AN INVESTIGATION ON THE DIVERSITY OF FISHING GEARS, CATCH ASSESSMENT AND THE SOCIO-ECONOMIC STATUS OF THE FISHERMEN COMMUNITY OF DHUNAT UPAZILLA, BOGRA

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ABSTRACT

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The study was carried out at Dhunat Upazilla under the district of Bogra for a period of four months from June to September 2002 to assess the diversity of fishing gears, catch assessment survey and the socio-economic condition of the riverine fishermen. The fishermen were found to follow various types of fishing gears and broadly categorized into three groups such as nets, traps and wounding gears. A total of 5 types of nets, 2 types of traps and one type of wounding gear were recorded. A total of 38 species of fishes were identified in the catches of different gears used by the fishermen. Among the different types of nets, the highest number of species recorded in the catches of sein net (25) which was followed by cast net (18) and relatively less number of species were recorded in the catch of push net (7). The average highest catch was obtained with the sein net was average 4.26 kg/ day) and the lowest with the (traps) Bair (the average 0.60 kg/day). It was found that Muslims were featuring as the absolute majority (66.67%) the Hindus were remarkably lower (33.33). The largest family size (8 persons) belongs to the seine net fishermen whose income was the highest (160/-TK/month) and the lowest family size (5 persons) was found among the current jal and the lowest income was found for long line fishermen (520 Tk/ month). it may be included that fish population in this river have declined alarmingly due to embankment erosion , indiscriminant gears used and absence of management policy for the open water resources of Bangladesh.

Keywords: Fishing diversity, Catch Assessment, Fishermen Community

INTRODUCTION

Fisheries play an important role in nutrition, employment and foreign exchange earning as well as in other areas of Bangladesh economy. Fish alone supplies about 60 percent of animal protein and about 1.2 million people are directly employed by this sector. Another 11 million people indirectly earn their livelihood out of activity related to fisheries (Anonymous 1998). This sector contributes 5 percent of gross domestic product (GDP), and about 10 percent of total export earnings. The production of fish was estimated to be 1491000 Mt. fiscal year 1997-1998 as against production of 1257000 Mt. in 1995-96 (Anonymous 1998).

In Bangladesh there are two sources of fisheries-inland fisheries and marine fisheries. The inland fisheries again include capture fisheries and culture fisheries. Of these sources capture fisheries is the "most important. In 1997-98, 50 and 30 percent of total catch were obtained from capture fisheries, culture fisheries and marine fisheries, respectively (Anonymous 1991).

Banglagesh has a vast area of water bodies in the form of rivers, canals, haors and beels, reservoir, Kaptai Lake, Ox-bow lakes (baors), ponds, tanks, seasonally flooded areas and the Bay of Bengal. According to estimation the inland fisheries resources covers an area of 4.34 million hectares of which 94 percent comprises of natural fisheries and 6 percent of closed water culture fisheries. An estimated 1.03 million hectares of rivers and estuaries, 2.83 million hectares of floodplain, 1,14,161 hectares of beels and 68,800 hectares of Kaptai reservoir of her tremendous scope and potential augmenting fish production provided management techniques are adopted (Anonymous 1998).

Our knowledge about the aquatic life of a river is very limited due to lack of enough research work on various aspects of river. The river system is characterized by water currents, turbulence, geological and soil condition of the region through which the river flows. These factors are influenced by the inflow of tributaries and mostly by the drainage systems of the adjacent areas. The physico-chemical factors of the river are also influenced by various climatic conditions such as, sunshine, temperature, rainfall and humidity etc. Research work on ecological immunological and biological aspects of a river is very important for management of fishery resources to increase fish production.

In 1998-99, the number of fishermen was 1216 of which 60% were engaged in inland and

40% were marine fishing, respectively. It also appears that the number of fishermen engaged in inland capture is decreasing year by year. Since the inland fisheries play an important role to the employment opportunities (Third fisheries project, 1994), therefore, immediate efforts should be taken to proper management of these resources. Fishermen are one of the most vulnerable communities in Bangladesh. They are poor by any standard. Over the years economic condition of the fishermen has further deteriorated.

Alam *et al.* (1995) estimated the average per capita annual income of riverine fishermen families to be Tk. 2442, which is about 70% lower than the per capita income of the income of the country as a whole. Being an isolated community fishermen are deprived of many amenities of life. Actual condition of the fishermen community in general must be assessed to know the real potential riverine fishing as a source of income.

On the basis of above importance of such type of study, effective action plan for a comprehensive research program has yet been not taken up. Therefore, this study has been set out to assess the diversity of fishing gears used in the study area, to undertake a catch assessment and species composition and to understand the socio-economic condition of the fishermen.

MATERIALS AND METOHDS

Study Area

The study was conducted in the Jumuna River adjacent to the Dhunat Upazilla under the district Bogra during June to September 2001. The area of study side was about 4 km long with average depth 4.92 and wide 0.75 km. The river is an irregular shaped and in monsoon it is over flooded and affected the nearest villages.

Fishermen Category

In the study area the fishermen communities were divided into two (2) distinct groups such as, professional fishermen and subsistence fishermen. Sixty (60) fishermen were selected from professional and subsistence fishermen groups. The samples and relevant data were collected once weekly throughout the study period.

Sampling Procedure

Water samples were collected weekly at regular intervals from the Jamuna River.

Type of Gear Used

There are many types of gear used in the Jamuna River. The gears were surveyed at 6 (six) hours' intervals in each sampling day. A specially designed gear survey from was filled-up *liby* counting the gears.

Catch Assessment Survey (CAS)

Sapling of catches and their assessment were done once per week during the study period. The fishermen were selected on the basis of types of gear they operated. The total catches were weighed by a balance and the representative samples were taken with the help of hand without repetition of the same gear in each sampling day. The collected samples from different gears were taken in separate polythene bags gear-wise and brought to the Upazilla Fisheries Office, Shibganj, Bogra. The collected fishes were sorted species wise and the numbers of individuals for each species were counted and then their percent composition was determined.

Preparation of Questionnaire

To collect data, preparation of questionnaire is very important. Before preparing the final questionnaire, a draft questionnaire was developed keeping in view the objectives of the study. The draft questionnaire was pre-tested in the study area by interviewing a few fishermen by the researcher himself. The questionnaire was then changed, modified and rearranged according to the experience gather in the testing. The final questionnaire was then developed in logical sequence, so that the fishermen could answer chronologically. Questions related to socio-demographic condition, income of fishermen and the family members, factors affecting the level of fish production *and* other relevant aspects of riverine fishing were included in the questionnaire.

Collection of Data

To collect relevant data the single interview technique i.e. primary data were collected directly from the fishermen by the researcher himself. Several visits were made to the study area to collect accurate information related to objectives of the study. After each visits collected data were checked for accuracy and clarity.

RESULTS AND DISCUSSION

Fishing Gear Used

During the period of study, several types of fishing gear were found to operate in the study area, they were mostly of traditional type and some of them were unique for the particular locality. Gears were classified into three (3) groups, such as nets, traps and wounding gears. A brief description and mode of operation of 5 nets, 2 traps and I wounding gear recorded in the study area are given below.

Nets (Berjal): It is a rectangular net having large wall of netting and has two border lines. The upper border line contains floats at suitable interval. Floats may be made of bamboo, sola, light wood etc. The ground rope may (for large size net) or not (for smaller size net) have sinkers and lower border lines are united to a rope. These nets are widely used for encircling by stretching the net in the water body for catching fish, manipulating the head and ground floor. The nets are prepared in small pieces, which are joined together at the time of operation according to the necessity; sometimes it is as long as 250 m and locally called "jagat Ber Jal". This net is commonly used in rivers as well as other water bodies like beels, haors etc. Usually large varieties of fish are caught by this gear. It requires normally 5-6 manpower in operation.

Nets (Jhaki Jal): It is a conical shaped circular net made of nylon or cotton twine. The mesh size of the net varies with the types of water body and the target fishes. A long string about 5-7 m is attached to the apex of the cone. Iron weight in cylindrical form is attached at a regular interval around the peripheral end with the help of strong string. The string with weight is attached to some upper meshes directly about 10-20 cm above the bottom forming pocket all along the circular end inside the net. When the net is casted it spreads out over the water surface circularly and when lifted it comes out in conical form. It is locally known as "Jhaki jal". It needs single fisherman for operation.

Nets (Dharma jal): The net is fasted at the comers of four diagonal bent, split bamboo. The lift pole is tied at the center of the crossed bamboo poles and is handled like a level to lift the net from the water. In addition to the bamboo handle, occasionally a rope is used to facilitate the manipulation of the net. It is operated in shallow water bodies in low current and standing water. The net let down into the water and after sometimes, the net is raised and fish are collected by hand. It is also known as Sib jal. It demands 112 fishermen for operation.

Nets (Current jal): It is a rectangular net of single wall made of synthetic or cotton twine with a head rope but with or without foot rope. To the head rope floats are attached while the ground ropes may or may not have sinkers. During the operation, it is fixed by poles in all depth of water. The fishes trying to force their way through the nets are caught in the mesh and secured by their gills. The size of mesh varies from place to place depending on the size of fish to be caught. It is also known as "Fash jal" when it is made of cotton twine. It also requires 1-2 fishermen for operation.

Nets (*Thella jal*): It is a triangular net. Two bamboo poles, one longer than the other, are fixed at an angle of about 30 degrees to a third front pole. The longer portion of one of the poles used as a handle. To the triangular frame the net is fastened. During the operation triangular portion is lowered and is pushed forward over the bottom of water to a certain distance and lifted on small fish like punti, tengra, khalisha, chanda, darlona, icha etc, are caught by this net and used through out the year in shallow portion of water bodies.

Traps

Bair: It is a tubular shaped basket like trap. The bamboo sticks are arranged in parallel one after another and them with cane materials to make the structure of this gear. There is a unidirectional valve at the mouth and single opening at the upper side. It is mainly operated in shallow running water and set against the water current. Fish once entered through the valve can not escape. Traped fish are gathered at the back side. After certain period of time fish are collected through the opening. Here requires single fishermen to operate.

Dharki: It is a rectangular shaped trap which is made of bamboo stick and plates. There are two bulbs at the front side from top to bottom and one at upper side. This trap is used in shallow running water body setting at the middle point of paddy field and sometimes used in the river side with the help of bana. Fish enter through the valve and trapped.

Wounding Gear

Borshi: One end of this gear is round which attached with a twine. The other end which is bent and barbed with pointed edge. On the basis of mode of operation in the water bodies, borshi can be classified into three types, such as, daon borshi, noll borshi and chip borshi. In case of daon borshi, borshi is hung on at a suitable interval from a large rope. The two end of the main line are :ftxed to stakes on the opposite banks in case of river on two bouys. The lines are shot at night and hauled in the morning. At a time 15-25 borshi are hung on the line. In case of noll borshi, borshi is hung on from the bambo stick or sola with the help of fishing twine. In case of chip borshi, borshi is hWlg from the fishing rod with help of fishing twine. Here a float is nothing but a piece of sola or reed. While a piece of lead or iron from a sinker. The most commonly used baits are earthworm, insect larva, small fishes, semi-fermented small fish, live frogs, floW' paste etc. It is used roWld the year.

Weekly Variation of Gears Used

Weekly variations in the use of nets : Weekly variations in the use of nets in the Jamuna River are shown in Table 1. It was found that, the highest number (18) of berijal was operated in the 8th and the 16^{th} week and the lowest number (13) of berijal were operated in the 2nd and the 12^{th} week. There was no berjal operated in the 4^{th} , 5^{th} , 9^{th} and 10th Weeks. The highest (25) and the lowest (13) number of Jhaki jal operated in the 1st and the 10^{th} week respectively. In case of Dharma jal, it was found that the highest (25) and the lowest (10) number were recorded in the 5^{th} and 15^{th} week respectively. The highest (26) and the lowest (10) number of current jal were operated in the study area were recorded in the 5^{th} and the 13^{th} week respectively. In the 2^{nd} , 7^{th} , 8^{th} and 16^{th} week no current jal were operated. The highest (18) and the lowest (8) number of thelia jal operated in the study area were recorded in the 16^{th} week respectively.

Weekly Variation in the Use of Traps and Wounding Gears

Weekly variation in the use of traps and wounding gears in the Jamuna River are shown in Table 2. The highest (36) and the lowest (12) number of traps operated in the study area were recorded in the 3^{rd} and the 8^{th} week respectively. It was found that no traps were operated in the 15^{th} and the 16^{th} week. In case of wounding gear the highest (24) and the lowest (8) number of borshi were operated in the 4^{th} , 10^{th} and the 7^{th} weeks respectively.

Nam of the	Weeks															
nets	1 st	2 nd	3 rd	4 th	5 th	6 th	7^{th}	8 th	9 th	10 th	11 th	12 th	13 th	14 th	15 th	16 th
Bar jal	15	13	17	-	-	14	16	18	-	-	15	13	16	17	17	18
Jhaki jal	25	22	23	24	21	18	20	15	17	13	21	20	18	17	19	14
Dharma jal	23	20	24	27	25	17	15	18	20	22	16	17	14	-	10	-
Current jal	10	-	20	24	26	24	-	-	18	15	14	12	10	18	14	-
Thella jal	18	10	8	-	-	12	14	10	-	-	12	14	-	-	10	8
Total	91	80	92	72	72	85	88	83	55	50	78	76	58	52	69	40

Table 1. Weekly observation in the use of nets

Table2.Weekly	variation	in the us	e of traps	s and wour	nding gears
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Types of	Nam of			Weeks													
gears	the gears	1^{st}	2 nd	3 rd	4 th	$5^{\rm th}$	6 th	$7^{\rm th}$	8 th	9 th	10^{th}	11 th	12^{th}	13 th	14 th	15 th	16 th
	Bair	25	20	24	-	-	26	27	12	-	-	20	23	20	18	-	-
Traps	Dharki	-	-	12	15	14	10	-	-	13	15	13	10	8	-	-	-
	Total	25	20	36	15	14	36	27	12	13	15	33	33	28	18	-	-
Woundin g gears	Borshi	12	13	16	24	20	16	8	18	23	24	17	18	14	17	16	14
Total numb	er of gear	37	33	51	39	34	51	35	30	36	39	50	51	42	35	15	14

Diurnal observation in the Number of Gear Used

Diurnal variations in the number of gears used in the Jamuna River are presented in the Table 3. At 6.00 am nets were seen to be operated more frequently than other gears. At 10.00 am and 2.00 pm nets were operated in less numbers with an increase at 6.00 pm. The highest numbers of traps were operated at 6.00 am but no traps were operated at 2.00 pm in the study area. Borshi were operated at 6.00 pm in highest number.

Types of gear	Name of gears		Time	e of day	
Types of gear	Name of gears	6.00am	10.00am	2.00pm	6.00 pm
	Berjal	8	7	10	6
	Jhakija1	16	12	8	10
Nata	Dharmajal	15	10	9	12
Inets	Currentjal	13	7	3	10
	Thellajal	10	7	4	-
	Total	62	43	25	38
	Bair	30	14	-	20
Traps	Dhaki	12	8	-	9
	Total	42	32	-	29
Wounding goors	Borshi	8	5	4	10
woulding gears	Total	8	5	4	10
Total number	Total number of gears		80	29	77

Table 3. Diurnal observation in the use of gears in the Jamuna River

Catch Assessment Survey (CAS)

Species composition: During the study period a total of 38 species of fishes were recorded in the catches of different gears by the fishermen on the part of the Jamuna River. The species composition of fishes of different types of gear is shown in Table 4 and 5 respectively.

Nets (Berjal): In the catches of berjal a total of 25 species of fishes including chingri were recorded during the study period. Among the 25 species, chapila was found to be highest species which contributed about 30.92% and ilish was found to be lowest species that contributed about 0.19% of the catch. The next dominant species recorded were choto chingri (19.46%), chanda lama (5.15%), chanda ranga (4.56%) and kajuli (3.82%). The rest of the species were found to contribute insignificantly to the catch.

Nets (Jhaki jal): A total of 18 species of fishes including prawn (chingri) were recorded during the study period in the catches of jhaki jal. Among the 18 species, chot chinghri (icha) was found to be the highest in quantity which contributed about 37.72% and kalibaus was found to be the lowest species which contributed 0.57% of the catches. The next dominant species were recorded chapila (6.29%), batashi (5.71%), gochibaim (4.29%), gutum and titpunti (3.43%), ranmsh (2.86%), kajuli and tengra (2.29%), of the catches. The rest of the species were found to contribute insignificant quantity to the catch.

Nets (*Dharma jal*): A total of 15 species of fishes were recorded in the catches of dharma jal during the study period. Among the 15 species choto chingri was found to be highest species which contributed about 42.29% and the lowest species was bain which contribute about 0.85% in the catches. The next dominant species were lama chanda (9.04%), chapila (6.5%), baila and darkina (5.65%), jatpunti (4.8%), gochi baim and ranga chanda (3.39%). The rest of the species were found to contribute less significant to the total catch.

Nets (Current jal): In the present study, in case of current jal a total of 13 species were recorded during the study period. Among them titpunti was recorded as the highest species which contributed about 21.95% and boal was recorded as the lowest species which contributed about 1.22% of the catch. The next dominant species were bheda (18.30%), tengra (14.63%), golsha (9.75%), jatpunti and cui fly (7.31%), singh (4.88%),gama and koi (3.5%), magur and pabda (2.44%).

Nets (Thellajal)

In the catches of thella jal, a total of 7 species of fishes were recorded during the study period. Among the different species icha was found to be highest in number which contributed about 51.51 % and polka was found to be lowest species which contributed about 0.76% of the catch. The next dominant species were recorded were baila (18.18%), titpunti (12.87%), jatpunti (9.1%), darkina (6.06%) and lata (1.52%).

Species (Local	Ber	jal	The	ella jal	Dharn	na jal	Curre	nt jal	Jhak	i jal
Name)	Number	% of	Number	% of total	Number	% of	Number	% of	Number	% of
	of fish	total	of fish	% 01 total	of fish	total	of fish	total	of fish	total
Chapila	162	30.92	-	-	23	6.50	-	-	92	26.29
Batasi	12	2.30	-	-	-	-	-	-	20	5.17
Tengra	10	1.91	-	-	7	1.98	12	14.63	8	2.29
Balia	15	2.86	24	18.8	20	5.65	-	-	5	1.43
Tit punti	65	12.40	17	12.87	21	5.93	18	21.95	12	3.43
Jat punti	9	1.72	12	9.1	17	4.80	6	7.31	6	1.71
Chela	4	0.76	-	-	-	-	-	-	-	-
Bheda	-	-	-	-	-	-	15	18.30	4	1.14
Golda chingri	3	0.57	-	-	-	-	-	-	5	1.43
Golsha	-	-	-	-	-	-	8	9.75	4	1.14
Kajuli	20	3.82	-	-	-	-	-	-	8	2.29
Rui fry	7	1.34	-	-	10	2.82	6	7.31	3	0.85
Catla fry	10	1.91	-	-	-	-	-	-	7	2.00
Mrigal fry	7	1.34	-	-	-	-	-	-	-	-
Kalibaus	3	0.57	-	-	-	-	-	-	2	0.75
Gochi baim	13	2.48	-	-	12	3.93	-	-	15	4.29
Ilish	1	0.19	-	-	-	-	-	-	-	-
Gutum	-	-	-	-	16	4.52	-	-	12	3.43
Choto chingri	102	19.46	68	51.52	152	42.94	-	-	-	37.72
Baim	-	-	-	-	3	0.85	-	-	132	1.43
Rani fish	2	0.38	-	-	-	-	-	-	5	2.86
Rangha chanda	24	4.56	-	-	12	3.39	-	-	10	-
Lama chanda	27	5.15	-	-	32	9.91	-	-	-	-
Boal	3	0.57	-	-	-	-	-	1.22	-	-
Air	-	-	-	-	-	-	1	2.44	-	-
Ghaura	5	0.96	-	-	-	-	2	3.65	-	-
Koi	-	-	-	-	-	-	3	3.65	-	-
Shing	-	-	-	-	-	-	4	4.88	-	-
Lata	-	-	2	1.52	-	-	-	-	-	-
Magur	-	-	-	-	-	-	2	2.44	-	-
Kakila	12	2.29	-	-	5	1.41	-	-	-	-
Bagna	3	0.5	-	-	-	-	-	-	-	-
Potka	2	0.38	1	0.76	-	-	-	-	-	-
Khalisha	3	0.57	-	-	1.13	1.13	-	-	-	-
Darkina	-	-	8	6.06	5.65	5.65	-	-	-	-
Pabda	-	-	-	-	-	-	2	2.44	-	-
Total no of fish	524	100	132	100	100	100	82	100	350	100

Table 4. Average species composition (% of catch by number) of fishes of different types of nets used in the Jamuna River

Traps

Bair: During the present study about 5 species were recorded in the catches of bair trap. Among the 5 species galda chingri was found to be the highest which contributed about 37.15% and *Mystus aor* was found to be lowest which contributed about 5.71% in the catch. The next dominant species recorded were icha (28.57%), golsha (20.58%), titpunti (8.57%).

Dharki: About 6 species were recorded during the study period in the catches of dharki traps. Among them choto chingri (leba) was found to be highest which contributed about 80.29% and kholsba was found to be the lowest which contributed abut 1.12% in the catch. The next dominant species recorded were titpunti (6.69%), baila (5.57%), gutum (4.46%) and galda chingri (1.86%).

Wounding Gear

Borshi: In the catches of wounding gear-borshi, about 8 species were recorded during the study period. Among them jatpunti was fount to be highest in number which contributed about 29.31 % and boal was found to be lowest which contributed about 3.45% in the catch. The next dominant species recorded were titpunti (22.41%), baila (13.80%), lata (10.34%), tengra (6.90%) and gajar (5.17%).

Table 5. Average species composition (% of catch by number) of fishes of the different types of traps and wounding gears (borshi) used in the Jmuna Rivar

Species (Local name)		Name of gears											
	Bai	r	Dha	rki	Bors	shi							
	Number of fish	% of total	Number of fish	% of total	Number of fish	% of total							
Golda chingri	13	37.15	5	1.86	-	-							
Air	2	5.71	-	-	-	-							
Golsha	7	20	3	1.12	-	-							
Gutum	-	-	12	4.46	-	-							
Tit punti	3	8.57	18	6.69	13	22.41							
Icha	10	28.57	216	80.30	-	-							
Baila	-	-	15	5.57	8	13.80							
Gajra	-	-	-	-	3	5.17							
Jat punti	-	-	-	-	17	29.31							
Shol	-	-	-	-	5	8.62							
Boal	-	-	-	-	2	3.45							
Lata	-	-	-	-	6	10.34							
Tengra	-	-	-	-	4	6.90							
Total number of fish	35	100	296	100	58	100							

Weekly Comparison of Total Catch of Fishes (in kg) by different Fishing Gears Used

Weekly comparison of total catch rates/catch per unit of effort (kg/gear) of nets, traps and wounding gears are presented in Table 6. In the present study, in case of nets, the highest catch per unit of effort (CPUE) was found in the 14^{th} week and lowest catch per unit of effort (CPUE) was found in the 1^{st} week, which was 3.13 kg/gear and 1.31 kg/gear respectively. Incase of traps, the highest catch per unit of effort was found in the 6^{th} week and lowest in the 10^{th} week, which were 0.95 kg/gear and 0.40 kg/gear respectively. Incase of wounding gears (borshi) the highest catch per unit of effort (CPUE) was found in the 11^{th} week and lowest in the 4^{th} week which were 1.00 kg/gear and 0.45 kg/gear, respectively.

Table 5. Weekly catch composition (kg) of different fishing gears used

Types of	Nom of the							Weekl	y catch c	ompositio	on (Kg)							Average
gears	gears	1 st	2^{nd}	3 rd	4 th	5 th	6 th	7^{th}	8 th	9 th	10^{th}	11^{th}	12 th	13 th	14^{th}	15 th	16 th	catch (Kg/day)
	Bar jal	3.0	4.0	3.5	-	-	0.05	5.20	4.30	-	-	3.60	5.15	5.5	5.75	6.0	5.15	4.26
	Jhaki jal	1.75	1.50	1.25	0.75	0.50	1.30	1.62	2.50	2.00	1.35	2.00	2.15	2.00	2.15	1.5	1.25	1.59
Nata	Dharma jal	1.05	0.70	0.85	1.00	1.5	0.75	0.50	0.75	1.30	1.65	1.25	1.15	0.85	-	0.25	-	1.03
Inets	Current jal	0.50	-	1.75	2.15	3.25	1.50	-	-	2.10	2.75	2.00	1.50	1.75	1.50	1.25	-	1.83
	Thella jal	0.25	0.20	0.15	-	-	0.30	0.40	0.45	-	-	0.25	0.50	-	-	2.58	0.02	0.51
	Total catch	6.55	6.40	7.50	3.90	5.25	5.90	7.72	8.00	5.40	5.75	9.10	10.45	10.10	9.40	11.58	6.42	7.46
Total catch r	ates (Kg/gear)	1.31	1.60	1.50	1.30	1.75	1.18	1.93	2.00	1.80	1.91	1.85	2.09	2.53	3.13	2.79	2.14	
	Bair	0.50	0.75	1.0	-	-	0.65	0.80	0.50	-	-	0.25	0.40	0.55	0.65	-	-	0.60
Traps	Dharki	-	-	0.65	0.75	1.0	1.25	-	-	0.50	0.40	0.60	0.70	0.65	-	-	-	0.72
	Total catch	0.50	0.75	1.65	0.75	1.0	1.90	0.80	0.5	0.50	0.40	0.85	1.10	1.20	0.65	-	-	0.78
Total catch r	ates (Kg/gear)	0.50	0.75	0.83	0.75	0.10	0.95	0.80	0.50	0.50	0.40	0.43	0.55	0.60	0.65	-	-	-
Wounding gears	Borshi	0.95	0.90	0.72	0.45	0.50	0.70	0.55	0.65	0.75	0.85	1.00	0.75	0.65	0.60	0.55	0.45	0.68
Total catch r	ates (Kg/gear)	0.95	0.90	0.72	0.45	0.50	0.70	0.55	0.65	0.75	0.85	1.00	0.75	0.65	0.60	0.55	0.45	0.68

Socio-economic Condition of the Riverine Fishermen

The objective of this chapter is to understand the socio-economic condition of the riverine fishermen of the study area. Emphases are given on different variables such as religion, family size and composition, experience in fishing, occupational structure, income etc.

Religion

The status of religion of riverine fishermen is presented in the Table 7. About 66.67% and 33.33% riverine fishermen were Muslims and Hindus respectively.

Religion		Riverine fi		Total	% of total	
	Male	% of Male	Female	% of Female		
Muslim	35	87.50	5	12.5	40	66.67
Hindus	17	85.00	3	15.00	20	33.33
Others						
Total	52	86.67	8	13.33	60	100

Table6. Religious status of the riverine fishermen of the Jamuna River

Family Size and Composition

Within the riverine fishermen according to gear types, the largest family size (8 persons) belongs to the berjal fishermen and lowest family size (5 persons) was found among the current jal fishermen. The next dominant family size recorded were borshi (7 persons), dharki (7 persons), jhakijal (7 persons), dannajal (7 persons), bair (6 persons), thelia jal (6 persons). Average family size of the f18hermen of the all gears was found 6.62 persons in the Table 8.

Educational Status

The status of education of the riverine fishermen is presented in the Table 9. In all gears 63.33% of riverine fishermen were illiterate, 31.67% of riverine fishermen were up to primary level of education and 5% riverine fishermen had only secondary level of education.

Table 7. Family size and composition of riverine fishermen by sex and gear type of the Jamuna River

Riverine fishermen													
Sex	iex												
	BeIjal	Jhaki jal	Dhanna jal	Cnrrent jal	The11a jal	Bair	Dharlci	Borshi	hennen				
	N=12	N=lO	N=9	N=7	N=4	N=7	N=5	N=6	N=60				
Male	5	4	4	3	4	4	4	5	33				
% of Male	62.5	57.15	57.15	60	66.67	66.67	57.15	71.43	62.27				
Female	3	3	3	2	2	2	3	2	20				
% of Female	37.5	42.85	42.85	40	33.33	33.33	42.85	28.57	37.73				
Total family members	8	7	7	5	6	6	7	7	6.62				
% of Total family members	(100)	(100)	100	(100)	(100)	(100)	(100)	(100)	(100)				

Table 8. Educational status of riverine fishermen of the Jamuna

Loval of				Riverine fish	ermen				All
advastion	Berjal	Jhakijal	Dharma Jal	Current Jal	Thella Jal	Bair	Dharki	Borshi	gears
education	N=2	N=10	N=9	N=7	N=4	N=7	N=5	N=6	N=60
Illiterate	9	5	5	4	3	5	4	3	38
% of Illiterate	75	50	55.56	57.14	75	71.43	80	50	(63.33)
Primary level	3	4	4	2	1	2	1	2	19
% of Primary level	25	40	44.44	28.57	25	28.57	20	33.33	(31.67)
Secondary level	-	1	-	1	-	-	-	1	3
% of secondary level	-	10	-	14.29	-	-	-	16.67	(5.00)
Total number of fishermen	12	10	9	7	4	7	5	6	60
% of Total number of fishermen	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)

Average Monthly Income of Riverine Fishermen According to Gear Types

Average monthly income of riverine fishermen according to gear types are presented in the Table 10. The highest average monthly income was found among the betjal fishermen and they earned 20.97% income from fishing as the main occupation, and the lowest average monthly income was found among the thella jal fishermen and they earned only, 6.81% income from fishing.

Name of gears	Riverine fishermen		Total average monthly income (TK)	% of Total income
	Male	Female	-	20.97
Berjal	1600	-	1600	16.76
Jhaki jal	1280	-	1280	8.85
Dhanna jal	820	530	675	8.32
Current jal	780	490	635	6.81
Thella jal	520	-	520	13.43
Bair	1025	-	1025	16.71
Dharki	1275	-	1275	8.13
Borshi	720	520	620	
Total	8020	1540	7630	100

Table 9. Average monthly income of riverine fishermen by gear types of the Jamuna River

SUMMERY AND CONCLUSION

The fishermen were found to follow three (3) fishing techniques viz, netting, trapping and angling. Within the fishing techniques three (3) types of fishing gears were recorded to be used by the fishermen for fishing. Among them (5) were fishing nets, two (2) fishing traps, one (1) wounding gear. A total of 38 species of fish were identified in the catches of different gears in this river.

In case of nets the number of species was recorded in the catches of ber jal (25), which was closely followed by jhaki jal (18). Relatively less number of species was recorded in the catches of current jal (13), dharma jal (15) and thela jal (7). in the traps, bair (5) and dharki (6) were found to catch a variety of species of fish. Wounding gear, borshi (8) caught more species of fish than the rest of the hooks and lines. Weekly average highest catch rates, CPUE (3.13 kg/gear) were recorded in nets and the lowest catch (0.40 kg/gear) in the traps.

Socio economic condition of riverine fishermen communities were presented in terms of religion, family size and composition, educational status and income etc, in the present investigation, it was found that the Muslims were featuring as the absolute majority of the fishermen. About 66.67% and 33.33% riverine fishermen were the Muslims and Hindus respectively.

The average monthly income of the berjal fishermen was the highest and they earned 20.97% income from fishing as the main occupation and average monthly income of thella jal fishermen was the lowest and they earned 6.81% income from fishing. it may be concluded that berjal fishermen were more efficient than other gears.

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