



## Assessment of fish fauna and socio-economic condition of fishermen in Chikli River

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### ABSTRACT

The main objective of the study was determining the present status of fish fauna and socio-economic conditions of the 80 fishermen in Chikli River, Saidpur district during January 2016 to July 2016 by using questionnaires, field visit and interviewing with the fishermen. The results indicated that about 27 species of fish fauna were found in Chikli River, among them 23 species were indigenous and 4 species were exotic. Major dominant species were Rui (*Labeo rohita*), Catla (*Catla catla*), Common carp (*Cyprinus carpio*), Bata (*Labeo bata*), Kharsa (*Labeo angra*), Shingi (*Heteropeneustes fossilis*), Taki (*Channa punctatus*), Shol (*Channa striatus*), Magur (*Clarias batrachus*), Tengra (*Mystus tengara*), Tengra (*Mystus bleekery*), Chanda (*Chanda nama*), Mola (*Amblypharyngodon mola*), Mola (*A. microlepsi*), Darkina (*Rasbora rasbora*), Boal (*Wallago attu*), Kakila (*Xenentodon cancila*) in the study area. During the study period two critically endangered (*Puntius sarana*, *Pangasius pangasius*), three endangered (*Labeo bata*, *Ompok pabda*, *Channa marulius*) and four vulnerable (*Chanda nama*, *Salmostoma phulo*, *Channa orientalis*, *Notopterus notopterus*) fish species were found in the Chikli River. Assessment of socio-economic condition of fishermen showed that fishermen belonged to the age groups ranged from 27 to 67 years with an average of 47.39 year. Fishermen of 52.5% were middle aged and 36.2 % old aged having age above 51 years and 11.3% of them belonged to young age category. Level of education of the fisherman ranged from 0.5 to 12 years of schooling having an average of 5.53. The present study suggested that fishermen communities should be educated by creating awareness for the proper conservation, management and enhancement of biodiversity in the Chikli River.

### INTRODUCTION

The freshwater fisheries resources of Bangladesh are declining day by day due to lack of proper management policy, over-exploitation and the unplanned establishment of dams (FAO, 2009). Evaluation of fish fauna and socio-economic condition of fishermen has become a burning issue for fisheries scientists, ecologists, fisheries managers, environmentalists. Moreover, the rapid growth of population and high rate expansion of agricultural activities, unplanned industrial activities are major threats for the freshwater fisheries resources. The haors, baors, rivers, beels and jheels are of fluvial origin and are commonly identified as freshwater resources (DoF, 2015). At least 265 species of fin fishes are found in freshwater of Bangladesh (Rahman, 2005). River is generally rich in fisheries resources, native wild

fish species, prawn, snail, crabs and turtles. Due to over exploitation and various ecological changes of River, some important fish species and turtles have disappeared. Considering the fertility and nutrients, overall ecosystem of the Chikli River is productive and is inhabited by diversified fauna. The abundance of small native fishes has been declined due to overfishing and deterioration of natural habitat.

Freshwater resources play an important role in the socio-economic development of the country. Recently, this sector is providing opportunities for economic as well as social upliftment. Fish supplements to about 60% of our daily animal protein intake. More than 11% of the population is dependent directly and indirectly on the fisheries for their living (DoF, 2015). Fisheries sector has already been well-known as a vital income and

employment-generating sector in Bangladesh, cheap sources of healthy food for the population of the country.

Due to massive loss of aquatic biodiversity of freshwater resources, a well-planned and systematic study is required to assess the present status of biodiversity in the Chikli River of Bangladesh with a view to take an appropriate action to preserve and manage the aquatic fauna. The present study focuses on the abundance, species combination and related aspects of the Chikli River. Many fishermen are involved in this River for their livelihoods. The present research

was conducted to determine the fish biodiversity and socio-economic conditions of the fishermen of the Chikli River at Saidpur district in Bangladesh.

## MATERIALS AND METHODS

### Site Selection

The area of Chikli River is located 25°52'38"N 88°55'50"E about 53 sq km with an average depth of 12 ft which is located at Saidpur upazilla of Saidpur district (Figure 1). This study was conducted from January 2016 to July 2016.

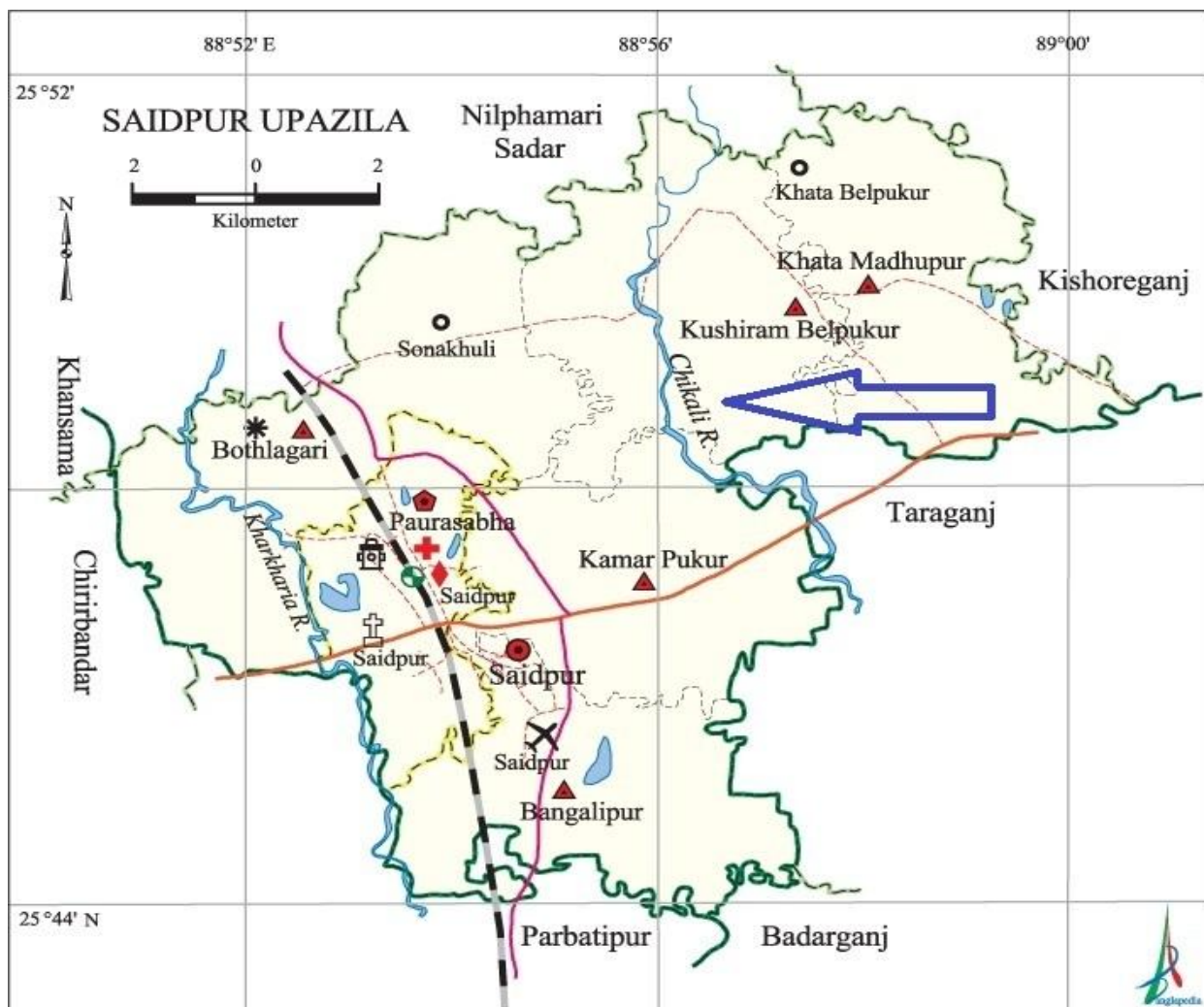


Figure 1  
Map Showing the survey area.

## Collection of data

The draft interview schedules were prepared according to the objectives of the study. With this draft schedule, the researcher will be visited the study area and pre-tested those and after making necessary correction, modification and adjustment final schedule will be developed. Data were collected by using two methods: (a) Questionnaire survey (b) Physical observation. Fifty fishermen were selected through random sampling. The primary data were assembled through field survey at the village level by using a well structural questionnaire.

Data were collected both by physically observation and interview with fishermen at house, field, fishing place and market. To collect the detail information about the socio-economic conditions of fishermen, several parameters were used like age groups, education level, earners dependent ration etc.

## Statistical analysis

One way analysis of variance (ANOVA) was done with the help of SPSS (Statistical Package for Social Sciences) computer program to process all the collected information in computer. Descriptive statistical methods like mean, percentage distribution and standard deviation were used.

## RESULTS AND DISCUSSION

### Assessment of fish fauna

There are about 27 species of fish fauna found in the Chikli River under 10 families, among them 23 species were indigenous and 4 species were exotic (Table 1). Some of them are common, less common and vulnerable. Among them the major dominant species are Catla (*Catla catla*), Taki (*Channa punctatus*), Tilapia (*Oreochromis*

*mossambicus*), Gachua (*Channa orientalis*), Magur (*Clarias batrachus*), Sharputi (*Puntius sarana*), Boal (*Wallago attu*), Pangus (*Pangasius pangasius*), Bata (*Labeo bata*), Shing (*Heteropneustes fossilis*), Tengra (*Mystus tengara*), Chanda (*Chanda nama*), Bele (*Glossogobius giuris*), Rui (*Labeo rohita*), Common carp (*Cyprinus carpio*), Mola (*Amblypharyngodon mola*) were found during the study period. The exotic fish species were Common carp (*Cyprinus carpio*), Nilotica (*Oreochromis niloticus*), Tilapia (*O. mossambicus*) and Thai Pangus (*Pangasius hypophthalmus*). A total 7 threatened fish species were recorded according to IUCN (2003) redlist of Bangladesh which is concurred with some other studies (Joadder, 2008b; Imteazzaman and Galib, 2013).

### Analysis of various fish groups

Fish groups that have been found are Carp, Snakehead, Cat fish, Perch-like, Mola carpet, Barb, Featherback, Rivershad, Elongate glass perchlet and Freshwater garfish. Among them 8 species were Catfish (30%), 5 species are found under Carp (19%), 4 species were Snakehead (15%), 3 species under Perch-like (10%), 2 species were Mola carpet (7%), 1 species under Barb (4%), Featherback (4%), Rivershad (4%), Freshwater Garfish (4%) and Elongate glass perchlet (4%, Table 1 . This result is similar to other earlier studies (Rahman, 2000).

### Status of threatened fish species

IUCN (2003) declared 54 fish species are threatened. Seven threatened fish species were found in Chikli River during the study period. Among them 4 species (*Puntius sarana*, *Pangasius pangasius*, *L. bata*, *Chanda nama*,) were found to be available and 3 species (*Channa striata*, *Channa orientalis*, *Channa marulius*) rarely available (Table 1).

Table 1  
Biodiversity status of available fish species in the Chikli River over the study period.

| Group name         | Local name     | English name                 | Scientific name                    | Status |
|--------------------|----------------|------------------------------|------------------------------------|--------|
| Carp               | Rui            | Rohu                         | <i>Labeo rohita</i>                | ***    |
|                    | Bata           | Bata labeo                   | <i>Labeo bata</i>                  | ***    |
|                    | Kharsa         | Angra                        | <i>Labeo angra</i>                 | **     |
|                    | Katol          | Catla                        | <i>Catla catla</i>                 | ***    |
|                    | Common carp    | Carp                         | <i>Cyprinus carpio</i>             | ***    |
|                    | Taki           | Spotted snakehead            | <i>Channa punctatus</i>            | ***    |
| Snakehead          | Gozar          | Great snakehead              | <i>Channa marulias</i>             | **     |
|                    | Shol           | Snakehead murrel             | <i>Channa striata</i>              | **     |
|                    | Gachua         | Walking snakehead            | <i>Channa orientalis</i>           | ***    |
| Molacarp           | Mola           | Mola carplet                 | <i>Amblypharyngodon mola</i>       | **     |
|                    | Mola           | Indian Carplet               | <i>Amblypharyngodon microlepsi</i> | ***    |
|                    | Tengra         | Bagrid catfish               | <i>Mystus tengara</i>              | ***    |
|                    | Modhu Pabda    | Pabdah cat fish              | <i>Ompok pabda</i>                 | *      |
|                    | Shing          | Stinging catfish             | <i>Heteropneustes fossilis</i>     | ***    |
|                    | Darkina        | Gangetic scissortail rasbora | <i>Rasbora rasbora</i>             | *      |
| Cat fish           | Boal           | Freshwater shark             | <i>Wallago attu</i>                | ***    |
|                    | Tengra         | Day's mystus                 | <i>Mystus bleekery</i>             | **     |
|                    | Pangus         | Yellow tail catfish          | <i>Pangasius pangasius</i>         | ***    |
|                    | Magur          | Magur                        | <i>Clarias batrachus</i>           | ***    |
| Featherback        | Foli           | Bronge feather back          | <i>Notopterus notopterus</i>       | **     |
| Beel shad          | Phul chela     | Finescale razorbelly minnow  | <i>Salmostoma phulo</i>            | ***    |
| Perch-like         | Tilapia        | Tilapia                      | <i>Oreochromis mossambicus</i>     | ***    |
|                    | Nilotica       | Nile tilapia                 | <i>Oreochromis niloticus</i>       | ***    |
| Freshwater Garfish | Bele           | Tank goby                    | <i>Glossogobius giuris</i>         | ***    |
|                    | Kakila         | Freshwater garfish           | <i>Xenentodon cancila</i>          | ***    |
| Elongate perchlet  | glass Chanda   | Elongate glass perchlet      | <i>Chanda nama</i>                 | ***    |
| Barb               | Deshi sharputi | Olive barb                   | <i>Puntius sarana</i>              | ***    |

Source: Field survey (2016); \*\*\*Available, \*\*Not so available, \*Rarely found

### Socio-economic condition of the fishermen

A total of eighty fishermen living near river were interviewed from various places like house, fishing place, market, and field etc. Wide ranges of indicator were collected in various aspects of socio-economic characteristics.

### Assessment of age group

The age of fisherman ranged from 27 to 67 years with an average of 47.39 year and standard

deviation of 9.95 years. On the basis of their age, the fisherman were classified into three categories as young (up to 35), middle age (36-50) and old aged (>51) are presented in Table 4.

This data revealed that 52.5% of the respondents were middle aged, 36.2 % of the participants belonged to the old age category having age above 51 years and 11.3% of them belonged to young age category.

### ***Educational status of the fishermen***

Level of education of the fisherman ranged from 0.5 to 12 years of schooling having an average of 5.53 and standard deviation of 5.08. On the basis of their level of education, the fisherman were classified into four categories as can sign only (0.5), can read and write only (1), primary (5), secondary (6-10) and higher secondary (12) (Table 5).

Data demonstrated in Table 5 revealed that 26.3% of the fisherman can sign only, 23.8% of the fisherman can read and write, 23.7% of the fisherman had higher secondary level of education, 20% of the fisherman had secondary level of education and 6.3% of them having higher primary level of education. Hence, education gives favorable disposition to the fisherman to adopt new ideas skills related to their fish catching, management activities to improve their environmental status in the changing conditions.

### ***Income and living standard***

The incomes of the fishermen were not good. The only source of income of fishermen is fish catching and selling. From the interviews, it was found that the highest income of the fishermen from selling fish was Tk. 380/day and the lowest income Tk. 250/day. Moreover, every year many people are getting involved in fishing as a seasonal or part time occupation. As a result, fishing pressure is continuously increasing in this River. The study showed that 20% fishermen's yearly income was found to be Tk. 60000-80000, 48% fishermen's yearly income was between Tk.81,000-1,00,000 and 32% fishermen's yearly income was found > Tk.1,00,000 annually. This study supports the previous studies of Alam (2005) and Dev (2011).

### ***Household condition***

The household condition of the fishermen ranged from 3 to 11 members, with an average of 5.39 and standard deviation of 1.61. On the basis of their household condition, the fishermen were classified into three categories as small (up to 4), medium (5 to 7) and larger (>7) size family are shown in Table 6.

It was revealed that 61.3% of the fishermen possessed medium size family, 31.2% of the fishermen possessed small size family and 7.5% of the fishermen had larger family (Table 6). It is assumed that the fishermen having small family likely to more involve in different waste management activities to improve their status.

### ***Annual income of fishermen***

Annual income of fishermen ranged from BDT. 30000- BDT. 765000 with an average of BDT. 209736.88 and standard deviation of 143892.99. On the basis of annual income, the fisherman were divided into five categories as low income (up to 100000), medium income (100000-150000), high income (150000-250000) and very high income (>250000) (Table 7).

### ***Household assets***

The household assets of the fisherman were measured by computing a household assets score on the basis of his/her possession of 16 selected assets. The household assets score ranged from 10-51 with a mean of 26.09 and standard deviation of 9.41. Based on the household assets score the fisherman were classified into three categories: low assets holder (up to 25), medium assets holder (26-39) and high assets holder (>40) (Table 8).

### ***Professional status of fishermen***

Among the 80 fishermen, It was found that 50% fishermen were professional and 50% were part time fishermen where 30%, 10%, 3% and 7% were agricultural worker, day laborer, businessmen and rickshaw puller respectively (Figure 2). This result is similar to the other authors (Bhaumik and Saha 1994).

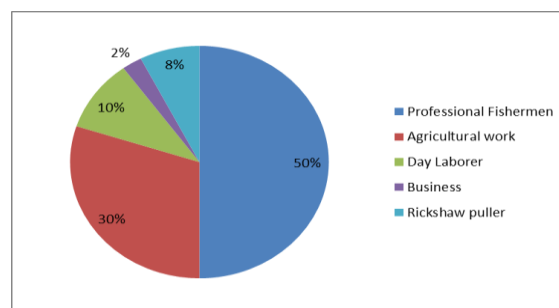


Figure 2  
Professional status of fishermen

**Sanitation**

In the study area 40% fishermen had sanitary latrine for defecation, 10% used semi-pacca latrine and 40% used kacha latrine. However, 10% fishermen do not have any latrine and they defecated beside the bank of the River and agricultural land (Table 2).

Table 2  
Sanitation status of fishermen.

| Sanitation         | Number of fishermen |
|--------------------|---------------------|
| Sanitary latrine   | 32                  |
| Semi-pacca latrine | 8                   |
| Kacha latrine      | 32                  |
| No latrine         | 8                   |

**Earners-dependent ratio and credit operation**

The earning- depending ratio of the fisherman household is 1:2.3. In the study area it was found that 25% fishermen borrowed money from the neighbours. 20% borrowed money from Grameen Bank by giving mortgage either land or household properties, 30% took loan from local NGO's (ASA, BRAC etc.) and 25% did not take any loan (Table 9).

**Land properties of the fishermen**

Of the total 80 fishermen 25% was landless, 34% having land between 1-5 katha, 15% having land between 5-10 katha, 14% having land between 11-15 katha, 12% having land above 15 katha (Table 3).

Table 4  
Age distribution of fisherman

| Category             | Frequency | Percent | Mean  | Standard Deviation |
|----------------------|-----------|---------|-------|--------------------|
| Young Age (Up to 35) | 9         | 11.3    |       |                    |
| Middle Age (36-50)   | 42        | 52.5    | 47.39 | 9.95               |
| Old Age (>51)        | 29        | 36.2    |       |                    |
| Total                | 80        | 100.0   |       |                    |

Table 3  
Land properties of fishermen.

| Number of fishermen | Land properties (Katha) |
|---------------------|-------------------------|
| 20                  | 00                      |
| 27                  | 1-5                     |
| 12                  | 5-10                    |
| 11                  | 11-15                   |
| 10                  | Above 15                |

**Recreational accessories of the fishermen**

The fishermen and their children usually enjoy various types of traditional games and sports like Kabadi, Boat race etc. Among 80 fishermen some of them have various modern electronic and non-electronic accessories for their recreation. 30% of the fishermen do not have any electronic accessories, while 35% have only radio, 5% have cassette player, 15% have only television, 10% have both radio and television and 5% have radio, television and cassette player (Figure 3).

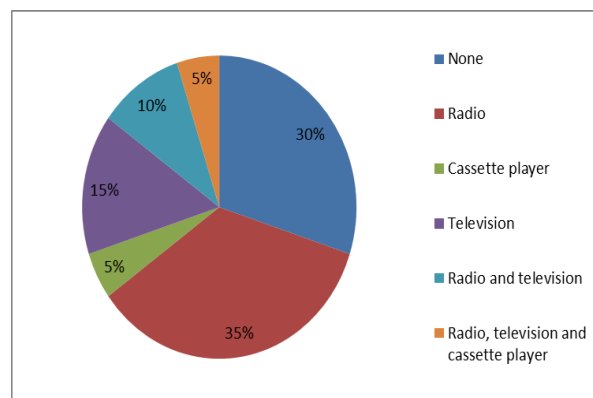


Figure 3  
Percentage of Recreational accessories of the fishermen.

Table 5  
Fisherman`s level of education.

| Category                | Frequency | Percent | Mean | Standard Deviation |
|-------------------------|-----------|---------|------|--------------------|
| Can sign only           | 21        | 26.2    | 5.53 | 5.08               |
| Can read and write only | 19        | 23.7    |      |                    |
| Primary                 | 5         | 6.3     |      |                    |
| Secondary               | 16        | 20.0    |      |                    |
| Higher secondary        | 19        | 23.8    |      |                    |
| Total                   | 80        | 100.0   |      |                    |

Table 6  
Household condition of the fishermen

| Category        | Frequency | Percent | Mean | Standard Deviation |
|-----------------|-----------|---------|------|--------------------|
| Small (up to 4) | 25        | 31.2    | 5.39 | 1.61               |
| Medium(5-7)     | 49        | 61.3    |      |                    |
| Larger(>7)      | 6         | 7.5     |      |                    |
| Total           | 80        | 100.0   |      |                    |

Table 7  
Annual income of the fishermen.

| Category         | Frequency | Percent | Mean      | Standard Deviation |
|------------------|-----------|---------|-----------|--------------------|
| Low income       | 11        | 13.8    | 209736.88 | 143892.99          |
| Medium income    | 17        | 21.3    |           |                    |
| High income      | 37        | 46.3    |           |                    |
| Very high income | 15        | 18.6    |           |                    |
| Total            | 80        | 100.0   |           |                    |

Table 8  
Household assets of the fisherman.

| Category                     | Frequency | Percent | Mean  | Standard Deviation |
|------------------------------|-----------|---------|-------|--------------------|
| Low assets holder (up to 25) | 35        | 43.8    | 26.09 | 9.41               |
| Medium assets holder (26-39) | 38        | 47.5    |       |                    |
| High assets holder (>40)     | 7         | 8.7     |       |                    |
| Total                        | 80        | 100.0   |       |                    |

Table 9  
Earner-dependent ratio.

| Family member        | Total Family number (n=80) |                | Ratio (Earner : Dependent) |
|----------------------|----------------------------|----------------|----------------------------|
|                      | No.                        | Percentage (%) |                            |
| Total earners        | 24                         | 30             | 1:2.3                      |
| Total dependents     | 56                         | 70             |                            |
| Total family members | 80                         | 100            |                            |

**CONCLUSIONS**

Bangladesh having vast and diversified water resources of 4.34 million ha is unique in term of valuable components of the environment, ecology,

resource potential and biodiversity in Bangladesh. The fish production from natural resources sharply reduced in recent years due to indiscriminate fishing. The present study revealed that the Chikli River has 27 fish species but the socioeconomic

condition of the fisherman was not so well. According to present findings, fish biodiversity in the Chikli River like as fish act should be implemented properly, stop the catching of fishes during breeding season and fishermen communities should be educated for overall enhancement of fisheries resources.

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