

**STATUS ON FISH BIODIVERSITY OF BEELS AND ITS  
FISHERS LIVELIHOODS IN ATGHORIA UPAZILA OF  
PABNA DISTRICT**



**A THESIS  
BY**

**MD. ABDUL HALIM**

**EXAMINATION ROLL NO. 10 FishAqua JJ-07 M**

**SEMESTER: JANUARY - JUNE, 2011**

**REGISTRATION NO.: 36890**

**SESSION: 2010 - 2011**

**MASTER OF SCIENCE (M. S.)  
IN  
AQUACULTURE**



**DEPARTMENT OF AQUACULTURE  
BANGLADESH AGRICULTURAL UNIVERSITY  
MYMENSINGH**

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## ABSTRACT

A study was conducted to find out the fish diversity and livelihood status of fishermen in the Chatra, Gaab and Jolka beel, located in Atghoria upazila under Pabna district for six months from November, 2010 to April, 2011. A total of 59 species belonging to 41 genera and 17 families were accounted and identified so far from the Chatra, Gaab and Jolka beel. Out of them, 43 resident species and 16 were non resident species. Of the 59 fish species recorded, 19 species were belonging to the family Cyprinidae. Next to Cyprinidae, 7 species were belonging to family Bagridae. Four species were belonging to family Channidae & Siluridae each. Three species were belonging to family Anabantidae, Cobitidae & Mastacembelidae each. Two species were belonging to family Cichlidae, Clupeidae & Notopteridae each. Only 1 species belonged to family Belonidae, Claridae, Gobiidae & Heteropneustidae each. The identified fishes were divided into 6 categories based on their abundance during the study period. Among the 59 species, 19 species were common, 18 were extremely common, 14 were few, 3 were vulnerable, 2 were endangered and finally 3 species were treated as critically endangered. Among the 75 fishermen in three studied beels different relevant information were collected to know their socio-economic conditions in terms of age structure, religious status, educational status, monthly income, housing condition, land area, family type, family size, sanitation facilities, health facilities, drinking water facilities, savings etc. It was found that about 41.33% were fulltime fishermen, 34.67% seasonal and the rest of the fishermen (24%) were subsistence. Among the fishermen the percentage of Muslims and Hindus were 83.33% & 16.67% respectively. On the other hand, 40% fishermen were illiterate, 37.34% primary level, 17.33% class VI to IX, 4% SSC and 1.33% HSC level. Most of the fishermen's houses (68%) were kacha and very few (10.67%) were semi pakka. About 57.33% and 42.67% of fishermen lived with nuclear and joint families respectively. Male and female members of household were 56.67% & 43.33% respectively. Total earning member were 128 out of 390, in which the percentage of male and female were 81.25% & 18.75% respectively. About 61.33% of households used latrines which were kacha, 25.33% semi-paka, 4% were paka and rest of them (9.34%) had no latrine facilities. As per occupation, 45.33% people were found to have agriculture. Besides this, fishing, business, services and others were 34.67%, 6.67%, 4% & 9.33% respectively. About 33.33% fishermen households were dependent on quack/nurse while 18.67% got health service from the qualified doctor. Non government organization such as Grameen bank (13.33%), ASA (4%), Anannay (9.33%), BRAC (4%) and local co-operative (17.33%) provided micro-credit facilities to the fishermen.

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## **CHAPTER 1**

### **INTRODUCTION**

Being a country of rivers and floodplains with a high potential of aquatic resources, fish plays a very important role in daily life of many people in Bangladesh. In addition 10% people of this country are directly or indirectly involved at this sector. The vast water resources are covering 5.28 million ha. of inland water and 710 km coastline with sub-tropical climate, suitable soil and water conditions offer a very high potential for fisheries and aquaculture development (DoF, 2010).

#### **1.1 Biodiversity**

Biodiversity is the variety of all life forms; the different plants, animals and microorganisms, their genes and the ecosystems of which they are a part (UNEP, 2001). The term “Biodiversity” is used to describe the spectacular variety of life on our planet and the ways in which species are concerned to each other. Biodiversity is usually considered at three levels:

- i) species diversity: It refers to the variety of living organisms on earth,
- ii) ecosystem diversity: It refers to the variety of habitats, biotic communities and ecological processes in the biosphere and
- iii) genetic diversity: It refers to the variation of genes within species.

##### **1.1.1 Aquatic Biodiversity**

Aquatic biodiversity can be defined as the variety of life and the ecosystems that make up the freshwater, tidal and marine regions of the world and their interactions. Aquatic biodiversity encompasses freshwater ecosystems, including lakes, ponds and reservoirs, rivers and streams, groundwater and wetlands. Aquatic biodiversity has enormous economic and aesthetic value and is largely responsible for maintaining and supporting overall environmental health.

##### **1.1.2 Status of Fish Biodiversity**

Bangladesh is blessed with the world’s richest and most diverse inland aquatic ecosystem having a wide variety of living aquatic resources. But over the years, due to natural and man made causes, aquatic biodiversity especially species diversity of fish and other aquatic organisms in open water had been declining sharply. The country is also enriched with

endemic fish resources including 265 freshwater fishes and 24 prawn species; 475 marine fishes and 36 shrimp species (DoF, 2010). There is no well-ground official statistical of the species of fishes which are almost extinct now. In spite of this, according to a research of the IUCN (International Union Code of Nomenclature) 54 species of fish had been enlisted as threatened (DoF, 2010).

Hence it is very much essential to undertaken necessary attempts for conserving and enhancing aquatic biodiversity. Establishment of aquatic sanctuary is one of the effective tools for conserving fish stock, preserving biodiversity and increasing fish production. The government of Bangladesh had given special emphasis on fisheries development and takes different program and significant steps towards environmental protection and biodiversity conservations (DoF, 2010).

## **1.2 Livelihood Status of Fishermen**

Livelihood status of the beel dwelling fishermen were mostly depend on the fisheries resources and biodiversity of the beel. On the other hand, fish diversity is also somewhat dependent on the livelihood of the fishermen. So, fishing group was an important community to enrich the fish diversity and economics of Bangladesh. But most of the fishermen were poor and deprived of many amenities of life. All time they had to struggle to survive. Livelihood condition of fishermen was not satisfactory at all. Because they had not getting free access to the water body to harvest fish. Most of the beels were now being controlled and managed by a few rich and influential persons of the area.

Beels play an important role to develop the fish diversity and to improve the livelihood condition of fishermen. Beels were generally rich in fisheries resources. Considering the fertility and nutrients, overall ecosystem of beels was productive and is inhabited by diversified fauna and flora. As a result, beels were rich in organic debris, mud and aquatic vegetations. So, beels were very favorable natural habitats of small and large indigenous fishes and different food organisms. Many other fish and prawn species migrate into inundated areas of beels from adjacent river and canal to feed, grow and breed during monsoon.

The Chatra, Gaab and Jolka were located the east side of Atghoria upazila. The Chatra beel surrounded by 5 villages (East: Shargram, west: Jatrapur, north: Baoikhali, south: Sripur and south east: Laksmipur). The Gaab beel surrounded by 3 villages namely Baoikhali, Dulampur and Rajapur each village located north side of the beel. The Jolka beel located the north east

side of Chatra beel. It was surrounded by Shargram village on its south east side. The Gaab and Jolka beel connected with Chiknai river where water flows came from Baral river. The Chatra, Gaab and Jolka were deeply flooded during the monsoon and some of the villages were exposed to wave action that causes erosion of homestead land.

In Bangladesh beels had a significant contribution to nutrient supply, employment opportunity and earning of foreign exchange. As Chatra, Gaab and Jolka were an important beel to provide sufficient fish supply and it had a great influence on livelihood of fishermen and fish diversity but there was not previous work on it. So, it was required to survey for the development of the beel region.

## **1.2 Objectives of the Research Work**

Many fishermen, both part-time and fulltime were related in fishing activities in Chatra, Gaab and Jolka beel. The aim of this study was to figure out the present status of fish species and livelihood status of fishermen related to this Chatra, Gaab and Jolka beel. However, to attain this aim, present study was carried out to fulfill the following objectives-

- to know the availability of different fish species in the Chatra, Gaab and Jolka beel.
- to know the conservation status of available fish species.
- to determine the livelihood conditions of the Chatra, Gaab and Jolka beel dwelling fishermen and
- to formulate recommendations for effective management of the Chatra, Gaab and Jolka beel.

## CHAPTER 2

### REVIEW OF LITERATURE

Very limited research work had so far been done in Bangladesh in the field of inland open water fisheries in general and particularly on beel fisheries. This field was neglected because fisheries were once believed to be the gift of nature and ever abundant. The present study was mainly concerned with the fish diversity and livelihood status of fishermen of the Chatra, Gaab and Jolka beel under Atghoria upazila of Pabna district. The purpose of this review of literature was to describe the present status of knowledge on fish diversity and livelihood status of fishermen of selected beel areas. So, the researcher attempted to review the available literature as related to the present study.

#### **2.1 Fish Diversity**

Bizby (1995) stated that biodiversity was the variety of all life forms; the different plants, animals and microorganisms, their genes and the ecosystems of which they were a part. The term “Biodiversity” was used to describe the spectacular variety of life on our planet and the ways in which species were concerned to each other. Biodiversity was usually considered at three levels, such as species diversity, ecosystem diversity and genetic diversity.

Lowe-Mc-Connell (1999) stated that biodiversity was the term introduced in the mid-1980s for the total richness and variety of species on earth. There after, concern for the environment led to UN convention on biological diversity at the second earth summit in Rio, 1992. It was expressed as: species biodiversity, ecosystem biodiversity and now, with DNA studies, as genetic diversity within certain species.

Ahmed *et al.* (2004) worked on ecology of Shakla beel under Brahmanbaria district, Bangladesh. A total of 52 fish species belonging to 36 genera, 20 families and 1 species of prawn so far identified from the beel. Of the 52 fish species recorded, 16 species were belonging to the family Cyprinidae followed by Siluridae, Anabantidae, and Channidae of which each family belongs to four species.

DoF (2005) recorded that our tropical water bodies sustain large varieties of fishes, a feature, which was just contrary to the temperate regions where the number of fish species were less but their size and quality are quite large. There were a total of 12 species of exotic fish and 24 species of prawn. In addition 475 species of marine fish and 36 marine shrimp had been recorded in Bay of Bengal.

Joadder (2008) was carried out a study to the ecological aspects of beel Kumari, Rajshahi (average area of 500 ha.), northern part of Bangladesh for a period of ten months (September, 2005 to June, 2006). A Total of 76 fish species belonging to 76 genera, 26 families and 1 species of prawn were identified so far from the beel.

Lima *et al.* (2010) found that introduction of alien species considered worldwide as one of the most important threats to fish diversity. In the Middle Doce River (Southeastern Brazil) the introduction of alien fish had caused the decline and local extinction of some native fishes. In the present study 50 inhabitants of two nearby communities (Baixa Verde and Cava Grande) were interviewed in order to explore their environmental perception and to determine their role in intentional fish dispersal.

## **2.2 Socio-Economic Condition**

Bhaumik and Pandit (1991) studied four large beels of West Bengal to investigated different aspects of socio-economic status of the fishermen. They were found to earned between Rs. 401-500 per month during off season. Their activities were observed to be restricted towards exploitation of weed fish from the beels where as a large section engaged themselves as daily labour, during what period the income varied between Rs. 210-300.

Baily (1994) stated that fishermen and their families in the south and south east Asia were often considered to be the poorest of the poor. Coastal fishermen of Bangladesh had a low level of education.

Rahman (1994) found that fishermen were socially, economically and educationally disadvantaged communities and lack their own financial resource. In Bangladesh, most of the fishermen were illiterate and few have primary level of education.

Hannan (1994) found that fishing and fish farming was considered as a low class profession and fishermen were traditionally poor. They lived from hand to mouth.

Ahmed (1996) found that fulltime fishermen in Tangail district area were 84% of which 24% had subsidiary occupation, 81% were found fishing throughout the year and 92% were member of some associations, clubs and cooperatives.

CPP (1996) surveyed professional fishermen in project area in Tangail district under the compartmentalization pilot project (CPP). It was reported that 54% earned tk. 50 per day, 70% took loan from money lender and 69% fishing individually.

Mahabubullah (1998) studied the socio-economic scenarios of the polder fishing communities of Bangladesh.

Roy and Dorairaj (1998) conducted a socio-economic survey during 1991-95 on the fishermen community. In south Andamn, the literacy rate varied from 19.85% to 66.85%. In middle Andamn literacy rate varied between 28.92% to 27.81%. The estimated income fluctuated from the lowers range of Rs. 816-1225 to Rs. 7899-10200 per month in south Andaman.

Ahmed and Saleh (1999) studied the socio-economic conditions of the coastal fishermen and reported that 73.33% earned Tk. 50 per/day. He studied the socio-economic conditions of coastal fishermen.

Muhit *et al.* (2000) carried out a study on the fishermen communities of the Dhaleswari river. This study reported that majority (90%) of the fishermen engaged in fulltime fishing. This study also revealed that maximum fishermen caught fish individually and more than 97% fishermen were members of different association.

Luu (2001) stated that the interventions, which were the support poor peoples to manage their aquatic resources, should be identified on the basis of understanding of poor people's livelihood. He also conducted an investigation on rural fishers to engage in aquaculture depends upon their assets base, including human and social assets, physical and financial assets.

Rahman *et al.* (2008) stated that in Bangladesh, during monsoon floodplains retain water for 5-6 months are normally not used for crop production with had high potential for production of fish and other aquatic animals. Considering the prospects of achieving greater socio-economic and livelihood benefits of the people including the poor from floodplains for was effective used for fish culture works on the development of technological option was carried out under the supported Challenge program project of the World Fish Center, DoF and BARC implemented from 2005-2010. For this purpose six floodplains were selected from the Indo-ganges river basin located at Rajshahi, Rangpur and Mymensingh districts.

Hossain (2010) found that per capita income and improved food security had placed Bangladesh on the track to achieving the status of a middle level fishermen. Bangladesh was one of the most densely populated countries in the world. Despite rapid urbanization, more than 75% of fishermen of our country as poor and low-income level. However, Bangladesh's main challenge was to eradicate poverty by increasing equitable income. The gross domestic product of Bangladesh was growing steadily.

### CHAPTER 3

#### MATERIALS AND METHODS

Methodology is an indispensable and integrated part of any research. The method of data collection depends upon the nature, aims and objectives of the study undertaken. There were several methods of collection of data and information. Among those methods, selection of a particular method depends on many considerations. Such as the nature of the research problems, time constraints, fund availability etc. For the present study, the survey method was followed.

It also deals with the selection of the research area identification of target groups and selection of analytical methods that were used in the study. The study was based on field survey where primary data was collected from the Chatra, Gaab and Jolka beel under Atghoria upazila of Pabna district.

The design of the survey for the present study involved some necessary steps which is outlined in Fig. 1.

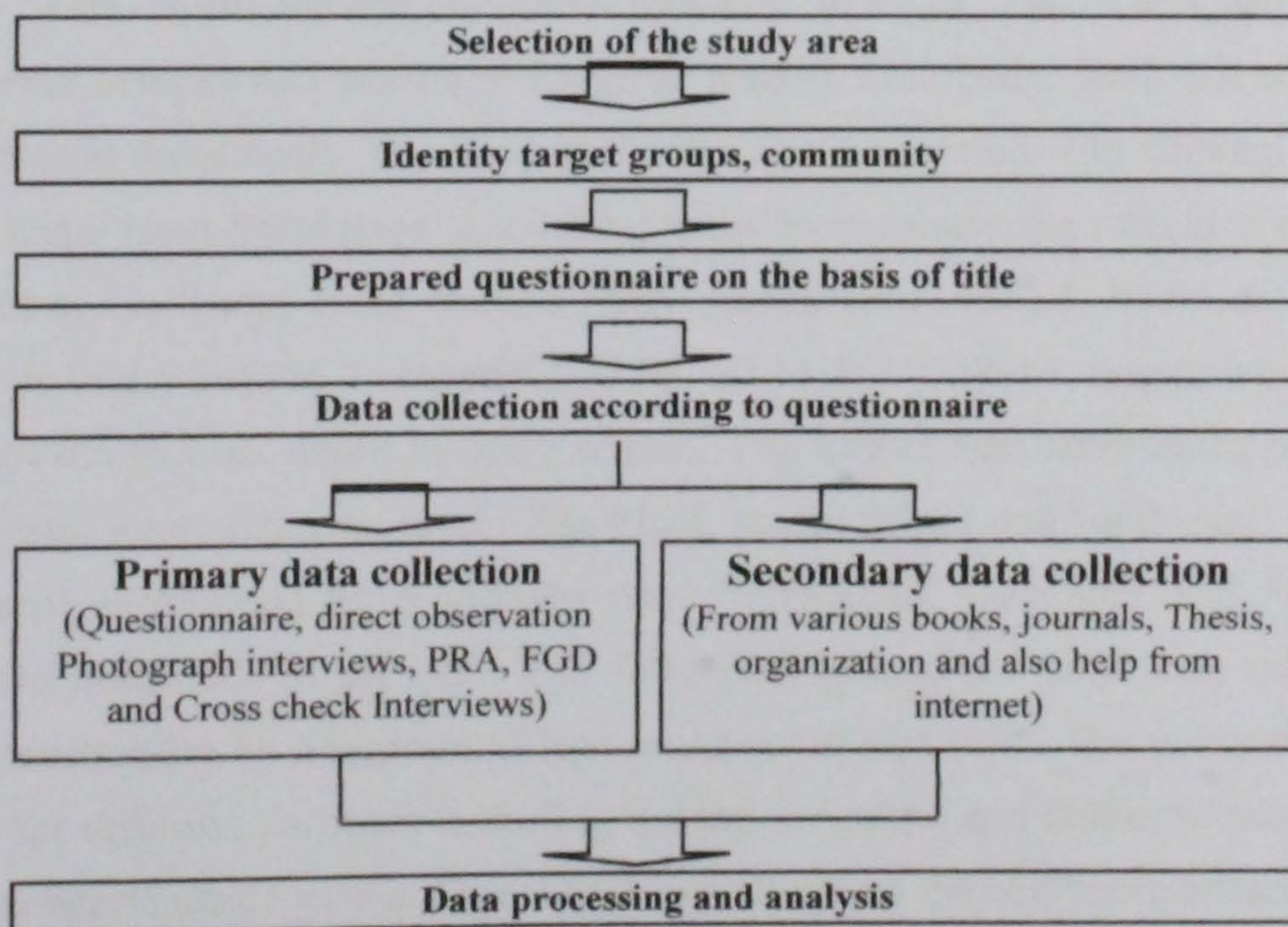


Fig. 1. Design of the research methodology.

The methodology used for the present study is presented below:

### **3.1 Selection of the Study Area**

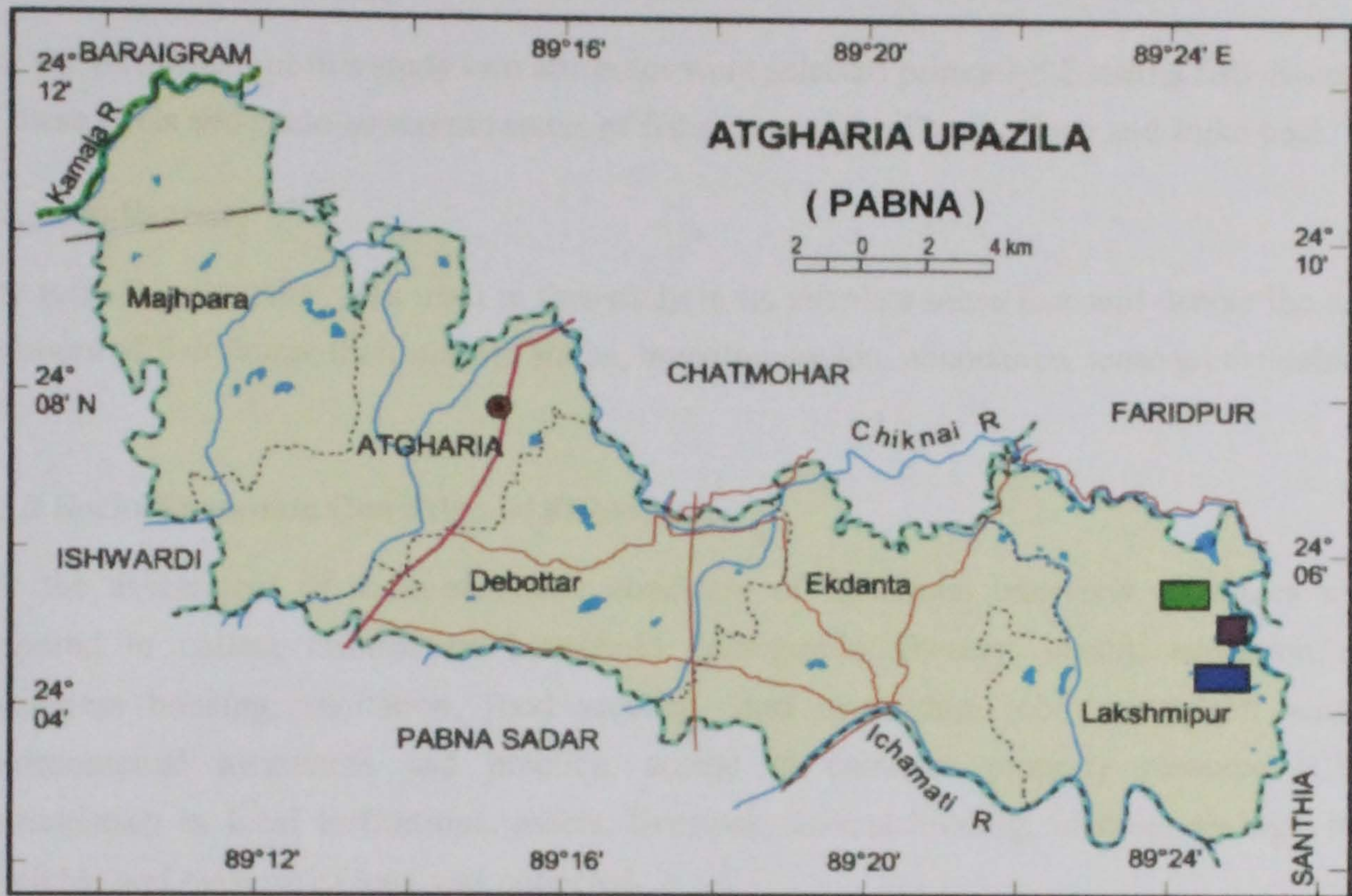
The Chatra, Gaab and Jolka beel under Atghoria upazila of Pabna district was considered for the study. At first, primary information was collected from Upazila Fisheries Officer (UFO), Atghoria, regarding the concentration of the area for fishing activities in the Chatra, Gaab and Jolka beel. On the basis of these information, a preliminary survey was conducted in the study area. Finally, decision was taken for the study of this beel.

The main reason for selecting these beels for the study as follows:

- There was a well concentration of inundated waterbodies.
- Very little was known about these beels.
- Fisheries biodiversity was very rich and
- Finally, co-operation from the fisheries officer and respondent was expected to be high and therefore reliable data obtained.

### **3.2 Study Area: the Chatra, Gaab and Jolka Beel**

The beels under study were located at Atghoria upazila of Pabna district within the latitudes of 24°04' to 24°06' North and the longitudes of 89°24' to 89°28' East. The Chatra, Gaab and Jolka beel were semi-closed perennial irregular shaped waterbody. Rain fall was the main source of water in these beels. The Gaab and Jolka beel connected with Chiknai river where water flows came from Baral river. According to the Government the total area of the waterbody in Chatra, Gaab and Jolka beel in rainy season were 4352.5, 93.95 & 1014.75 ha. respectively & in dry season it comprises 53.98, 20.24 & 107.96 ha. respectively. It was on average about 4.5 to 6 m. depth in rainy season. The Chatra beel surrounded by 5 villages (East: Shargram, west: Jatrapur, north: Baoikhali, south: Sripur and south-east: Laksmipur). The Gaab beel surrounded by 3 villages namely Baoikhali, Dulampur and Rajapur each village located north side of the beel. The Jolka beel located the north east side of Chatra beel. It was surrounded by Shargram village on its south-east side. The villagers used these waterbodies for different purposes including fishing, irrigation and domestic needs. A newly constructed concrete sluice gate in Chatra beel, which makes the beel more attractive.



**Fig. 2.** Showing the geographical position of study area.



Plate 1. Chatra beel during rainy season.



Plate 2. Gaab beel during dry season.



Plate 3. Jolka beel during rainy season.

**Fig. 3.** The studied beels.

### **3.3 Selection of Attributes**

For the fulfillment of this study two attributes were selected primarily: Existing fish diversity of these beels and socio-economic status of fishermen of the Chatra, Gaab and Jolka beel.

#### **3.3.1 Biodiversity**

The term 'biodiversity' was used in this study in its simplest sense that will denote the total numbers of fish fauna, their present status, breeding season, abundance, seasonal availability etc.

#### **3.3.2 Socio-Economic Condition of Fishermen**

For the assessment of socio-economic condition of fishermen interview schedules were prepared to collect information household demography literacy, health, education and awareness housing, sanitation, food security, land ownership, job during lean season, environmental awareness and practice, access to common property resource (CPR) participation in local institutions, assets, livestock, animal holding, income, savings, loan available and purpose of loan was collected.

### **3.4 Period of Data Collection**

The study was based on both primary and secondary data. Both data were collected during the month of November, 2010 to April, 2011 in fortnightly.

### **3.5 Data Collection Method**

#### **3.5.1 Method of Fish Biodiversity Study**

For the study of fish diversity of the Chatra, Gaab and Jolka beel, sampling of catches and their assessment were carried out fortnightly. The representative samples were taken by hand in each sampling day. The taxonomic guide was used for the identification of fish species. Museum and Laboratory specimen of Faculty of Fisheries, BAU were also used for this purpose.

#### **3.5.2 Method of Socio-Economic Data Collection**

The sample size of fishermen depends on several factors, such as financial constraints the important of the results, its method of data collection etc. For this study the sample size was 75 (25 in each beel). Fishermen were selected through simple random sampling method.

### 3.5.3 Preparation and Test of Questionnaire

For the data collection from fishermen a questionnaire was prepared in accordance with the objectives set for the study. Before preparing the questionnaire, a draft questionnaire was developed and then tested in the study area. The questionnaire was then changed, modified and rearranged according to the experience gather in testing. The final questionnaire was then developed in logical sequence so that the fishermen could answer chronologically. Question related to socio-economic demographic condition, income of fishermen, family members and other relevant aspects of beel fishing was included in the questionnaire. Questionnaire was constructed into English and transferred to Bengali (Bangla) during face to face interview.

### 3.5.4 Data Collection

For this study a combination of questionnaire, interview, participatory rural appraisal (PRA) tool such as focus group discussion (FGD) and cross check interviews with key informants were used for fishermen.

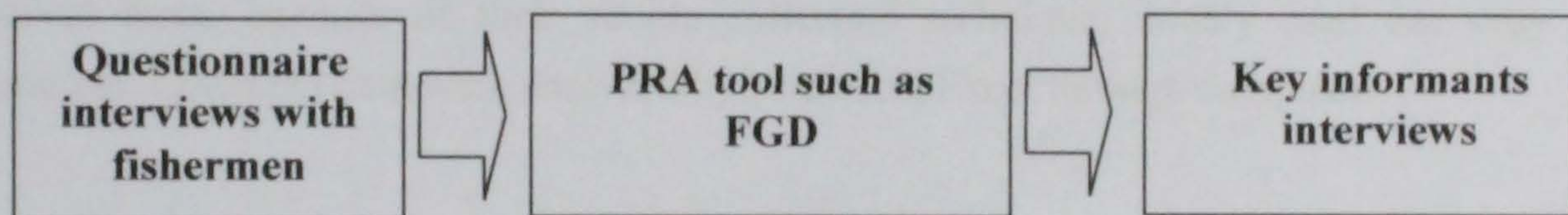


Fig. 4. Data collection method from fishermen.

### 3.5.5 Questionnaire Interviews

For questionnaire interviews, simple random sampling method was followed for 25 fishermen in the each beel. Fishermen were interviewed at home or beel sites during fish catching.

### 3.5.6 Participatory Rural Appraisal (PRA)

PRA is a group of methods to collect information from target group in participatory fashion (Chambers and Conway, 1992). The advantages of PRA over other method were that through wider participation of the community, the information collected was likely to more accurate. The participation of fishermen previous opportunity for cross-checked individual option as well as allowing the community to discuss the issue that they feel important, rather than responding to a questionnaire. For the present study, PRA tool such as Focus Group Discussion was conducted with fishermen. In this study, FGD was used to get an overview of particular issues such as fish diversity, socio-economic condition of fishermen etc. A total 6 FGD session were conducted in these beels area where each group size of 5 to 6 fishermen. FGD sessions were held at fishermen houses and tea stall of the study area.

### **3.5.7 Cross Check Interviews**

Cross check interviews were conducted with key informants such as Upazila Fisheries Officer, school teachers, local leaders, NGO worker where information was contradictory or requested for further assessment. The interviews respondents were conducted in their office and house.

### **3.6 Summarization, Tabulation and Reliability of Data**

After collection of data from the field, data were recorded in master table sheets. After completion of the pre-tabulation task, actual tabulation work was started. A number of tables were prepared on the basis of aims and objectives of the study. Finally, tabulated data were analyzed and condensed by using averages, percentages etc. to obtained the results.

### **3.7 Analytical Technique of the Study**

Tabular analysis technique was used in this study. Data were presented mostly in tabular and graphical form, because of their simple collection technique, widely used and easy to understand. Collected data were analyzed by Microsoft Excel through computer.

A decorative graphic consisting of several overlapping rectangular shapes and two intersecting lines. The shapes are in shades of blue, yellow, and orange. The lines are a light teal color, forming a cross-like structure that frames the text.

**CHAPTER 4**

**RESULTS**

## CHAPTER 4

### RESULTS

#### 4.1 Fish Diversity of Chatra, Gaab and Jolka Beel

A total of 59 species belonging to 41 genera and 17 families were accounted and identified so far from the Chatra, Gaab and Jolka beel. Out of them, 49 were indigenous species and 10, exotic species. Of the 59 fish species recorded, 19 species were belonging to the family Cyprinidae. Next to Cyprinidae, 7 species were belonging to family Bagridae. Four species were belonging to family Channidae & Siluridae each. Three species were belonging to family Anabantidae, Cobitidae & Mastacembelidae each. Two species were belonging to family Cichlidae, Clupeidae & Notopteridae each. Only 1 species belonged to family Belonidae, Claridae, Gobiidae & Heteropneustidae each. The identified fishes were divided into 6 categories based on their abundance during the study period. Among the 59 species, 19 species were common, 18 were extremely common, 14 were few, 3 were vulnerable, 2 were endangered and finally 3 species were treated as critically endangered.

Details results about the fish-biodiversity about Chatra, Gaab and Jolka beel are given below:

**Table 01. A check list of indigenous fish species with their status recorded in Chatra, Gaab and Jolka beel during study period**

Sl. No.	Family	Genus	Species	Species availability in studied beel and remarks					
				Chatra	Remarks	Gaab	Remarks	Jolka	Remarks
1	Anabantidae	<i>Anabas</i>	<i>Anabas testudineus</i>	P	C	P	C	P	C
2		<i>Colisa</i>	<i>Colisa fasciata</i>	P	EC	P	EC	P	EC
3		<i>Colisa</i>	<i>Colisa lalius</i>	A	-	P	E	P	E
4	Bagridae	<i>Mystus</i>	<i>Mystus seenghala</i>	P	C	P	C	P	C
5		<i>Mystus</i>	<i>Mystus tengara</i>	P	EC	P	EC	P	EC
6		<i>Mystus</i>	<i>Mystus cavasius</i>	P	C	P	C	P	C
7		<i>Mystus</i>	<i>Mystus vittatus</i>	P	C	P	C	P	C
8		<i>Mystus</i>	<i>Mystus aor</i>	P	F	P	F	P	F
9	Belonidae	<i>Xenentodon</i>	<i>Xenentodon cancila</i>	P	V	P	V	P	V
10	Centropmidae	<i>Chanda</i>	<i>Chanda nama</i>	P	EC	P	EC	P	EC
11		<i>Chanda</i>	<i>Chanda ranga</i>	P	EC	P	EC	P	EC
12		<i>Chanda</i>	<i>Chanda lala</i>	P	C	P	C	P	C
13	Channidae	<i>Channa</i>	<i>Channa punctatus</i>	P	EC	P	EC	P	EC
14		<i>Channa</i>	<i>Channa orientales</i>	P	C	P	C	P	C
15		<i>Channa</i>	<i>Channa striatus</i>	P	EC	P	EC	P	EC
16		<i>Channa</i>	<i>Channa marulius</i>	A	-	P	CE	P	CE
17	Claridae	<i>Clarias</i>	<i>Clarias batrachus</i>	P	C	P	C	P	C
18	Clupeidae	<i>Gadusia</i>	<i>Gadusia chapra</i>	P	EC	P	EC	P	EC

Sl. No.	Family	Genus	Species	Species availability in studied beel and remarks					
				Chatra	Remarks	Gaab	Remarks	Jolka	Remarks
19		<i>Corica</i>	<i>Corica soborna</i>	P	EC	P	EC	P	EC
20	Cobitidae	<i>Lepidocephalus</i>	<i>Lepidocephalus guntea</i>	P	C	P	C	P	C
21		<i>Somileptus</i>	<i>Somileptus gongota</i>	P	C	P	C	P	C
22		<i>Botia</i>	<i>Botia dario</i>	A	-	P	CE	P	CE
23	Cyprinidae	<i>Labeo</i>	<i>Labeo rohita</i>	P	C	P	C	P	C
24		<i>Labeo</i>	<i>Labeo bata</i>	P	C	P	C	P	C
25		<i>Labeo</i>	<i>Labeo calbasu</i>	P	F	P	F	P	F
26		<i>Catla</i>	<i>Catla catla</i>	P	C	P	C	P	C
27		<i>Cirrhina</i>	<i>Cirrhina mrigala</i>	P	C	P	C	P	C
28		<i>Cirrhina</i>	<i>Cirrhina reba</i>	P	EC	A	-	P	EC
29		<i>Amblypharyngodon</i>	<i>Amblypharyngodon mola</i>	P	EC	P	EC	P	EC
30		<i>Esomus</i>	<i>Esomus danricus</i>	P	EC	P	EC	P	EC
31		<i>Puntius</i>	<i>Puntius sarana</i>	P	EC	A	-	P	EC
32		<i>Puntius</i>	<i>Puntius sophore</i>	P	EC	P	EC	P	EC
33		<i>Rohtee</i>	<i>Rohtee cotio</i>	A	-	P	CE	P	CE
34	<i>Salmostoma</i>	<i>Salmostoma bacila</i>	P	C	P	C	P	C	
35	<i>Salmostoma</i>	<i>Salmostoma phulo</i>	A	-	P	F	P	F	
36	Gobiidae	<i>Glossogobius</i>	<i>Glossogobius giuris</i>	P	EC	P	EC	P	EC
37	Heteropneustidae	<i>Heteropneustes</i>	<i>Heteropneustes fossilis</i>	P	C	P	C	P	C
38	Mastacembelidae	<i>Mastacembelus</i>	<i>Mastacembelus pancalus</i>	P	C	P	C	P	C
39		<i>Mastacembelus</i>	<i>Mastacembelus armatus</i>	A	-	P	V	P	V
40		<i>Macragnathus</i>	<i>Macragnathus aculeatus</i>	P	EC	P	EC	P	EC
41	Notopteridae	<i>Notopterus</i>	<i>Notopterus chitala</i>	A	-	P	CE	A	-
42		<i>Notopterus</i>	<i>Notopterus notopterus</i>	P	E	P	E	A	-
43	Schilbeidae	<i>Pseudeutropius</i>	<i>Pseudeutropius atherinoides</i>	P	C	P	C	P	C
44		<i>Eutropiichthys</i>	<i>Eutropiichthys vacha</i>	P	F	P	F	P	F
45		<i>Ailia</i>	<i>Ailia coila</i>	P	F	P	F	P	F
46	Siluridae	<i>Wallago</i>	<i>Wallago attu</i>	A	-	P	EC	P	EC
47		<i>Ompok</i>	<i>Ompok pabda</i>	A	-	P	CE	P	CE
48	Sisoridae	<i>Hara</i>	<i>Hara hara</i>	A	-	P	F	P	F
49	Tetraodontidae	<i>Tetraodon</i>	<i>Tetraodon cutcutia</i>	P	V	P	V	P	V

Here,

(P= Present, A= Absent, C= Common, EC= Extremely common, E= Endangered, CE= Critically endangered, F= Few and V= Vulnerable).

**Table 02. A check list of exotic fish species with their status recorded in Chatra, Gaab and Jolka beel during study period**

Sl. No.	Family	Genus	Species	Species availability in studied beel and remarks					
				Chatra	Remarks	Gaab	Remarks	Jolka	Remarks
1	Cichlidae	<i>Oreochromis</i>	<i>Oreochromis niloticus</i>	P	F	A	-	P	F
2		<i>Oreochromis</i>	<i>Oreochromis mossambicus</i>	P	F	P	F	P	F
3	Cyprinidae	<i>Hypophthalmichthys</i>	<i>Hypophthalmichthys molitrix</i>	P	C	P	C	P	C
4		<i>Aristichthys</i>	<i>Aristichthys nobilis</i>	P	C	P	C	P	C
5		<i>Ctenopharyngodon</i>	<i>Ctenopharyngodon idella</i>	A	-	P	F	P	F
6		<i>Cyprinus</i>	<i>Cyprinus carpio</i> var. <i>communis</i>	P	F	P	F	P	F
7		<i>Cyprinus</i>	<i>Cyprinus carpio</i> var. <i>specularis</i>	P	F	P	F	P	F
8		<i>Puntius</i>	<i>Puntius gonionotus</i>	P	F	P	F	A	-
9	Siluridae	<i>Pangasius</i>	<i>Pangasius sutchi</i>	P	F	A	-	A	-
10		<i>Clarias</i>	<i>Clarias gariepinus</i>	P	F	A	-	A	-

Here,

(P= Present, A= Absent, C= Common, EC= Extremely common, E= Endangered, CE= Critically endangered, F= Few and V= Vulnerable).

**Table 03. Indigenous fish species with their group, local name, common name, breeding season and seasonal availability recorded during study period**

Sl. No.	Groups	Species	Local name	Common name	Breeding season	Seasonal availability
1	Air-breathing catfish	<i>Clarias batrachus</i>	Magur	Walking catfish	May to Aug.	Autumn to winter
2		<i>Heteropneustes fossilis</i>	Shing	Stinging catfish	Not known	Round the year
3	Butter catfish	<i>Hara hara</i>	Chaka, Maka	Gangetic goonch	Not known	Rainy season
4	Carp	<i>Labeo rohita</i>	Rui	Indian major carp	April to July	Round the year
5		<i>Labeo bata</i>	Bata	Bata labeo	April to July	Rainy season
6		<i>Labeo calbasu</i>	Kalbaush	Black rohu	April to July	Rainy season
7		<i>Catla catla</i>	Catla, Catol	Indian major carp	April to July	Rainy season
8		<i>Cirrhina mrigala</i>	Mirka, Mrigel	Indian major carp	May to July	Rainy season
9		<i>Cirrhina reba</i>	Raikor	Caurvery white carp	April to July	Rainy season
10	Catfish	<i>Mystus seenghala</i>	Aire, Guizza	Giant river catfishes	Not known	Round the year
11		<i>Mystus tengara</i>	Tengra, Bajari	Tengra mystus	April to Aug	Round the year

Sl. No.	Groups	Species	Local name	Common name	Breeding season	Seasonal availability
12		<i>Mystus cavasius</i>	Gulsha tengra	Gangetic mystus	April to July	Round the year
13		<i>Mystus vittatus</i>	Tengra	Striped dwarf catfishes	April to July	Round the year
14		<i>Mystus aor</i>	Aire	Gang tengra	April to July	Round the year
15		<i>Pseudeutropius atherinoides</i>	Batasi	Indian batasi	May to July	Rainy season
16		<i>Eutropiichthys vacha</i>	Bacha	Batchwa vacha	Not known	Rainy season
17		<i>Ailia coila</i>	Bashpata	Gangetic ailia	Not known	Round the year
18		<i>Wallago attu</i>	Boal	Freshwater shark	May to Aug.	Round the year
19		<i>Ompok pabda</i>	Pabda	Pabdah catfish	Not known	Rainy season
20		Eel	<i>Mastacembelus pancalus</i>	Guchebaim	Striped spiny eel	April to July
21	<i>Mastacembelus armatus</i>		Shal baim	Tire-track spiny eel	April to July	Round the year
22	<i>Macrogathus aculeatus</i>		Tarabaim	One-striped spiny eel	April to July	Round the year
23	Featherback	<i>Notopterus chitala</i>	Chital	Humped featherback	April to July	Round the year
24		<i>Notopterus notopterus</i>	Foli	Bronze featherback	May to July	Autumn
25	Glass perch	<i>Chanda nama</i>	Chanda	Elongate glass-perchlet	March to October	Round the year
26		<i>Chanda ranga</i>	Llal chanda	Highfin glassy perchlet	Not known	Round the year
27		<i>Chanda lala</i>	Chanda	Glass-perchlet	Not known	Round the year
28	Gobies	<i>Glossogobius giuris</i>	Bailla, Bele	Bar-eyed goby	Not known	Round the year
29	Loach	<i>Lepidocephalus guntea</i>	Gurkoi, Gutum	Guntea loach	Not known	Round the year
30		<i>Somileptus gongota</i>	Poia	Gongota loach	Not known	Round the year
31		<i>Botia dario</i>	Rani	Necktie loach	Not known	Round the year
32	Minnows	<i>Amblypharyngodon mola</i>	Mola , Moya	Mola carplet, Pale carplet	April to November	Round the year
33		<i>Esomus danricus</i>	Darkina	Flying barb	Not known	Rainy season
34		<i>Puntius sarana</i>	Punti	Barb	April to July	Round the year
35		<i>Puntius sophore</i>	Punti	Spotfin swamp barb	April to July	Round the year
36		<i>Rohtee cotio</i>	Dhela	Vatani rohtee	April to July	Rainy season
37		<i>Salmostoma bacila</i>	Chela	Large razorbelly minnow	April to July	Round the year
38		<i>Salmostoma phulo</i>	Ful chela	Razorbelly minnow	April to July	Round the year
39	Needle fish	<i>Xenentodon cancila</i>	Kaika, kakila	Freshwater garfish	Not known	Round the year
40	Perch	<i>Anabas testudineus</i>	Koi	Climbing perch	April to July	Round the year
41		<i>Colisa fasciata</i>	Khalisha	Striped gourami	June to Oct.	Round the year
42		<i>Colisa lalius</i>	Lal khalisha	Striped gourami	June to Oct.	Round the year
43	Puffer fish	<i>Tetraodon cutcutia</i>	Potka	Ocellated puffer fish	Not known	Round the year

Sl. No.	Groups	Species	Local name	Common name	Breeding season	Seasonal availability
44	Sardine	<i>Gadusia chapra</i>	Chapila, Khaira	Indian river shad	May to Aug.	Round the year
45		<i>Corica soborna</i>	Kechi, kaski	Ganga river-sprat	May to August	Round the year
46	Snake head	<i>Channa punctatus</i>	Taki, Sati	Spotted snakehead	April to July	Round the year
47		<i>Channa orientalis</i>	Garua, Chang	Asiatic snakehead	April to July	Round the year
48		<i>Channa striatus</i>	Shol	Stripped snakehead	April to July	Round the year
49		<i>Channa marulius</i>	Gajar	Giant snakehead	April to July	Round the year

**Table 04. Exotic fish species with their group, local name, common name, breeding season and seasonal availability recorded during study period**

Sl. No.	Groups	Species	Local name	Common name	Breeding season	Seasonal availability
1	Air-breathing catfish	<i>Clarias gariepinus</i>	Magur, African magur	North African catfish	Not known	Rainy season
2	Barb	<i>Puntius gonionotus</i>	Punti, Sarpunti	Minnows barb	Not known	Rainy season
3	Carp	<i>Hypophthalmichthys molitrix</i>	Silver, silver carp	Silver carp	Not known	Rainy season
4		<i>Aristichthys nobilis</i>	Briged, Bighead carp	Bighead carp	Not known	Rainy season
5		<i>Ctenopharyngodon idella</i>	Grass carp	Grass carp	Not known	Rainy season
6		<i>Cyprinus carpio var. communis</i>	Japani rui, Carpu	Common carp	Jan.-Mar. & July-August	Rainy season
7		<i>Cyprinus carpio var. specularis</i>	Minar carp, Carpu	Mirror carp	Jan.-Mar. & July-August	Rainy season
8	Catfish	<i>Pangasius sutchi</i>	Pangash	Sutchi catfish	Not known	Rainy season
9	Cichlid fish	<i>Oreochromis niloticus</i>	Nilotica	Nile tilapia	All the year	Rainy season
10		<i>Oreochromis mossambicus</i>	Tilapia	Mozambique tilapia	All the year	Rainy season



*Anabas testudineus*



*Colisa fasciata*



*Colisa lalius*



*Mystus seenghala*



*Mystus tengara*



*Mystus cavasius*



*Mystus vittatus*



*Mystus aor*



*Xenentodon cancila*



*Chanda nama*



*Chanda ranga*



*Chanda lala*



*Channa punctatus*



*Channa orientalis*



*Channa striatus*



*Channa marulius*



*Clarias batrachus*



*Gadusia chapra*



*Corica soborna*



*Lepidocephalus guntea*



*Somileptus gongota*



*Botia dario*



*Labeo rohita*



*Labeo bata*



*Labeo Calbasu*



*Catla catla*



*Cirrhina mrigala*



*Cirrhina reba*



*Amblypharyngodon mola*



*Esomus danricus*



*Puntius sarana*



*Puntius sophore*



*Rohtee cotio*



*Salmostoma bacila*



*Salmostoma phulo*



*Glossogobius giuris*



*fastacembelus armatus*



*Notopterus notopterus*



*Ailia coila*



*Hara hara*

ed beel.

Thesis title : Status on fish biodiversity and livelihood of beels under Atghoria upazila of Pabna district

বিষয়-বিশেষ: Biodiversity and livelihood status of fishermen of beels under Atghoria upazila of Pabna district

সংস্করণ শব্দার্থ: Status on fish biodiversity of beels and its fishers livelihoods in ATghoria upazila of Pabna district

ফরাসী,

Md. Abdul Halim

Roll NO. 10 Fish Aqua-JJ-07M

Reg. No. 36890

Session : 2010-11

Semester : January-June/11.



*Oreochromis niloticus*



*Oreochromis mossambicus*



*Hypophthalmichthys molitrix*



*Aristichthys nobilis*



*Ctenopharyngodon idella*



*Cyprinus carpio var. communis*



*Cyprinus carpio var. specularis*



*Puntius gonionotus*



*Pangasius sutchi*



*Clarias gariepinus*

**Fig. 06. Different exotic fish species in the studied beel.**

## 4.2 Socio-Economic Condition of Fishermen of Chatra, Gaab and Jolka Beel

Most of the fishermen did not barely passed any of the social stratification, economic position and standard of living. The lack of resources resulted in their direct subordination and subjugation to the village power structure. Therefore, the whole socio-economic gamut that surrounded them negatively affected proper utilization of open water fisheries resources, which ultimately affected the development of fisheries in Bangladesh as a whole. All spheres of rural life were dominated largely by the traditional power groups and the fishing community was easily susceptible to them. Since the fishery community was traditionally comprised of poor and powerless it was very much vulnerable to such unequal power struggle.

Details results about the socio-economic conditions of fishermen of studied beels are given below:

### 4.2.1 Fisher/ Fishermen Types

Among the 75 fishermen it was found that about 41.33% were fulltime fishermen, 34.67% were seasonal and the rest of the 24% were subsistence fishermen. The observed fishermen in Chatra, Gaab and Jolka beel in about 44%, 20% & 60% were engaged in fulltime fishing respectively. On the other hand 32%, 40% and 32% were seasonal respectively and 24%, 40% & 8% were subsistence respectively (Fig. 07).

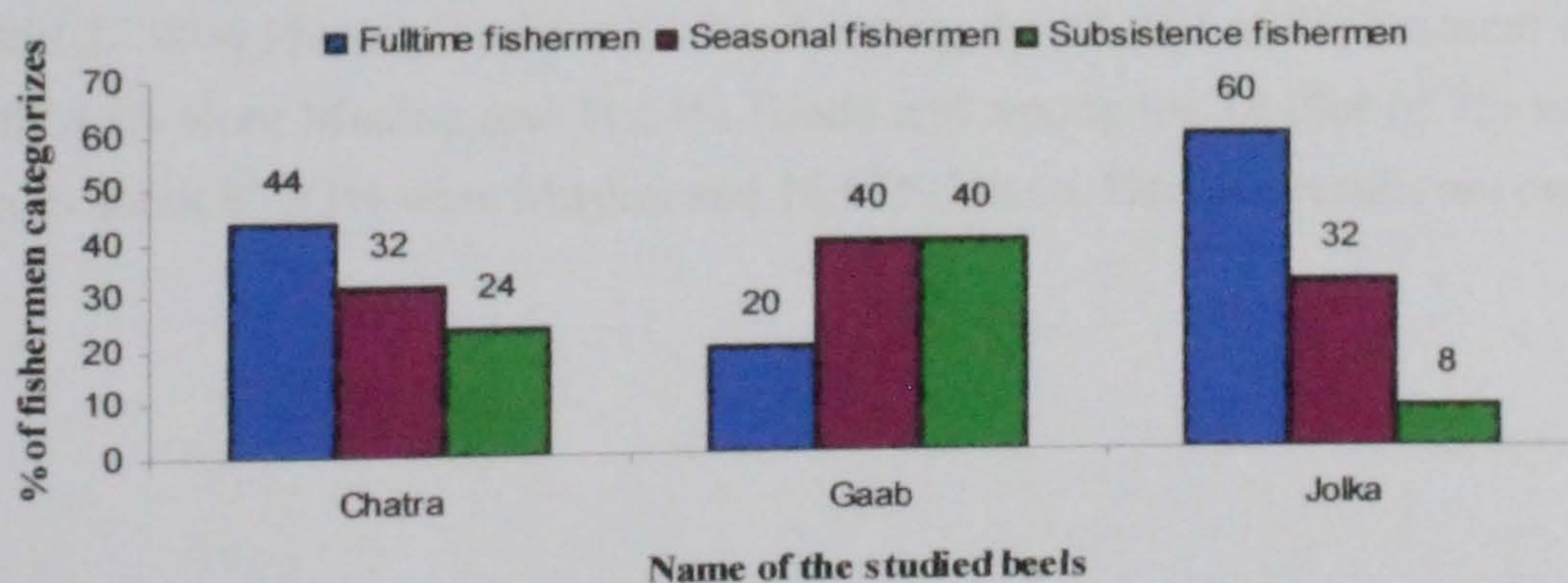


Fig. 07. Categorizes of observed fishermen

### 4.2.2 Average Monthly Income of Fishermen

Among the 31 fulltime fishermen (out of 75) it was found that about 80.65% fishermen income limited between 2 to 5 thousands (Tk.). On the other hand, among the 26 (out of 75) seasonal fishermen only 19.23% fishermen earned 2 to 5 thousands (Tk.) and among the 18 (out of 75) subsistence fishermen only 72.22% fishermen earned 2 to 5 thousands (Tk.). Detailed results are presented in Table 05.

### 4.2.3 Fishing Types

About 49.33% fishermen in Chatra, Gaab and Jolka beel perform their fishing through group form and 50.67% were individually. Among the 75 fishermen it was found that in Chatra, Gaab and Jolka beel 24%, 56% and 68% were fishing through group form respectively. On the other hand 76%, 44% and 32% were fishing individually respectively (Fig. 08).

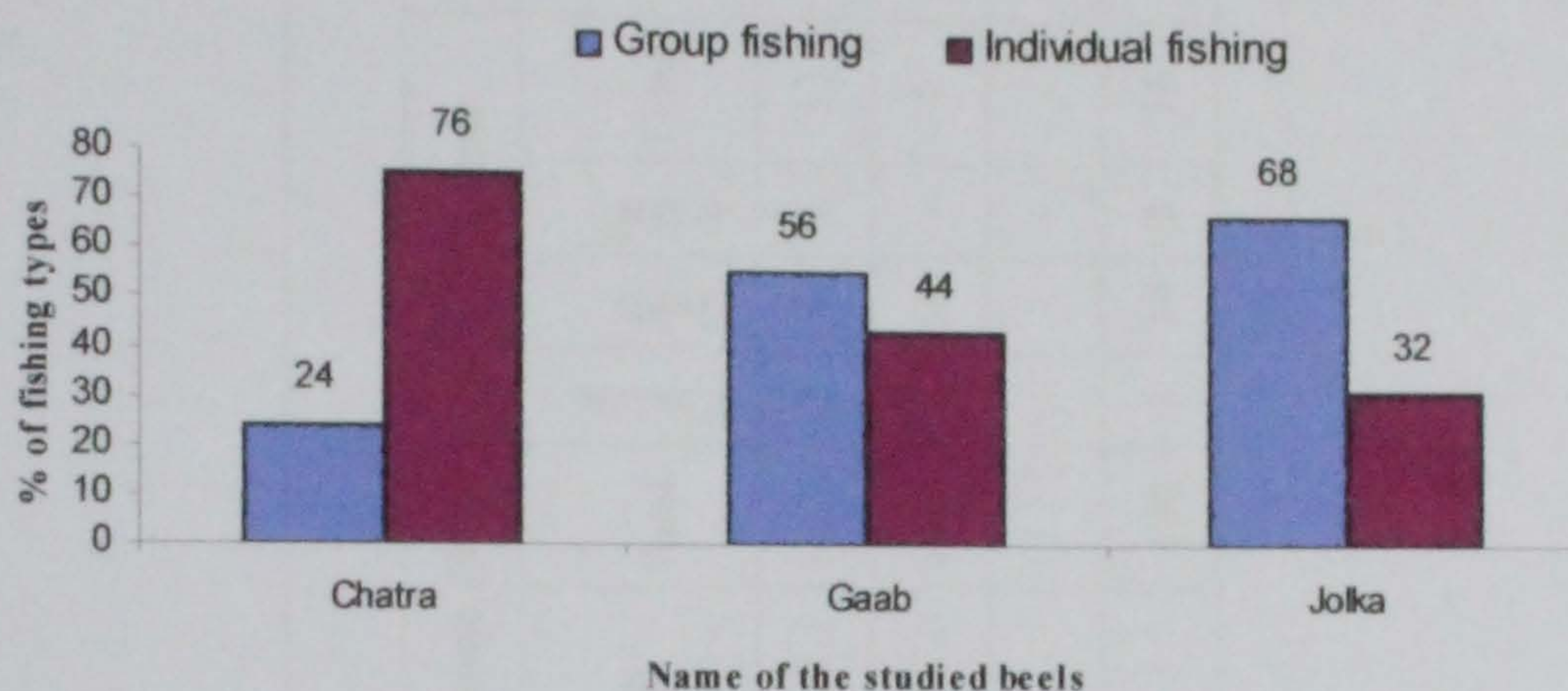


Fig. 08. Fishing types of observed fishermen.

### 4.2.4 Religion

Among the 31 fulltime fishermen (Out of 75) it was found that about 87.10% fishermen were Muslim and 12.90% Hindu. On the other hand among the 26 (Out of 75) seasonal fishermen in about 88.46% were Muslim and 11.54% Hindu and among the 18 (Out of 75) subsistence fishermen in about 83.33% were Muslim and 16.67% Hindu. Detailed results are presented in Table 06.

Table 05. Average monthly income of observed fishermen

Average monthly income (in thousand)	Fishermen types																							
	Fulltime				Percentage (%)				Seasonal				Percentage (%)				Subsistence				Percentage (%)			
	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total
2 to 5	6	4	15	25	54.55	80	100	80.65	2	2	1	5	25	20	12.5	19.23	3	8	2	13	50	80	100	72.22
6 to 10	4	1	-	5	36.36	20	-	16.13	4	6	7	17	50	60	87.5	65.39	3	2	-	5	50	20	-	27.78
11 to 15	1	-	-	1	9.09	-	-	2.22	2	2	-	4	25	20	-	15.38	-	-	-	-	-	-	-	-
<b>Total</b>	<b>11</b>	<b>5</b>	<b>15</b>	<b>31</b>				<b>100</b>	<b>8</b>	<b>10</b>	<b>8</b>	<b>26</b>				<b>100</b>	<b>6</b>	<b>10</b>	<b>2</b>	<b>18</b>	<b>6</b>	<b>10</b>	<b>2</b>	<b>18</b>

Table 06. Religious status of observed beel fishermen

Religion	Fishermen types																							
	Fulltime				Percentage (%)				Seasonal				Percentage (%)				Subsistence				Percentage (%)			
	No. of fishermen								No. of fishermen								No. of fishermen							
	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total
Muslim	8	5	14	27	72.73	100	87.10	7	8	8	23	87.5	80	100	88.46	5	8	2	15	83.33	80	100	83.33	
Hindu	3	-	1	4	6.67	-	12.90	1	2	-	3	12.5	20	-	11.54	1	2	-	3	16.67	20	-	16.67	
<b>Total</b>	<b>11</b>	<b>5</b>	<b>15</b>	<b>31</b>			<b>100</b>	<b>8</b>	<b>10</b>	<b>8</b>	<b>26</b>				<b>100</b>	<b>6</b>	<b>10</b>	<b>2</b>	<b>18</b>				<b>100</b>	

#### 4.2.5 Age and Age Structure

From the questionnaire interview it was found that 22.67% (Under age) were less than 30 years. 41.33% (Middle age) were between 30 to 40 years and 36% (Old) were more than 40 years old. The observed fishermen in Chatra, Gaab and Jolka beel in about 20%, 32% and 16% were under age respectively. On the other hand 56%, 44% and 24% were middle age respectively and 24%, 24% and 60% were old respectively (Fig. 09).

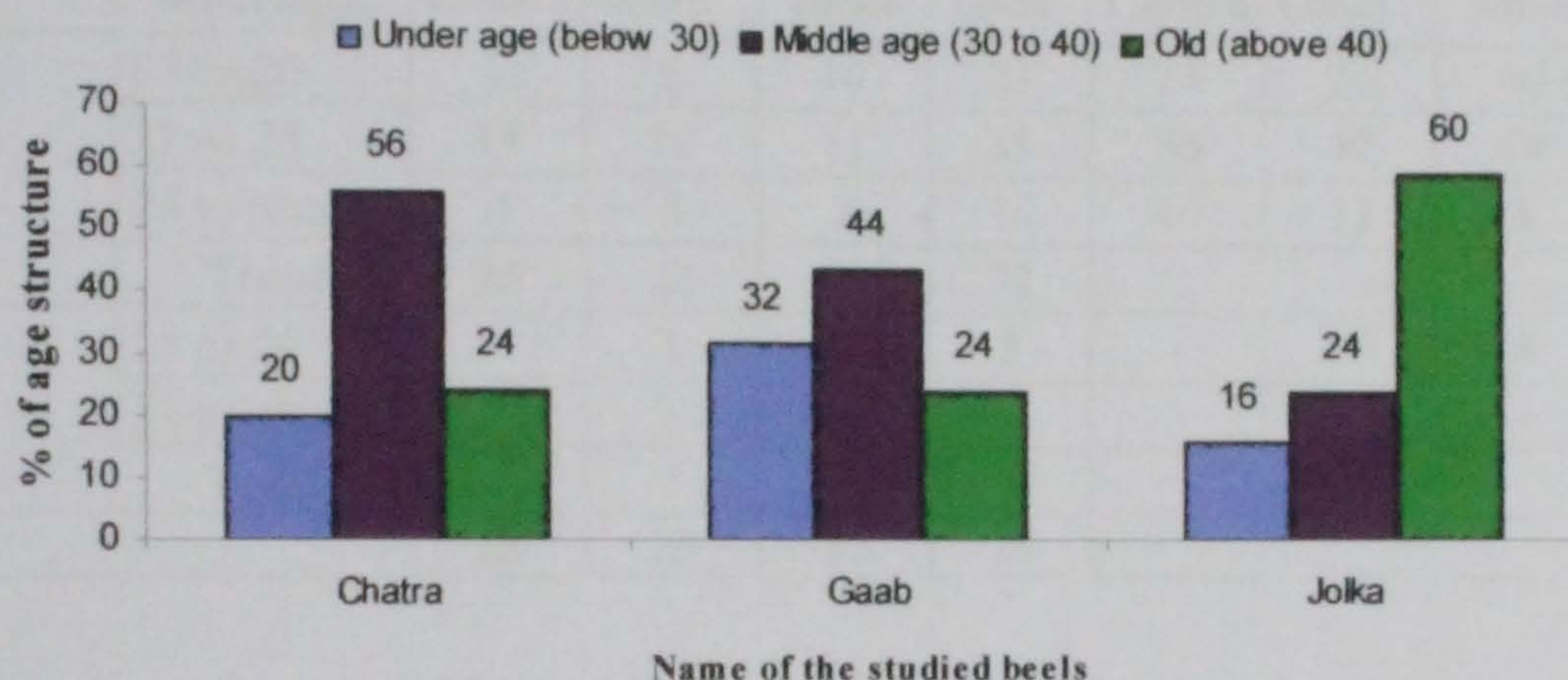


Fig. 09. Age and age structure of observed fishermen.

#### 4.2.6 Sex Category

The observed fishermen in about 96% were male and 4% were female. Among the 75 fishermen it was found that in Chatra, Gaab and Jolka beel 100%, 96% and 92% were male respectively. On the other hand in Gaab and Jolka beel 4% and 8% were female respectively and no female fishermen present in Chatra beel (Fig. 10).

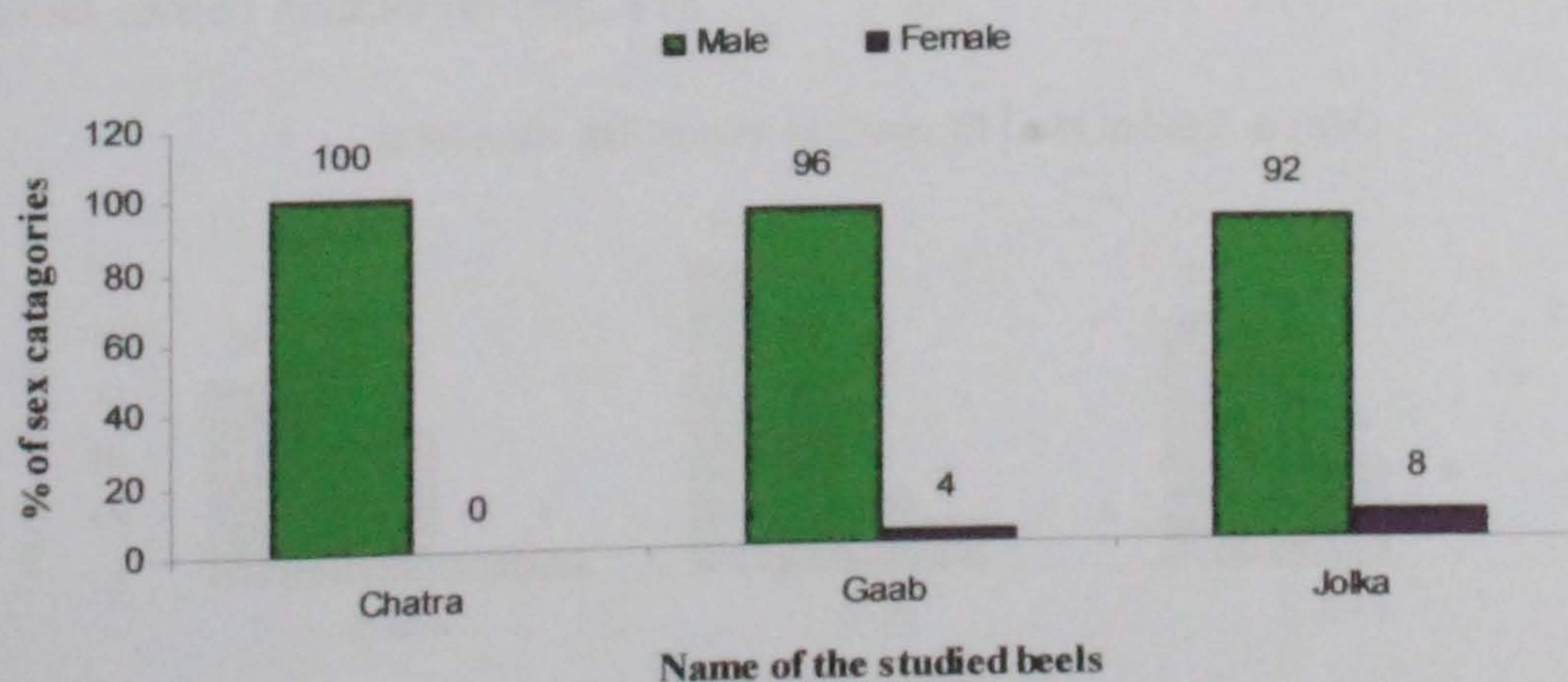


Fig. 10. Sex category of observed fishermen.

#### 4.2.7 Age of Marriage and Marital Status

From the present study it was found that about 46.67% fishermen (male) married within 21 to 25 years, and 18.67% male fishermen married in 26 years and above. On the other hand all of female fishermen married within 15 to 20 years (Table 07).

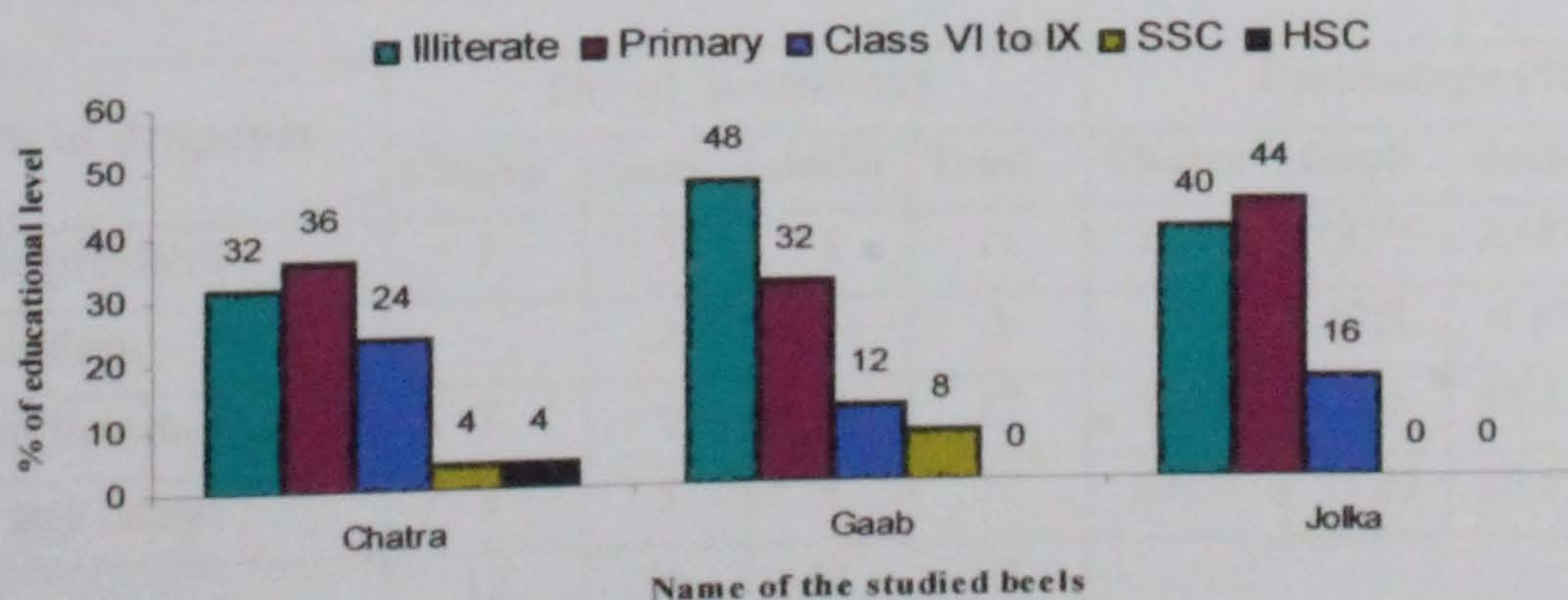
**Table 07. Marital status of observed fishermen**

Sex	Age of marriage	No. of fishermen				Percentage (%)			
		Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total
Male	15 to 20	7	6	10	23	28	24	40	30.66
	21 to 25	14	10	11	35	56	40	44	46.67
	26 to above	4	8	2	14	16	32	8	18.67
	<b>Total</b>	<b>25</b>	<b>24</b>	<b>23</b>	<b>72</b>				<b>96</b>
Female	15 to 20	-	1	2	3	-	4	8	4
	21 to above	-	-	-		-	-	-	-
	<b>Total</b>	<b>-</b>	<b>1</b>	<b>2</b>	<b>3</b>				<b>4</b>
<b>Total</b>		<b>25</b>	<b>25</b>	<b>25</b>	<b>75</b>				<b>100</b>

#### 4.2.8 Educational Status of Fishermen Family

##### 4.2.8.1 Educational Status of Fishermen

From the present study it was found that in Chatra, Gaab and Jolka beel about 40% were illiterate and 60% were literate. From the literate fishermen, 37.34%, 17.33%, 4% & 1.33% were earned primary level, class VI to IX, SSC and HSC respectively. Among the 75 fishermen in Chatra, Gaab and Jolka beel in about 32%, 38% & 40% were illiterate respectively and 36%, 32% & 44% were primary level respectively. On the other hand 24% 12% & 16% were Class VI to IX respectively. In Chatra and Gaab beel 4% & 8% of fishermen earned SSC respectively and only 4% of fishermen in Chatra beel were HSC and nobody could earned graduation (Fig. 11).



**Fig. 11. Educational status of observed fishermen.**

#### 4.2.8.2 Status of School Going Children of Fishermen

Among 75 households 90.67% were maintained to continuity in education, in which 50.67% were only boys, 24% were only girls and 16% were both. About 9.33 % house hold had no participation to run education. School attending number per family was found in Chatra, Gaab and Jolka beel in about 1.56, 1.12 and 1.36 respectively (Table 08).

**Table 08. School going children of fishermen**

School going pattern	No. of household				Percentage (%)				Attendant Number			Average per family		
	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Chatra	Gaab	Jolka
Only boys	12	17	9	38	48	68	36	50.67	16	21	14	1.33	1.24	1.56
Only girls	6	4	8	18	24	16	32	24	10	7	12	1.67	1.75	1.5
Both	7	-	5	12	28	-	20	16	13	-	8	1.86	-	1.6
Non school going	-	4	3	7	-	16	12	9.33	-	-	-	-	-	-
<b>Total</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>75</b>				<b>100</b>	<b>39</b>	<b>28</b>	<b>34</b>	<b>1.56</b>	<b>1.12</b>	<b>1.36</b>

#### 4.2.8.3 Cause of School Dropout of Children

Different causes were responsible in favour of dropout of the children from school. Among these involvement in income was very dominant. About 50.94% children were dropped out for involving in income, 20.75% for economic problem, 5.67% for social problem i.e. eve teasing and superstition etc. and rest of them (22.64%), without any cause (Table 09).

**Table 09. Cause of school dropout of children**

Causes of dropouts	No. of household				Percentage (%)			
	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total
Economic problem	3	3	5	11	23.08	18.75	20.83	20.75
Social problem	-	2	1	3	-	12.8	4.17	5.67
Involve in income	7	6	14	27	53.85	37.5	58.33	50.94
Without any cause	3	5	4	12	23.08	31.25	16.67	22.64
<b>Total</b>	<b>13</b>	<b>16</b>	<b>24</b>	<b>53</b>				<b>100</b>

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## 4.2.9 Household Status

### 4.2.9.1 Housing Condition

From the present study it was found that in Chatra, Gaab and Jolka beel about 68%, 10.67 %, 20% & 1.33% were kacha, semi-paka, kacha & semi-paka and kacha & paka house respectively. Among the 75 households it was found that in Chatra, Gaab and Jolka beel in about 56%, 72% & 76% were kacha house respectively and 16%, 8% & 8% were semi-paka respectively. On the other hand 4% houses in Chatra beel were kacha & paka and had no paka houses in studied households (Fig.12).

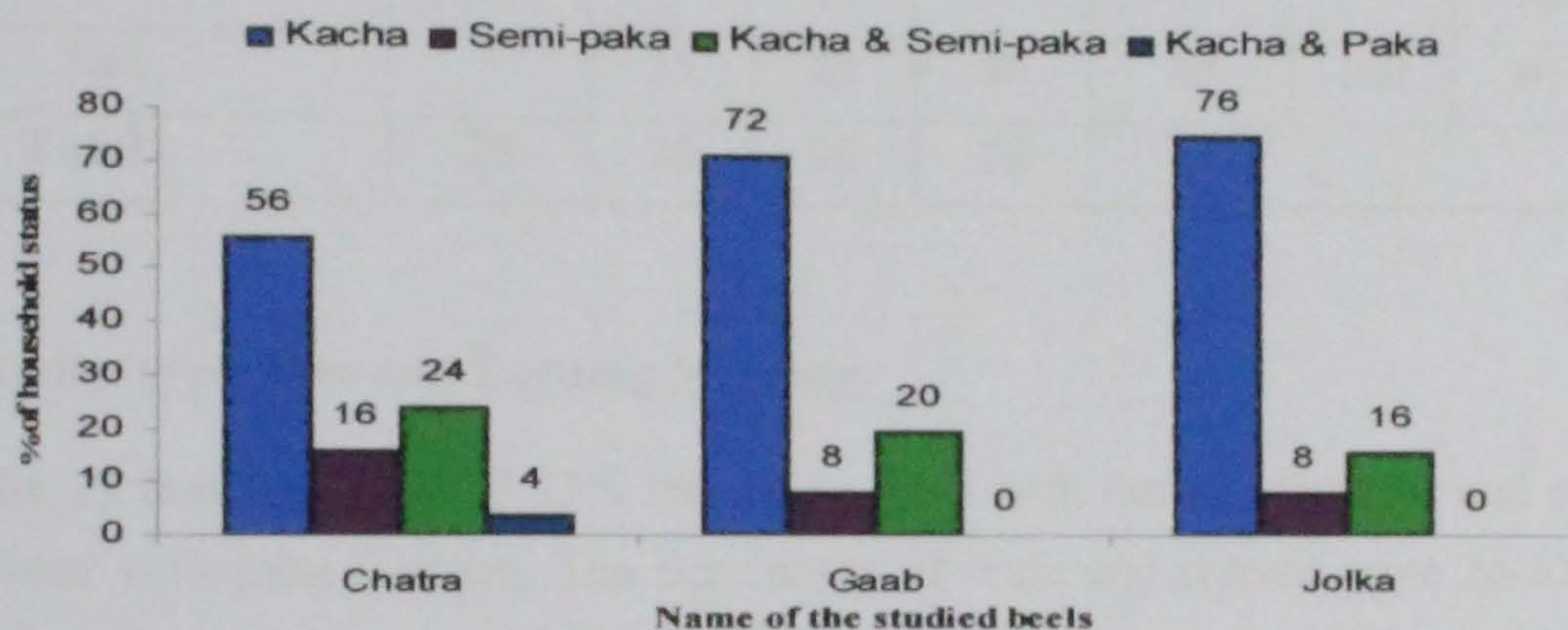


Fig. 12. Housing condition of observed fishermen.

### 4.2.9.2 Number of House Owned by Fishermen

Majority of fishermen had owned one houses (88%). About 9.33% fishermen owned no house, 2.67% had owned two houses. From the present study it was found that in Chatra, Gaab and Jolka beel in about 84%, 92% & 88% fishermen had one houses respectively and in Chatra and Jolka beel each 4% of fishermen were two houses. On the other hand in Chatra, Gaab and Jolka beel, 12%, 8% & 8% fishermen had no houses respectively (Fig.13).

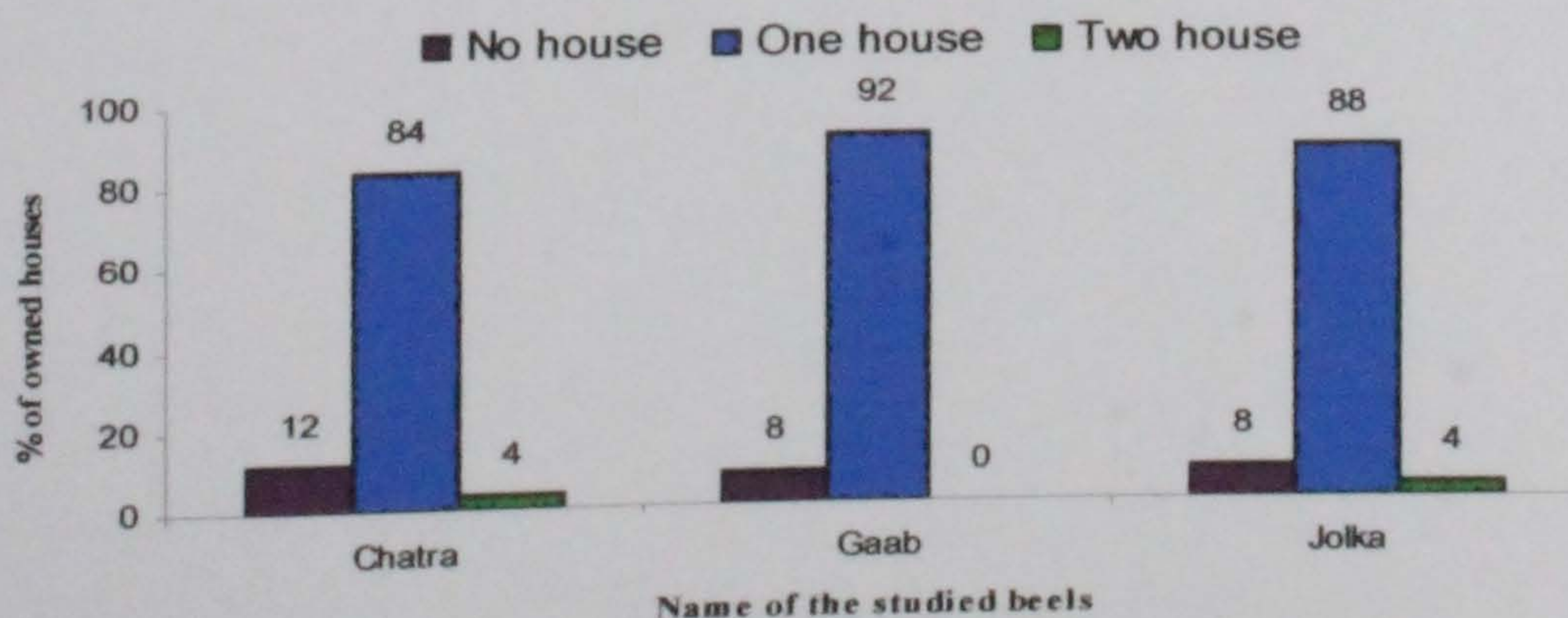


Fig. 13. Owned housing number of observed fishermen.

### 4.2.9.3 Use of Electricity

In the present study it was found that the majority member of households used no electricity (66.67%) and few households used electricity (33.33%). The fishermen of Chatra beel used electricity (80%) and fishermen of Gaab beel had no facilitated to use electricity (Table 10).

**Table 10. Electricity use of observed fishermen**

Use of electricity	No. of household				Percentage (%)			
	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total
Yes	20	-	5	25	80	-	20	33.33
No	5	25	20	50	20	100	80	66.67
<b>Total</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>75</b>				<b>100</b>

### 4.2.10 Family Type, Size and Earning Member

Among the 75 families about 57.33% fishermen lived with nuclear families and only about 42.67% lived with joint families. The percentage of male and female were 56.67 & 43.33 respectively. Total earning member were 128 out of 390, in which the percentage of male and female were 81.25 & 18.75 respectively (Table 11).

Table 11. Family type, family size, total earning member and the percentage of earning member of observed fishermen

Family type		Family size								Earning member																	
		No. of household				Family member				Percentage (%)				No. of fishermen				Percentage (%)									
Type		Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total	Sex	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total	Sex	Chatra	Gaab	Jolka	Total				
Joint		8	9	15	32	32	36	60	42.67	Male	96	70	55	221	66.54	53.84	52.89	56.67	Male	33	36	35	104	89.19	81.82	74.47	81.25
Nuclear		17	16	10	43	68	64	40	57.33	Female	60	60	49	169	38.46	46.15	47.12	43.33	Female	4	8	12	24	10.81	18.18	25.53	18.75
<b>Total</b>		<b>25</b>	<b>25</b>	<b>25</b>	<b>75</b>	<b>156</b>	<b>130</b>	<b>104</b>	<b>390</b>		<b>156</b>	<b>130</b>	<b>104</b>	<b>390</b>				<b>100</b>		<b>37</b>	<b>44</b>	<b>47</b>	<b>128</b>				<b>100</b>

#### 4.2.11 Diseases and Nature of Treatment

From the present survey, information was collected on the extent of nature of treatment received by fishermen. It was found that 18.67% fishermen received treatment from qualified doctor, 33.33% from quack or nurse, 29.33% from homeopathy, 5.33% from herbal, 6.67% from others and rest of them (6.67%) did not take any treatment for their normal diseases (Table 13).

#### 4.2.12 Sanitation Practices

In the study area it was found that about 61.33%, 25.33% & 4% of latrines were kacha, semi-paka & paka and rest of them (9.34%) had no latrines. Among the 75 households it was found that in Chatra, Gaab and Jolka beel about 52%, 60% & 72% of latrines were kacha respectively and 36%, 28% & 12% were semi-paka respectively. In Chatra and Gaab beel 8% & 4% latrines were paka respectively. On the other hand in Chatra, Gaab and Jolka beel 4%, 8% & 16% households had no latrines facilities (Fig.14).

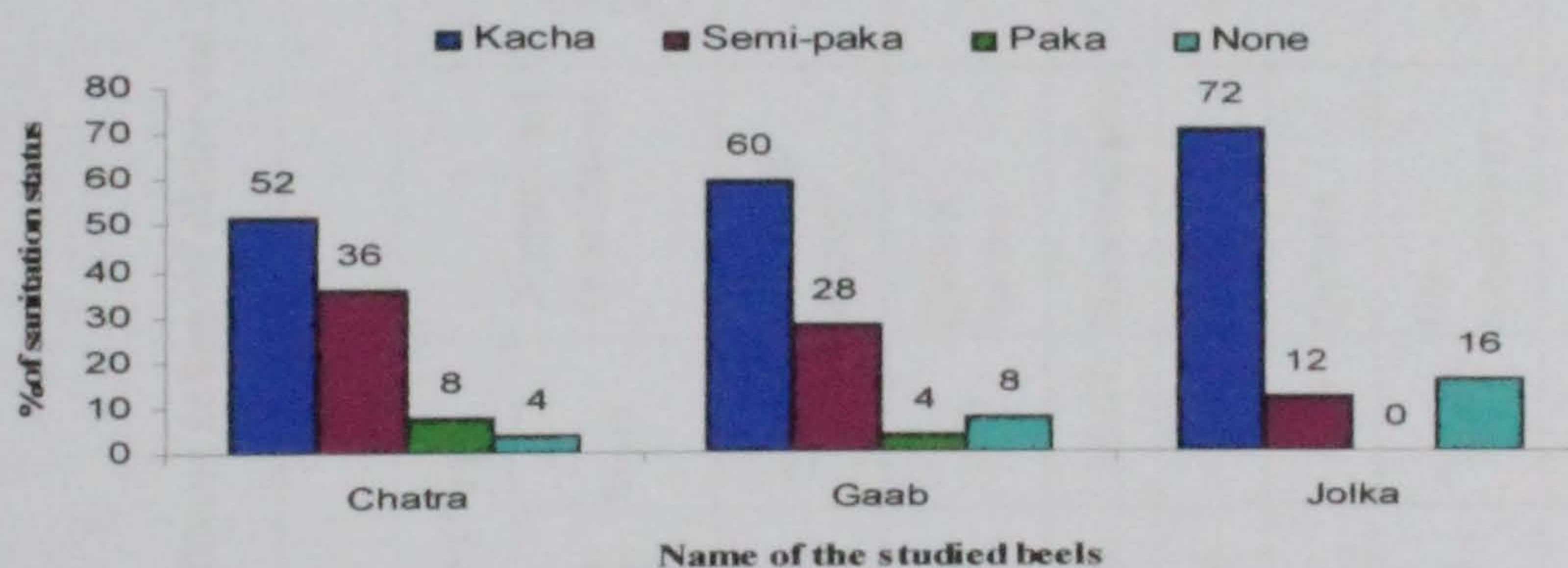


Fig. 14. Sanitation status of observed fishermen.

#### 4.2.13 Sources of Drinking Water

Of the total 75 fishermen interviewed most of them used tube-well water for drinking and house hold purposes. About 28% fishermen used own hand tube-well, 42.66% used another hand tube-well, 26.67% used Govt. hand tube-well and rest of them (2.67%) used beel and pond water for drinking purposes (Table 12).

Table 12. Sources of drinking water of observed fishermen

Sources of water	No. of fishermen				Percentage (%)			
	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total
Own hand tube-well	10	5	6	21	40	20	24	28
Another hand tube-well	9	10	13	32	36	40	52	42.66
Govt. tube-well/Tara pump	6	10	4	20	24	40	16	26.67
Beel and pond	-	-	2	2	-	-	8	2.67
<b>Total</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>75</b>				<b>100</b>

Table 13. Diseases of fishermen and nature of treatment taken of observed fishermen

Diseases type	Diseases of fish farmer					Nature of treatment taken											
	No. of fishermen			Percentage (%)		Nature of treatment	No. of fishermen			Percentage (%)							
	Chatra	Gaab	Jolka	Total	Chatra		Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total				
Diarrhoea	4	6	6	16	16	24	24	24	21.33	7	5	2	14	28	20	8	18.67
Fever	8	9	10	27	32	36	40	36	36	5	10	10	25	20	40	40	33.33
Dysentery	5	5	4	14	20	20	16	18.67	18.67	7	7	8	22	28	28	32	29.33
Malnutrition	3	2	4	9	12	8	16	12	12	4	-	-	4	16	-	-	5.33
Others	-	1	-	1	-	4	-	1.33	1.33	-	1	4	5	-	4	16	6.67
No disease	5	2	1	8	20	8	4	10.67	10.67	2	2	1	5	8	8	4	6.67
<b>Total</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>75</b>				<b>100</b>	<b>100</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>75</b>				<b>100</b>

#### 4.2.14 Food and Nutrition

##### 4.2.14.1 Number of Meal Taken per Day

It was found that majority of fishermen took three meals (73.34%), 17.33% fishermen took two meals and 9.33% took four meal per day (Table 14).

**Table 14. Daily meal taken of observed fishermen**

Meal taken	No. of fishermen				Percentage (%)			
	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total
Two	3	4	6	13	12	16	24	17.33
Three	20	19	16	55	80	76	64	73.34
Four	2	2	3	7	8	8	12	9.33
<b>Total</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>75</b>				<b>100</b>

##### 4.2.14.2 Food Intake

Among the 75 household it was found that 22.67% fishermen took fish in 6 to 7 days in a week, 33.33% were 3 to 5 days and only 28% were 0 to 2 days in a week. Due to high price of meat the 6.67% fishermen took meat in 0 to 2 days in a week, 9.33% took eggs in 0 to 2 days, 12 % in 3 to 5 days, 4% in 6 to 7 days in a week, 32% fishermen took milk in 0 to 2 days in a week, 25.33 % in 3 to 5 days, 13.33 % in 6 to 7 days in a week, 17.33% fishermen took pulses in 0 to 2 days in a week, 12% in 3 to 5 days, 20 % in 6 to 7 days in a week. 6.67% fishermen took vegetables in 0 to 2 days in a week, 17.33% in 3 to 5 days and 40 % in 6 to 7 days in a week (Table 16).

##### 4.2.15 Dependency Type on Beel Water

Among the 75 fishermen it was found that about 18.67% fishermen depended upon beel only for fishing purposes, 13.33% for household purposes, 42.67% for fishing and irrigation and rest of them (25.33%) depended upon fishing, irrigation and household purposes (Table 15).

**Table 15. Dependency type on beel water of observed fishermen**

Dependency type	No. of fishermen				Percentage (%)			
	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total
Only fishing	3	5	6	14	12	20	24	18.67
Fishing and house hold	3	4	3	10	12	16	12	13.33
Fishing and irrigation	13	9	10	32	52	36	40	42.67
Fishing, irrigation and house hold	6	7	6	19	24	28	24	25.33
<b>Total</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>75</b>				<b>100</b>

Table 16. Weekly food intake by observed fishermen

Food item	No. of days in week																							
	0-2				3-5				Percentage (%)				6-7				Percentage (%)							
	No. of household				No. of household				No. of household				No. of household				No. of household							
	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total				
Fish	7	6	8	21	24	24	28	5	11	9	25	20	44	36	33.33	5	4	8	17	20	16	32	22.67	
Meat	4	1	-	5	16	4	6.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Egg	4	2	1	7	16	8	9.33	4	3	2	9	16	12	8	12	2	1	-	3	8	4	-	4	
Milk	2	12	10	24	8	48	32	5	6	8	19	20	24	32	25.33	4	3	3	10	16	12	12	13.33	
Pulses	3	4	6	13	12	16	17.33	4	3	2	9	24	12	8	12	4	6	5	15	16	24	20	20	
Vegetables	5	-	-	5	20	-	6.67	7	2	4	13	28	8	16	17.34	10	11	9	30	40	44	36	40	
<b>Total</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>75</b>			<b>100</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>75</b>				<b>100</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>75</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>75</b>	<b>100</b>

## 4.2.16 Land Use Information

### 4.2.16.1 Own Household Land

Among the studied fishermen 30.67% owned 1 to 10 decimal lands, 36% fishermen owned 11 to 20, 24 % owned 21 to above household land. And rest of them (9.33%) had no household land (Table 17).

**Table 17. Household land area owned by of observed fishermen**

Area of household land (Decimal)	No. of fishermen				Percentage (%)			
	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total
1 to 10	8	7	8	23	32	28	32	30.67
11 to 20	12	6	9	27	48	24	36	36
21 to above	2	10	6	18	8	40	24	24
None	3	2	2	7	12	8	8	9.33
<b>Total</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>75</b>				<b>100</b>

### 4.2.16.2 Area of Cultivated Land

Among 75 fishermen the area of utilized land area varied from 41 to 80 decimal (32%) in most of the fishermen and 1 to 40 decimal in 4% fishermen. Detailed results are presented in Table 18.

**Table 18: Cultivated land area of observed fishermen**

Area of cultivated land (Decimal)	No. of fishermen				Percentage (%)			
	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total
1 to 40	3	-	-	2	12	-	-	4
41 to 80	7	13	4	24	28	52	16	32
81 to 120	3	9	10	22	12	36	40	29.33
121 to 160	6	-	7	13	24	-	28	17.33
161 to above	3	1	2	6	12	4	8	8
None	3	2	2	7	12	8	8	9.33
<b>Total</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>75</b>				<b>100</b>

#### 4.2.16.3 Area of Land within the Beel

Among the studied fishermen it was found that 4% fishermen owned 1 to 40 decimal lands, 36% owned 41 to 80 decimal, 37.33% owned 81 to 120 decimal and 12% owned 160 to above decimal lands. And 4 % fishermen were out of land with in these beels (Table 19).

**Table 19. Area of land with in the beel of observed fishermen**

Area of cultivated land (Decimal)	No. of fishermen				Percentage (%)			
	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total
1 to 40	3	-	-	3	12	-	-	4
41 to 80	4	15	8	27	16	60	32	36
81 to 120	8	6	14	28	32	24	56	37.33
121 to 160	5	-	-	5	20	-	-	6.67
161 to above	5	3	1	9	20	12	4	12
None	-	1	2	3	-	4	8	4
<b>Total</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>75</b>				<b>100</b>

#### 4.2.16.4 Area of Lease Land

Among the studied fishermen it was found that 48% fishermen were out of mortgaged land and they cultivated their own land and majority (29.33%) of fishermen leased land in 21 to 41 decimal. Details results are shown in Table 20.

**Table 20. Area of leased land-in of observed fishermen**

Area of mortgaged-in land (Decimal)	No. of fishermen				Percentage (%)			
	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total
1 to 20	2	-	-	2	8	-	-	2.67
21 to 40	4	10	8	22	12	40	32	29.33
41 to 60	2	3	1	6	8	12	4	8
61 to above	6	3	-	9	24	12	-	12
None	11	9	16	36	44	36	64	48
<b>Total</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>75</b>				<b>100</b>

#### 4.2.17 Recreational Sources and Use of Media

Among the 75 fishermen, 30.67%, 10.67%, 12%, 10.67% & 33.32% used radio, television, cassette player, VCD, and mobile phone as recreational purposes respectively and only 2.67% read newspaper as recreation. From the present study it was found that in Chatra, Gaab and Jolka beel in about 28%, 20% & 44% fishermen used radio as recreational sources of media respectively and in about 12%, 16% & 4% fishermen used television respectively. On the other hand in Chatra, Gaab and Jolka beel a large number of fishermen in about 36%, 40% & 24% used mobile phone respectively and a few fishermen read newspaper in the studied beels (Fig.15).

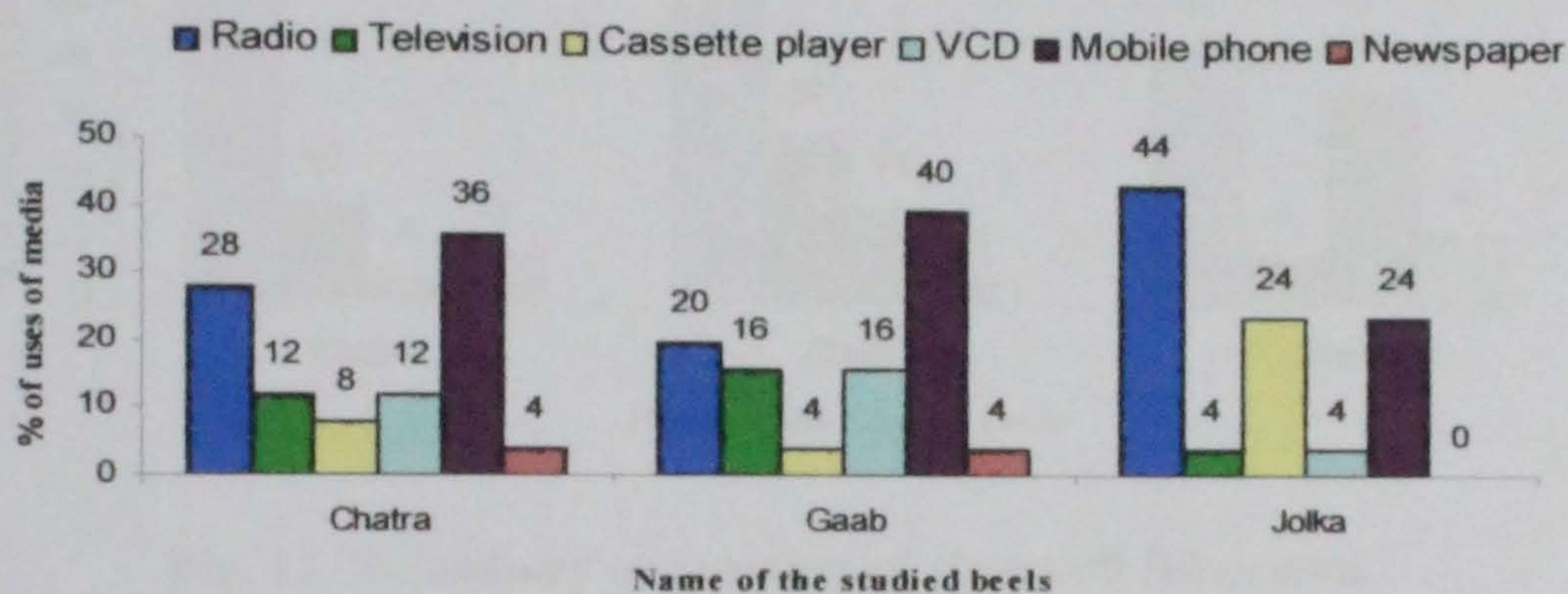


Fig. 15. Recreational sources and use of media of observed fishermen.

#### 4.2.18 Occupation

##### 4.2.18.1 Main Occupation of the Beel Fishermen

Among the 75 fishermen it was found that the main occupation in most cases was agriculture (45.33%) besides this fishing, business, services and others were 34.67%, 6.67%, 4% & 9.33% respectively. From the present study in Chatra, Gaab and Jolka beel in about 40%, 68% & 28% fishermen involved in agriculture respectively and besides this in about 32%, 28% & 44% fishermen involved in fishing respectively (Fig.16).

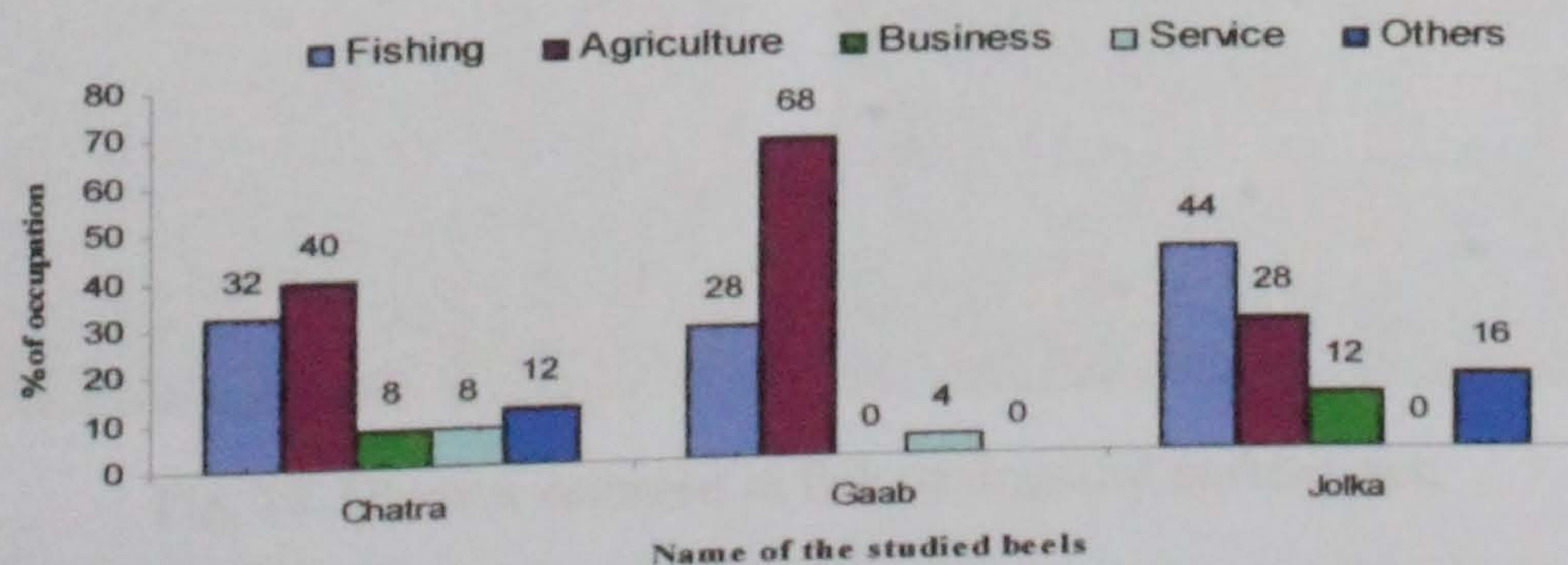


Fig. 16. Main occupation of observed fishermen.

#### 4.2.18.2 Subsidiary Occupation of the Beel Fishermen

The subsidiary occupations of studied fishermen were found to be fishing in most cases and it was about 72%, 52% & 44% in Chatra, Gaab and Jolka beel respectively besides this few fishermen involved business and others (agriculture, livestock rearing and vegetation etc.) subsidiary occupation (Fig. 17).

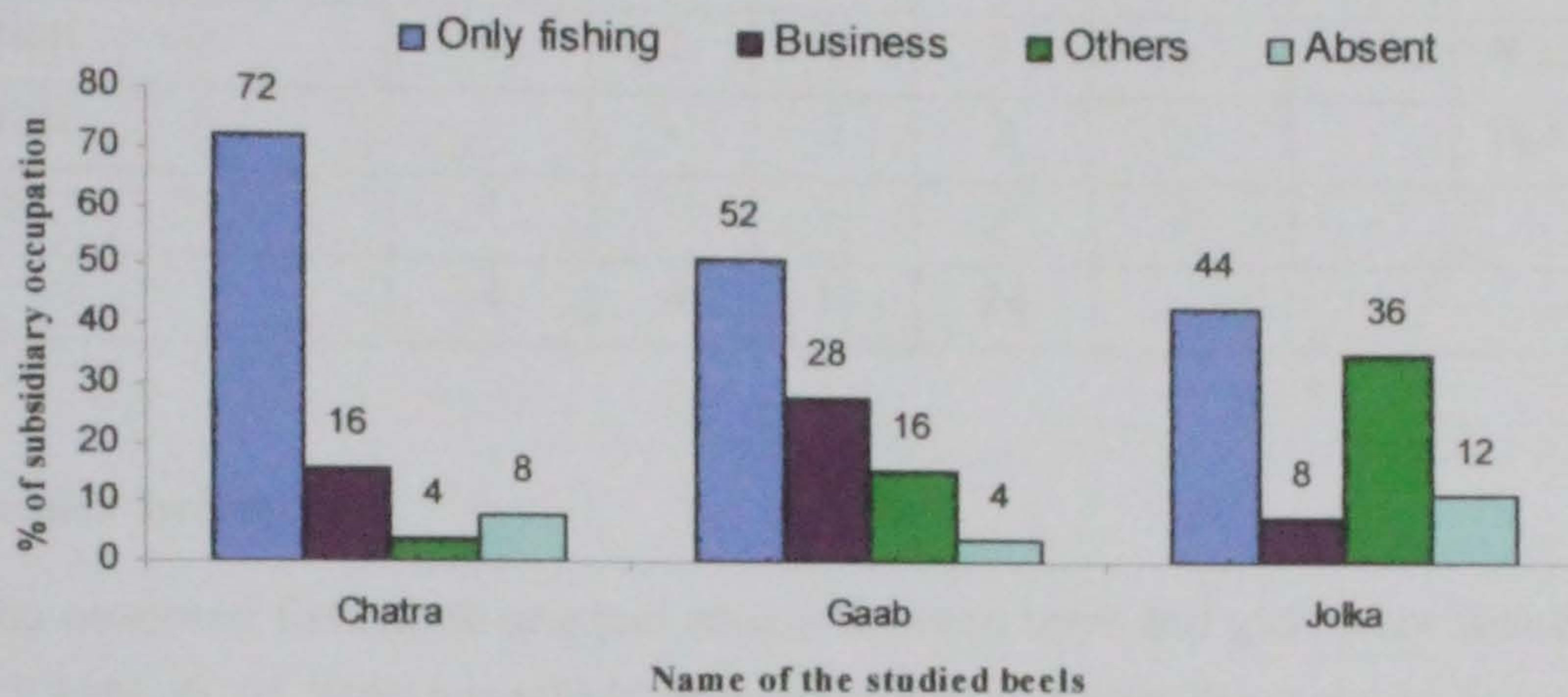


Fig. 17. Subsidiary occupation of observed fishermen.

#### 4.2.19 Women Participation

Participation of women in earning besides household activities were found. Among 75 households, 33.33% women were involved in live-stock rearing, 29.17% poultry rearing, 12.5% in both vegetation and fishing & fish drying, 8.33% in handicrafts (net making, knitting) and 4.17% in business (Table 21).



Fig. 18. Women engaged in fish drying and making net.

**Table 21. Women participation types of observed household**

Participation types	No. of women				Percentage (%)			
	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total
Fishing & fish drying	-	1	2	3	-	12.5	16.67	12.5
Livestock rearing	1	2	5	8	25	25	41.67	33.33
Poultry rearing	2	3	2	7	50	37.5	16.67	29.17
Vegetation	-	2	1	3	-	25	8.33	12.5
Handicraft	-	-	2	2	-	-	16.67	8.33
Business	1	-	-	1	25	-	-	4.17
<b>Total</b>	<b>4</b>	<b>8</b>	<b>12</b>	<b>24</b>				<b>100</b>

#### 4.2.20 Gender Issues

Among the observed fishermen unequal access between boys and girls were found. In about 21.33%, 1.33% & 25.34% household showed unequal access between boys and girls in education, food and other purposes respectively and rest of them had no (52%) unequal access (Table 22).

**Table 22. Unequal access between boys and girls of observed household**

Conflicts	No. of household				Percentage (%)			
	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total
In educational purposes	3	6	7	16	12	24	28	21.33
In food purposes	-	-	-	-	-	-	4	1.33
Others	7	8	4	19	28	32	16	25.34
Absent	15	11	13	39	60	44	52	52
<b>Total</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>75</b>				<b>100</b>

#### 4.2.21 Savings of Fishermen

Among the 75 fishermen it was found that in Chatra, Gaab and Jolka beel in about 44%, 56% & 28% fishermen saved their earned money in village co-operative societies respectively and in about 24%, 24% & 16% fishermen used to no savings respectively (Fig.19).

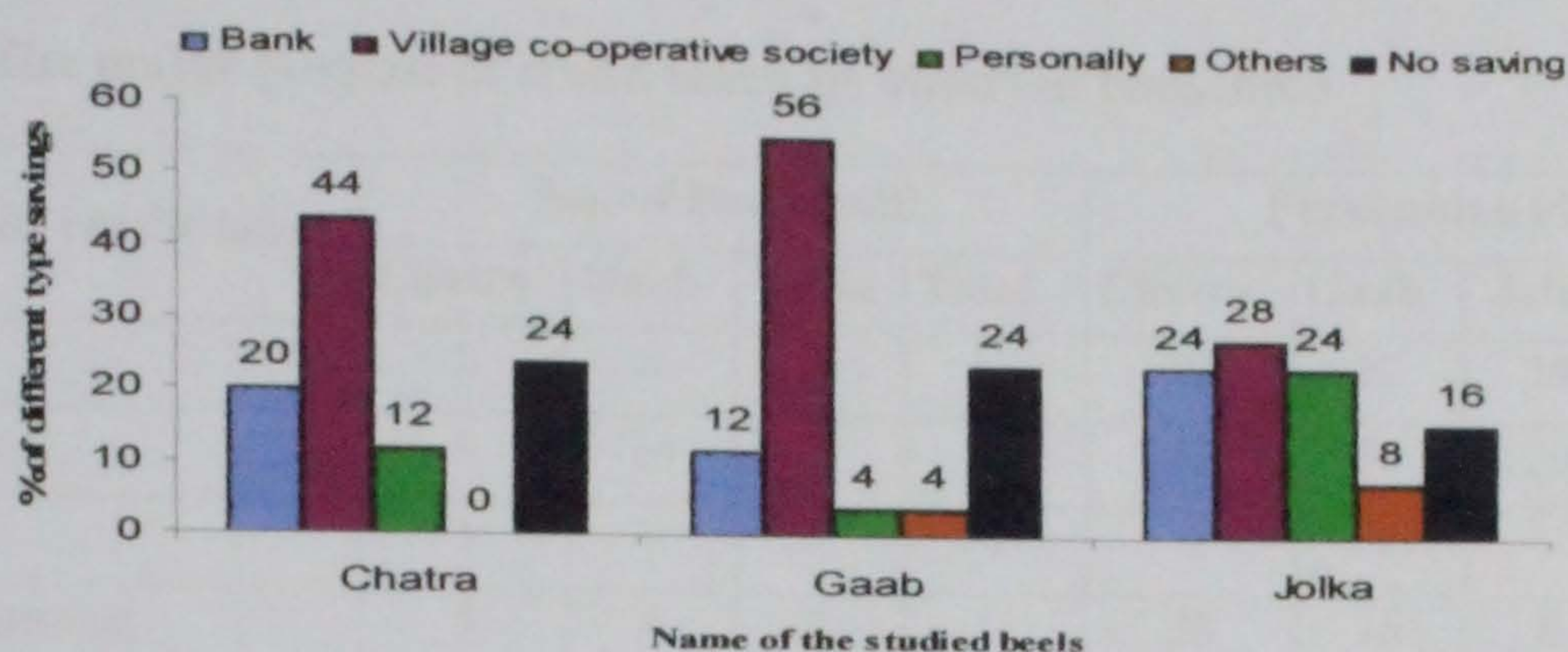


Fig. 19. Saving and saving types of fishermen of observed household.

#### 4.2.22 Credit/ Loan

##### 4.2.22.1 Credit Providers

In studied area some non government organization (NGO's) such as Grameen bank (13.33%), ASA (4%), Anannay (9.33%), BRAC (4%) and local co-operative (17.33%) provided micro-credit facilities to the fishermen (mainly women) for different purposes such as farming (crop, poultry, dairy) small business, handicrafts. Govt. participation was absent in this case. The fishermen also got some financial support privately such as neighbors (9.33%), relative (16.67%) and money lenders (24%). About 4% fishermen were out of credit (Table 23).

Table 23. The major credit taken from different types of credit providers by observed household

Credit providers		No. of household				Percentage (%)			
Types	Decriptions	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total
Private	Neighbors	3	3	1	7	12	12	4	9.33
	Relatives	4	5	2	11	16	20	8	16.67
	Money lenders	2	6	10	18	8	24	40	24
Institutional	Grameen bank	4	-	6	10	16	-	24	13.33
	ASA	-	3	-	3	-	12	-	4
	Anannay	5	2	-	7	20	8	-	9.33
	BRAC	2	1	-	3	8	4	-	4
	Co-operatives	3	5	5	13	12	20	20	17.33
None	-	2	-	1	3	8	-	4	4
<b>Total</b>		<b>25</b>	<b>25</b>	<b>25</b>	<b>75</b>				<b>100</b>

#### 4.2.22.2 Purpose of Credit Taken

About 36% fishermen utilized their credit in agriculture purposes. 20% utilized their credit in fishing (gear repaired or buying), 1.33% in business, 14.67% both in poultry farming & others and 8% in dairy farming purposes (Table 24).

**Table 24. The major purpose of credit taken by observed household**

Purposes of credit taken	No. of household				Percentage (%)			
	Chatra	Gaab	Jolka	Total	Chatra	Gaab	Jolka	Total
Fishing	5	3	7	15	20	12	28	20
Agriculture	8	14	5	27	32	56	20	36
Business	1	-	-	1	4	-	-	1.33
Poultry farming	5	4	2	11	20	16	8	14.67
Dairy	-	2	4	6	-	8	16	8
Medical	1	-	-	1	4	-	-	1.33
Others	3	2	6	11	12	8	24	14.67
No credit taken	2	-	1	3	8	-	4	4
<b>Total</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>75</b>				<b>100</b>

#### 4.2.23 Socio-Economic Constraints of the Fishermen

From the present study it was also found that socio-economic constraints such as population pressure, low income, literacy, low economic status and lack of alternative employment opportunities were the main problems for beel fisheries development. Fishermen were also facing problem of child education, animal feed and house building materials. Almost all fishermen mentioned lack of capital and the reducing natural fish population as their main problems.

## CHAPTER 5

### DISCUSSION

In this chapter findings of the present study has been discussed, compared with the findings of others studies.

#### 5.1 Fish Diversity of Chatra, Gaab and Jolka Beel

A total of 59 species belonging to 41 genera and 17 families were accounted and identified so far from the Chatra, Gaab and Jolka beel. Out of them, 49 were indigenous species and 10, exotic species. Of the 59 fish species recorded, 19 species were belonging to the family Cyprinidae. Next to Cyprinidae, 7 species were belonging to family Bagridae. Four species were belonging to family Channidae & Siluridae each. Three species were belonging to family Anabantidae, Cobitidae & Mastacembelidae each. Two species were belonging to family Cichlidae, Clupeidae & Notopteridae each. Only 1 species belonged to family Belonidae, Claridae, Gobiidae & Heteropneustidae each. The identified fishes were divided into 6 categories based on their abundance during the study period. Among the 59 species, 19 species were common, 18 were extremely common, 14 were few, 3 were vulnerable, 2 were endangered and finally 3 species were treated as critically endangered. Khan and Khaleque (2007) also stated that in present condition about 12 species of fishes were critically endangered, 28 were endangered and 14 species were vulnerable in our country. The identified fishes were further categorized in 28 groups. Among them carps minnows barbs and catfishes were most dominant groups according to there numbers. Joadder (2008) recorded a total of 76 fish species belonging to 76 genera, 26 families and 1 species of prawn were identified from the beel Kumari, under Rajshahi district. Ahmed *et al.* (2004) recorded a total of 52 fish species belonging to 36 genera, 20 families and 1 species of prawn during the study period in Shakla beel under Brahamanbaria district. Of the 52 fish species recorded, 16 species were belonging to the family Cyprinidae followed by Siluridae, Anabantidae, and Channidae of which each family belongs to four species. Rana (2003) recorded 101 species of fish from the Baral beel of Chalan beel flood plain. Haroon *et al.* (2002) identified a total of 92 species of fish and prawn from Sylhet-Mymensingh sub-basin. He found the dominance of barbs, catfishes and major carps in the Sylhet sub-basin and catfishes, major carps and prawns in the Mymensingh sub-basins. Siddiquee (2001) recorded a total of 14 species of non- resident fish and 43 resident species were identified of which 30 were common, 9 rare and 5 highly endangered in Rajdhala beel under Netrokona district. In India, Sugunun and Bhattachariya (2000) recorded 54 species blonging to 18 families from Dighali

beel under Kamrup district. The common species contributing to commercial landings belong to eight groups (Carps, catfishes, murrels, featherbacks, air-breathing fishes, hilsa, prawns and miscellaneous fishes). Mortuza (1997) recorded 126 fish and 13 species of fisheries item from the Barnai river (FCDI) project area.

Local fishers, BMC members, kua owners, retailers of local fish markets, NGO workers, fisheries officials and peoples residing along the immediate vicinity of the beel informed that species diversity and fish production of the beel had declined, many species had been lost over time due to loss of fish habitat, over fishing, siltation, use of fertilizer and insecticides in the rice field as well as used of a few types of destructive fishing gears *viz.* seine nets (ber jal/ badai jal) and gill net of (current jal/ fash jal). Similar observations were found by Ahmed *et al.* (2004) in Shakla beel, Brahmanbaria district and Joadder (2008) in Beel Kumari under Rajshahi district.

## **5.2 Socio-Economic Condition of Fishermen of Chatra, Gaab and Jolka Beel**

### **5.2.1 Fisher/ Fishermen Types**

There were different types of fisher in Bangladesh, some fisher mainly for consumption, some fisher as alternative employment and some are solely dependent on fishing. The fishermen who catch fish in the studied beel were categorized into three groups which are:

- ❑ Fulltime fishermen (depend on fishing almost round the year)
- ❑ Seasonal fishermen (catch fish only a part of the year as a source of income and keep them engaged in other activities in other time of the year)
- ❑ Subsistence fishermen (catch fish for their own consumption. Sometimes the subsistence fishermen act as seasonal fishermen in peak season of fish)

Among the 75 fishermen it was found that about 41.33% were fulltime fishermen, 34.67% were seasonal and the rest of the 24% were subsistence fishermen. The observed fishermen in Chatra, Gaab and Jolka beel in about 44%, 20% & 60% were engaged in fulltime fishing respectively. On the other hand 32%, 40% and 32% were seasonal respectively and 24%, 40% & 8% were subsistence respectively. Raju (2002) in Sailkupa upazila obtained about maximum fish farmers (62%) were engaged themselves in fulltime fishing.

### **5.2.2 Average Monthly Income of Fishermen**

Average monthly incomes of observed fishermen were found to vary from 2500 to 14500. Comparatively the average monthly income of fulltime fishermen were less than seasonal and subsistence fishermen. For the reason that, the main occupation of fulltime fishermen

were mostly fishing. Among the 31 fulltime fishermen (Out of 75) it was found that about 80.65% fishermen income limited between 2 to 5 thousands (Tk.). On the other hand, among the 26 (Out of 75) seasonal fishermen only 19.23% fishermen earned 2 to 5 thousands (Tk.) and among the 18 (Out of 75) subsistence fishermen only 72.22% fishermen earned 2 to 5 thousands (Tk.). Roy and Dorairaj (1998) estimated that the fluctuated lowest range of income were Rs. 816-1225 at Chowdhuri and Rs. 7886-10200 at Panighat per month in south Andaman. Raju (2002) reported that maximum fish farmers (37%) yearly income was between 10 to 30 thousands (Tk) in Sailkupa upazila under Jhenaidah district.

### **5.2.3 Fishing Types**

About 49.33% fishermen in Chatra, Gaab and Jolka beel perform their fishing through group form and 50.67% were individually. Among the 75 fishermen it was found that in Chatra, Gaab and Jolka beel 24%, 56% and 68% were fishing through group form respectively. On the other hand 76%, 44% and 32% were fishing individually respectively. Ahmed (1996) and Muhit *et al.* (2000) revealed that maximum 69% to 75% fishermen caught fish individually in Dhaleswari river.

### **5.2.4 Religion**

Religion plays an important role in the social life of people of a given area. Among the 31 fulltime fishermen (Out of 75) it was found that about 87.10% fishermen were Muslim and 12.90% Hindu. On the other hand among the 26 (Out of 75) seasonal fishermen in about 88.46% were Muslim and 11.54% Hindu and among the 18 (Out of 75) subsistence fishermen in about 83.33% were Muslim and 16.67% Hindu and no Buddhists or Christians. Karim (2004) found 68% and 32% Muslim & Hindu fishermen respectively in Dhamharail beel. He also stated that, the dominance of Muslims was understood on the ground of changing socio-economic structure, lack of employment opportunity and realization of the beel fishing potential as a source of income. Samima (2000) stated 61.11% Hindus and 85.67% Muslims fishermen in Galamary fishing community. Among the 75 fishermen it was found that majorities of fulltime and subsistence fishermen were Muslims and they continue their occupation by generation to generation.

### **5.2.5 Age and Age Structure**

Knowledge of the age structure of fishermen is important in estimating potential productive human resources. From the questionnaire interview it was found that 22.67% (under age) were less than 30 years. 41.33% (middle age) were between 30 to 40 years and 36% (Old) were more than 40 years old. The observed fishermen in Chatra, Gaab and Jolka beel in about 20%, 32% and 16% were under age respectively. On the other hand 56%, 44% and

24% were middle age respectively and 24%, 24% and 60% were old respectively. Ahmed (1996) in Tangail and Ahmed (1999) in coastal region reported 66% and 70% fishermen less than 40 years age respectively.

### **5.2.6 Sex Category**

The observed fishermen in about 96% were male and 4% were female. Among the 75 fishermen it was found that in Chatra, Gaab and Jolka beel 100%, 96% and 92% were male respectively. On the other hand in Gaab and Jolka beel 4% and 8% were female respectively and no female fishermen present in Chatra beel. Mahbubur (2001) found in about 90% of fishermen were male in the Baculiar haor, Itna, Kishoregonj.

### **5.2.7 Age of Marriage and Marital Status**

From the present study it was found that about 96% fishermen (male) married majority in 15 to 20 and 21 to 25 years, and 18.67% male fishermen married in 26 years above. On the other hand all of female fishermen married in 15 to 20 years. Ahmed (1996) in Tangail, Mannu (1999) in Kuakata and Raju (2002) in Sailkupa obtained married fishermen at 94%, 92% and 68% respectively.

### **5.2.8 Educational Status of Fishermen Family**

#### **5.2.8.1 Educational Status of Fishermen**

Literacy level can play a vital role in efficient management and operation of farming activities. Because educated farmers can had better access to the relevant technical information as well as can made national economic decisions. From the present study it was found that in Chatra, Gaab and Jolka beel about 40% were illiterate and 60% were literate. From the literate fishermen, 37.34%, 17.33%, 4% & 1.33% were earned primary level, class VI to IX, SSC, HSC respectively. Among the 75 fishermen in Chatra, Gaab and Jolka beel in about 32%, 38% & 40% were illiterate respectively and 36%, 32% & 44% were primary level respectively. On the other hand 24% 12% & 16% were Class VI to IX respectively. In Chatra and Gaab beel 4% & 8% of fishermen earned SSC respectively and only 4% of fishermen in Chatra beel were HSC and nobody could earned graduation. Roy and Dorairaj (1998) found 61.91% had studied up to primary standard in Andamans fishermen community. Mahabubullah (1998) in polder fishing community, Ahmed (1999) in coastal area and Raju (2002) in Sailkupa upazila obtained the literacy rates at 23%, 25% and 90.8% successively.

### **5.2.8.2 Status of School Going Children of Fishermen**

School going children numbers of observed fishermen were at satisfactory level. Among 75 households 90.67% were maintained to continuity in education, in which 50.67% were only boys, 24% were only girls and 16% were both. About 9.33 % house hold had no participation to run education. School attending number per family was found in Chatra, Gaab and Jolka beel in about 1.56, 1.12 and 1.36 respectively. Ahmed (1996) and Raju (2002) found the number of school attending children per family at 1.17 and 1.37 in Mirzapur, Tangail and Sailkupa upazila under Jhenaidah district respectively.

### **5.2.8.3 Cause of School Dropout of Children**

Different causes were responsible in favour of dropout the children from school. Among these involved in income was very dominant. About 50.94% children were dropout for involving in income, 20.75% for economic problem, 5.67% for social problem i.e. eve teasing and superstition etc. and rest of them (22.64%) without any cause. Ahmed (1996) found 59% children were dropout for involving in income in Mirzapur, Tangail.

### **5.2.9 Household Status**

The primary task of any steady concerned with fishermen households was the study of the socio-economic conditions which were a perquisite for the design and implementation of effective policy and program for their development. In order to obtain bench mark, information about the socio-economic conditions and standards of living the fishermen an attempt was made to provide overall picture of the structure, outfits and standards of living of fishing communities.

#### **5.2.9.1 Housing Condition**

There were three major types of houses in the study area such as:

- Kacha (made of bamboo tree leaves and tin with mud flooring)
- Semi-paka (brick built floor and wall and tin made roof)
- Paka (made of brick and concrete)

From the present study it was found that in Chatra, Gaab and Jolka beel about 68%, 10.67 %, 20% & 1.33% were kacha, semi-paka, kacha & semi-paka and kacha & paka house respectively. Among the 75 households it was found that in Chatra, Gaab and Jolka beel in about 56%, 72% & 76% were kacha house respectively and 16%, 8% & 8% were semi-paka respectively. On the other hand 4% houses in Chatra beel were kacha & paka and had no paka houses in studied households. Ahmed (2002) found that in Mymensingh area, (62%) of fishermen house structure were kacha.

### **5.2.9.2 Number of House Owned by House Hold**

Majority of fishermen had owned one houses (88%). About 9.33% fishermen owned no house, 2.67% had owned two houses. From the present study it was found that in Chatra, Gaab and Jolka beel in about 84%, 92% & 88% fishermen had one houses respectively and in Chatra and Jolka beel each 4% of fishermen were two houses. On the other hand in Chatra, Gaab and Jolka beel, 12%, 8% & 8% fishermen had no houses respectively.

### **5.2.9.3 Use of Electricity**

The present study found that the majority member of households used no electricity (66.67%) and few households used electricity (33.33%). The fishermen of Chatra beel used electricity (80%) and fishermen of Gaab beel had no facilitated to use electricity. Samima (2000) reported that 70% fishermen used electricity Galamary in Khulna.

### **5.2.10 Family Type, Size and Earning Member**

In studied beel communities families were classified in two types:

- Nuclear family (married couple with children)
- Joint family (group of people related by blood and law)

The family functions as a unit for income generation, consumption, reproduction and social interaction in the fishermen community. Among the 75 families it was found that about 57.33% fishermen lived with nuclear families and only about 42.67% lived with joint families. The percentage of male and female were 56.67 & 43.33 respectively. Total earning member were 128 out of 390, in which the percentage of male and female were 81.25 & 18.75 respectively. Halder (2002) recorded the largest and smallest family size in about 6.67 & 4.50 persons per family in hogra fishermen of Doba beel.

### **5.2.11 Diseases and Nature of Treatment**

A family may be said to well served in health facilities were all of its members had sustainable access to the medical care needed to be free of debilitation, preventable health problems. From the present survey, information was collected on the extent of nature of treatment received by fishermen. It was found that 18.67% fishermen received treatment from qualified doctor, 33.33% from quack or nurse, 29.33% from homeopathy, 5.33% from herbal, 6.67% from others and rest of them (6.67%) did not take any treatment for their normal diseases. Alam (2006) found in his study that only 42% of the farmers in Mithapukur upazila under Rangpur district got the opportunities for medical care by MBBS doctor and Upazila health complex while the rest 58% was dependent on village doctor and others. CPP (1996) also reported that maximum fish farmer (31.6%) took quack treatment against disease.

### **5.2.12 Sanitation Practices**

The sanitary conditions of observed fishermen were very poor. Three types of latrine were used:

- Kacha (made of bamboo with leaf, plastic sheet fencing and inadequate drainage disposal)
- Semi-paka/ sanitary (made of brick with leaf or tin fencing and inadequate drainage disposal)
- Paka (made of brick with good drainage disposal)

In the study area it was found that in about 61.33%, 25.33% & 4% of latrines were kacha, semi-paka & paka and rest of them (9.34%) had no latrines. Among the 75 households it was found that in Chatra, Gaab and Jolka beel in about 52%, 60% & 72% of latrines were kacha respectively and 36%, 28% & 12% were semi-paka respectively. In Chatra and Gaab beel 8% & 4% latrines were paka respectively. On the other hand in Chatra, Gaab and Jolka beel 4%, 8% & 16% households were no latrines facilities. Alam (2006) found in his study that only 24% had good sanitation condition using pakka toilets in Mithapukur upazila under Rangpur district.

### **5.2.13 Sources of Drinking Water**

The provision of clean and safe drinking water was considered to be the most valued elements in society. Of the total 75 fishermen interviewed most of them used tube-well water for drinking and house hold purposes. About 28% fishermen used own hand tube-well, 42.66% used another hand tube-well, 26.67% used Govt. hand tube-well and rest of them (2.67%) used beel and pond water for drinking purposes. Ahmed (1999) mentioned that most fishermen used pond water due to lack of tube well in coastal area, Dumuria, Khulna.

### **5.2.14 Food and Nutrition**

#### **5.2.14.1 Number of Meal Taken per Day**

It was found that majority of fishermen took three meals (73.34%), 17.33% fishermen took two meals and 9.33% took four meal per day. Samima (2000) stated 58% fishermen took 2 meal and 20% took 1 meal per day in Galamary under Khulna district.

#### **5.2.14.2 Food Intake**

Food intakes through the studied fishermen were interviewed in weekly basis. From the results, among the 75 household it was found that 22.67% fishermen took fish in 6 to 7 days in a week, 33.33% were 3 to 5 days and only 28% were 0 to 2 days in a week. Due to high price of meat the 6.67% fishermen took meat in 0 to 2 days in a week, 9.33% took eggs in 0

to 2 days, 12 % in 3 to 5 days, 4% in 6 to 7 days in a week, 32% fishermen took milk in 0 to 2 days in a week, 25.33 % in 3 to 5 days, 13.33 % in 6 to 7 days in a week, 17.33% fishermen took pulses in 0 to 2 days in a week, 12% in 3 to 5 days, 20 % in 6 to 7 days in a week. 6.67% fishermen took vegetables in 0 to 2 days in a week, 17.33% in 3 to 5 days and 40 % in 6 to 7 days in a week.

#### **5.2.15 Dependency Type on Beel Water**

The communities of beel were closely related with beel. They depend on beel water in diverse ways. Among the 75 fishermen it was found that about 18.67% fishermen depends on beel only for fishing purposes, 13.33% for household purposes, 42.67% for fishing and irrigation and rest of them (25.33%) depend upon fishing, irrigation and household purposes.

#### **5.2.16 Land use Information**

In the rural context possession and ownership of homestead and agricultural land is the ominous indicator of family wealth and status. Information were collected about own house land, area of cultivated land, leased in /out land and area of land with in the beel.

##### **5.2.16.1 Own House Hold Land**

Among the studied fishermen 30.67% owned 1 to 10 decimal lands, 36% fishermen owned 11 to 20, 24 % owned 21 to above household land. And rest of them (9.33%) had no household land.

##### **5.2.16.2 Area of Cultivated Land**

The fishermen of studied beel utilizes their land by cultivating different types of crops such as paddy, mustered, garlic, onion, chili, sesame in dry season. Among 75 fishermen the area of utilized land majority in 81 to 120 decimal (29.33%) and minimum in 1 to 40 decimal (4%).

##### **5.2.16.3 Area of Land with in the Beel**

Most of lands of fishermen were with in the beel. During the rainy season the maximum lands were flooded and the fishermen were engaged in fishing. Again In dry season the farmers/fishermen turn into engaged in crop cultivation. Among the studied fishermen it was found that 4% fishermen owned 1 to 40 decimal lands, 36% owned 41 to 80 decimal, 37.33% owned 81 to 120 decimal and 12% owned 160 to above decimal lands. And 4 % fishermen were out of land with in these beels.

#### **5.2.16.4 Area of Lease Land**

The fishermen of studied beel mortgaged the land from neighbor, relatives or wealthy person through a fixed amount of money. The amount of money mainly depends upon the quality and area of land. Among the studied fishermen it was found that 48% fishermen were out of mortgaged land and they cultivated their own land and majority (29.33%) of fishermen leased land in 21 to 41 decimal.

#### **4.2.17 Recreational Sources and Use of Media**

In present situation peoples are very much conscious about their recreation and they use different types of media to enjoy their life. Among the 75 fishermen, 30.67%, 10.67%, 12%, 10.67% & 33.32% were used radio, television, cassette player, VCD, and mobile phone as recreational purposes respectively and only 2.67% read newspaper as recreation. From the present study it was found that in Chatra, Gaab and Jolka beel in about 28%, 20% & 44% fishermen used radio as recreational sources of media respectively and in about 12%, 16% & 4% fishermen used television respectively. On the other hand in Chatra, Gaab and Jolka beel a large number of fishermen in about 36%, 40% & 24% used mobile phone respectively and a few fishermen read newspaper in the studied beels.

#### **5.2.18 Occupation**

##### **5.2.18.1 Main Occupation of the Beel Fishermen**

Among the 75 fishermen it was found that the main occupation in most cases was agriculture (45.33%) besides this fishing, business, services and others were 34.67%, 6.67%, 4% & 9.33% respectively. From the present study in Chatra, Gaab and Jolka beel in about 40%, 68% & 28% fishermen involved in agriculture respectively and besides this in about 32%, 28% & 44% fishermen involved in fishing respectively. Raju (2002) found that 51% fish farmer's main occupation were agricultural work in Sailkupa upazila under Jhenaidah district.

##### **5.2.18.2 Subsidiary Occupation of the Beel Fishermen**

The subsidiary occupations of studied fishermen were found fishing in most cases and it was in about 72%, 52% & 44% in Chatra, Gaab and Jolka beel respectively besides this few fishermen involved business and others (agriculture, livestock rearing and vegetation etc.) subsidiary occupation. Ahmed (1996) found that about 34% fishermen depending on fish farming as subsidiary occupation in Tangail.

### **5.2.19 Women Participation**

Participation of women in earning besides household activities were found. Among 75 households, 33.33% women was involved in live-stock rearing, 29.17% poultry rearing, 12.5% in both vegetation and fishing & fish drying, 8.33% in handicrafts (net making, knitting) and 4.17% in business.

### **5.2.20 Gender Issues**

Discriminative act between boys and girls are the obstacles for social development. Among the observed fishermen unequal access between boys and girls were found. In about 21.33%, 1.33% & 25.34% household showed unequal access between boys and girls in education, food and other purposes respectively and rest of them had no (52%) unequal access.

### **5.2.21 Savings of Fishermen**

The men get financial and mental security from his savings. Fishermen were unconscious about their future. Among the 75 fishermen it was found that in Chatra, Gaab and Jolka beel in about 44%, 56% & 28% fishermen saved their earned money in village co-operative societies respectively and in about 24%, 24% & 16% fishermen used to no savings respectively.

### **5.2.22 Credit/ Loan**

#### **5.2.22.1 Credit Providers**

In studied area some non government organization (NGO's) such as Grameen bank (13.33%), ASA (4%), Anannay (9.33%), BRAC (4%) and local co-operative (17.33%) provided micro-credit facilities to the fishermen (mainly women) for different purposes such as farming (Crop, poultry, dairy) small business, handicrafts. Govt. participation was absent in this case. The fishermen also got some financial support from privately such as neighbors (9.33%), relative (16.67%) and money lenders (24%). About 4% fishermen were out of credit. CPP (1996) reported that 70% took loan from money lender in Tangail district. But Raju (2002) found 48% fish farmers took loan form neighbors in Sailkupa upazila under Jhenaidah district.

#### **5.2.22.2 Purpose of Credit Taken**

The fishermen of studied beel utilized their loan in different purposes. About 36% fishermen utilized their credit in agriculture purposes. 20% utilized their credit in fishing (gear repaired or buying), 1.33% in business, 14.67% both in poultry farming & others and 8% in dairy farming purposes. Chantarashi (1994) stated majority of the fishermen were indebt for

money borrowed to buy fishing gear and food but Raju (2002) found 22% for agriculture in Sailkupa upazila under Jhenaidah district.

### **5.2.23 Socio-Economic Constraints of the Fishermen**

Socio-economic constraints such as population pressure, low income, literacy, low economic status and lack of alternative employment opportunities were the main problems for beel fisheries development. Fishermen were also facing problem of child education, animal feed and house building materials. Almost all fishermen mentioned lack of capital and the reducing natural fish population as their main problems. Fishermen of Bangladesh were socially disadvantage and lacking fulfilling their basic need (DFID, 2001).

According to Rahman (1994), in Bangladesh fishermen were below the poverty line and were struggling to survive, with health, nutrition, sanitation water supply, soil fertility, cooking fuel, animal feed and house building material were day to day problem.

## CHAPTER 6

### SUMMARY AND CONCLUSION

The present study was conducted about fish diversity and livelihood status of fishermen in Chatra, Gaab and Jolka beel, located under Atghoria Upazila, Pabna district. The objectives of this study were set to observe the fish diversity in beel like availability of various species of fish which had economic value and sketch-out the socio-economic conditions of beel fishermen.

The study was carried out for six months from November, 2010 to April, 2011. Data collection was carried out by survey method using pre-tested structural questionnaires, field visit and interviewing with fishermen finally cross check the primary data with different secondary data sources.

A total of 59 species belonging to 41 genera and 17 families were accounted and identified so far from the Chatra, Gaab and Jolka beel. Out of them, 49 were indigenous species and 10, exotic species. Of the 59 fish species recorded, 19 species were belonging to the family Cyprinidae. Next to Cyprinidae, 7 species were belonging to family Bagridae. Four species were belonging to family Channidae & Siluridae each. Three species were belonging to family Anabantidae, Cobitidae & Mastacembelidae each. Two species were belonging to family Cichlidae, Clupeidae & Notopteridae each. Only 1 species belonged to family Belonidae, Claridae, Gobiidae & Heteropneustidae each. The identified fishes were divided into 6 categories based on their abundance during the study period. Among the 59 species, 19 species were common, 18 were extremely common, 14 were few, 3 were vulnerable, 2 were endangered and finally 3 species were treated as critically endangered.

Among the 75 fishermen (related to fishing operation in beel) different relevant information were collected to justify their socio-economic conditions.

In the present study about 41.33% were found as fulltime fishermen, 34.67% were seasonal and the rest of the fishermen (24%) were subsistence. The Average monthly incomes of observed fishermen were found to vary from 2500 to 14500 Tk. Comparatively the average monthly income of fulltime fishermen were less than seasonal and subsistence fishermen. About 49.33% fishermen perform their fishing through group form and 50.67% were individually.

According to the present study the status of religion of beel fishermen 83.33% & 16.67% were Muslim and Hindu respectively. Among the 75 fishermen it was found that majorities of fulltime and subsistence fishermen were Muslims and they continue their occupation by generation to generation.

Among the 75 fishermen in about 40% were illiterate and 60% were literate, from the literate fishermen, 37.34% primary level, 17.33% class VI to IX, 4% SSC, 1.33% HSC and nobody could earned graduation.

Among the 75 households, 90.67% households were maintained continuity in education, in which 50.67% were only boys, 24% only girls and 16% were both. About 9.33 % household had no participation to run education. School attending number per family was found in Chatra, Gaab and Jolka beel about 1.56, 1.12 and 1.36 child respectively.

The housing condition of fishermen not so well. About 68% only kacha house. 10.67% semi-paka house. 20% kacha & semi-paka house and about 1.33% kacha & paka house and had no paka house.

It was found that about 57.33% fishermen lived with nuclear families and only about 42.67% lived with joint families. Total earning member were 128 out of 390, in which the percentage of male and female were 81.25% & 18.75% respectively. Among the 75 families the percentage of male and female were 56.67% & 43.33% respectively.

The sanitation practices of observed fishermen were very poor. In the study area it was found that out of 75 household in about 61.33% of latrines were kacha, 25.33% were semi-paka, 4% were paka and rest of them (9.34%) were had no latrine facilities.

Of the total 75 fishermen interviewed most of them use tube-well water for drinking and house hold purposes. About 28% fishermen used own hand tube-well, 42.66% used another hand tube-well, 26.67% used Govt. hand tube-well and rest of them (2.67%) used beel and pond water for drinking purposes. On the other hand, out of 75 fishermen it was found that about 18.67% fishermen depends on beel only for fishing purposes, 13.33% for household purposes, 42.67% for fishing and irrigation and rest of them (25.33%) depend upon fishing, irrigation and household purposes.

Among the 75 fishermen the main occupation in most cases was agriculture (45.33%) besides this fishing, business, services and others were 34.67%, 6.67%, 4% & 9.33% respectively. On the other hand, the subsidiary occupations of studied fishermen were found fishing in most cases and it was 56% beside this business and others (fishing, agriculture, livestock rearing and vegetation etc.), 17.33% & 18.67% respectively and rest of them have no (8%) subsidiary occupation.

Participation of women in earning besides household activities were found. About 33.33% women was involved in live-stock rearing, 29.17% poultry rearing, 12.5% in both vegetation and fishing & fish drying, 8.33% in handicrafts (Net making, knitting) and 4.17% in business.

Fishermen were unconscious about their future. About 21.33% fishermen maintain their life as hand to mouth and they had no savings accounts. Rest of fishermen savings their earned money in different ways. 18.67% by bank, 42.67% by village co-operative societies, 13.33% saved personally and 4% by others.

Some non government organization (NGO's) such as Grameen bank (13.33%), ASA (4%), Anannay (9.33%), BRAC (4%) and local co-operative (17.33%) provided micro-credit facilities to the fishermen. The fishermen also got some financial support from privately such as neighbors (9.33%), relative (16.67%) and money lenders (24%). About 4% fishermen were out of credit.

Despite the fishermen's living conditions were poor, the survey suggests that they had improved their socio-economic condition through fishing. Such improved conditions were described further on the basis of qualitative indicators. These could include food consumption, increased social status and improvement of their livelihood approach. The most significant change was found in food consumption.

Bangladesh was blessed with rich and extensive inland and marine fishery resources, with a wide variety of indigenous and exotic fish fauna. The soil, water and climate of this land were very favorable to inland fisheries, both in open and closed waters (Ahmed *et al.*, 1997). It is the third largest country for inland water bodies in the world after china and India but fish production is very low as compared to other Asian countries. The inland water bodies were utilizing only for capture fisheries. But it had been proved that if the inland water bodies were properly managed, the fish production had increased. The principal management way of open water fisheries could be community based management.

In conclusion, it could be said that the fish production in these beels had declined alarmingly. Beside this, there was no effective beel management committee as well as policy for these beel. So, some beel management policies should be adopted according to previously noted suggestions, which in turn, protect the species diversity of fish as well as increase fish production. With the increase of fish production the socio-economic conditions of fishermen will be improved. For this, GOs and NGOs organization should be came forward and assist fishermen to go ahead.

## References

- Ahmed, K. K. U., Hasan, K. R., Ahamed, S. U., Ahmed, T. and Mustafa, G. 2004. Ecology of Shakla Beel (Bramhmanbaria), Bangladesh. Bangladesh Fisheries Research Institute, Riverine station, Chandpur 3602, Bangladesh, 'World Fish Center-Bangladesh'. *Bangladesh Journal of Fisheries*. **9**: 101-110.
- Ahmed, M. N. U. 1999. A study on socio-economic aspect of coastal fishermen in Bangladesh. Department of Fisheries. BAU, Mymensingh, Bangladesh. 53 pp.
- Ahmed, M. N. U., 1996. Reports on the fishermen's socio-economic survey. Fisheries survey and monitoring program. Department of fisheries, Tangail. 4 pp.
- Ahmed, M., Capistrano, A. D. and Hossain, M. 1997. Co- management of Bangladesh Fisheries. *Fisheries Management and Ecology*. **4(3)**: 233- 248.
- Ahmed, N. 2002. Socio-economic aspects of freshwater prawn culture development in Mymensingh. Bangladesh. A report prepared for ICLARM, Dhaka. 25 pp.
- Alam, M. J. 2006. Status of fish farming and livelihood of the fish farmers in Mithapukur, Rangpur. An MS Thesis Submitted to Department of Fisheries Management, BAU, Mymensingh. 81 pp.
- Baily, C. 1994. Employment, labor productivity income in Small-scale fisheries of South and South-East Asia. In: Socio-economic issues in coastal fisheries management. Proceeding of the IFPC symposium, Bangkok, Thailand, FAO Indo-pacific fisheries commission (IFPC). pp. 24-45.
- Bhaumik, U. and Pandit, P. K. 1991. Socio-economic status of fishermen in some beels of West- Bengal. *Environment Ecol*. **9(3)**: 600-603.
- Bizby, S. A. 1995. Characterization of Biodiversity Assessment. In: global Biodiversity (Edit. B. H. Seywood) Cambridge University Press, Cambridge. pp. 21-106.
- C.P.P. 1996. Socioeconomic profile of the professional fishermen and institutional organization. Final Report. Bangladesh Water Development Board, Tangail. pp. 11-45.

- Chambers, R and Conway, G. 1992. Sustainable Rural livelihood: practical concepts for the 21<sup>st</sup> century, IDS discussion paper no 296. Sussex: Institute of Development studies, England. 148 pp.
- Chantarasi, S. 1994. Integrated Resource Development of the Sundarbans Reserved Forest 4<sup>th</sup> draft reports on Fisheries Resources Management for the Sundarbans Reserved forest, Khulna, Bangladesh (BGD, 84/056) EAO- UNDC. 171 pp.
- DFID, 2001. Livelihood Analysis and Development or Planning Support for the poor in Aquaculture and Aquatic Resource management, 13-15 February 2001. Department of Agriculture and Rural Development (DARD) research Institute for Aquaculture (RIA), Thai Nguyen, Vietnam. 128 pp.
- DoF, 2010. Fish Fortnight Compendium, Department of Fisheries, Ministry of Fisheries and Livestock, Government of the People's Republic of Bangladesh. pp. 102-103.
- DoF. 2005. *Jatio Matshaw Pakkha Sankalan 2005*. Department of fisheries. Bangladesh. 133 pp.
- Halder, D. K. 2002. Studies on the availability of small indigenous species (SIS) of fishes and socio-economic condition of fishers in two rice fields. MS Thesis. Department of Fisheries Management, BAU, Mymensingh. 136 pp.
- Hannan, M. 1994. Fisher folk organization in Bangladesh. In: Socio-economic issues in coastal fisheries management. Proceeding of the IPEC symposium: Bangkok, Thailand, FAO Indo pacific Fisheries Commission (IPEC), **8**: 216-222.
- Haroon, A. K. Y., Halder, G. C., Rahman, S. I., Razzaquee, M. A., Alam, M. and Nurul amin, S. M. 2002. Sylhet- Mymensingh basin fish stock assessment. Final report, Bangladesh Fisheries Research Institute (BFRI), Riverine station, Chandpur, Bangladesh. 81 pp.
- Hossain, M. M. 2010. Changing consumption patterns in rural Bangladesh. *International Journal of Consumer Studies*. **34(3)**: 349-356.
- Joadder, M. A. R. 2008. Ecology of Kumari Beel (Rajshahi), Northern part of Bangladesh. 3<sup>rd</sup> Biennial Fisheries Conference & Research Fair 2008, BFRF. 94 pp.
- Karim, M. M. 2004. Community based fishing activities and socio- economic status of fishermen in Dhamharail Beel under kapasia Upazilla of Gazipur District. M. Sc. Thesis. Department of Aquaculture, Bangladesh Agricultural University (BAU), Mymensingh. 76 pp.

- Khan, M. Y. and Khaleque, M. A. 2007. Present and future condition of our indigenous fishes (in Bangla). *Matshaw shonkolon-2007*. Department of fisheries. 54 pp.
- Lima, F. P., Latini, A. O. and Marco Junior, P. 2010. Environmental perception by alien fish dispersal in Brazilian tropical lakes. *Interciencia*, **35(2)**: 84-91.
- Lowe-Mc-Connell, R. 1999. The History of Aquatic Biodiversity, pp. 29-33. In pullin, ACP-EU Fisheries Research Initiative. Proceedings of the conference on Sustainable Use of Aquatic Biodiversity: Data, Tools and Co-operation. Lisbon, Portugal, 3-5 September 1998. ACP-EU Fish. Res. Rep., **6**: 70.
- Luu, L. T. 2001. Promotion of small scale pond aquaculture in Vietnam. CABI Publication, U.K. pp. 55-75.
- Mahabubullah, M. 1998. Case study of polder and estuarine fisheries community in Bangladesh. In: Socioeconomic study of Tropical Fishing community in Bangladesh. A report for Food and Agricultural Organization (FAG), Rome. 122 pp.
- Mahbubur, M. 2001. Study on the Fisheries and Socio-economic condition of the Fishermen in the Baculiar haor, Itna, Kishoregonj. MS Thesis, Department of Fisheries Management, Bangladesh Agricultural University, Mymensingh. 62 pp.
- Mannu, M. U. 1999. Jeleder Sukh Dukh. *The Daily Janakantha*. 22 August 1999. 5 pp.
- Mortuza, M. G. 1997. Fish and fisheries of the river Barnai: Flood control and drainage (FCD) project. M. Sc. Thesis. Dept. of Zoology, Rajshahi University. 199 pp.
- Muhit, A. and Saleh, A. M. 2000. Impact of the Banghobandhu bridge construction on fish population and socio-economic condition of the fishermen communities of Dhaleswari river. M. Sc. Thesis fisheries and marine resource technology Discipline, Khulna University, Khulna, Bangladesh. 40 pp.
- Rahman, A. K. A. 1994. The small-scale marine fisheries of Bangladesh, In : socio-economic issues in coastal fisheries management, Proceeding of the IPEC symposium, Bangkok, Thailand. FAO (Food and Agricultural Organization) Indo pacific Fisheries commission. **8**: 170- 175 .
- Rahman, M., Fazlur, Barman, B .K. and Ahmed, K. 2008. Development of technological options for community based fish culture in seasonal floodplains in Bangladesh. 3<sup>rd</sup> Biennial Fisheries Conference & Research Fair 2008, BFRF. 102 pp.

- Raju, A. 2002. Livelihood status of fish farmers in Sailkupa Upazila under Jhenaidah district. M. S. thesis. Fisheries and Marine Resource Technology Discipline. Khulna University, Bangladesh. 53 pp.
- Rana, R. 2003. Utilization of aquatic resources and livelihood strategies of the fishing communities around the Baral beel in Sirajgang district. M. Sc. Thesis (unpublished), Dept. of Zoology, Rajshahi University. 157 pp.
- Roy, S. D. and Dorairaj K. 1998. Socioeconomic aspects of fishermen of Andaman with respect sustainable development. *Ecosystem and Sustainable Development*. pp. 147-156 .
- Samima, A. 2000. Socio-economic condition of fishing community: Galamary fish market, Khulna, B. Sc. Thesis. Fisheries and Marine Resource Technology Discipline, Khulna University, Khulna, Bangladesh. pp. 52-76.
- Siddiquee, M. J. A., 2001. Biological and social management of Rajdhala beel at Netrokona district and its impacts on Biodiversity and poverty alleviation. M. Sc. Thesis. Department of fisheries management, Bangladesh Agricultural University (BAU), Mymensingh. 77 pp.
- Sugunun, V. V. and Bhattachariya, B. K. 2000. Ecology and fisheries of Beels in Assam. Bull No. 104, CICFRI, Barrackpore-743101, West Bengal. 66 pp.
- UNEP (United Nations Environment Programme) Report, 2001. Bangladesh: State of the Environment (Biodiversity). pp. 77-92.

## Appendix

Questionnaire on status on fish biodiversity of beels and its fishers livelihoods in  
Atghoria upazila of pabna disrtict.

<input type="checkbox"/> Chatra beel	<input type="checkbox"/> Gaab beel	<input type="checkbox"/> Jolka beel
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Sl. No. -----

Date: -----

### A. Study of fish diversity

Sl. No.	Local name	Species availability (Remarks)	Breeding season	Seasonal availability

### B. Study of socio-economic status of fishermen

1. Farmers name : .....

2. Age of fisherman : ..... Years .....

3. Address:

Village: ....., Union: .....,

Upazila: ....., District: .....

4. Sex:

<input type="checkbox"/> Male	<input type="checkbox"/> Female
-------------------------------	---------------------------------

5. Age and age structure:

<input type="checkbox"/> Below 30	<input type="checkbox"/> 30 to 40	<input type="checkbox"/> Above 40
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6. Marital status:

<input type="checkbox"/> Married	<input type="checkbox"/> Unmarried
----------------------------------	------------------------------------

7. Total Family member:

<input type="checkbox"/> Male:	<input type="checkbox"/> Female:
--------------------------------	----------------------------------

8. Religion of fisherman:

<input type="checkbox"/> Muslim	<input type="checkbox"/> Hindu	<input type="checkbox"/> Christian	<input type="checkbox"/> Buddhist
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9. Fishermen categorizes:

<input type="checkbox"/> Fulltime	<input type="checkbox"/> Seasonal	<input type="checkbox"/> Subsistence
-----------------------------------	-----------------------------------	--------------------------------------

10. Fishing types

<input type="checkbox"/> Group	<input type="checkbox"/> Individual
--------------------------------	-------------------------------------

11. Average monthly income (In thousand Tk.):

<input type="checkbox"/> 2 to 5	<input type="checkbox"/> 6 to 10	<input type="checkbox"/> 11 to 15
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12. Number of earning family members: .....