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Socio-Economic Conditions of *Jatka* Fishers in Some Selected Spots of Meghna Estuary

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Abstract: The present study was conducted to know activities and causes of illegal *Jatka* fishing of Meghna River in Bangladesh. The aim was to assess catch per unit effort (CPUE) and abundance of *Jatka* in three spots of Meghna River and the livelihood of fishermen in the study areas. Data were collected randomly interviewing, arranging focus group discussion (FGD) and participatory rural appraisal (PRA) among fishermen and market chain members. The CPUE of *Jatka* was 63-84kg/1000m during peak season (Nov-Jan) and 30-37kg/1000m net/hour during lean season (Feb-Mar) respectively in three spots (Sadar of Noakhali, Ramgati of Lakshmipur, Chairmanghat of Noakhali). The highest CPUE of *Jatka* was 6.05kg/100m net/ hour at Ramgati and the lowest was 4.8kg/100m net/ hour at Chandpur and moderate was 5.15 kg/100m net/hour at Chairmanghat. The CPUE of *Jatka* was 100kg/boat/day at Chandpur and fishing season is December to March. The CPUE of Jatka is 110kg/boat/day at Ramgati and fishing season is November to March. The CPUE of *Jatka* was 106kg/boat/day at Chairmanghat and fishing season is September to January. 35%, 33% and 32% kg of *Jatka* was caught/boat/day at Ramgati, Chairmanghat and Chandpur respectively. The highest abundance of *Jatka* was $363/5.40\times10^7$ m^2 at Ramgati and the lowest is $288/5.40\times10^7$ m^2 at Chandpur. The moderate abundance of *Jatka* was $309/5.40\times10^7$ m^2 in Chairmanghat. Relatively young men of 31-45 years age group dominated in all study locations. In the study 90% of fishermen were Muslim and majority belonged to nuclear family with members ranging from 5 to 6, above the national average. As for standard of living, nearly half (47-55%) of fisher's family do not uses sanitary latrine. In study 100% have access to tube-well water. About 59% of fishers' family had corrugated tin-shed house in all study areas. It was found that in average 55% are workers in fishing boats on profit sharing basis and the rest are single or group owner of either boat and/or net. Monthly income of the fishers in study area reportedly very low in average BDT 4,500 during season and only BDT 2000 during off-season. One third of fishers' were found to be literate who can read and write one was reportedly know how to sign his name and the rest was reportedly illiterate. In terms of general health care, roughly one third get access to medical public or other form of Medicare. In average 45% reportedly get some form of subsidy (VGF card) from Government during banning period but it is not sufficient to maintain their livelihood.

Key words: *Jatka* · Meghna River · Catch Per Unit Effort (CPUE) · Livelihood

INTRODUCTION

Hilsa is the highest contribution in country's fish production amounting 1.0% to the GDP of Bangladesh. The production of hilsa depends on the survivability of *Jatka* (small hilsha fish ranges not up to 10 inch long). To save hilsa and increase its annual production protection of *Jatka* in their nursing ground is vital and government has banned *Jatka* fishing in the country. Unfortunately, complete stoppage of *Jatka* fishing could

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not be implemented due to many reasons. One of the reasons may be socio-economic and livelihood status of the fishers' community. Hilsa production will be doubled if 10% *Jatka* will survive [1, 2]. The production of hilsa is increasing day by day due to take the step of *Jatka* conservation activities from 2003-2004. Hilsa remains in *Jatka* condition from November to May in our country. Protection and conservation of fish act 1950 contain catching of *Jatka*, purchasing-selling and transportation is prohibited from November to May. But there are some reasons (e.g. current *jaal* production, shrinkage of rivers, river training, water pollution, lack of employment, insufficient of subsidy to the *Jatka* fishermen, population explosion, lack of patriotism, political influence, poverty, trap of Mohajon, lack of collaboration) which hindrance the implementation of *Jatka* conservation.

In Bangladesh there are about 2% of the country's total population depending for their livelihood on the hilsa fishery (Hilsa and *Jatka* catching) directly or indirectly [3]. The hilsa stocks are exploited by a variety of gears, the most common of which are clap nets, gillnets, driftnets, seine nets, barrier nets and fixed bag nets. The largest part of the harvest, however, is caught by gillnets. These gillnets are set with the help of small (usually under 10 m.) non-motorized and motorized fishing vessels boats. According to Kleih *et al.* [4], 88% of hilsa is marketed for domestic consumption while the remaining 12% is exported. The fall in catch per boat while maybe not identical to catch per unit effort, may be indicative of the decline in the hilsa stock during the period.

Jatka fishing was increased in 4-5 times more in 2014 than 1990. In experimentally shows that about 2.72 kg of *Jatka was get* per unit hour and per 100 m gill net in the downstream of the Meghna River [5]. According to Day [6] the minor breeding migration in March-April in the upper Irrawaddy takes place when the rivers are flooded by melting snow, not by monsoon rains. Doubted whether the fish is truly anadromous as it is found in the Ganga and Gangetic delta practically at all times of the year. Shoals of hilsa visit the Palk Bay annually from November to May when a regular sea fishery is noticed.

MATERIALS AND METHODS

Selection of the Study Area: The study was conducted in the three stations of the Meghna River from August 2013 to December 2013 to study the determination of catch per unit effort (CPUE) of *Jatka*, abundance of *Jatka* and livelihood condition of Jatka fishermen. The following procedures were followed in conducting the present study.

Data Collection Method: Primary data were collected through both quantitative and qualitative methods. Direct Interview through structured questionnaire, interview schedule, Observation, depth interview, focus group discussion and check list were used to collect primary data. A pilot survey was conducted in the study area in order to know the technical details and conditions of the target sample respondents. Secondary materials for the study were collected from the Bangladesh Fisheries Research Institute (BFRI), Chandpur. Besides, various government documents and publications like Fourth Fish Project, DoF; Statistical Year Books and Economic Survey Reports were also reviewed to collect data and cross reference.

Data Processing and Analysis: Data were prepared for analysis after assortment of the data. Data collected in local unit were altered into standard unit in order to lessen miscalculation then it put into the table and transferred to computer. All calculations were calculated by using Microsoft Excel 2007.

RESULTS

Catch per Unit Effort of *Jatka* Is Estimated at Chandpur: It was found that about 63 kg *Jatka* caught per hour in the peak season and 33 kg *Jatka* in lean season by a current net 1000m long and 5-6 m in breadth. Fishermen claimed that the peak season of Jatka fishing in and around Chandpur areas are done during November to January as shown in Table 1 and Table 2.

The catch per unit effort of *Jatka* fishing in lean season is from February to March which is summarized in Table 2.

Catch per Unit of Jatka Is Estimated in Ramgati of Lakshmipur: It was found that about 84 kg *Jatka* caught per hour in the peak season and 37 kg Jatka in lean season. Fishermen claimed that the peak season of *Jatka* fishing in and around Chandpur areas are done during November to January as shown in Table 3 and Table 4.

The catch per unit effort of *Jatka* fishing in lean season is from February to March which is summarized in Table 4.

Catch per Unit Effort of *Jatka* Is Estimated in Chairmanghat of Noakhali: It was found that about 73 kg *Jatka* caught per hour in the peak season and 30 kg Jatka in lean season. Fishermen claimed that the peak season of *Jatka* fishing in and around Chandpur areas are done during November to January as shown in Table 5.

Table 1: CPUE of *Jatka* in Chandpur (peak season)

Stakeholder (Fishermen)	Net length (m)	Net width (m)	Catch (kg)	Fishing (hour)	Peak season
Group-1	1000	5-6	90	1	Nov- Jan
Group-2	1000	5-6	33	1	Nov- Jan
Group-3	1000	5-6	67	1	Nov- Jan
Average			63		

Table 2: CPUE of Jatka in Chandpur (lean season)

Stakeholder (Fishermen)	*Net length* (m)	Net width (m)	Catch (kg)	Fishing (hour)	Lean season
Group-1	1000	5-6	35	1	Feb- Mar
Group-2	1000	5-6	55	1	Feb- Mar
Group-3	1000	5-6	10	1	Feb- Mar
Average			33		

Table 3: CPUE of *Jatka* in Ramgati of Lakshmipur (peak season)

Stakeholder (Fisher men)	Net length (m)	Net width (m)	Catch (kg)	Fishing (hour)	Peak season
Group-1	1000	5-6	115	1	Nov-Jan
Group-2	1000	5-6	63	1	Nov-Jan
Group-3	1000	5-6	75	1	Nov-Jan
Average			84		

Table 4: CPUE of *Jatka* in Ramgati of Lakshmipur (lean season)

Stakeholder (Fisher men)	Net length (m)	Net width (m)	Catch (kg)	Fishing (hour)	Lean season
Group-1	1000	5-6	25	1	Feb-Mar
Group-2	1000	5-6	45	1	Feb-Mar
Group-3	1000	5-6	40	1	Feb-Mar
Average			37		

Table 5: CPUE of Jatka in Chairmanghat of Noakhali (peak season)

Stakeholder (Fisher men)	Net length (m)	Net width (m)	Catch (kg)	Fishing (hour)	Peak season
Group-1	1000	5-6	56	1	Nov-Jan
Group-2	1000	5-6	44	1	Nov-Jan
Group-3	1000	5-6	120	1	Nov-Jan
Average			73		

Table 6: CPUE of *Jatka* in Chairmanghat of Noakhali (lean season)

Stakeholder (Fisher men)	Net length (m)	Net width (m)	Catch (kg)	Fishing (hour)	Lean season
Group-1	1000	5-6	15	1	Feb-Mar
Group-2	1000	5-6	30	1	Feb-Mar
Group-3	1000	5-6	45	1	Feb-Mar
Average			30		

The catch per unit effort of Jatka fishing in lean season is from February to March which is summarized in Table 6, 7, 8 & 9.

CPUE of Jatka in Chandpur Is Estimated by per Boat: Fishermen stated that on an average 100 kg *Jatka* is caught per boat per day. The catch per unit effort of *Jatka* in Chandpur is summarized in Table 7.

Comparison of Cpue of in the Three Stations of *Jatka* by per Boat/day: The investigation showed that the percentage of *Jatka* fishing is comparatively higher in Ramgati and lower in Chandpur (Fig. 1).

Catch Amount of *Jatka* and Other Fishes in Different Months in Three Stations of the Meghna River: It was showed that December is the highest catch of Jatka and March is the highest by catch of fishes and vice versa (Fig. 2).

Contrast of *Jatka* Abundance among the Three Stations (Chandpur, Ramgati and Chairmanghat) of the Meghna River: Fishermen claimed that the abundance of *Jatka* is depended on the migration system, water quality parameter and plankton availability. It was that the highest abundance of *Jatka* at Ramgati, lowest in Chandpur and moderate in Chairmanghat which is summarized in Table 10.

Table 7: CPUE of *Jatka* in Chandpur

Number of FGD	Net length(m)	Net width(m)	Catch amount (kg/boat/day)	Fishing season
01	1000-1500	5-6	96	Nov-Mar
02	1000-1500	5-6	80	Nov-Mar
03	1000-1500	5-6	110	Nov-Mar
04	1000-1500	5-6	90	Nov-Mar
05	1000-1500	5-6	130	Nov-Mar
Average			100	

Table 8: CPUE of *Jatka* in Ramgati of Lakshmipur

Number of FGD	Net length (m)	Net width(m)	Catch amount (kg/boat/day)	Fishing season
01	1000-1500	5-6	120	Nov-Mar
02	1000-1500	5-6	105	Nov-Mar
03	1000-1500	5-6	100	Nov-Mar
04	1000-1500	5-6	90	Nov-Mar
05	1000-1500	5-6	135	Nov-Mar
Average			110	

Table 9: CPUE of *Jatka* in Chairmanghat of Noakhali

Number of FGD	Length of net(m)	Width of net (m)	Catch amount(kg/boat/day)	Fishing season
01	1000-1500	5-6	103	Nov-Mar
02	1000-1500	5-6	120	Nov-Mar
03	1000-1500	5-6	100	Nov-Mar
04	1000-1500	5-6	80	Nov-Mar
05	1000-1500	5-6	130	Nov-Mar
Average			106	

Table 10: Comparison of abundance of *Jatka* in three stations of the Meghna River

Sample Area	No. of Jatka/ $5.40 \times 10^7 m^2$	Percentage (%)	Rank of abundance
Chandpur	288	30.00	3
Ramgati	363	38.81	1
Chairmanghat	309	32.19	2
Total	960	100	

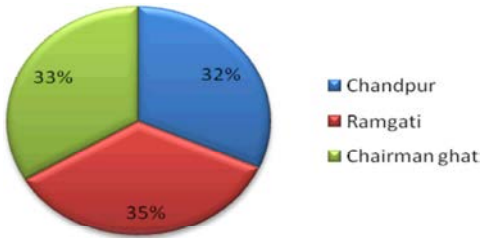

Fig. 1: The percentage of *Jatka* fishing in the three stations of the Meghna River

Socio-Economic Status of *Jatka* Fishermen Communities: The study emphasized on the fisher's livelihood condition over the year. The most marginalized segment of the population of this area especially land less people and their children were involved in *Jatka* fishing and trading for their livelihoods. Their levels of income fluctuate from time to time depending on the peak and lean seasons as well as on banned and non-banned season. A total of 61 randomly selected fishermen were interviewed for the collection of data.

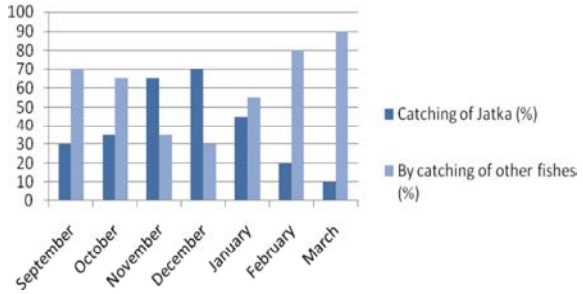

Fig. 2: Catch and by-catch of *Jatka* percentage in different months in three stations of Meghna River

Age Structure: Age of the respondents ranged from 7 to above 45 years and above 45 years. They were classified into four categories as child (7-15years), young (16-30 years), middle aged (31-45 years) and old above 45 years.

Chandpur: The highest proportions (54%) of fisher's community were middle aged and above 50 years were the lowest (9%).

Ramgati: The highest proportions (52%) of fisher's community were middle aged and above 45 years was the lowest (2%).

Chairmanghat: The highest proportions (43%) of fisher's community were middle aged above 45 years was the lowest.

Religious Status: In a study area religion can play a very important role in the socio-cultural activities of people. Majority of the people (in an average 90%) are Muslims. Very small percentages are Hindus. There are no Christians or Buddhists in the fisher's community.

Family Type: In rural Bangladesh, families were classified into two types: i) Nuclear family, married couples with children and ii) Joint family, group of people related by blood and/or law. The family functions as a unit for income generation, consumption, reproduction and social interaction. Most of the family types are nuclear family. Due to their family size, they prefer nuclear family.

Family Size: Family size was defined as the number of persons, either working or not, belonging to the same family. In the study, average family size of the Jatka fishermen was found 5.6. Family was categorized as small family (members up to 4), medium family (members 5 to 8) and very large family (members above 8). Chandpur-Small family was 45 % followed by medium family 46% and very large family 9%. Ramgati-Small family was 55 % followed by medium family 38% and very large family 7%. Chairmanghat-Small family was 59 % followed by medium family 32% and very large family 9% (Fig. 3).

Educational Status: Educational statuses of the respondents were categorized by the level of the education i.e. highest class passed by them. They were classified into following four groups on the basis of their education level (class passed). Chandpur-Most of the fishermen (36%) can sign only, 35% are illiterate and very low percentages of people (9%) have completed secondary education. Ramgati-Most of the fisherman (47%) are illiterate and 4% completed secondary education. Chairmanghat-Most of the fishermen (40%) can sign only, 36% are illiterate and 8% completed secondary education.

Housing Condition: In the study area houses of fishermen were of three main types as i) *Katcha* ii) tin shed and iii) half building. Chandpur- Housing condition were

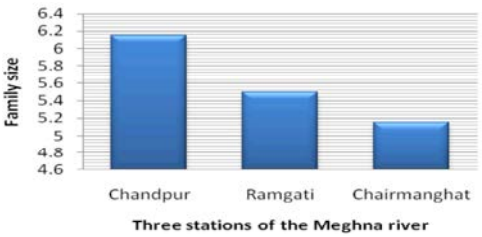

Fig. 3: Family sizes of the fishermen in the study areas

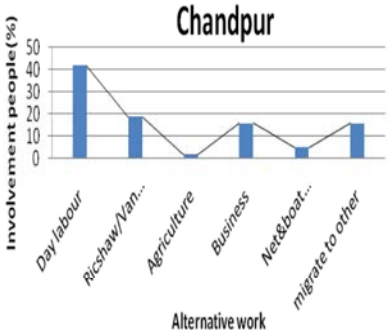

Fig. 4: Occupation during banning and lean season at Chandpur

dominated by *katcha* (33%), followed by tin shed (56%) and half building (11%). Ramgati- Housing condition were dominated by *katcha* (40%), followed by tin shed (54%) and half building (6%). Chairmanghat- Housing condition were dominated by *katcha* (30%), followed by tin shed (66%) and half building (4%).

Fishing Assets of the Fishermen: It was reported that the fishermen are very poor. They are trying to buy fishing boat and net for free access but few have. Most of the fishermen work on the other boat.

Occupational Status: It was reported that during banning season fishermen seek alternative income opportunities and involved in various occupations as day laborer, net making and mending, agricultural works etc. It was reported that fishermen do not plead guilty about illegal fishing of Jatka. It was showed that day labour is the highest proportion of people that are involved in alternative income (Figs. 4, 5, 6).

Monthly Income: It was showed that fishermen's income decreased to less than TK. 2,000 from TK. 4500 during banning and non-banning season.

Impacts of Banning Period on the Socio-Economic Conditions of *Jatka* Fishermen: It was known that few years ago Hilsa production decreased in our country due

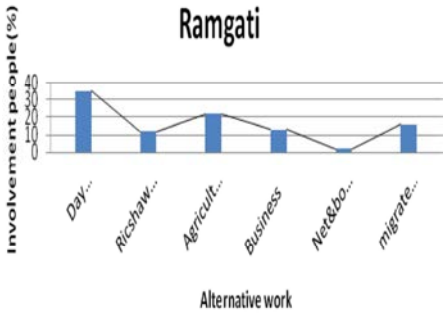

Fig. 5: Occupation during banning and lean season at Ramgati

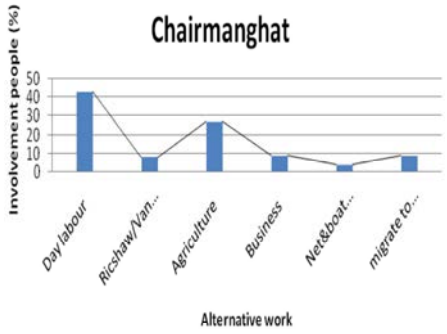

Fig. 6: Occupation during banning and lean season at Chairmanghat

to many reasons, one of which is tremendous catching of *Jatka* (Hilsa fish having a length less than 23 cm). Therefore Govt. banned *Jatka* fishing during November to May and all types of fishing during March-April and 14- 24 October. Banning period had a tremendous influence on the livelihoods of Hilsa fishermen.

Initiatives to Bear up During Banning Season: Present studies have identified several alternative livelihood strategies already adopted by the Jatka fishermen. Most of these alternatives have been driven by the Government stuff policy. Generally, the following alternatives with financial support have been provided by the government like, (1) Cow rearing (2) Goat and poultry rearing (3) rickshaw van; (4) sewing machine and (5).Tea and battle-leaf stall; (6) vegetable business and (7) tree plantation. Besides some alternative livelihood options for fishermen have been driven by some NGOs.

Loan: Most of the fishermen lived on hand to mouth. During banning season as their income source is about to ceased they were bound to borrow money from local *Mohajon or Aratdar* or NGO or local depot holder at a very high interest with some conditions. Amount of loan ranged between BDT 2,000 to 50,000. It was reported that on an average 17% more fishermen took loan during banning season compared with non-banning period

DISCUSSION

Cpue of *Jatka* in the Three Stations: CPUE of *Jatka* was high in Ramgati but low in Chandpur and medium in the Chairmanghat. In Chandpur *Jatka* catching rate was found to be 4.8kg/100m net/ hour, 6.05 kg/hour in Ramgati and 5.15kg/100m net /hour in the Chairmanghat. The average catch amount of *Jatka* was 5.33 kg/hour/ 100m net among the three stations of Meghna River. According to Rahman [5], 2.72kg *Jatka* is caught per hour per 100m net in different parts of the Meghna River in 2011. Jatka catching rate was 100 kg/day/boat in Chandpur, 110 kg / day / boat in Ramgati and 106 kg/day/boat in Chairmanghat. The peak season of *Jatka* fishing is Nov- Jan and the lean season of *Jatka* fishing is Feb- Mar. According to Rahman [5], the peak season *Jatka* in the coastal region of Bangladesh (downstream of Meghna River) is started from November to January. The availability of Jatka is depended on the breeding season of Hilsa. Generally Hilsa breeding season starts from Sep-Oct [7]. About 63kg is caught in a 1000 m net in an hour in the peak season of Chandpur, but 84 kg is caught in Ramgati and 73 kg is caught in Chairmanghat. In the lean season, there are 33 kg/ 1000 m net/ hour caught in Chandpur, 37kg/1000 m net/ hour in Ramgati and 30 kg/ 1000 m/ hour in Chairmanghat. December is the highest fishing rate of Jatka in the downstream of the Meghna River.

***Jatka* Abundance in the Three Stations of the Meghna River:** *Jatka* abundance is high in Ramgati (Rank 1) and low in Chandpur (Rank 3) and medium in Chairmanghat (Rank 2). Reportedly, there were 288 *Jatka* per 5.40×10^7 m^2 areas in Chandpur, 363 *Jatka* in the same fishing area in Ramgati and 309 *Jatka* in Chairmanghat. About 19, 300 MT *Jatka* was caught in Bangladesh in the year of 2000; about 95% *Jatka was* caught from downstream of the Meghna River [3].

Livelihood Status among the Three Stations of the Meghna River: Fishermen are very poor. According to BBS [8], the extreme poor percentage of Noakhali is 34.3%, 31.49% in Chandpur and 38.55% in Ramgati. The extreme percentage of poor is high in fishermen community. Most of them are landless; they live from hand to mouth.

Age Structure Whose Are Involved in *Jatka* Fishing: Middle aged (31-45 years) fishers' involvement is high in *Jatka* fishing and second high is young (16-30 years) and very low in the child and old aged people. 54% middle aged people are involved in fishing in Chandpur, 52% in Ramgati and 43% in Chairmanghat. Middle aged fishermen (43%) are close to young aged fishermen (38%) in Ramgati.

Religion: Religion is an important attribute in the cultural area in any society. Although majority of the fishermen in different parts of the country are Hindus [1, 7, 9, 10] but in our study 87% fishermen is Muslim in Chandpur, 85% in Ramgati and 93% in Chairmanghat. This is might be due to less accessibility of alternative livelihoods in the coastal region. The dominance of Muslims in the fishing community indicates that Muslims are gradually coming to fishing profession.

Family Type: Most of the families are nuclear. In case of fisher's family, they have high family member. Family conflicts are common due to poverty and income variation of the family member and that's why they prefer to live as a nuclear family. 62% nuclear family in Chandpur, 73% nuclear family in Ramgati and 63% nuclear family in Chairmanghat.

Family Size: The family size is related to occupation, income and was likely to have an important influence on fishing practice. The family members include husband, wife, son, daughter, brother, sister and parents. In Mymensingh district, Alam *et al.* [10] found that 45% fishermen family has 5-6 members. The high tendency of giving birth of child is due to the fact that the poor, illiterate fishermen thought that the more the number of family members the higher will be the income. Besides most of them are unknown to family planning and they are not prefer to birth control. In our study the average family size is 5.6 among the three stations. The average family size of Chandpur is 5.15, 5.5 in Ramgati and 6.15 in Chairmanghat. According to BBS [8], average size of the households is 5.13, 5.23 and 5.56 respectively in Chandpur, Ramgati and Chairmanghat.

Income Status of Fishermen: The income profile is the main economic indicator of national development. In most cases the income of the fishermen in Bangladesh is below poverty level [5] that is also found in this study (annual income ranged from BDT 15,000 to 60,000). Hossain [5] indicated that fishermen in Kaliakoir upazilla under Gazipur district had annual income ranging from BDT 24,000 to 40,000. During banning period, monthly income of the hilsa fishermen decreased to BDT 2,000 from BDT 4,500 and sometimes income goes to nearly zero due to lack of alternative employment opportunity.

Fishing Assets of the Fishermen: Fishing assets indicate that social status of the fishermen. Fishermen do not provide any charge to the other when they possess fishing boat and net. Majority (56%) of fishermen worked in the other boat in Chandpur.30% fishermen possesses boat and fishing net.14% fishermen have joint ownership of boat and fishing boat. Majority (50%) of fishermen worked in the other boat in Ramgati. Majority (60%) of fishermen worked in the other boat in Chairmanghat.

Alternative Employment Opportunities: There is very shortage of employment opportunities of fishermen. Besides they are not expert in others work. They are deprived of training in alternative works. Majority of fishermen have no past saving that's why they cannot run any business. The permanent fishermen are 30% in Chandpur, 33% in Ramgati and 27% in Chairmanghat. Day labor is the first highest alternative facilities in the three stations. Agriculture is the highest alternative facilities in Chairmanghat (17%). The fishing communities suffer from various problems such as, extortion, lack of fishing gear, inadequate credit facilities, ineffective marketing system etc. These types of problems were also being faced by the fishermen elsewhere [3, 7, 12, 13]. The problems as faced the fishing community in case of three stations need immediate attention and solution for betterment of the fishing community. Anon [7], suggested a bulk of alternative options, in generally, for Shrimp fry collectors of Bangladesh, including home gardening; Duck, chicken and goat rearing; making fish traps and gear; oyster and crab cultivation; bee keeping; cultivation of medley grass for mat weaving; cultivation of golpata for roof construction; tree nurseries; paper bag making; sewing; shrimp fry nurseries, in regard to low investment capital all those are in line with the present study [14]. The fishing communities suffer from various problems such as, extortion, lack of fishing gear, inadequate credit facilities, ineffective marketing system etc. These types of problems were also being faced by the fishermen elsewhere [3, 7, 12-15]. The problems as faced the fishing communities in case of study areas and immediate attention and solution for betterment of the fishing community.

CONCLUSION

The study was focused on the variation of CPUE and abundance of *Jatka* in the three stations of Meghna River and the socio-economic conditions of the *Jatka* fishermen of Chandpur, Ramgati and Chairmanghat of Bangladesh. Population pressure, low income, lack of alternative employment opportunities, extortion by the local extortionist, loan problem, theft robbing etc. were the common socio-economic constraints of the fishermen of the study area. Fishermen also faced various problems such as child education, health facilities, food consumption and pasting of savings during banning season. Almost all fishermen mentioned lack of capital and lack of viable alternatives during banning period as their main problems. Actually fishermen of Bangladesh are socially disadvantaged and unable to fulfilling their basic needs and they also live below the poverty line and are struggling to survive with health, nutrition and sanitation a day to day problem [5]. The increase fish production definitely we should take initiatives to improve the socio-economic conditions and nutritional status of the fishermen. Necessary steps should be taken to develop the awareness among the fishermen by Govt. and NGOs. Hilsa production is depended on *Jatka*. Proper authority should be concerned about controlling the *Jatka* fishing. The fisher's livelihood was not so good. Most of them had no land, fishing asset etc. They were deprived of well sanitation, housing condition etc. The alternative income facility was so poor. They claimed that subsidy was not fair and something to pay for getting subsidy.

Recommendations:

- Educational institution should be set up in fishermen's village to improve their educational status.
- Alternative working opportunities should be increased during banning season.
- Government subsidy should be increased.
- Awareness should be increased through seminar, symposium, poster, banner, television program, radio program, etc.
- Proper authority should be sincere, conscious and enthusiastic.
- Proper implementation of law
- Train the fishermen in other activities, such as horticulture, poultry farming, fish farming, agriculture, home craft, pottery etc.
- It is crucial to protect the fishermen from pirates by strengthening forest guards and police force with coast guard involvement to give the maximum benefit to fishers and legal resource extraction.
- Women participation in various income generating activities is also found there. In this case community based management can be more effective for uplifting their livelihood.
- Some rules should be framed and implemented in regarding the use of gears, so that fishermen cannot catch fingerlings, brood fish indiscriminately.
- Institutional credit systems should be established to provide soft term loan to the fishermen.
- The fishermen should be encouraged to sell their fish to the market directly without involvement of the intermediaries.
- Government should provide the necessary infrastructural, financial and technical assistance for the improvement of the livelihood of this fishing community.
- Government should create job opportunities for them by establishment of agriculture based or other industry.

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