi, Baspata, Koi, Chapila, Pabda, Cheka, Shing, Magur, Kuchia, Guchi, Gorkuna, Baluchata, Chingri, Khorsula, Taki, Shol etc.

**Seasonal variation of catch composition**

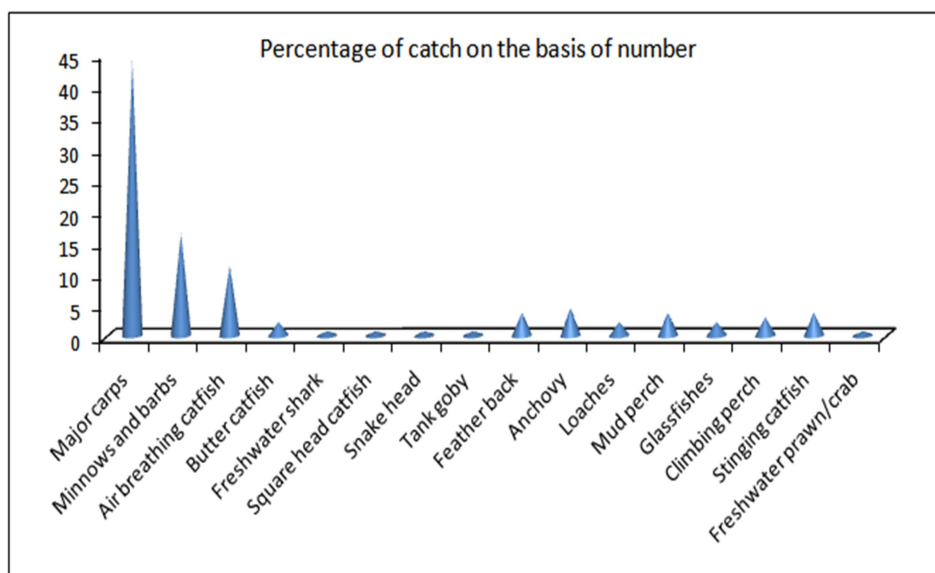
In the study period, data was collected on the basis of number of fishes were caught and the weight of fishes. Variation of catch composition in the study period has been discussed below:

**a) Seasonal variation of catch composition (on the basis of number) in the study period**

On the basis of number, the most abundant species of cast net was Major carp contributed (43.70%) of the total catch in the study period. The other dominant species were Minor carp contributed (16.3%) and Air breathing catfish contributed (11.11%) of the total catch respectively during the study period. In the study period Major carp was dominated by 46.15%, 34.48% and 43.47% in the month of July, August and September respectively on the basis of number. In the other months catch of Major carp was also high in cast net but the amount of catch was comparatively low. Variation of catch composition (on the basis of number) in the study period is shown in (Table 1 and Fig. 2)

**Table 2:** Seasonal variation of catch composition on the basis of number

Group Name / Month name	Major carps	Minnows and barbs	Air breathing catfish	Butter catfish	Freshwater shark	Squarehead catfish	Snake head	Tank goby	Featherback	Anchovy	Loaches	Mud perch	Glassfishes	Climbing perch	Stinging catfish	Freshwater prawn/crab
July	12	7	-	1	1	1	-	-	2	-	-	2	-	-	-	-
August	10	8	4	-	-	-	-	-	1	-	1	2	-	3	-	-
September	10	-	6	-	-	-	-	-	-	6	-	-	1	-	-	-
October	7	-	-	1	-	-	1	-	1	-	2	-	-	-	2	-
November	7	1	-	-	-	-	-	-	1	-	-	-	-	1	1	-
December	6	2	-	-	-	-	-	1	-	-	-	1	-	-	1	-
January	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	1
February	7	3	5	-	-	-	-	-	-	-	-	-	2	-	1	-
Total	59	22	15	3	1	1	1	1	5	6	3	5	3	4	5	1
% of Fish	43.70	16.36	11.11	2.22	0.70	0.70	0.70	0.70	3.70	4.44	2.22	3.70	2.22	2.96	3.70	0.70



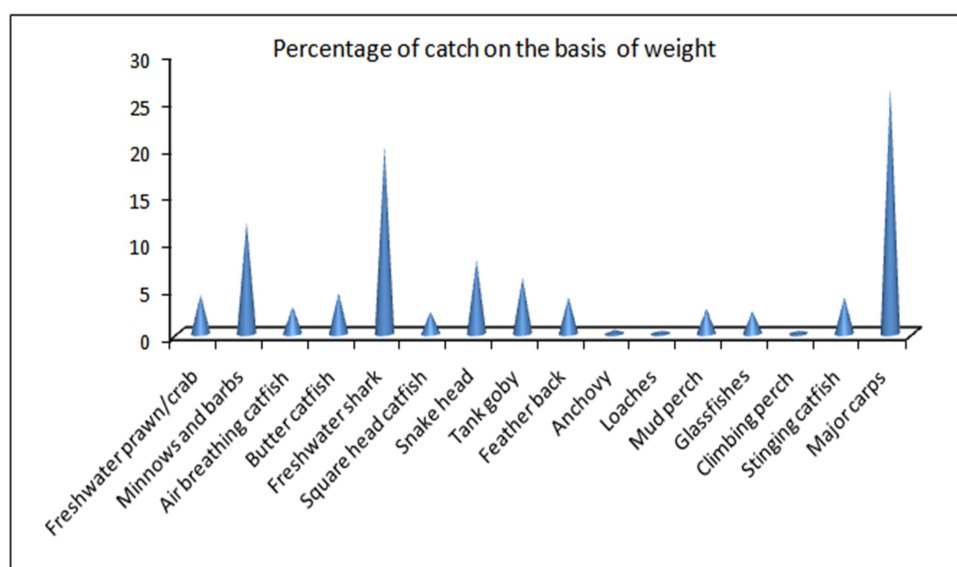
**Figure 2:** Percentage of catch on the basis of number

**b) Seasonal variation of Catch composition (on the basis of weight) in the study period**

On the basis of weight, the dominant species was Major carp contributed (26.4%) of the total weight. The other dominant species were Freshwater shark contributed (20%), Minor Carp contributed (12%) respectively. Variation of catch composition (by weight basis) in the study period is shown in (Table 2 and Fig. 3).

**Table 3:** Seasonal variation of catch composition on the basis of weight

Group Name Month name	Freshwater prawn/crab	Minnows and barbs	Air breathing catfish	Butter catfish	Freshwater shark	Square head catfish	Snake head	Tank goby	Feather back	Anchovy	Loaches	Mud perch	Glassfishes	Climbing perch	Stinging catfish	Major carps
July	6.6	33	-	7.5	149	17	-	-	12	-	-	-	-	-	-	-
August	4.5	34.5	4.5	-	-	-	-	-	5.6	-	0.8	7	-	1.8	-	-
September	5.4	-	11.5	-	-	-	-	-	-	3	-	9	6	-	-	-
October	3.5	-	-	11.5	-	-	59	-	5.4	-	1.4	-	-	-	12	-
November	3.5	4.5	-	-	-	-	-	-	6	-	-	-	-	0.6	6	-
December	6.5	4.70	-	-	-	-	-	45	-	-	-	4	-	-	6	-
January	-	3.30	-	-	-	-	-	-	-	-	-	-	-	-	-	197
February	1.4	9	5.5	13.5	-	-	-	-	-	-	-	-	12	-	5	-
Total	31.4	89	21.5	32.5	149	17	59	45	29	3	2.2	20	18	2.4	29	197
% of Fish	4.21	12	2.9	4.4	20	2.3	7.9	6.0	3.9	0.4	0.3	2.7	2.4	0.3	3.9	26.4



**Figure 3:** Percentage of catch by weight

**Economics of Khepla jal:** The monthly expenditure and income status regarding studied net is shown in Table 3. The benefit-cost ratio (BCR) was found (1.06) for the cast net (Khepla jal). Major expenditure issues were net making and management, laborer wages, bribe to the local influential people and transportation cost. On the other hand, income came only from selling of harvested fishes.

**Table 3:** Monthly economics of Khepla jal in the study area

Net type	Cost	Income	BCR
Cast net	118333.33	243333.33	1.06

#### IV. DISCUSSION

Cast net has widely used at Chalan Beel, because of its easy handling, mobile and fishing duration is short. It has also widely used at Dhaka, Mymensingh, Bakarganj, Rajshahi, Jessore, Bogra, Pabna, Rangpur, Dinajpur known as 'khalajal', in Rangpur and Chitagong it is known as 'chlatki'. It is known as 'dhundi and kheo' in Sylhet, 'teora' in Jessore, 'pheka' in Dinajpur (Ahmed, N. 1971). During the study period a total number of 16 fish and fisheries items were noted in the catch of cast net. A total of 26 species were caught with cast net (Mahmud, TA, 2007) and the presences of 23 species in the Baculiar River (Mahmud, M, 2001) which is slightly higher than the present findings, whereas 18 species were found in the Jamuna River (Shahjahan, 2000) which is closely related at the findings of the present experiment. Among the 16 species, Major carp (43.70%) was dominant on the basis of number. The other dominant species were Punti contributed (16.30%), Air breathing cat fish contributed (12%) respectively during the study period some what similar to the findings

(Mahmud, TA, 2007). In the study period July, August, September was the peak season for Major carp. The percentage of number of Major carp was caught in July, August, September was 46.15%, 34.48% and 43.47% on the basis of number respectively. The other reason was that Major carp is bottom dweller shellfish and cast net mainly operated in bottom. That's why Major carp was the dominant species in cast net in the Chalan Beel during the study period. The other species of fishes were also caught but insignificant. So we can say that cast net is an appropriate fishing gear operating in the Chalan Beel.

On the weight basis, the dominant species was Major carp, contributed (26.4%) of the total weight. The other dominant species were respectively freshwater shark contributed (20%), Punti contributed (12%), Major carp contributed (4.21%) and so on. In the study period it is observed that above mentioned species are dominant respectively in several months. The less significant species were Glass fishes (2.4%), Air breathing catfish (2.9%), Square head cat fish (2.3%). Loaches (0.3%), Anchovy (0.4%), Climbing perch (0.3%) were insignificant species in the study period. Holder (2002) recorded About 17 species of fishes both in Dobabeel and Charabeel and dominant species were *C. nama*(14.29%), *P. sophore*(12.39%), *A. mola*(9.94%), *M. pancalus*(7.45%), *C. puntatus*(6.83%).

## V. CONCLUSIONS

The catch of fish has been declined in Chalan Beel, but the social dignity of fishermen has been increased due to increase income as well as prices of fish. However, fishermen faced several constraints. The fishermen have no access to bank loans due to the insufficient collateral security. They do not have access to any Government or non-government organizations offering technical and financial support. It may be summarized that fish catch in this beel have declined gradually due to indiscriminate gear used, sand collection, embankment erosion, unplanned use of water resources, pollution and lack of management policy. In order to increase the abundance of fish and to recover some exclusive endangered fish species from the Chalan Beel, some action plans should be taken immediately. As for example, establish the fish sanctuary in different parts of the beel, ban of the current Jal and the fish fry should be released by the Government for better management and development practices to improve the revering fishery resources.

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Nahid Sultana. "A Study of Khepla Jal (Cast Net) in the Chalan Beel, Bangladesh." International Journal Of Modern Engineering Research (IJMER), vol. 07, no. 11, 2017, pp. 34–40.