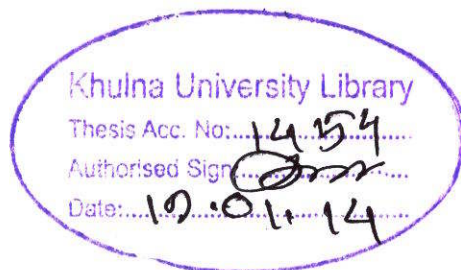


**PRESENT MANAGEMENT SCENARIO OF MARJAT
BAOR AT KALIGONG IN JHENAIDAH**



Approved as to style and content by



A handwritten signature in black ink, appearing to be "Dr. Khandaker Anisul Huq".

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Declaration

Present Management Scenario of Marjat Baor at Kaligong in Jhenaidah

The results presented in the thesis with the above mentioned title are entirely of the candidate's own investigations and no part of the results has been accepted for any degree nor is it being concurrently submitted for any degree.



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February, 2008

DEDICATED

TO



MY BELOVED PARENTS

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At first all my admiration goes to the supreme creator and ruler of the universe, Allah For his great mercy to create and alive me.

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Md. Tariqul Islam Khan

February-2008



Abstract

Baor fishery of the south-west region of Bangladesh is an important resource of inland fisheries. The study was conducted to identify the management scenario of Marjat Baor in the district of Jhenaidah. This baor is directly managed by Baor Manager under the Department of Fisheries. The commonly cultured species were silver carp (*Hypophthalmichthys molitrix*), grass carp (*Ctenopharyngodon idella*), common carp (*Cyprinus carpio*), rohu (*Labeo rohita*), catla (*Catla catla*) and mrigal (*Cirrhina cirrhosus*) and the stocking density of those species were 65, 35, 18, 22, 18 and 17 kg/ha and 1440, 780, 390, 490, 390 and 370 no/ha respectively. The species composition of silver carp, grass carp, common carp, rohu, catla, and mrigal were 37%, 20%, 10%, 13%, 10% and 10% respectively. Kochal and Komor fishing were used for fish harvesting. Fish harvesting was done two times in a year. The survey result showed that the total production of the several fiscal years, 2003-04, 2004-05, 2005-06 and 2006-07 were 70.01, 58.02, 80.01 and 63.75 mt respectively. The baor had some problems such as over fishing, siltration, lack of proper management, protection and lack of implementation of fish act. If these problems can be overcome, the production could be increased. It will be able to fulfill our target demand that helps on our national economy.

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List of Abbreviations

BBS	Bangladesh Bureau of Statistics
BRAC	Bangladesh Rural Advancement Committee
DoF	Department of Fisheries.
FFG	Fish Farmers Group
IFAD	International Fund for Agricultural Development
LFT	Lake Fisheries Team
LMG	Lake Management Group
MOFL	Ministry of Fisheries and Livestock
NGO	Non Government Organization
OLP	Oxbow Lake Project
PD	Project Director

CHAPTER: ONE

INTRODUCTION

Chapter-1

Introduction

1.1. Background of the study

Bangladesh is a developing country. Fisheries sector plays an important role as a source of income, employment, nutrition and foreign exchange earnings in Bangladesh. Fish is renewable natural resource and plays a great role for the improvement of socio-economic condition of poor fishers. Bangladesh is blessed with vast water bodies (5433900 ha) of inland fisheries (DoF, 2005). This is in the form of rivers, beels, canals, reservoirs, Kaptai Lake, haors, baors (oxbow lakes), ponds, tanks, seasonally flooded areas etc. The inland water bodies are rich in freshwater fish species comprising 260 indigenous, 12 exotic and 24 fresh water prawn species (Rahman, 1989). There goes a wise proverb “*Mache Bhate Bangalee.*” i.e. fish ranks second to rice as our staple food. In spite of vast fisheries resources the present fish production of Bangladesh is unable to meet the demand of the fish requirement for increasing population of the country. Fisheries sector contributes 63% of an animal protein to our daily diet (DoF, 2005). Per capita per day fish consumption, which was 32g in mid sixties, declined to the level of 20g in mid eighties (FAO, 1995). Fish production has increased significantly over the last few years. During 2005-2006, the total fisheries production in Bangladesh was 23.29 lakh mt in which inland fisheries and marine fisheries comprised 9.57 lakh mt and 4.8 lakh mt. Besides closed water fisheries and shrimp were 8.59 lakh mt. This production level reflects per capita per day availability of 25 gm of fish where the minimum requirement is about 38g per day (DoF, 2002). The enormous water resources and great biodiversity of fish and prawn species offer Bangladesh tremendous potential to develop both aquaculture and fisheries. The water resource was very rich in the past but the present production of fish has failed to keep pace with the population size that is increasing in

geometric rate-over 130 millions of people of the country. About 12 millions of people are directly or indirectly involved in fisheries sector for their livelihood (DoF, 2002). The competent fisheries manpower can play an important role to bring a change in fisheries production and profitability that have such a crucial place in the national economy, nutrition and employment.

There are approximately 600 oxbow lakes in the southwest part of Bangladesh with an estimated combined water area of 5488 ha (DoF, 1996). It is generally estimated around 14,000 fishers (2.5 fishers per hectare water body) are directly involved and nearly 70,000 rural people are the direct beneficiaries of this fishery (Islam,1995).

The name 'Oxbow' refers to its shape that is like a horseshoe and is termed oxbow lake (local name, 'Baor').An oxbow lake is a dead section of a river created when the river changed its course. Oxbow lakes are common resources, with both fish and the water forming part of the common resource. Unmanaged common resources become "open access" and tend to be over-used by the people living near such resources (Ostrum, 1990). The transfer of the fisheries management of the oxbow lakes to the local fishers' community is essential establishing a functional CPR (Common Property Regimes). (Apu *et al.*, 1997a). By screening the inlets and outlets, an oxbow lake can be converted into culture-based fisheries (DoF, 1996).

Baors were the properties of *Zomindars* (property owners) during the British colonial days (1757-1947) and became government property after the abolition of the *Zomindary* system through a land settlement act in 1951 (Apu *et al.*, 1997b).These were leased to private individuals or cooperatives through open auctions. Individual leaseholders with short-term lease contract (for three years) were rarely enthusiastic to invest in stocking or fish resource up-keeping in such a vast and extensive water bodies with huge

overseeing/enforcement costs in an open access system. In most cases lease of these water-bodies were taken as a prestige possession and demonstration of economic might in the socio-economic setting of the countryside. These natural lakes as common property resource created lot of enthusiasm among policy makers in governmental circle and donor agencies, particularly since onwards the eighties. Since then, emphasis was drifting towards increasing production and welfare considerations of the fishers living in surroundings of those lakes (help eliminating poverty in the same time) through several policy implementation regimes during the eighties and the nineties. The lake management now transformed into three distinct management types. Firstly as directly managed by government (implementing arm, DoF, and called Oxbow Lakes Project-I; OLP-I), secondly managed by private leaseholders (purely revenue oriented) and lastly (third) jointly managed by the fishers (some prefer to say co-management i.e. DoF, NGOs and fishers cooperatively working together for increasing fish resources and known as Oxbow Lakes Project-II; OLP-II, (Alam, 2003).



In culture-based fisheries, the young fish are raised artificially and regularly stocked into open waters. The most successful example of culture-based fishery that has been accomplished in Bangladesh is in oxbow lakes located in south-west Bangladesh (Hasan and Middendorp, 1997). From 1968, the Department of Fisheries (DoF) aimed at increasing the fish production in some of the lakes through the Development Management Scheme (DMS). Then there existed little knowledge on oxbow lake stocking, size and species composition and only a limited supply of wild fingerlings was available. Fishers harvested the stocked and non-stocked fish and received a share of 40% of the catch. Only listed fishers slowed the catch stocked carps but sill access to indigenous fish was free to all (Apu *et al.*, 1997b).

Fish culture in oxbow lakes is the practice by which an open water fishery converted into culture-based fisheries by screening the inlets and outlets. Three species of indian major carps (rui, catla and mrigal,) and four species of carps (silver carp, grass carp, big head and common carp) are regularly stocked and harvested. Twenty lakes located in four districts of Southwest Bangladesh were brought under culture-based fisheries management through Oxbow Lakes Project (OLP-II). The average yield of stocked carps of oxbow lakes under culture based fisheries management increased from 121 kg/ha/yr in 1991-92 to 700 kg/ha/yr in 1996-97 (Hasan and Middendorp, 1997).

To increase fish production the government has to increase fish production through inland culture fisheries. Although the total area of oxbow lakes in the country is 5488 ha, to meet up the local fish demand of the south-west region, the lakes play a very important role. There is no separate statistics of boar (oxbow lakes) fish production at present, however a baseline survey conducted by Bangladesh centre for Advanced Studies (BCAS) 1991, reported fish production to be 150 kg/ha/yr. After the project intervention and implementation by the adopting culture based fisheries management, production has been increased. The present production rate is between 400-1820 kg / ha / yr (Alam, 2003).

Based on the previous experience (OLP-I), second phase of the project (OLP-II) was formulated and successfully executed (1989-1997) by the government. The second phase included 23 lakes for development. During this phase, the international Fund for Agriculture Development (IFAD) provided the fund. The necessary loans were disbursed among the fishers groups through the national NGO-BRAC (Bangladesh Rural

Advancement Committee). Fishers themselves, by their Lake Fishing Team (LFT) stocked the fingerling, guarded the lake, harvested the fish, marketed the fish and got the 100% sale proceed (Alam, 2003).

Fishers are one of the most valuable communities in Bangladesh. They are poor by any standard. Over the years, the livelihood status of the fishers has further deteriorated. Being an isolated community fishers are deprived of many amenities of life. Actual condition of the Baor fishers must be assessed to know the real potential of Baor fisheries as a source of income for this poor community.

This study was carried out at Marjat Baor in Jhenaidah district. It was managed by the government. The culture management of baor Marjat is characterized as “Direct Fisheries Management by the department of Fisheries (DoF)”. There is no direct participation of local community.

1.2 Objectives:

The present research study was conducted to understand the management status of baor fisheries and its problem through personal interview and observation by a structured questionnaire. The result of the present study may contribute largely in the formulation of appropriate management for the baor fishers and policy maker of Bangladesh. From the present study, it can be concluded that this sector has tremendous scope for increasing total production of fish. Therefore, this study has been set out to assess the following objectives:

- To identify the management scenario of Marjat Baor.
- To identify the culture strategies.
- To identify the problems existing in Marjat Baor

CHAPTER TWO

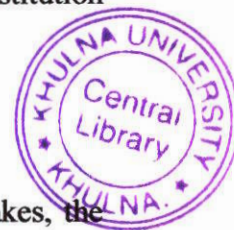
REVIEW OF LITERATURE

Chapter-2

Review of Literature

Hossain *et al.* (1997) recorded 43 fish species from two floodplain in the South-western region of Bangladesh in 1992-1995. Rahman (1989) reported 260 fresh water species from floodplains, lakes and rivers of Bangladesh. The indigenous fish species, reported oxbow lakes under culture based fisheries management, appear not different from a control lake (Haque *et al.*, 1997).

The Oxbow Lakes Small Scale Fishermen Project-II (OLP-II) is a social fisheries project in 23 oxbow lakes, locally called baor, in south-western Bangladesh along the border with India. The objective of the OLP-II project is to transfer the culture-based fisheries management of oxbow lakes to the fishers themselves by creating appropriate institution and a mechanism for guaranteeing security of tenure (Minddendrop *et al.*, 1996).



In the day-to-day implementation of the common property regime in oxbow lakes, the fishing Rules are uphold to entire participation in fishing maintain equity and enforce LMG democracy by rotation of leadership (Apu *et al.*, 1997a).

Apu *et al.* (1997b) in his study found that the members of the Bahadurpur fishers group not just catch but they actually manage the fisher's resources as a common property regime.

Ruddle (1994) found that Governments of many countries in Asia and Pacific have often underestimated the role and capacities of local community in management of fisheries,

while at the same time local community also can not successfully implemented fisheries management by themselves alone .

Presently, 20 lakes are under intensive culture-based fisheries management by the fisheries groups (LFT) and stocked with carp fingerlings of six different species (Middendrop *et al.*, 1996). A detailed analysis of the financial performance of ten fishers groups in their fifth year of operation is presented (Middendrop *et al.*, 1997). Middendrop and Balarin (1997) reported that culture bases fisheries is considered as a kind of farming, as it involves ownership of the fish as well as management control.

Hannan (1994) reported that fishing is considered as a low-class profession and fishermen are traditionally poor. They lived from hand to mouth. These fishermen are socially, economically and educationally disadvantaged community and lack of their own financial resources (Rahman, 1994b). Fishermen and their families in the South and South East Asia often are considered to be among they poorest of the poor (Bailey, 1994). In Bangladesh, most of the fishermen are illiterate and few have primary level of education (Rahman, 1994 a). Coastal fishermen of Bangladesh have a low level of education (Bailey and doulman, 1994).

Ahmed (2004) found that the full time fishermen in Tangail district were 84%; 24% had subsidiary occupation, 81% were found fishing throughout the year and 29% were member of some association, clubs and co-operatives.

Mahabubullah (1986) studied the polder fishing community of Bangladesh. He reported that among the polder fishing community 64% had no boat and 61% had no gear. While, 98% reported, fishing as their main source of income and 71% earned 400 taka per month or above. A similar study was conducted by DoF (1996) on fishermen community of the Chanda beel and revealed that there were 22% professional and 74% non-

professional fishermen. 85% carried out fisheries activities individually, 5% were members of co-operatives, 34% aware of NGO programs and the average household income was 15000 taka per year.

Mannu (1999) obtained data on the sea going fishermen at Kuakata and reported that 72% were full time fishermen, 89% earned an average 25000 taka per year, 2% owners of trawler, and 4% carried out fishing during winter and rainy season. Ahmad (1984) studied the socio-economic condition of coastal fishermen and reported that 73.33% earned taka 50 per day.

A vast majority (90% and 91.66%) fisherman of the Dhaleswar River is engaged in full time fishing. This study also revealed that maximum fishermen caught fish individually, and also more than 97% were members of different associations (Al-Muhit, 2000).

Chantarasri (1994) reported that about the Sundarbans Reserved Forest (SRF) fishermen community. Fishing was carried out in groups. Most of the fishermen own their fishing gears with which they caught less than 40-kg fish per month. Typically monthly earning was 2000 to 3000 taka.

DoF (2001) further conducted a survey on the socio-economic condition of the fishermen in eleven upazilas of the district of Patukhali and Barguna under Fisheries Extension Development project and reported that rate of literacy among fishing community was far less than other areas. Their economic condition was so bad that they often could not afford educational expanses for their children. This study reported that about 70-80% fishermen were laborer (work in other gears and boats); about 70% of fishermen had an average daily income of taka 20-25, and the rest 30% taka 25-40.

Ostrom (1990) in his study mentioned Oxbow lakes as common resources, with the fish and the water forming part of the common resource. Unmanaged common resources become "open access" and tend to be over-used by the people living near such resources. Like Ostrom (1990) and Pomery (1994) concluded Common property regimes are forms of management grounded in a set of accepted rights rulers by a group of resource users for the sustainable and interdependent use of collective goods.

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CHAPTER: THREE

MATERIALS AND METHODS

Chapter-3

Materials and Methods

This chapter deals with the methodology which was adopted for selection of the study area, collection, processing, analyzing and presentation of data. The methodology that was used for this study is briefly described below.

3.1 Study Area

The study was conducted at Marjat baor. Area of the Marjat baor is about 253 hectares and length 7.5 km. Gourinathpur village is to the East of the baor, Patibilla village is to the west corner. The lake is characterized as “Direct Fisheries Management by the Department of Fisheries (DoF)”, where a fisheries officer directly manages the baor. This baor is managed by experienced senior level fisheries officer called Baor Manager. The baor manager works in co-operation with a specified number of approved fishers. Fourteen (14) fishermen groups directly or indirectly depend on the Baor. Department of Fisheries (DoF) bears all the costs including the costs of fingerling stocking, guarding and marketing while the fishers provide and maintain the boats, nets and fishing equipment. Baor manager is responsible for stocking in suitable time and decides the time of harvesting. The fishers are responsible for fishing.

3.2 Questionnaire Survey

Structured questionnaires were used to collect different selected biological and management related information. In addition, data were collected by extensive field visit. The questionnaire was prepared emphasizing the objective of the study. Before

finalization the questionnaire were pre-tested through field visit. Then the questionnaires were finalized and prepared for data collection. The questions were specific and were free from any kind of influence.

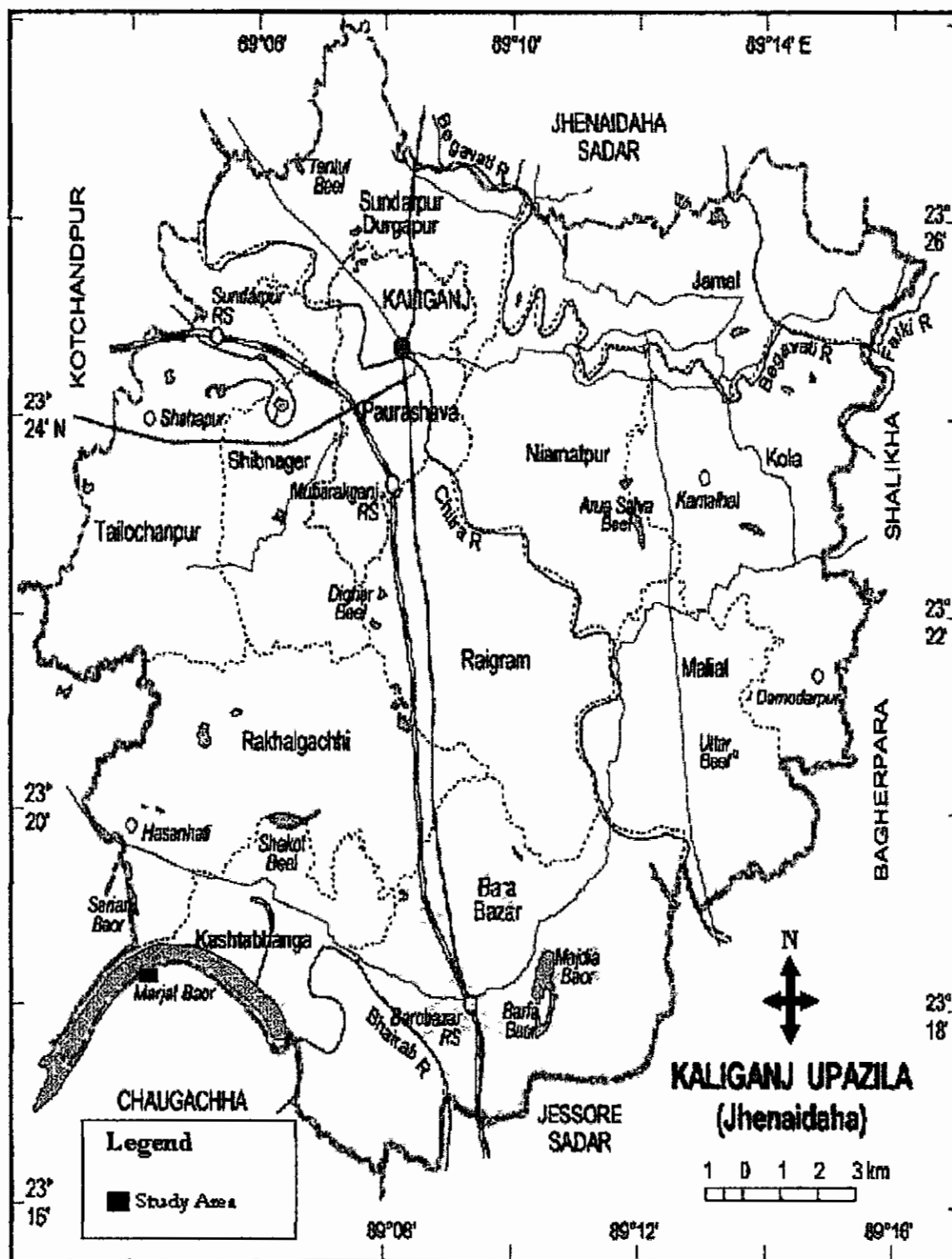


Fig.1: Map of Kaliganj upajilla

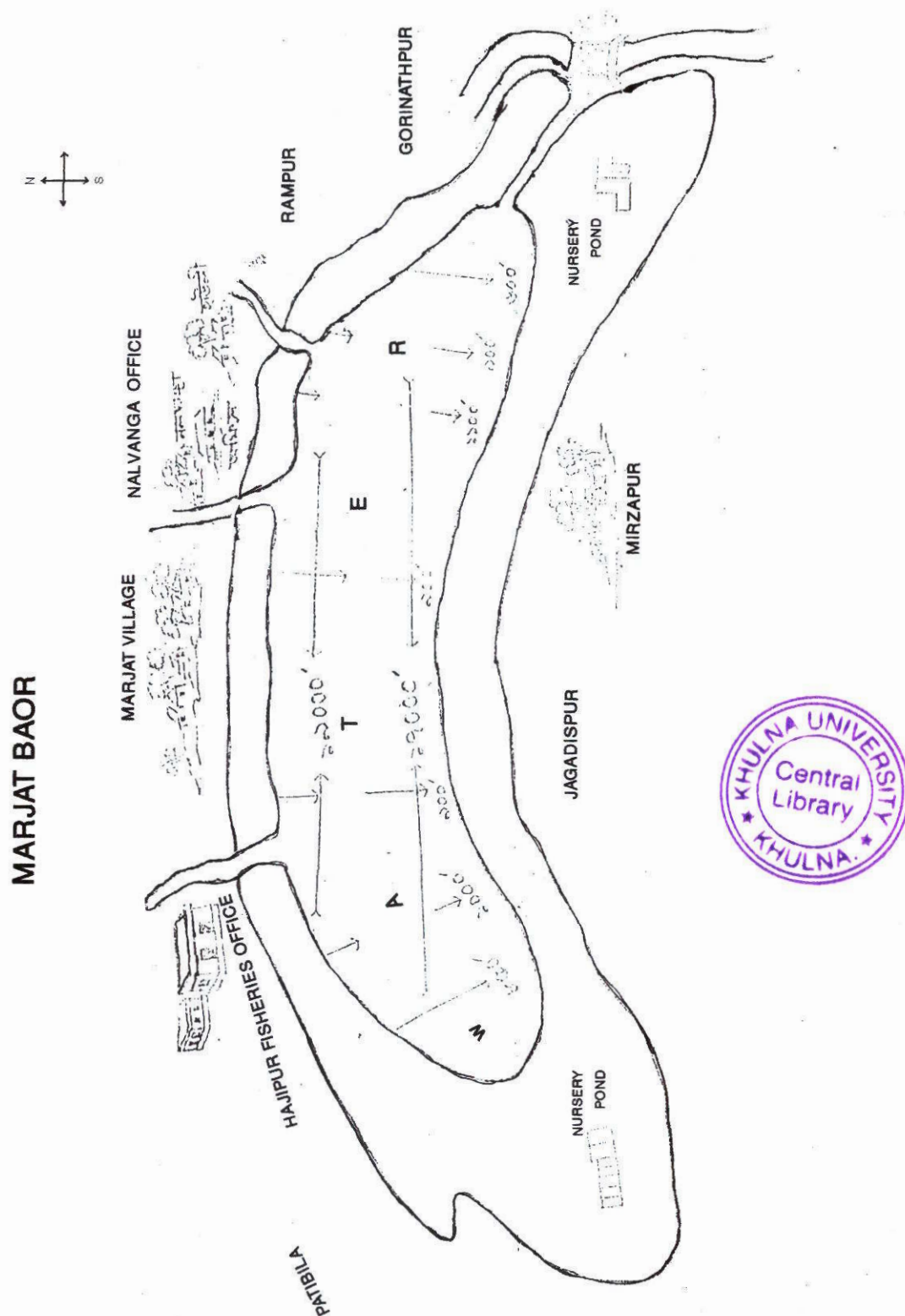


Fig. 2: Map of Marjat Baor

3.3 Sources and Type of Data

In order to fulfill the objectives of the study, both primary and secondary relevant information and literature were used and collected from two sources, which are:

3.3.1 Primary Source

The primary data were collected through field survey at the study area by using a structural questionnaire. Data on fishermen activities were collected both by physical observation and interviewing with fishermen at the both oxbow lake side throughout the culture period. Technological issues were asked to manager as per the questionnaire. Fingerling costs, costs related to equipments and gears used, miscellaneous and other cost were collected from the annual audit reports of boar.

3.3.2 Secondary Source

Necessary relevant information on culture and management system, production data were collected from project director Office- Jessore and Kalijong thana fisheris office, Marjat Baor Office, Department of Fisheries and Bangladesh Bureau of Statistics (BBS). Prescribed questionnaires were also used to collect the secondary information.

3.4 Data Analysis

Collected data and information obtained from the survey were accumulated, grouped and interpreted according to the objective as well as parameters. Some data contained numeric and some contained narrative facts. The data were then presented in graphs and tabular forms.

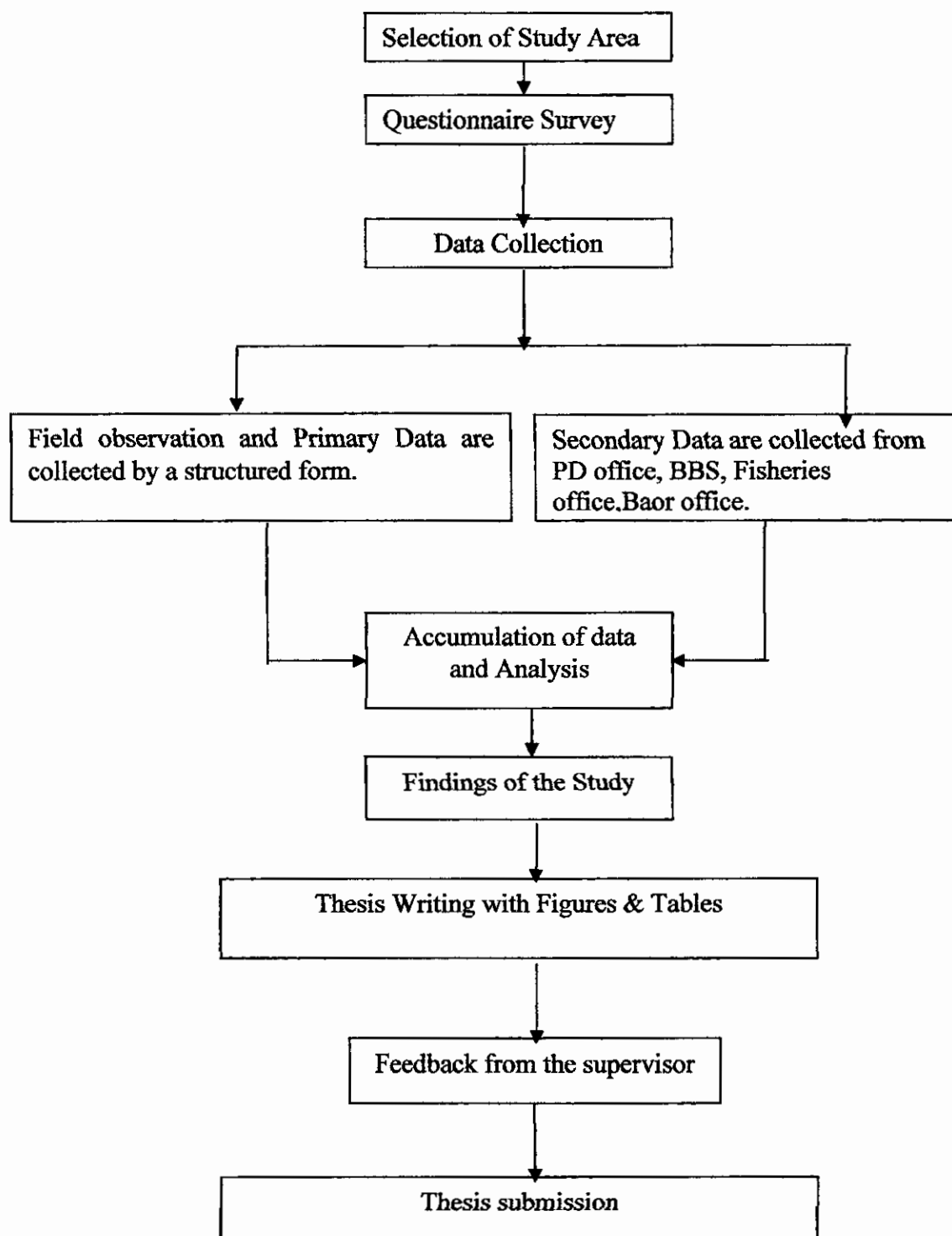


Fig. 3: Schematic Diagram of Methodology of the Study

CHAPTER: FOUR

RESULTS

Chapter-4

Results

4.1. Physical condition of Marjat baor

The level of infrastructural development in Marjat Baor was much highly established under government departmental management in Baor fisheries development project. The general information on physical condition of Marjat Baor is shown in Table 1.

Table 1: Physical condition of Marjat Baor

Sl. No.	Characters	Marjat Baor
1	Area (ha.)	253
2	Average depth (m)	6
3	Approach road (Km)	1
4	Total fishermen (no.)	140
5	Surrounding villages (no.)	8
6	Sluice gate (no.)	2
7	Bamboo screen	√
8	Fish landing centre (no.)	2
9	Guard shed	2
10	Embankment	√
11	Fish Sanctuary	2
12	Pump house	√
13	Shallow tube-well	2
14	Electricity supply	√

4.1.1 Community selection of Baor

Participation in the LFT (Lake Fisheries Team) is open to all persons interested in fishing as a livelihood i.e. both traditional Hindu and Muslim landless farmers who live within one km. of the lake. The list of LFT fishers is prepared jointly by DoF for approval. In the day-to-day implementation of the common property regime in oxbow lakes, the fishing rules and upheld to insure participation in fishing maintain equity and enforce LMG (Lake Management Group) democracy by rotation of leadership.

There is Lake Fisheries Teams (LFT) and Fish Farmers Group (FFG) at the primary operational level and at the apex (collective level) is lake management group (LMG). All the LFTs of a baor together elect an LFT committee by election among team members. The LMG committee is then formed with representatives of both of the LFTs and FFGs of a lake. The president, secretary and treasurer of the LFT committee are also the president, secretary and treasurer of the LMG committee respectively while the president and secretary of the FFG committee are the vice-president and assistant secretary of the LMG committee respectively. The LFT/FFG committee works independently to manage the baor fishery. A general meeting of all general members of the LMG is held annually. All of them, 60% members must be present in general meeting for koram. Baor management committee and the executive body are elected according as shown in Fig.4.

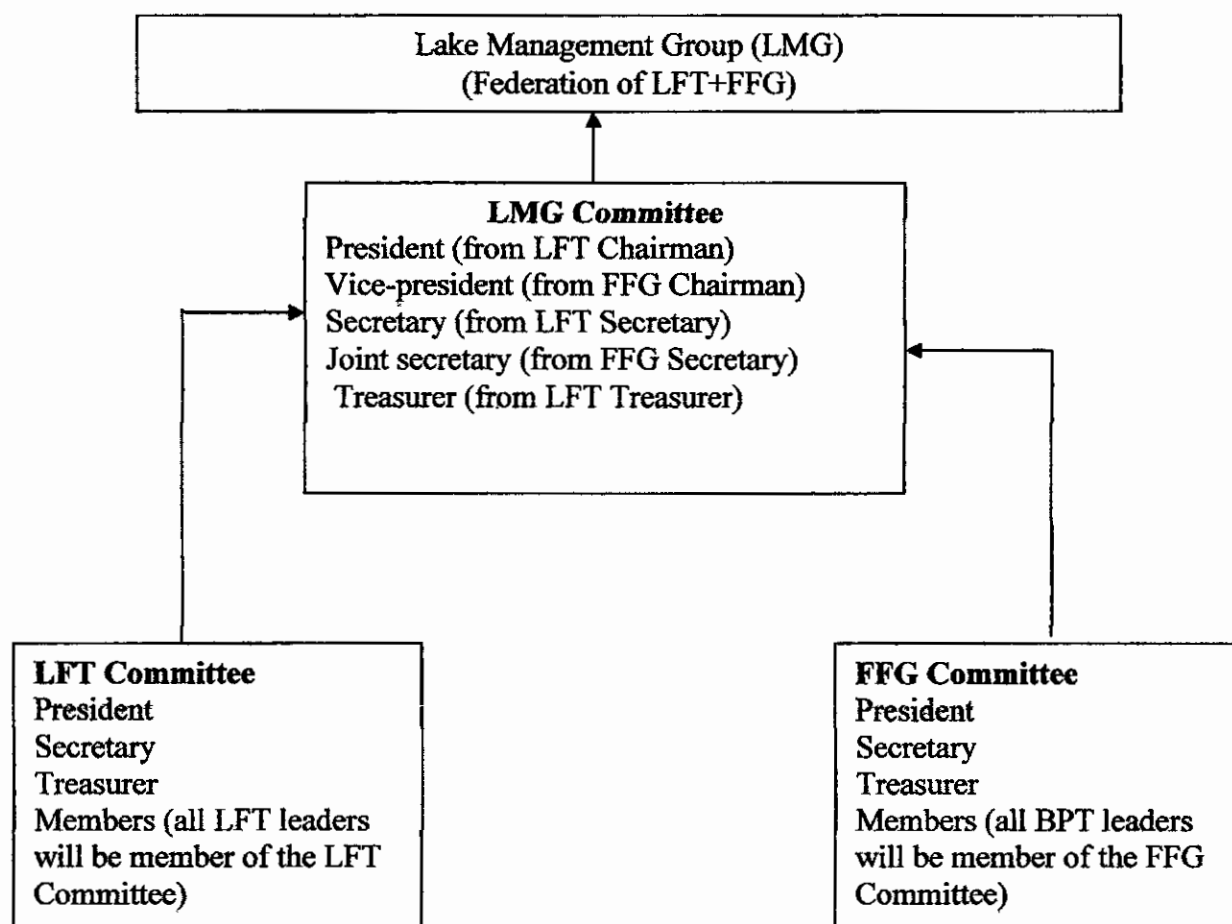


Fig. 4: Schematic Diagram Showing the Baor Management Committee.

4.2 Baor Culture Management

4.2.1 Stocking time

For fish culture, 8-10 cm in size small fish are collected from different sources like central hatchery, Katchandpur and Jessore hatchery for stocking in Marjat Baor. During stocking in baor all under size, weak and dead fry are rejected. In the surveyed area, fingerlings were stocked once in a year. Sometimes stocking is done in two times a year. In the year 2003 to 2007, it was done in the month from June to July.

4.2.2 Fertilizing and feeding

No fertilizer and feed was provided in the year 2003 to 2007. Fish culture was fully dependent on natural feed.

4.2.3 Stocking Density

The stocking density of Marjat Baor was about 185 kg/ha and yield highest about 316 kg/ha in 2005-2006. Table 2 shows the stocking rate and yield in different fiscal years.

Table 2: Stocking density of different year

Year	Stoking Rate (kg/ha)	Yielding Rate (kg/ha)
2003-2004	180	277
2004-2005	175	229
2005-2006	185	316
2006-2007	180	253

Source: Project Director Office, Jessore, 2007



4.2.4 Species wise stocking density

The commonly cultured species were silver carp (*Hypophthalmichthys molitrix*), rohu (*Labeo rohita*), catla (*Catla catla*), mrigal (*Cirrhina cirrhosus*), common carp (*Cyprinus carpio*), grass carp (*Ctenopharyngodon idella*) and the stocking density of those species were 65, 22, 18, 17, 18, 35 kg/ha and 1440, 490, 390, 370, 390, 780 no/ha respectively in the year 2004-2005.

Table 3: Stocking density of major species in Marjat Baor

Species	(kg/ha)	(no/ha)
Silver carp	65	1440
Rohu	22	490
Catla	18	390
Mrigal	17	370
Common carp	18	390
Grass carp	35	780
Total	175	3860

Source: Project Director Office, Jessore, 2007

4.2.5 Species Composition

In present study, stocking density of Marjat Baor was about 180 kg/ha and yield about 253 kg/ha in 2006-2007. Silver carp and Grass carp both were stocked in higher than other species in Marjat Baor through out the year. The species composition of Marjat Baor are shown in Table 4

Table 4: Species composition of major species in Marjat Baor

Species	Percentage
Silver carp	37
Rohu	13
Catla	10
Mrigal	10
Common carp	10
Grass carp	20
Total	100

Source: Project Director Office, Jessore, 2007

The species composition of silver carp, rohu, common carp, catla, grass carp and mrigal were 37%, 13%, 10%, 10%, 20%, 10% respectively (Fig 5). The stocking ratio of silver

carp was the highest as because this species attain marketable size comparatively earlier than other species.

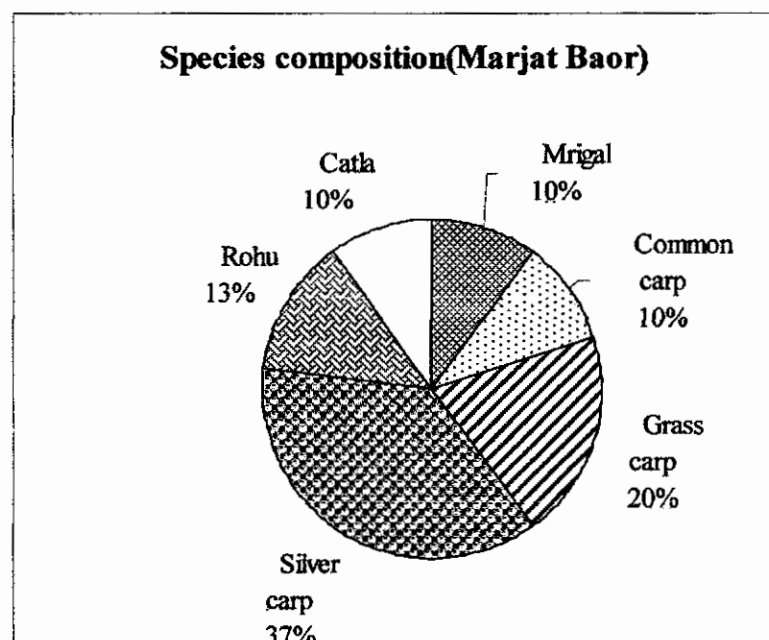


Fig. 5: Species composition of major species in Baor Majrat

4.3 Checklist of Fish Species of Marjat Baor

Besides the stocked species, more 15 different fish species have been identified from the studied baor. Local name and scientific name of the fish species have been shown in Table 5.

Table 5: Checklist of Fish Species

Sl No.	Local Name	Scientific Name
1.	Rohu	<i>Labeo rohita</i>
2.	Catla	<i>Catla catla</i>
3.	Mrigal	<i>Cirrhina mrigala</i>
4.	Calbasu	<i>Labeo calbasu</i>
5.	Silver carp	<i>Hypophthalmichthys molitrix</i>
6.	Grass carp	<i>Ctenopharyngodon idella</i>
7.	Common carp	<i>Cyprinus carpio</i>
8.	Punti	<i>Puntius spp.</i>
9.	Kholisha	<i>Colisa fasciatus</i>
10.	Taki	<i>Channa punctatus</i>
11.	Shoal	<i>Channa striatus</i>
12.	Chela	<i>Salmostoma bacaila</i>
13.	Mola/Maya	<i>Amblypharyngodon mola</i>
14.	Tengra	<i>Mystus tengra</i>
15.	Foli	<i>Notopterus notopterus</i>
16.	Shing	<i>Heieropneustes fossilis</i>
17.	Magur	<i>Clarius batrachus</i>
18.	Bele	<i>Glossogobius giuris</i>
19.	Small chingri	<i>Palaemon spp.</i>
20.	Boal	<i>Wallago attu</i>
21.	Ranga Chanda	<i>Chanda ranga</i>

Source: Marjat Baor Office

4.4 Fish Harvesting Methods

Mainly kochal and komor were used for fish harvesting in Majrat Baor.

4.4.1 Kochal fishing

Kochal fishing is mainly used for fishing the carps stock (silver carp and catla), the method consisted the seine net, normally operated for harvesting (Figure-6-A). Initially the seine net is operated for 6-10 days and by that time, the escapees, take refuge the komors, set in nearby areas. At that stage the fisherman stopped operating the seine net and started fishing in the komors by encircling those with drag nets. Table 6 represents a year wise data of total fishing using different methods.

Table 6: Different fishing methods and production in different fiscal year

Fishing method	Production of Fiscal Year			
	2003-04	2004-05	2005-06	2006-07
Kochal fishing	23.34	19.34	26.67	21.25
Komor Fishing	46.67	38.68	53.34	42.50
Total (mt)	70.01	58.02	80.01	63.75

Source: Project Director Office, Jessore, 2007

4.4.2 Komor Fishing

Komor fishing or drag netting is principally adopted as a device to catch the remaining in the baors after the completion of kochal. The density of the fish population in the baor gets reduced after kochal fishing. The remaining fish after driven by the kochal operation take shelter in the bush parks set nearby in the areas. It has been seen that catla and silver

carp are mainly caught by kochal fishing. Comparatively bigger ones of catla and silver carps can escape the kochal and take shelter in the komors. Also, rohu, mrigal and common carps, which feed in the column and in the bottom areas can escape large and hide in the bush parks. As a result of the harvest from komors, principally consist of bigger catla and silver carps and varied size of rohu, mrigal and common carps. It was found that in marjat Baor maximum komor fishing was done. Komor fishing has been shown in Fig 6-B.



A. Kochal



B. Komor

Fig. 6: Showing the different fishing methods- A. Kochal Fishing, B. Komor Fishing

4.5 Production

The survey result revealed that the total production of the fiscal year 2003-04 was 70.01(mt), in 2004-05 was 58.02(mt), 2005-06 was 80.01(mt) and 2006-07 was 63.75(mt). The year wise total production is shown in Fig 7.

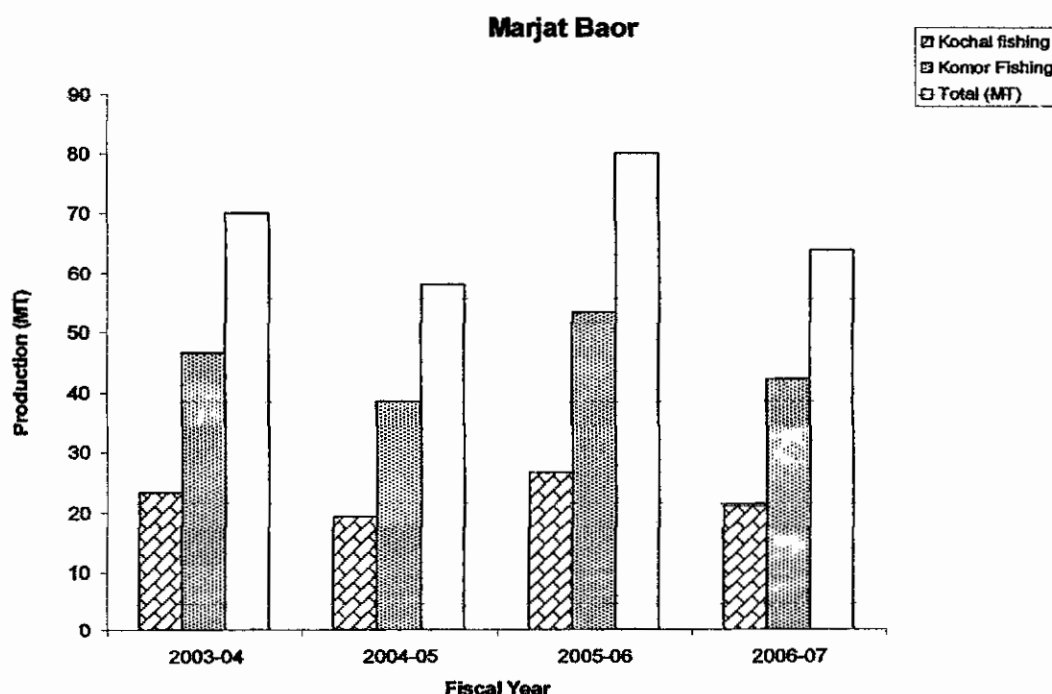


Fig. 7: Production in Different fishing method

4.6 Marketing system

Marketing system may be thought of as the connecting link, the bridge between specialized producers and consumers. It is both a physical distribution and an economic bridge designed to facilitate the movement and exchange of commodities from the farm to fork. It is composed of alternative product flows (marketing channel), a variety of farms (middleman) and numerous business activities. The marketing channel may be short or long for a particular commodity depending on the marked quality of the products, nature and size of the consumers and produces, marketing services needed and

the prevailing social and physical environments. In the study area, the marketing channels which consisted of fishermen, aratdars, paikers and retailers are depicted.

4.6.1 Baor Fishermen

Baor fisherman is the first man in fish marketing channel. So Fish marketing channels started from the fishermen. The earliest links in the fish marketing chain were the fishermen. They brought their fish to local market at Baro Bazar and sold their fish to the Aratdars. But some fishermen sold their fish to the Paikers and some fishermen directly to the consumer. After the fishermen, the major intermediaries who entered into the fish marketing chain in the study area were Aratdars, Packers and retailers.

4.6.2 Aratdars

It is the second step in the marketing channel. The Aratdars were the commission agents who had fixed establishment in the marketing and did the function of negotiating transactions between buyers and sellers of fishes on receipt of Aratdars' commission. They provide short period storage facilities and also perform the function of grading, sometimes; they also buy and sell fish. All Aratdars had business licenses.

4.6.3 Paikers

They were big merchants and licensed traders having fixed business premises in the wholesale market and they did business with large volume of transactions. The Paikers invested a large amount of money in their business, because they supplied their fish to another district.

4.6.4 Retailers

The retailers buy fish in the wholesale market for resale directly to ultimate consumers.

4.6.5 Consumers

They are the last link of intermediaries in the channel of marketing. The function of retailer is procure supplies and display them in forms and at times convenient for consumes. In the study area retailers sold total market supply of their fish to consumers.

Marketing channel is shown in Fig 8.

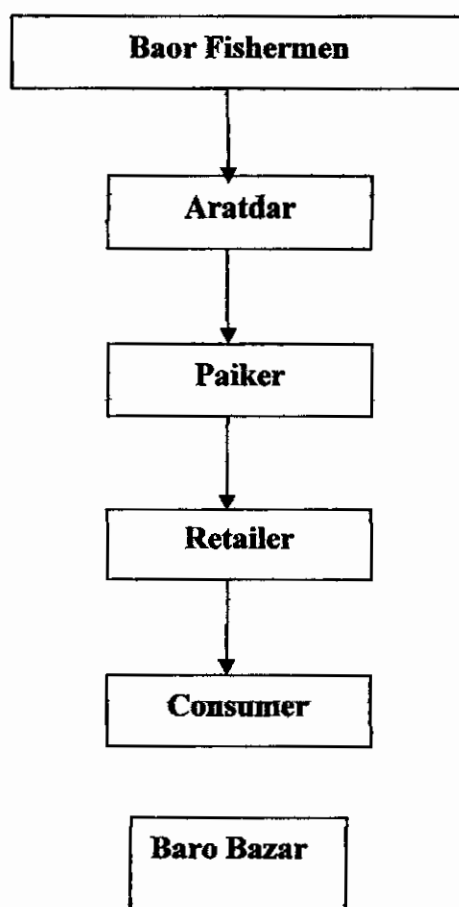


Fig. 8: Diagram of Marketing channel of Marjat Baor

CHAPTER: FIVE

DISCUSSION



Chapter-5

Discussion

The main objective of the present study was to observe the existing fisheries management scenario with a view to assessing the performance of baor culture management, harvesting of fish to identify problems associated with the management baor and remedial measures of baor management problems. The name of the selected baor was Marjat. It was located at Kaligonj in Jhenaidaha district. Data was collected by interview technique were supplemented by information received from various sources and also personal observation.

The study baor is taken under management by Department of Fisheries (DoF). There is no role of NGO to manage this baor. On the other hand, Middlemen cannot interfere to the baor through leasing system.

In oxbow lake, fishing of stocked carps generally takes place between November and June and fishing remains closed during July-October (Haque *et al.*, 1997). The relationship between carp yield and stocking density indicates that the stocking density in an oxbow lake can be increased up to 5000 fingerlings producing a yield of 900 kg/ha (Hasan *et al.*, 1997). It is mentioned that in year 2006-07 the stocking density in Chandbeel, Terghoria, Sholmari, Harda and Batikamari baor was 303, 180, 305.5, 310 and 380.5 kg/ha, respectively. Stocking density afformentioned area increase from the previous year could be due to technical knowledge and awareness of the farmers and direct assistance by the aquaculture officer of the Padakhap Manobic Unnyan Kendra. On the other hand, higher stocking densities in Batikamari baor may be 380.5 kg/ha in 2006-07.

The study was revealed that fertilizer and feed was not applied in Marjat baor. The culture system of it was fully dependent on natural feed.

Hossain *et al.* (1997) conduct an investigation in the South- West region of Bangladesh and concluded that silver carp should be the principal species comprising about 45% of the total stocking and the remaining could be Common carp, Rohu and Mrigal. Presently, 20 lakes are under intensive culture-based fisheries management by the fishers groups (LFG) and stocked with carp fingerlings of six different species (Middendorp *et al.*, 1996). Hasan and Middendorp (1997) mentioned that rohu was found to be the most expensive followed by catla, mrigal, grass carp, common carp and silver carp in the southwest parts of Bangladesh.

Generally, Fish harvesting is done by komor and kachal. Besides, fish harvesting is done by chak fishing in the baors of Chuadanga and Meherpur districts. But chak fishing is not introduced in Marjat baor. The study revealed that the production was higher in komor fishing than kochal fishing. In the fiscal year 2006-2007 the production of komor and kochal fishing was 42.5 and 21.25 mt respectively.

The study was found that in the fiscal year 2005-06 the total production was notably higher (80.01 mt) than that of other fiscal years of 2003-04, 2004-05 and 2006-07.

In the study it was observed that the marketing system of this baor is done by a variety of farms (middlemen) and numerous business activities. Marketing channels are the alternative routes of product flows from producers to consumers (Kohls and Uhl, 1980). It is the sequence of intermediaries through which a commodity passes wholesaling is a major step in the dispersion activities of marketing from the producers to the consumer (Kohls and Uhl, 1980).

Quddus (1991), Mia (1996) and Rahman (2003) identified several types of marketing channels in Netrokona, Mymensingh and Gazipur district, respectively, all of which involve the active participation of aratdars and beparies as a strong link in the existing marketing system. Presence of intermediaries has also been reported in other parts of Bangladesh and India (Ahmed 1984, Khan 1995).

Retailers, who are primarily interested in the problems that arise from servicing their customers, could not possibly search out and deal with the producer and sources of all their product (Kohls and Uhl, 1980).

CHAPTER SIX

PROBLEMS AND RECOMMENDATIONS

Chapter-6

Problems and Recommendations

6.1 Problems of Marjat Baor:

This baor is one of the largest baor in Bangladesh. The development of this baor plays a vital role in our national economy that helps to increase our GDP. But there are some problems of this baor. These are given below-

- Lack of developed management system and controlled harvesting.
- Negligence of office staff
- Low production due to availability of quality fingerlings.
- Lack of adequate market facilities for fish marketing.
- Poaching is a major problem in baor fishery.
- Conflict and chaos among fishermen.
- Lack of friendly environment.
- Lack of fund for baor management.
- Dike problem.
- Excess growth of aquatic weeds and water hyacinth.
- Siltation due to deposition of sediments from agriculture field and muddy roads etc.
- Indiscriminate abstraction of water for irrigating crop fields.

6.2 Recommendations

A number of recommendations have been drawn on the basis of problems and results obtained from the study are as follows:

- Quality and adequate fingerlings should be ensured.
- Sudden changes of boar manager should be stopped.
- More government assistance should be provided in time.
- Weekly meetings should be arranged for good management practice.
- Unnecessary cost should be minimized.
- Increase security facilities to decrease poaching of fish.
- Local political power should be minimized for the sake of better management



CHAPTER SEVEN

CONCLUSION

Chapter-7

Conclusions

Baor fisheries play an important role in the poverty alleviation of poor people as well as food protein supply for the country. Marjat Baor plays an important role in fish production, income generating activities, employment opportunities and socio economic condition of the fishers' community. There are many problems in the baor fisheries management. These problems can be solved through the application of scientific culture technology. As a result, the fish production will be increased and the livelihood status of that fishers' community will be improved. Fishermen can be provided with licenses and can be trained up and motivate on some important issues. A large number of fishermen depend on baor for their income and consumption. A lot of people are engaged in baor fisher for their livelihood through it. But due to various manmade and natural reasons such as over-fishing, siltration, lack of proper management, protection and implementation of fish act has declined the baor capture fisheries. Recommendations are made for sustainable financial returns that the government baor can be handed over to the private management system.

CHAPTER EIGHT

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Chapter-8

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APPENDIX

APPENDIX

Questionnaire

Information on Baor and its Management Scenario

1. Name of the baor:

2. Address:

3. Seasonal calendar:

Steps	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Preparation												
Stocking												
Harvesting												

4. Area of the baor:

5. Pattern of fish culture:

6. Major Fish species of baor (fish fry released/ha)

Species	(kg /ha)
Rui	
Catla	
Mrigal	
Silver carp	
Grass carp	
Common carp	

7. Others fish species of baor:

8. Species composition:

Species	Number (%)
Silver carp	
Rohu	
Catla	
Mrigal	
Common carp	
Grass carp	