

**AN INVESTIGATION OF FISH FAUNAS AVAILABLE IN
THE RIVER SYSTEMS OF GREATER DINAJPUR AND
RANGPUR DISTRICTS**



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AN INVESTIGATION OF FISH FAUNAS AVAILABLE IN THE
RIVER SYSTEMS OF GREATER DINAJPUR AND RANGPUR
DISTRICTS

A Project Thesis

By

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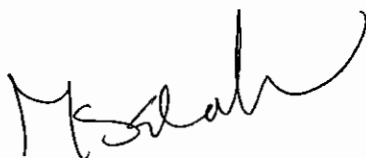
AN INVESTIGATION OF FISH FAUNAS AVAILABLE IN THE
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DISTRICTS

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DECLARATION

The results submitted in this project thesis are entirely of the candidate's own investigations and no part of the results has been accepted for any degree, nor it is being concurrently submitted for any degree.



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CONTENTS

TITLE	PAGE
ACKNOWLEDGEMENT	I
ABSTRACT	II
CONTENTS	III
LIST OF TABLES	IV
LIST OF FIGURES	V
LIST OF ACRONYMS AND ABBREVIATION	VI
CHAPTER ONE: INTRODUCTION	1
CHAPTER TWO: REVIEW OF LITERATURE	4
CHAPTER THREE: MATERIALS AND METHODS	8
CHAPTER FOUR: RESULTS AND DISCUSSION	20
CHAPTER FIVE: CONCLUSION	36
CHAPTER SIX: REFERENCES	38

LIST OF TABLES

Table No.	Title	Page
Table-1	Ten sampling stations for Karatoya-Atrai-Tangon-Purnabhaha river system.	12
Table-2	Ten sampling stations for Tista-Dharla-Brahmaputra river system.	12
Table-3	Sampling periods in compliance with four dominant seasons.	15
Table-4	Frequency of sampling with seasons dates and stations.	16
Table-5	Systematic species list with stations, seasons and abundance.	21
Table-6	Number of species found during investigation at different sampling stations.	33



LIST OF FIGURES

FIGURE		PAGE
1	Map showing Karatoya-Atrai-Tangon-Purnabhaha River system with the data collection spots.	13
2	Map showing Tista-Dharla-Brahmaputra River system with the data collection spots	14

LIST OF ACRONYMS AND ABBREVIATIONS

Acronyms and abbreviations	Elaboration
DOF	Department of Fisheries
<i>Et al</i>	Associates
Etc	Etcetera
F	Family
G	Genus
Ha	Hectare
O	Order
Sp	Species
UFO	Upazila Fisheries Officer

Chapter One

Introduction

INTRODUCTION

1.1. Background of the study

Bangladesh is very rich in inland capture fish production. It has large number of rivers with extensive floodplains. The total area available for inland fisheries is about 43, 07974 ha, with culture fisheries comprising 2, 60658 ha. The inland capture fishery covers an area of 40, 47316 ha, comprising rivers and estuaries (excluding the Sundarban) 10, 31563 ha, beels 11416 ha, Kaptai lake 68800 ha and floodplain 28, 32792 ha. (DOF, 2002). There are about 230 rivers flows across the country. A network of rivers and their tributaries, numbering 230 with a total length of 2200 km flow down through the country to the Bay of Bengal. These are having roughly 800 km of perennial waterways; provide an excellent opportunity for raising fish. (Nuruzzaman, 1993).

Although whole Bangladesh is a vast network of natural water systems, but the northern part of the country comparatively less rich with natural water resources than the southern region. The effect of Farakka Barrage, the lower rate of rainfall and very low water level in soil are main reasons for less watered areas in this region. As a result the amount of natural fisheries resources declines day by day in this part of the country. The river systems of greater Dinajpur and Rangpur districts comprise a variety of fishes of commercial importance and taxonomic interest. So the present study of availability of ichthyofaunas in river systems of greater Dinajpur and Rangpur districts was undertake to obtain an idea about the species availability and this abundance which can be helpful to take necessary steps for fisheries conservation and management.

1.2. Importance of the study

The investigation of the availability of fish faunas in greater Dinajpur and Rangpur districts covers main natural water channels of Karotoa, Tangon, Atrai, Purnabhaha, Tista, Dharla and Brahmaputra rivers. These rivers are full of various ichthyofaunas but no detailed account on the ichthyofaunas of the rivers is available. Although freshwaters of Bangladesh abound with a large variety of fish, systematic position of these fish has not been adequately studied in the past, especially from the point of view of modern systematic. It is an accepted fact that before any management and development program relating to fish and fisheries is undertaken it is essential to determine the taxonomic status of the fish concerned. The need

for the production of a comprehensive guide for identification of the fish faunas of the country was, therefore, greatly felt. Karatoya-Atrai-Tangon-Purnabhaba and Tista-Dharla-Brahmaputra river systems are dominant river systems with a variety of fishes of commercial importance and taxonomic interest.

Hamilton Buchanan (1822) enumerated a good number of fishes from the same deemed to be endemic to that habitat. Although different authors published different accounts of freshwater species of different region, but no published report or survey regarding the fish species of Karatoya-Atrai-Tangon-Purnabhaba and Tista-Dharla-Brahmaputra river system are available. Rahman (1973-1986) in a series of scholarly papers accounted most of the freshwater fishes of Bangladesh and described a number of new forms, but he did not give any account of fish species available in the main river systems of greater Dinajpur and Rangpur river systems and in the area as a whole. The present investigation was deemed necessary in this regard and has been carried out to know about the ichthyofaunas of the river systems.

1.3. Rationale of the study

The diversity of fish species is decreasing day by day due to overfishing, pollution, catching of all sorts of fish by improper ways, lack of management practices, lack of awareness and increasing demand of fish for the burgeoning people. So, protection and conservation of these fish species is now standing as a vital matter. In order to conserve and protect the fish species, information on fishfaunas is necessary. This study aimed at collecting necessary information on existing, extinct and endangered fish species.

The present investigation was carried out on two main river systems of greater Dinajpur and Rangpur districts namely Karatoya- Atrai-Tangon- Purnabhaba river systems of greater Dinajpur district and Tista- Dharla- Brahmaputra river systems of greater Rangpur district. Fish specimens from different sampling stations of two river systems constituted the study materials. The specimens collected during the investigation were identified primarily in the field. Those that appeared difficult to identify brought to respective UFO/DFO for their help in identification. Literatures consulted for identification were mainly that of Jayaram (1981) and Rahman (1973-1986).

The watercourses were found to be rich in fishfaunas. A total of 123 species belonging to 61 genera, 24 families and 12 orders. It records 70 species from the river system of greater Dinajpur district and 123 species from river systems of greater Rangpur district. The river

systems of present investigation are important river systems in northern part of the country and the present findings on the species diversity are deemed to be useful for the fishery biologist and fishery development workers.

1.4. Limitations of the study

To perform the study there were some limitations. The main limitations were difference of local name in different locality and very small size of fish. During the study period, there were some very small fishes. They could not be identified accurately. Water quality parameters were not recorded for different rivers in the study area. Another problem was that the samples of fish fauna were not preserved for accurate identification.

1.5. Objectives of the study

The main purpose of study was to record the availability or diversity of fish faunas of greater Dinajpur and Rangpur districts. The specific objectives of the study were formulated

- To obtain information about the availability of different fish species.
- To obtain ideas as to the season of availability
- To obtain ideas as to the major ecological condition of the habitat of the availability.
- To recommend means for conservation and management.





Chapter Two

Review of Literature

REVIEW OF LITERATURE

The present investigation on the ichthyofauna of the river systems of greater Dinajpur and Rangpur districts recorded 120 species of fish under 60 genera, 24 families and 12 orders. The species were identified after reviewing a large volume of literatures some of those are cited below.

Published reports on the fishery investigations in the Indian part of the oriental region although not a few in numbers but very often these all fall short when micro-regional approach with population dynamics and speciation studies are concerned.

Southwell (1915) reviewed the published reports of fishery investigations in Bengal, Bihar and Orissa up to 1913. However, the knowledge of freshwater fish fauna of Bangladesh actually begins with the work of Francis Hamilton. (Formally F.Buchanan cited by Rahman, 1986). In his book 'An account of the fishes found in the river Ganges and its branches', published in 1822 from Edinburgh, London, Hamilton for the first time described the freshwater fishes found in the Gangetic provinces.

Hamilton also does the first micro-regional approach to fauna investigation. As early as between 1807 and 1813 he made a minute investigation into the fish and fisheries of the then Rangpur District that appeared in the monumental work of W.W.Hunter (1876). Day (1877), edited the fish and fisheries of Rangpur District with notes in his volume 'Fisheries and Botany of Eastern India' which listed 126 species of freshwater fish from the district.

Later, Day (1878), published his inimitable masterpiece. 'The Fishes of India' which described (including the supplement), 1418 species of fish found in the territories of the present day Republics of India, Pakistan, Bangladesh, Burma and Srilanka. Although authentic and more scientific, his study materials included specimens from a wide geographic range with a century old time span and as such, his description in many cases

do not largely conform to description provided for the fishes occurring in the smaller geographic range of Bangladesh.

Shaw Shebbeare (1937), provided a micro-regional account of fishes from the Darjeeling district and its adjoining Duats. Although they described 131 species of fish in the text, at least 14 species of fish (7 from market collection and the other 7 were not seen by them during the course of their investigation, 1918-1933) and the number of their actual finding comes down to 117.

Smith (1945) published an account of "The Freshwater fishes of Siam, or Thailand" dealing with 15 orders, 49 families, 9 sub-families, 209 genera and 560 species. In this publication a separate generic status has been given to *Puntius cosuatis* (Ham.) to his own genus *Oreochthys*.

Ahmed (1953) provided a list of 106 freshwater species of fish from the East Pakistan (now Bangladesh). Apparently, the list appears to be incomplete and does not include many of the known and some of the very common forms.

Mendis (1954) compiled "Fishes of Ceylon" which appears to have not been based on study of specimens.

Munro (1955) in his book "Marine and Fresh water Fishes of Ceylon" described a number of fishes that are also available in Bangladesh.

Weber & De Beaufort (1913-1956) in several volumes (vols. I-X) described fishes purely from taxonomic viewpoint and a large number of species described by them also occur in Bangladesh.

Bhuiyan (1964) provided a taxonomic account of only 71 species of fish from Dhaka district.

Qureshi (1965) published from Karachi an illustrated book "Common Freshwater Fishes of Pakistan" which include 133 species most of which occur in Bangladesh. This work does not appear to have been based on study of specimens and as such is of little or limited use for the taxonomists.

Doha (1973) published a list of 106 species of fish from Mymensingh and Tangail districts with an approach to their bio-ecology.

Haq (1973) presented a list on 47 species belonging to 16 families from Sylhet and Mymensingh districts.

Rahman (1973-1986) in a series of scholarly papers provided list of most of the freshwater fishes of Bangladesh and described a number of new forms. He (1974a.) compiled a checklist of 257 freshwater bony fishes of Bangladesh with nomenclature notes, which included a number of estuarine species and a good number of freshwater species, which were not available then. In October 1989, he published a book named "Freshwater Fishes of Bangladesh" with up to date account of the freshwater fishery of Bangladesh that included a revised list of 260 species of fish known to inhabit the freshwaters of Bangladesh.

Shafi & Quddus (1982) published an account of 144 freshwater species of fish from Bangladesh waters. This work is not exhaustive and does not include over 100 species of fish earlier recorded from freshwaters of Bangladesh.

Jayaram (1981) published a very useful handbook for the identification of the Freshwater fishes of this region and described as many as 742 species of fish under 233 genera and 64 families.

Rainboth (1983) published a paper describing a new cyprinid fish from Bangladesh waters.

Hauque (1986) investigated the ichthyofauna of the river Dharla, Kurigram and provided a list of 164 species under 77 genera, 27 families and 12 orders.

Hossain *et. al.* (1990) studied on some aspects of fish and fisheries of the river Atrai.

Huda (2002) investigated the ichthyofauna available in the Gorai-Madhumati river system and recorded 123 species of fish under 62 genera, 31 families and 12 orders.

Among other contributions on the taxonomy of the fish fauna of Bangladesh by Bangladeshi authors mention may be made of Hussain (1970), Karim (1978) and Ameen (1987).



Chapter Three

Materials and Methods

MATERIALS AND METHODS

1. Description of the rivers:

Situated in the deltaic plain of the three-river systems-the Ganges, the Brahmaputra and the Meghna, Bangladesh have vast inland open waters, rich in fisheries resources. There are about 230 rivers flowing across the country, most of which enter in Bangladesh from Himalayans and ultimately fall into the Bay of Bengal. The present investigation was carried out in the rivers of greater Dinajpur and Rangpur districts. There are about 12 rivers flowing in greater Dinajpur and Rangpur districts. In greater Dinajpur district, there are three districts namely Thakurgoan, Panchagarh and Dinajpur whereas in greater Rangpur districts there are now five districts-Rangpur, Kurigram, Lalmonirhat, Nilphamari and Gaibandha districts. The investigation was not carried out at Gaibandha district. The rivers, which flow into greater Dinajpur district, are Karotoa, Tangon, Atrai and Purnabhaha. The rivers, which cross greater Rangpur district, are mainly Tista, Dharla and Brahmaputra mainly.

Karatoya river enters in Panchagarh district from India and crosses Panchagarh Sadar, Boda and then enter in Khansama upazila of Dinajpur district, where it named as Atrai river and then crosses over Khansama, Chirirbander, and Dinajpur Sadar upazilas. Tangon is a small and comparatively narrow river, which flows over Atowari of Panchagarh district, Thakurgoan Sadar and Pirgonj upazila of Thakurgoan district. Purnabhaha flows over Birgonj, Kaharol, Dinajpur Sadar and Birol upazilas of Dinajpur district.

In greater Rangpur district the main rivers are Tista, Dharla, Brahmaputra, Ghaghot and Jamuneshwari etc. Tista is one of the big rivers of northern part of the country, which flows over Lalmonirhat and Rangpur district.

Tista crosses almost all upazilas of Lalmonirhat district and Gangachara, Kaunia and Pirgonj upazilas of Rangpur district. After Rangpur, Tista mixes with Brahmaputra at Chilmari upazila of Kurigram district. Brahmaputra flows over Kurigram Sadar, Ulipur, Chilmari of Kurigram district and then Phulchari of Gaibandha district. One part of Tista flows beside Jaldhaka upazila of Nilphamari. Dharla flows over Kurigram Sadar, Phulbari upazila of Kurigram district and then at Lalmonirhat.

Most of the rivers of greater Dinajpur and Rangpur districts starts from Himalayans and Brahmaputra deltaic plains and enter Bangladesh through passing India. Rivers of greater Dinajpur and Rangpur districts generally become shallower during winter season i.e. from November- February. At this time water mainly found in the deepest part of the river, which are locally called as “Moni” at Panchagarh and Thakurgoan region. Rivers of greater Rangpur district i.e. Tista, Dharla, Brahmaputra have water all the year round. Different kinds of fishes are mainly found in the rainy and autumn season. The bed of these rivers is sandy and the current is rapid. Numerous shallows and shifting sands render navigation extremely difficult. The banks are low and shelving and rivers are liable to constant changes of its course.

2. Description of the locality:

a) Location

The area under the present investigation was divided into two river systems of greater Dinajpur and Rangpur district. The river system of greater Dinajpur district starts from Panchagarh district and ends at Dinajpur through passing Thakurgoan whereas the river system of greater Rangpur district starts from Lalmonirhat district and ends at Kurigram district through passing Rangpur and Nilphamari district. The investigation area lies approximately between latitudes $25^{\circ} 15'$ and $26^{\circ} 30'$ North and longitudes $88^{\circ} 15'$ and $89^{\circ} 50'$ East.

b) Climate/ Meteorological features:

The climate of the investigation area was monsoon dominated with a seasonal wind reversal. There are four seasons namely winter, summer, Monsoon and Post-monsoon.

i) Temperature:

The region lies above the northern tropic and its climate is that of a sub-tropical nature with special characteristics derived from its physical conformation, the proximity of the Himalayas and the Garo Hills, and the monsoon rainfall.

The rivers in the Rangpur district receive a considerable share of the precipitations caused by Garo Hills. The characteristic features of the climate are thus a mild and equitable temperature, a high humidity and a plentiful rainfall (Bangladesh Bureau of Statistics).

The period March- May is one of the hot and increasingly violent thundershowers. The area's temperature is about 80° F with extreme minima and maxima ranging between 54° F and above 102° F. June to September is the period of true monsoon but humid conditions continue up to early November. The average temperature is 80° – 85° F with extreme maxima, about 70° F with extreme minima, about 97° F during the peak of monsoon period. (Bangladesh Bureau of Statistics).

ii) Rainfall:

The seasonal rainfall of the investigation area is caused by monsoon during mid June to September. The average rainfall of the area is about 150 cm. during rainy season the maximum and minimum rainfall ranges between 80cm and 180cm respectively.

c) Soil quality/ Region topography:

The investigation area was an alluvial plain largely with coarse sand and loamy soil in some part. The soil of greater Dinajpur district is about blackish to dark gray, soil p^H 5.5-6.0, whereas the soil of greater Rangpur district is about dark grayish brown or dark gray and soil p^H is 5.0-6.0. (Bangladesh Bureau of Statistics).

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Page 2

3. Description of the study materials:

The investigation was carried out into two different river systems of greater Dinajpur and Rangpur districts. The Karatoya- Atrai-Tangon-Purnabhaha river system covers the main river channel of greater Dinajpur district. Another river system, which exhibits a main feature of river system of greater Rangpur district, is Tista-Dharla – Brahmaputra river system. These two river systems give the main feature of fish species status of this large region of Bangladesh. A huge number of ichthyofaunas from ten different sampling stations of each river system on 80 different dates over a period of one year from May 2002 to April 2003 constituted the study material.

Not only direct observation of fish specimens was made but also interview reports of the local fishermen, fish depot, local fish market and fish landing centres constituted the database.

4. Selection of sampling stations:

Ten sampling stations each from two different river systems were selected at different places of greater Dinajpur and Rangpur districts. Ten sampling stations were selected at different upazilas of Panchagarh, Thakurgoan and Dinajpur districts for Karatoya- Atrai-Tangon-Purnabhaba river system of greater Dinajpur district and other ten sampling stations were selected from different upazilas of Rangpur, Kurigram, Lalmonirhat and Nilphamari districts for the river system of Tista-Dharla – Brahmaputra river system of greater Rangpur district. The stations were selected quite arbitrarily and based on the areas of the rivers where water stays all the year round, especially for Dinajpur region. Ten sampling stations for two different river systems are given Table1 and Table2. Figure 1 and Figure 2 are showing the data collection spots for Karatoya- Atrai-Tangon-Purnabhaba river system of greater Dinajpur district and Tista-Dharla – Brahmaputra river system of greater Rangpur district respectively.



Table1: Ten sampling station for Karatoya- Atrai-Tangon-Purnabhaha river system of greater Dinajpur district.

Station No	Location	River Name	Notation
1	Panchagarh Sadar, Panchagarh	Karatoya	STA-1
2	Boda, Panchagarh	Karatoya	STA-2
3	Debigonj, Panchagarh	Karatoya	STA-3
4	Chirirbandar, Dinajpur	Atrai	STA-4
5	Dinajpur Sadar, Dinajpur	Atrai	STA-5
6	Atowari, Panchagarh	Tangon	STA-6
7	Thakurgoan Sadar, Thakurgoan	Tangon	STA-7
8	Kaharol, Dinajpur	Purnabhaha	STA-8
9	Birol, Dinajpur	Purnabhaha	STA-9
10	Dinajpur Sadar, Dinajpur	Purnabhaha	STA-10.

Table2: Ten sampling station for Tista-Dharla – Brahmaputra river system of greater Rangpur district.

Station No	Location	River Name	Notation
1	Patgram, Lalmonirhat	Tista	STA-11
2	Kaligonj, Lalmonirhat	Tista	STA-12
3	Kaunia, Rangpur	Tista	STA-13
4	Jaldhaka, Nilphamari	Tista	STA-14
5	Kurigram Sadar, Kurigram	Dharla	STA-15
6	Chilmari, Kurigram	Dharla	STA-16
7	Phulbari, Kurigram	Dharla	STA-17
8	Ulipur, Kurigram	Bhrahmaputra	STA-18
9	Chilmari, Kurigram	Bhrahmaputra	STA-19
10	Char Razibpur, Kurigram	Bhrahmaputra	STA-20.

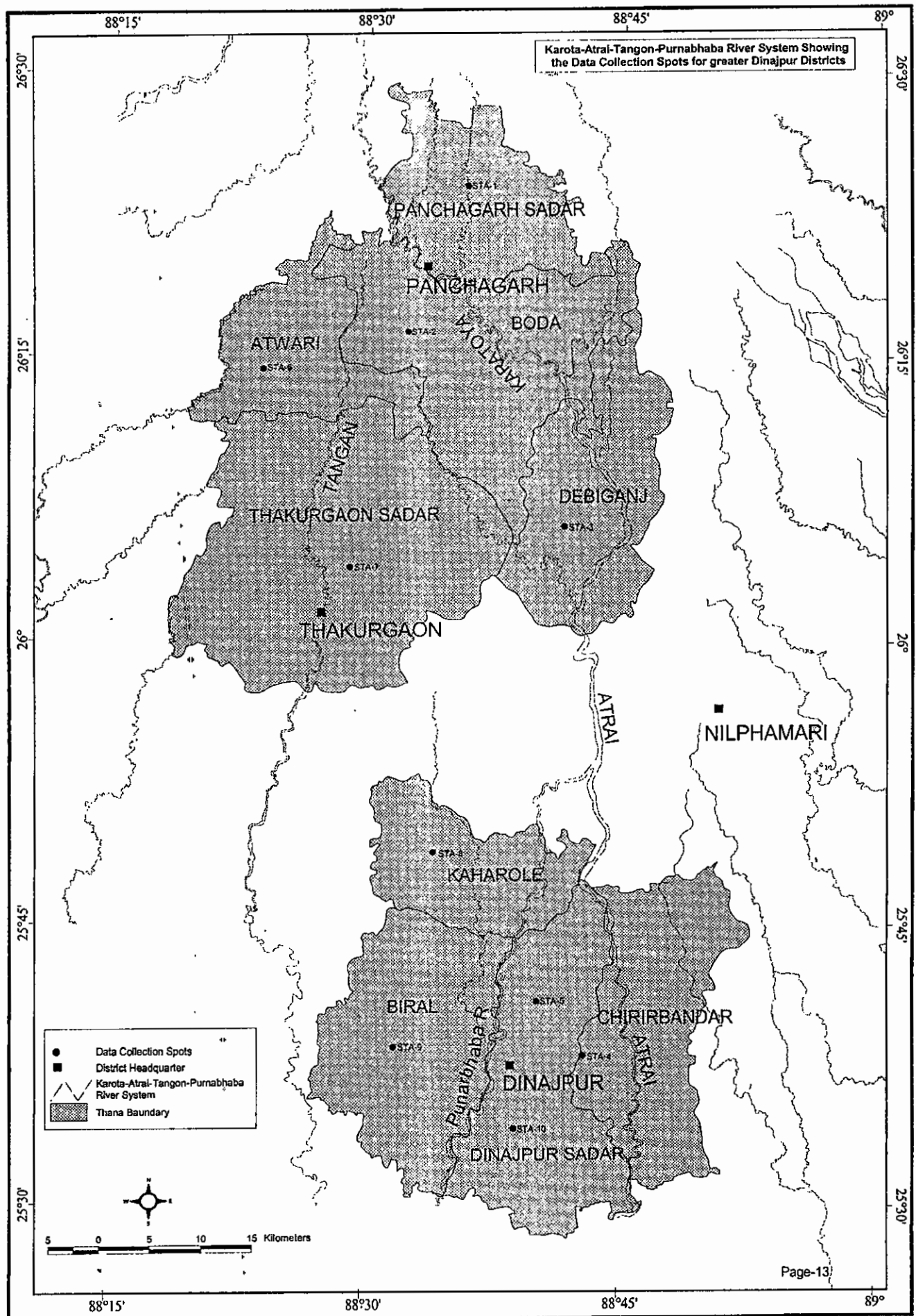


Fig1: Map showing Karatoya-Atrai-Tangon-Purnabhaha River system with the data collection spots.

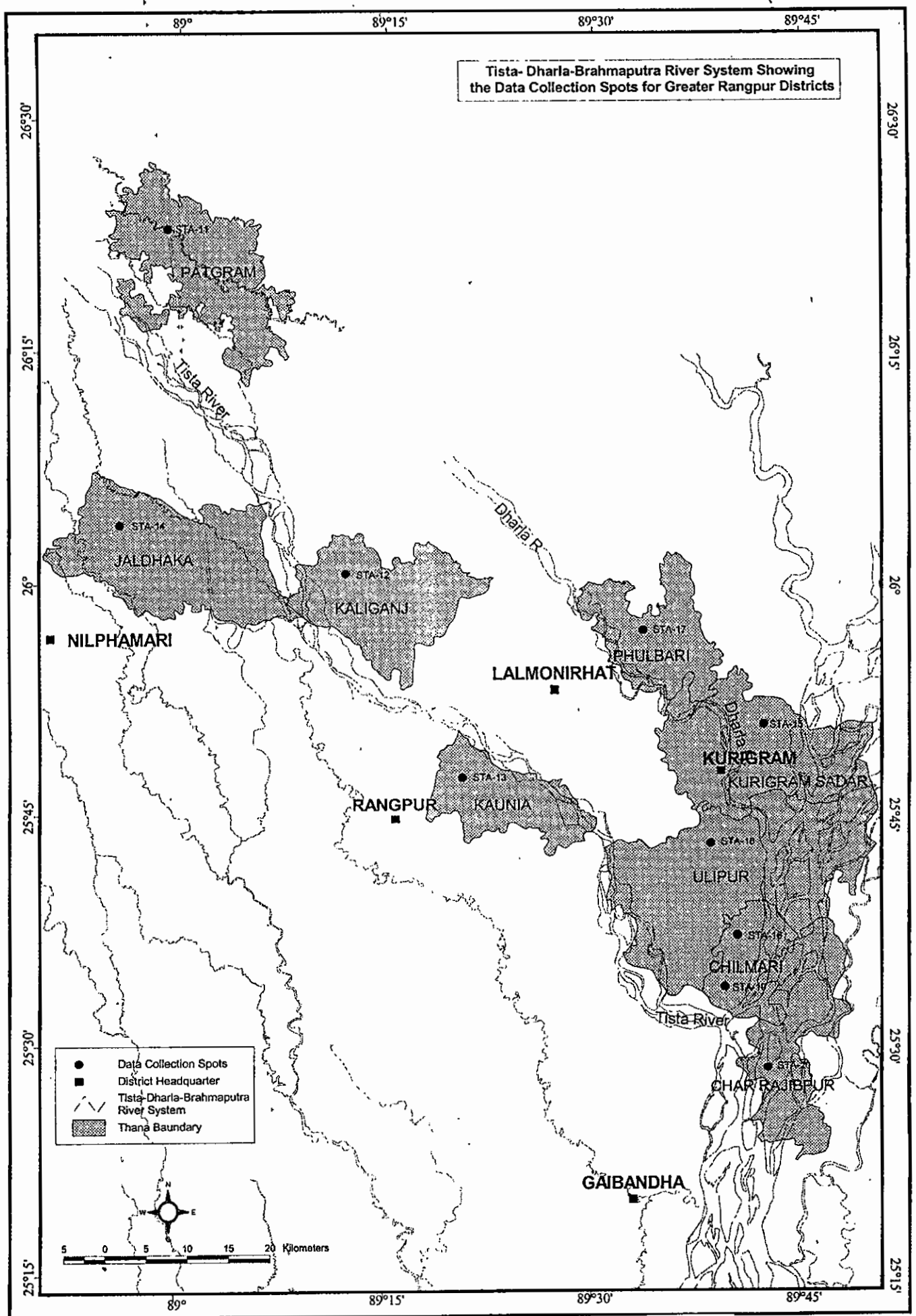


Fig2: Map showing Tista-Dharla-Brahmaputra River system with the data collection spots

1. Selection of sampling period:

Four sampling periods were selected in compliance with four dominant seasons as mentioned in Table 3.

Table 3: Sampling periods in compliance with four dominant seasons.

Serial No.	Sampling Period	Month	Notation	Description
a	Summer	Feb-April	SUM	Hot weather, least water volume, fishes become very vulnerable to fishing effort.
b	The Rainy season	May-July	RAI	Water volume increases, torrential flow, hard to catch fish.
c	The Autumn	Aug-Oct	AUT	Water volume and current moderate, frequent visit to flood. Fishes become very vulnerable to fishing gear in the second half of the season.
d	Winter	Nov-Jan	WIN	Cold weather, diminishing water volume. Fishes become susceptible to fishing gear.

2. Duration, date and frequency of sampling:

The duration of investigation was 12 solar months commencing from February 2002 and continued up to June 2003. Periodic sampling was carried out. Detailed sampling information is cited in Table 4.

Table 4: Frequency of sampling with season, dates and stations.

Season of sampling	Date of sampling	Station sampled	Frequency of sampling			Remarks
			Season	Station	Cumulative total	
SUM (Feb-April)	5.2.2002	STA-3	SUM-39	STA-1=3	80	Sampling intensity in the spring was made high because of vulnerability of species during this season.
	5.2.2002	STA-2		STA-2=2		
	6.2.2002	STA-1		STA-3=4		
	7.2.2002	STA-6		STA-4=2		
	8.2.2002	STA-7		STA-5=1		
	9.2.2002	STA-3		STA-6=3		
	9.2.2002	STA-4		STA-7=3		
	10.2.2002	STA-8		STA-8=2		
	11.2.2002	STA-9		STA-9=3		
	11.2.2002	STA-10		STA-10=3		
	12.2.2002	STA-1		STA-11=2		
	12.2.2002	STA-3		STA-12=2		
	13.2.2002	STA-6		STA-13=2		
	13.2.2002	STA-7		STA-14=2		
	14.2.2002	STA-9		STA-15=2		
	14.2.2002	STA-10		STA-16=2		
	20.2.2002	STA-14		STA-17=2		
	22.2.2002	STA-12		STA-18=2		
	23.2.2002	STA-11		STA-19=2		
	24.2.2002	STA-13		STA-20=2		
	26.2.2002	STA-15				
	28.2.2002	STA-18				
	2.3.2002	STA-17				
	4.3.2002	STA-16				
	5.3.2002	STA-19				
	8.3.2002	STA-20				
	12.3.2002	STA-2				
	12.3.2002	STA-3				
	13.3.2002	STA-4				
	15.3.2002	STA-6				
	16.3.2002	STA-1				
	17.3.2002	STA-7				
	21.3.2002	STA-5				
	23.3.2002	STA-8				
	25.3.2002	STA-10				
	27.3.2002	STA-9				
	1.4.2002	STA-14				
	3.4.2002	STA-13				
	5.4.2002	STA-15				
	6.4.2002	STA-18				
	7.4.2002	STA-16				
	8.4.2002	STA-19				
	11.4.2002	STA-17				
	13.4.2002	STA-20				
	18.4.2002	STA-11				
	19.4.2002	STA-12				

RAI (May-July)	13.5.2002	STA-1	RAI=25	STA-1=1		
	14.5.2002	STA-2		STA-2=2		
	14.5.2002	STA-3		STA-3=2		
	16.5.2002	STA-6		STA-4=2		
	17.5.2002	STA-7		STA-5=2		
	19.5.2002	STA-4		STA-6=1		
	20.5.2002	STA-5		STA-7=1		
	22.5.2002	STA-8		STA-8=2		
	22.5.2002	STA-9		STA-9=2		
	24.5.2002	STA-10		STA-10=2		
	27.5.2002	STA-14		STA-11=2		
	28.5.2002	STA-13		STA-12=1		
	30.5.2002	STA-12		STA-13=2		
	1.6.2002	STA-11		STA-14=1		
	4.6.2002	STA-15		STA-15=1		
	6.6.2002	STA-16		STA-16=1		
	9.6.2002	STA-18		STA-		
	12.6.2002	STA-17		17=1		
	15.6.2002	STA-20		STA-18=2		
	18.6.2002	STA-11		STA-19=1		
	21.6.2002	STA-13		STA-20=1		
	25.6.2002	STA-18				
	28.6.2002	STA-19				
	1.7.2002	STA-9				
	1.7.2002	STA-8				
	2.7.2002	STA-10				
	6.7.2002	STA-3				
	6.7.2002	STA-2				
	9.7.2002	STA-4				
	9.7.2002	STA-5				
AUT (Aug-Oct)	5.8.2002	STA-3	AUT-11	STA-1=1		
	5.8.2002	STA-2		STA-2=1		
	7.8.2002	STA-6		STA-3=2		
	8.8.2002	STA-7		STA-4=0		
	12.8.2002	STA-1		STA-5=0		
	12.8.2002	STA-3		STA-6=2		
	13.8.2002	STA-6		STA-7=1		
	13.8.2002	STA-7		STA-8=0		
	16.8.2002	STA-9		STA-9=1		
	16.8.2002	STA-10		STA-10=1		
	11.9.2002	STA-11		STA-11=1		
	11.9.2002	STA-12		STA-12=1		
	17.9.2002	STA-13		STA-13=1		
	20.9.2002	STA-15		STA-14=0		
	20.9.2002	STA-18		STA-15=1		
	25.9.2002	STA-19		STA-16=0		
	29.9.2002	STA-17		STA-17=1		
				STA-18=1		
				STA-19=1		
				STA-20=0		

WIN	15.11.2002	STA-3	WIN-5	STA-1=0		
(Nov-Jan)	15.11.2002	STA-2		STA-2=1		
	19.11.2002	STA-4		STA-3=1		
	19.11.2002	STA-5		STA-4=1		
	26.11.2002	STA-8		STA-5=1		
	26.11.2002	STA-10		STA-6=0		
	22.11.2002	STA-20		STA-7=0		
	28.11.2002	STA-16		STA-8=1		
	28.11.2002	STA-18		STA-9=0		
				STA-10=1		
				STA-11=0		
				STA-12=0		
				STA-13=0		
				STA-14=0		
				STA-15=0		
				STA-16=1		
				STA-17=0		
				STA-18=1		
				STA-19=0		
				STA-20=1		



7. Method of Sampling

The investigator himself accompanied by some local volunteer with their usual nets carried out sampling. The investigator collected samples during traveling by boats of commercial fishermen. Some gear-specific fish collected by fishermen was also taken for identification. A 1 mm mesh synthetic seine net of 150m×6m was used at some stations like STA-18, STA-19 and STA-20. Besides these, fishermen's catch made with push net, Chotkajal (one kind of dip net) and seine net was also looked for specimens. Samplings were made at random. Samples were also taken from commercial fishermen; operating fishing in the river at the time of collection. Method followed in sampling was that of Backiel & Welcome (1980). Samples were collected from fish depots, fish landing centres, local fish purchasing centres beside the river also.

8. Method of Study:

i. Sorting, preservation and labeling of the specimens:

The specimens were sorted out according to morphometric groups to preserve in 10% formalin in plastic - lid glass jars. The large ones that were not possible to accommodate in jars available were studied eventually in the field and left the specimens.

ii. Identification of the collected specimens:

The specimens thus collected during the investigation were identified primarily in the field. Those, which appeared difficult to identify, were marked and brought to the UFO (Upazila Fisheries Officer) or DFO (District Fisheries Officer) of respective upazila or district and identification was made there with the help of different literature. Same species of different collection station but different local names were identified by bringing them together at one place.

iii. Literature consulted for identification:

Identification was made with the identification keys provided by the following authors: Hamilton (1822); Day (1877, 1878); Shaw and Shebbeare (1937); Smith (1945); Munro (1955); Jayaram (1981); Raniboth (1983) and Rahman (1973-1986).

Chapter Four

Results and Discussion

RESULTS AND DISCUSSION

The present investigation was carried out to know the availability of fishes in the main river systems of greater Dinajpur and Rangpur districts. The Karatoya- Atrai- Tangon- Purnabhaha river system covers entire natural water system of greater Dinajpur district (Panchagarh, Thakurgoan and Dinajpur district) and Tista- Dharla -Brahmaputra river system gives main river networking of greater Rangpur district (Nilphamari, Kurigram, Lalmonirhat and Rangpur district). These two river systems of greater Dinajpur and Rangpur districts are important natural watercourses in the region. The investigation produced a list of 120 species under 60 genera, 24 families and 12 orders.

The table arranged in the following manner. There are 5 columns:

i) Species column

ii) Station column: 1,2,3,4,5,6,7,8,9 and 10 indicated respective station numbers of greater Dinajpur district and 11,12,13,14,15,16,17,18,19 and 20 indicated respective station numbers of Tista- Dharla -Brahmaputra river system of greater Rangpur district.

iii) Season column:

S=Summer

R=Rainy

A=Autumn

W=Winter.

iv) Abundance column:

R= Rare (1-2 specimens)

F= Few (3-4 specimens)

P= Plenty (10 and above specimens).

v) Remarks column.

Table 5: Systematic species list with station, season and abundance.

Species	Occurrence			Remarks
	Station	Season	Abundance	
Order (O ₁). Anguiliformes				
Family (F ₁). Ophichthidae				
Genus (G ₁). <i>Pisodonophis</i>				
1. <i>Pisodonophis boro</i>	16, 17, 20	R	F	Spp. 1 and 2 found in JAAN (a hole dug in mud to entrap fish on the way of their movement)
2. <i>Pisodonophis chilensis</i>	11, 13, 16, 17	R	R	
G ₂ . <i>Lamnostoma</i> Kaup, 1856				
3. <i>Lamnostoma orientale</i>	7, 8, 12-14, 18	R	R	
O ₂ . Clupeiformes				
F ₂ . Clupeidae				
G ₃ . <i>Corica</i> , Ham. 1822				
4. <i>Corica soborna</i>	2-4, 10, 11, 14, 18	R	R	
G ₄ . <i>Hilsa</i> Regan, 1917				
5. <i>Hilsa ilisha</i>	16-20	R	R	
G ₅ . <i>Gudusia</i> Fowler, 1911				
6. <i>Gudusia chapra</i>	1, 2, 4, 6, 7, 9, 12-14, 16-17	All	P	
O ₃ . Osteoglossiformes				
F ₃ . Notopteridae				
G ₆ . <i>Notopterus</i> , Lacepede, 1860				
7. <i>Notopterus chitala</i>	11, 14, 15, 20	S	R	
8. <i>Notopterus Notopterus</i>	12, 13, 18-20	S	R	



O4. Cypriniformes				
F4. Cyprinidae				
G7. <i>Securicula</i> Gunther, 1868				
9. <i>Securicula gora</i>	2,5,8,10,15,19	R	R	
G8. <i>Salmostoma</i> Gunther, 1868				
10. <i>Salmostoma bacaila</i>	3,5,7,16,19,20	S	F	
11. <i>Salmostoma phulo</i>	4,6,7,13,16,20	S	P	
12. <i>Salmostomas</i> sp.	15,17,18	S	F	
G9. <i>Danio</i> Ham. 1822				
13. <i>Danio devario</i>	3,4,7,10,16-18,20	All	P	
14. <i>Danio shanensis</i>	11,15,18,20	S	P	
15. <i>Danio nigrofasciatus</i>	2,8,9,16,18,20	S	R	
16. <i>Danio rerio</i>	1,4,5,7,10,12,17,19	S	P	
G10. <i>Aspidoparia</i> Heckel, 1843				
17. <i>Aspidoparia jaya</i>	12,16,18,20	All	F	
18. <i>Aspidoparia morar</i>	2,4,6,9,11,13,16,20	All	P	
G11. <i>Amblypharyngodon</i> Bleeker, 1800				
19. <i>Amblypharyngodon melatinna</i>	2,4,6,12,15,17	S	P	
20. <i>Amblypharyngodon microlepis</i>	1,2,4,7,9,11,13,16	S	P	
21. <i>Amblypharyngodon mola</i>	1-6,9,11-16,20	All	P	
G12. <i>Barilius</i> Ham. 1822				
22. <i>Barilius baria</i>	1,2,6-9,11-14,17	S, W	P	

23. <i>Barilius barna</i>	1,3-5,9,11-15	W	P	
24. <i>Barilius bendelisis</i>	2-4,13,14,20	S	F	
25. <i>Barilius dogarsinghi</i>	2,4,10,12-18	S	P	
26. <i>Barilius eveardi</i>	1,4-9,12-18	S, W	P	
27. <i>Barilius gatensis</i>	7,11-14,18,20	W	F	
28. <i>Barilius radilatus</i>	8,11-14,19,20	S, W	F	
29. <i>Barilius shacra</i>	14-17,19	S, W	F	
G ₁₃ . <i>Raiamas</i> Jordan, 1919				
30. <i>Raiamas bola</i>	14,16,17,20	S	R	
G ₁₄ . <i>Oreichthys</i> H.M.Smith, 1933				
32. <i>Oreichthys cosuatis</i>	14,15,17,19	S, W	F	Sp. 32 collected from JAG (brush- shelter) harvest.
G ₁₅ . <i>Puntius</i> Hamilton, 1822				
33. <i>Puntius gelius</i>	2,3,9,10,11-14,18	S, W	F	
34. <i>Puntius phutonio</i>	3-7,11,18-20	S, W	F	
35. <i>Puntius sarana</i>	1-6,10,12-18	S, A, W	P	
36. <i>Puntius sophore</i>	1-6,9,10,11-16,20	S, W	P	
37. <i>Puntius terio</i>	2-6,9,10,11-16,20	S, W	P	
38. <i>Puntius ticto</i>	2-6,9,12-19	S, W	P	
39. <i>Puntius chola</i>	1,4,5,7,9,12,14,16	S, W	P	
G ₁₆ . <i>Labeo</i> Cuvier, 1817				
40. <i>Labeo calbasu</i>	4,5,8,13-15,18,20	A, W	F	Sp.44 reported by the local people to occur.
41. <i>Labeo devdevi</i>	3-5,11,12,15,18,20	A	F	
42. <i>Labeo gonius</i>	6,7,9,12,18,20	W	R	
43. <i>Labeo pangusis</i>	6,9,12,16,18	W	R	
44. <i>Labeo rohita</i>	6,9,13,14,17,18,20	A, W	F	
G ₁₇ . <i>Chagunius</i> H.M.Smith				
45. <i>Chagunius Chagunio</i>	6,8,9,13,16,17,19	All	P	

G ₁₈ . <i>Tor</i> Gray, 1833-34				
46. <i>Tor putitora</i>	12,13,15,17,20	A	R	
G ₁₉ . <i>Cirrhinus</i> (Cuvier) Oken, 1817				
47. <i>Cirrhinus mrigala</i>	1,6,8,10,13,14,16,19	A, W	R	
48. <i>Cirrhinus reba</i>	1,4,6,9,11,13,14,18	All	P	
G ₂₀ . <i>Osteocheilus</i> Gunther, 1860				
49. <i>Osteocheilus sondhii</i>	3,5,6,9,17,18,20	S	F	
G ₂₁ . <i>Catla</i> Valenciennes, 1844				
50. <i>Catla Catla</i>	1,6,9,10,12,15,16,19, 20	A, W	F	
G ₂₂ . <i>Crossocheilus</i> Van. Hasselt, 1823				
51. <i>Crossocheilus</i> <i>burmanicus</i>	11,16,18-20	S, W	F	
52. <i>Crossocheilus latius</i>	1,6,8,11,13,20	A	R	
F ₅ . Psilorhynchidae				
G ₂₃ . <i>Psilorhynchus</i> McClelland, 1839				
53. <i>Psilorhynchus balitora</i>	11,14,16,17,18,20	S	F	
54. <i>Psilorhynchus gracilis</i>	1,3,9,10,16,18-20	S	P	
55. <i>Psilorhynchus sucatio</i>	1,3,4,16-18	S	F	
F ₆ . Cobitidae				
G ₂₄ . <i>Nemachilus</i> van				

Haasselt, 1823			
56. <i>Nemachilus botia</i>	1,2,7,11,13,17	S, A	P
57. <i>Nemachilus corica</i>	8,11,13,15,20	S, W	F
58. <i>Nemachilus peguensis</i>	11,12,16,19	S	R
59. <i>Nemachilus sikmaiensis</i>	11,12,14,16,19	S	R
60. <i>Nemachilus sinuatus</i>	7,11,13,15,17,20	S	R
61. <i>Nemachilus zonalternans</i>	8,12,14-16,19	S, W	P
G ₂₅ . <i>Botia</i> , Gray, 1831			
62. <i>Botia hymenophysa</i>	11-14,19,20	W	F
63. <i>Botia lohachata</i>	12,14,18,19	S	F
64. <i>Botia rostrata</i>	11,15,17,18,20	S, A	P
G ₂₆ . <i>Lepidocephalus</i>			
Bleeker, 1858			
s.g. <i>Lepidocephalus</i>			
Jayaram, 1981			
65. <i>Lepidocephalus irrorata</i>	6,7,11-13,16,17	S	R
s.g. <i>Lepidocephalichthys</i>			
Jayaram, 1981			
66. <i>Lepidocephalichthys guntea</i>	2,5,6,8,12,15,17	S, W	P
67. <i>Lepidocephalichthys thermalis</i>	1,5,6,7,11,13,16	S	F
O ₆ . Siluriformes			
F ₇ . Bagridae			
G ₂₇ . <i>Rita</i> Bleeker, 1859			
68. <i>Rita, Rita</i>	11,12,15,17,18	S, W	P

G ₂₈ . <i>Batasio</i> Blyth, 1860				
69. <i>Batasio tengana</i>	1,3,7,8,11,13,14,17,20	S, W	P	
G ₂₉ . <i>Chandramara</i> Jayaram, 1972				
70. <i>Chandramara Chandramara</i>	12,15,16,18,20	S	F	
G ₃₀ . <i>Mystus</i> Scopoli, 1777				
71. <i>Mystus armatus</i>	11,15-17	S	R	
72. <i>Mystus bleekeri</i>	2-4,9,14,16,19,20	S, A, W	P	
73. <i>Mystus montanus</i>	14,15,17,18,19	S, W	F	
74. <i>Mystus oculatus</i>	13,15,19,20	S	F	
75. <i>Mystus tengara</i>	6,8,9,11,14,16,19	S, W	F	
76. <i>Mystus vittatus</i>	1,2,4,6,9,11,14,16,19	S, A, W	P	
77. <i>Mystus</i> sp.	14,15,19,20	S	R	
G ₃₁ . <i>Aorichthys</i> Wu, 1939				
78. <i>Aorichthys aor</i>	15,18,19	S	F	
79. <i>Aorichthys seenghala</i>	13,14-18	S, A	F	
F ₈ . Siluridae				
G ₃₂ . <i>Ompok</i> Lacepede, 1803				
80. <i>Ompok bimaculatus</i>	10,13,15,19,20	S	R	
81. <i>Ompok paba</i>	18,19	S, W	F	
G ₃₃ . <i>Wallago</i> Bleeker, 1851				
81. <i>Wallago attu</i>	9,15,18,20	R	R	
F ₉ . Schilbeidae				

G ₃₄ . <i>Ailia</i> , Gray, 1831				
82. <i>Ailia coila</i>	6,7,12,15,19	All	P	
G ₃₅ . <i>Pseudeutropius</i> Bleeker, 1862				
83. <i>Pseudeutropius</i> <i>atherinoides</i>	7,9,10,12,15,18,20	All	P	
G ₃₅ . <i>Clupisoma</i> Swainson, 1839				
84. <i>Clupisoma garua</i>	5,6,8,10,12,15	S, W	F	
F ₁₀ . Sisoridae				
G ₃₆ . <i>Bagarius</i> Bleeker, 1853				
85. <i>Bagarius bagarius</i>	3,4,11,13,19	S	R	
G ₃₇ . <i>Gagata</i> Bleeker, 1858				
86. <i>Gagata cenia</i>	1,4,5,7,13,16,19	All	P	
87. <i>Gagata youssoufi</i>	18,19	S, W	F	
G ₃₈ . <i>Nangra</i> Day, 1877				
88. <i>Nangra nangra</i>	8-10,12-15,20	All	P	
89. <i>Nangra robusta</i>	12,14,16,18,20	S, W	P	
G ₃₉ . <i>Erethistoides</i> Hora, 1950				
90. <i>Erethistoides montana</i>	19,20	S	R	
G ₄₀ . <i>Hara</i> Blyth, 1860				
91. <i>Hara Hara</i>	11,13,17	S	R	

G ₄₁ . <i>Glyptothrix</i> Blyth, 1860				
92. <i>Glyptothrix telchitta</i>	6,9,19	S	R	
G ₄₂ . <i>Pseudecheneis</i> Blyth, 1860				
93. <i>Pseudecheneis sulcatus</i>	16,18,19	S	R	
F ₁₁ . Heteropneustidae				
G ₄₃ . <i>Heteropneustes</i> Muller, 1840				
94. <i>Heteropneustes fossilis</i>	4,6,12,17,19	S, W	F	
O ₆ . Athériniformes				
F ₁₂ . Belionidae				
G ₄₄ . <i>Hyporhamphus</i> Gill, 1859				
95. <i>Hyporhamphus limbatus</i>	17,19	R	R	
G ₄₅ . <i>Xenentodon</i> Regan, 1911				
96. <i>Xenentodon cancila</i>	4-7,10,11-16,20	All	P	
F ₁₃ . Cyprinodontidae				
G ₄₆ . <i>Aplocheilus</i> McClelland, 1839				
97. <i>Aplocheilus panchax</i>	5,7,12,16,18	S, W	F	
O ₇ . Gasterosteiformes				

F ₁₄ . Syngnathidae				
G ₄₇ . <i>Doryichthys</i> Kaup, 1853				
98. <i>Doryichthys deocata</i>	6,9,13,17	S, W	F	
O ₈ . Chaniformes				
F ₁₅ . Channidae				
G ₄₈ . <i>Channa</i> Scopoli, 1777				
99. <i>Channa marulius</i>	9,10,12-16,18	W	R	
100. <i>Channa orientalis</i>	15,16,19	W	R	Sp.100 <i>Channa gachua</i>
101. <i>Channa punctatus</i>	4,5,10,12-15,17	All	P	is a synonym of this
102. <i>Channa striatus</i>	13-16,20	A, W	R	species.
O ₉ . Synbranchiformes				
F ₁₆ . Synbranchidae				
G ₄₉ . <i>Monopterus</i> Lacepede, 1800				
103. <i>Monopterus cuchia</i>	1,3,8,10,19,20	S	R	
O ₁₀ . Perciformes				
F ₁₇ . Chandidae				
G ₅₀ . <i>Chanda</i> Hamilton, 1822				
104. <i>Chanda nama</i>	1,4,8,14,16,17	All	P	
105. <i>Chanda ranga</i>	6,8,10,14,18	All	P	
F ₁₈ . Nandidae				
G ₅₁ . <i>Nandus</i> Val: 1831				

106. <i>Nandus Nandus</i>	2,4,10,12-18	All	P	
F ₁₉ . Mugilidae				
G ₅₂ . <i>Sicamugil</i> Fowler, 1939				
107. <i>Sicamugil cascasi</i>	11-14,19,20	S, R, W	P	
G ₅₃ . <i>Rhinomugil</i> Gill, 1863				
108. <i>Rhinomugil corsula</i>	1-4,7,14,18,19	S, W	R	
F ₂₀ . Goobidae				
G ₅₄ . <i>Acentrogobius</i> Bleeker, 1874				
109. <i>Acentrogobius cyanamos</i>	3-6,10,16,17	S	R	
G ₅₅ . <i>Glossogobius</i> Gill, 1860				
110. <i>Glossogobius giuris</i>	1,2,4-9,11-16,17	All	P	
F ₂₁ . Anabantidae				
G ₅₆ . <i>Anabas</i> Cuvier, 1817				
111. <i>Anabas oligolepis</i>	14,16,20	S	R	
112. <i>Anabas testudineus</i>	3,5,7,10,12,16-20	S, R, W	P	
F ₂₂ . Belontiidae				
G ₅₇ . <i>Colisa</i> Cuvier, 1831				
113. <i>Colisa fasciata</i>	1,3-6,9,12-14,17,20	All	P	
114. <i>Colisa labiosus</i>	12,15,19,20	S	R	
115. <i>Colisa lalius</i>	6,16,19	S, A	F	
O ₁₁ . Mastacemboiiformes				
F ₂₃ . Mastacembelidae				



<p>G₅₈. <i>Macrogathus</i> Lacepede, 1800</p> <p>116. <i>Macrogathus</i> <i>aculeatus</i></p>	<p>12,18,19</p>	<p>S, A</p>	<p>F</p>	
<p>G₅₉. <i>Mastacembelus</i> Scopoli, 1777</p> <p>117. <i>Mastacembelus</i> <i>armatus</i></p> <p>118. <i>Mastacembelus</i> <i>pencalus</i></p> <p>119. <i>Mastacembelus</i> <i>unicolar</i></p>	<p>1,4,5-7,15,18,19</p> <p>1,3,4,9,14,16,20</p> <p>10,12,14,17</p>	<p>S, A</p> <p>S, W</p> <p>S</p>	<p>F</p> <p>P</p> <p>R</p>	
<p>O₁₂. Tetraodoitiformes F₂₄. Tetraodontidae</p> <p>G₆₀. <i>Tetraodon</i> Linnaeus, 1758</p> <p>120. <i>Tetraodon cutcutia</i></p>	<p>2,4,5,9,14,16,19,20</p>	<p>All</p>	<p>P</p>	

Species met with during the course of investigation are presented in Table 5 with pertinent occurrence data.

The present investigation discloses the diversity of the fish faunas of the riversystem of greater Dinajpur and Rangpur district. The study represents 120 species of the fish belonging to 12 orders, 24 families and 60 genera.

Of the 120 species, 70 species found from riversystem of greater Dinajpur district (Panchagarh, Thakurgaon and Dinajpur district) and 120 species found from river stem of greater Dinajpur district riversystem of greater Rangpur district (Lalmonirhat, Kurigram, Nilphamari and Rangpur district). Most of the species found in this investigation have commercial importance and taxonomic interest of the economically important group of species, most outstanding ones are Barbs, Carps, Hill Trouts, River shads, Perches, Minnows and Bagrid and Siluroid Catfishes of the taxonomically significant groups are Loaches and Sisroid catfishes.

Outstanding among the fishes found are the Cyprinidae, which are the most numerous as regards genera and species and most abundant as regards individuals. The family includes carps (Rui, Catla, Mrigal, Calibaus etc), the barbs (Punti etc) and a large variety of minnows (Darkina, Chela, Mola etc), a consirable number of genus *puntius*, *changunius*, *mystus* etc was found. A few numbers of genera *Labeo*, *Catla*, *Psilorhynchus* etc was found, but the number of genera *Erethistoids*, *Hara*, *Chana* was rare. This may be due to bottom topography, food availability, over fishing and fishing of under sized fishes.

Samples varied in number, by size and by kind at different stations, in different seasons and with different gears. Maximum catch resulted in summer and minimum in the rainy season Majority of fish occurred at STA-20 and fewest at STA-8 which might be due to basin topography, food availability and fishing intensity. Hill Trouts, Loaches, and catfishes and minor carps most dominants. This may party be due to the ecology and bottom topography of the river compounded by over fishing and undersized fishes.

Species met during investigation, varied with number and diversification at different sampling stations. Some species were found almost all rivers in greater Dinajpur Rangpur districts where some species found rarely at different sampling stations. Species which were found more in numbers in the river systems of greater Rangpur district than in river systems of greater Dinajpur district. Some species were found at both the river systems of greater Dinajpur and Rangpur districts but they differ in local name at

different sampling places in this region. Number and diversification of species at different sampling stations cited below in table 6.

Table 6: Number of species found during investigation at different sampling stations.

Station No.	Number of species
STA-1	27
STA-2	24
STA-3	25
STA-4	39
STA-5	29
STA-6	38
STA-7	27
STA-8	20
STA-9	34
STA-10	25
STA-11	39
STA-12	50
STA-13	49
STA-14	53
STA-15	46
STA-16	52
STA-17	42
STA-18	46
STA-19	48
STA-20	55

It has been observed from the investigation that rivers of greater Rangpur district were richer with varieties of fish faunas than the river systems of greater Dinajpur district. Minimum numbers of species at rivers of greater Rangpur district were found 39, which was maximum number for river systems of greater Dinajpur district. Out of 120 species, species of genus *pisodonophis*, *hilsa*, *notopterus*, *raiamas*, *oreichthys*, *tor*, *botia*, *rita*, *chandramara*, *aorichthys*, *erethistoides*, *hara*, *pseudecheneis*, *hyporhamphus*, *sicamugil* were found only in the river system of greater Rangpur district.

From investigation, fishing the species of *Gudusia Chapra*, *Chagunius Chagunio*, *Cirrhinus reba*, *Ailia coila*, *Pseudodentropis atherinoides*, *Gagata cenia*, *Nangra nangra*, *Xenentodon cancila*, *Channa punctatus*, *Chanda nama*, *Chanda ranga*, *Nandus nandus*, *Glossogobius guiris*, *Colisa fasciata*, *Tetradon cutitia* found large amount and in all season. The species of families Ophichthidae, Notopteridae, Cyprinidae, Cobitidae, Bagridae, Sisoridae, Heteropneustidae, Belontiidae, Cyprinodontidae, Syngnathidae, Gobiidae, Mastacembelidae found few or rare.

Of the numerous species of clupeoid fishes found in freshwaters, estuaries and in the Bay of Bengal of the fishes of the Sub family Alosinae is of great significance in the country, particularly for the tremendous economic importance attached to the so called river shad, *Hilsa Ilisha*. This species rarely found in the river of Brahmaputra and Dharla, Which collected from fishermen's catch, caught with Chotkjal. A considerable amount of *Gudusia chapra* of the same family found almost all rivers n greater Dinajpur and Rangpur District.

Most of the perciform fishes are predominantly marine but a vast majority of them enter estuaries and rivers of Bangladesh. During the monsoon many of them would ascend upland rivers where local fisherman captures them. Some of the perciform fishes found especially in the Dharla and Brahmaputra river. *Hyporhamphus limbatus* is the species, which has been rarely found only one station (STA- 19) of Brahmaputra river. Estuarine fishes under the family Mugilidae named a *Rhinomugil corsula* have been rarely in Karotoa and Brahmaputra.

A few species of *Oreochthys cosuatis* under family cyprinidae has been found especially in Dharla river besides, members of many perciform fishes are largely restricted to fresh water habitat. Notable among them are Koi, Khalisha, Meni, Napit Koi and Chanda etc.

The Gobies (Bele, Chewa, and Chiring) are mostly small, carnivorous and bottom dwelling living along the shores of estuaries and river mouths. The commonest of all found in the riversystem was *Glossogobius guiris*.

A found few specimens of species of *Chanda marulius* under family channidae were found, but the number of specimen of *Channa striata*, *Channa orientatus* were found at rare.

The present investigation brings to light more clearly that the numbers of species in the riversystem in greater Dinajpur and Rangpur district has been declined for last few years. Many species of great

economic important and taxonomic interest e.g. *Notopterus chitala*, *Ompok pabda*, *Labeo nandina* etc is extremely rare or are critically endangered. This might be due to environmental degradation, overfishing, pollution, the extinction of water for agricultural irrigation, flood control measure, siltation.

Haque (1986) conducted an investigation on the availability of fish faunas in Dharla river at Kurigram and found out 164 species. But the present investigation shows that there are about 120 species at the same river system. The result shows a marked variation of species diversity. This declination of species availability may be due to over-fishing, habitat degradation by natural calamities and human activities.

The present investigation records 45 species in plenty, 38 species in few amounts and 37 species in rare number. It also records 70 species from greater Dinajpur district and 120 species from greater Rangpur district.

The northern parts of Bangladesh especially the river system of greater Dinajpur and Rangpur districts are not rich with fisheries resources compare with other part of the country. Many natural and manmade causes are responsible for low rate of capture fisheries in this region. Illegal operation of fishing, improper management, huge amount of siltation etc. are reasons for reducing the number and diversification of fishes in the rivers of greater Dinajpur and Rangpur districts. Some suggestions are given below:

- ❖ Most people in this region depend mainly on fish for their animal protein. So amount of capture fisheries reducing in this region day by day for over fishing. So the practice of over fishing should be stopped immediately.
- ❖ Though the amount of capture fish is less and people have great demand of fish, so most fishermen are involved in undersized fishing. Undersized fishing should be stopped.
- ❖ Fishing of brood fish should be stopped.
- ❖ Fishing during breeding and spawning season should be strictly prohibited.
- ❖ Fishing with suitable and proper fishing gear and craft may result of better production of capture fisheries in the rivers of greater Dinajpur and Rangpur districts.
- ❖ Govt. should take initiatives for stocking of fry at depth portion of rivers where water stay for all the year round.
- ❖ Prevention measures should be taken to protect river from siltation.
- ❖ Laws, regulations should be maintained properly.
- ❖ Awareness should develop among all level people about fisheries conservation through Govt. and NGOs.

Chapter Five

Conclusion

CONCLUSION

The present investigation reveals diversity of the ichthyopopulation of the river system of greater Dinajpur and Rangpur districts with a record of total 120 species belonging to 60 genera, 24 families and 12 orders. It records 70 species from the river system of greater Dinajpur district and 120 species from river system of greater Rangpur districts. The main river in this region i. e. Purnabhaba, Karotoa, Atrai, Tista, Dharla and Brahmaputra etc provided about 120 species fish fauna. But a good number of species has been extinct from the environment for natural or man-made reasons. Many locally popular species, which has great economic importance, has been lost or are in critically endangered stage. The population in this region mostly depends on capture fisheries for their animal protein. Since long areas of rivers spreaded in this region, but most of them get fully or seasonally without water for long time of the year due to effect of Farakka barrage, over fishing, extraction of water for irrigation, flood control measures and siltation.

Salient features of the investigation are summed up below:

1. Total number of species recorded: 120
2. Total number of genera recorded: 60
3. Total number of families recorded: 24
4. Total number of orders recorded: 12
5. Species found in the river system of greater Dinajpur district: 70
6. Species found in the river system of greater Rangpur district: 120
7. Extinct species: 35
8. Economically important group of fishes are barbs, carps, hill trouts, river shads, perches, minnows. Bagrid and Siluroid catfishes.
9. Fishes of taxonomic interest: Loaches and Sisoroid catfishes.



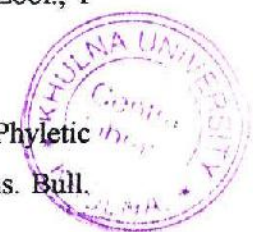
The present investigation, we think might not have been able to explore all the fish taxa of the rivers. Many isolated forms may be recorded in future. It did not even find all the species reported by previous workers (Hamilton, 1822; Day, *et al.*, 1977; Rahman, 1984; Haque, 1986). Extensive sampling with a variety of gears all the year round and introduction of serological study will result more and more species and discovery of new ones. However, it is hoped that the present work may serve as a stimulus for further study which will throw much needed light on the ecology of the known species and describe the ones that are as yet unknown. Government should take initiatives immediately to protect or improve the number of popular, tasty, great valued fish species in the natural river systems of greater Dinajpur and Rangpur districts.

Chapter Six

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