

Geographical position and aquatic resources of the river Mahananda

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Abstract: The present study was carried out on the Mahananda river. The Mahananda river is one of the major river of the Northern region of Bangladesh. The fisheries resources of Nawabganj are quite good. A good amount of the fishes are supplied from the Mahananda river to Nawabganj town and its adjacent area. During the study period, a total no. of 111 species of fishes was recorded. From the study area 15 species of fisheries items were recorded. Various types of aquatic vegetation found in the study period, which included algae, floating hydrophytes, submerged hydrophytes, emergent hydrophytes, spreading plants. The major groups of phytoplankton and zooplankton were also recorded. The socio-economic status of the fishermen is very poor. They have lack of hygiene knowledge. They are socially ignored and exploited by power groups. Fishermen community in the study area is mostly poor.

Key words: Mahananda, aquatic resources, socio-economic status.

Introduction

Bangladesh is a land of rivers. Around 230 rivers flow in the country including 53 international rivers. Most of the big cities and settlements developed near those water bodies (BBS 2005). In the modern age river plays a significant role in various economic activities. Rivers are vital and vulnerable freshwater systems that are critical for the sustenance of all life. The river also plays a vital role on the aquatic ecosystem as well as conserves biodiversity which is important for environmental balance. Bangladesh is very rich in freshwater fish production. Bangladesh ranks as the world leader accounting for a production of 4076 kg/sq. km against 411 kg/sq. km in China and 391 kg/sq km. in India (World Bank, 1989). Bangladesh ranks third (After China and India) among the world largest in land fish producing countries. People of Bangladesh consume about 75% of total calorie in talkie from carbohydrate due to lack of purchasing capacity and partly due to lack of knowledge of nutrition especially of protein contents of the fish first demonstrated by Lehman (1953). Fish is the most important and primary source of animal protein in human diet throughout the whole Indo-Pak-Bangladesh-Subcontinent and other Southeast Asia and African countries. It is the second cheap staple food after rice. The abundance of fisheries resources depends or is influenced on by different aquatic vegetation. They play a vital role in the aquatic habitat for fish and fisheries items. The successful fishery development of Bangladesh depends upon adequate consideration of biological, technical and economic information along with socio-economic and cultural information for making an overall decision. Pollnac (1981) reported that the relationship between technology and social organization in small scale fishing communities is regarded as providing the essential content for the institutional system, where equipments and new technology will help the poor. The present work mainly deals with a fisheries resource, aquatic vegetation, plankton, socio-economic condition of fishermen. The present research may be helpful to understand about aquatic vegetation, plankton of the river Mahananda.

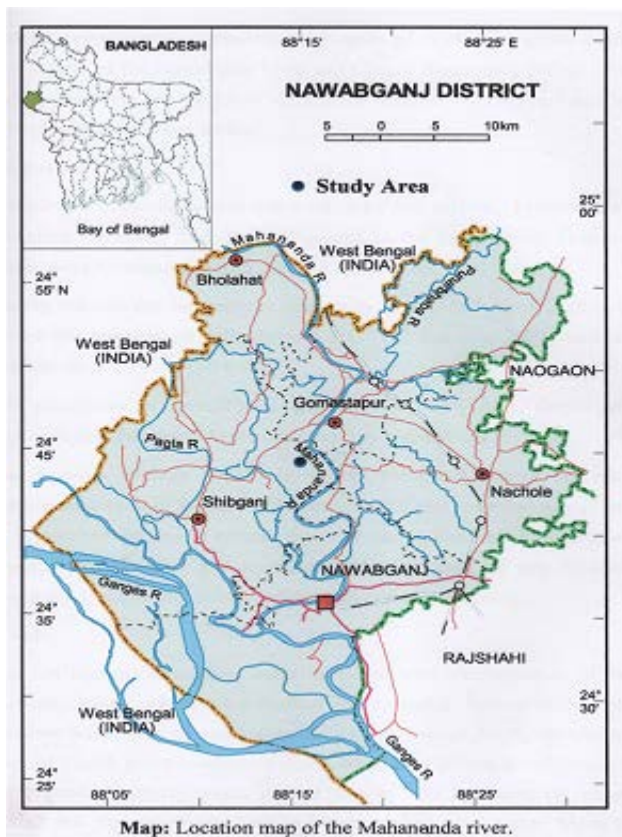
Materials and Methods

The data concerning the present study were collected through the survey method from fishermen and different fish traders. Interview schedules were used to collect various information systematic samples were taken during the period from April 2009 to March 2010. A total of 150

interviews were made with the fishermen and people associated with the fishing of the river Mahananda. The specimens thus collected during the investigation were identified primarily in the field. There which appeared difficult to be identified were marked and were brought to the laboratory of Department of Zoology, University of Rajshahi. The various information of the river Mahananda and data on the climate were collected from Water Development Board and metrological Department, Rajshahi respectively. Frequently water samples were collected for study of plankton and aquatic plants were also collected. The collected plankton was preserved in 4% formalin and was examined in the laboratory under binocular microscope ($\times 80$) as soon as possible. The identification of both zooplankton and phytoplankton was done by following key given by Whipple (1963), Needham and Needham (1962), Islam and Begum (1970), Islam and Aziz (1977). The different types of aquatic plants were collected from both sides of the river Mahananda at Nawabganj area and taken to the laboratory for identification. The study of socio-economic status of the fishermen of the study 45 fishermen were taken under interview. Fishermen have been classified by research into three types as- (i) professional (full time), (ii) seasonal (part time) and (iii) subsistence fishermen.

Results and Discussion

The geographical position of the Chapai Nawabganj district lies between the $24^{\circ}43'30''$ to $24^{\circ}25'00''$ East-west latitude and $88^{\circ}11'15''$ to $88^{\circ}25'40''$ in the North-South longitude (Fig. 1). Excepting the Mahananda the Ganges the Padma, the Pagla and the Punarbhaba rivers of Chapai Nawabganj district are of little hydrographic importance. The Mahananda, a river of fair size during rainy season, joins the Ganges just west of Godagari town. About sixteen miles further down stream, the river washes the southern tip of Rajshahi town. The Mahananda, another important river in the Chapai Nawabganj district, is a major tributary of the Padma. The river Mahananda flows close to Chapai Nawabganj district. However the sampling areas for the present investigation lie close between $24^{\circ}43'30''$ to $27^{\circ}33'15''$ East-West latitude and $88^{\circ}14'35''$ to $88^{\circ}18'30''$ North-South longitude, respectively. During the period of investigation the lowest water level recorded was 12.32 meter in April and the highest water level recorded was 19.50 meter in September (Table 1).



The distribution of monthly average rainfall has been shown in Table 3 the annual cycle of rainfall in the study area shows that it is seasonal. Rainfall is very light or about absent from December to January and increase somewhat in March to April. The highest average rainfall was occurred in September.

Fisheries resource:

During the study period, a total of 111 different species of fishes, 15 species of fisheries items under the classes Crustacea (Arthropoda), Gastropoda (Mollusca), Amphibia, Reptilia (Chordata), were identified. The local name of fishes are Chela, Banspata, Darka, Moa, Mola, Sarputi, Tit-punti, Rui, Calbaus, Bata, Mrigel, Katla,

Common Carp, Mirror Carp, Silver Carp, Grass Carp, Bau-mach, Gutum, Pulya, Boal, Kani-pabda, Pobda, Pangus, Ghaura, Jial, Magur, Air, Tengra, Rita, Kakila, Ural, Taki, Shol, Gajar, Kuchia, Chanda, Kol, Phopha, Veda, Baila, Bain, Gunchi, Potka etc. Fifteen species of fisheries item was found. They are Prawn, Golda chingri, Gura chingri, Crab, Snail, Mussel, Bull frog, Frog, Tortosie, Kachim, Dura, Water snake etc (Table 2).

Aquatic resource:

In the study area of the river Mahananda there are many types of aquatic resources besides the fisheries resources including aquatic vegetation. Algae are very need to fish culture because fish use algae as food. Different types of algae are found in study area of the Mahananda river. Different hydrophyte also found in the study area (Table 4). The plankton in the heterogenous assemblage of free floating micro-organisms with feable integic power of locomotion but most often depending upon the mercy of watercurrents. Plankton is of two types; one is Phytoplankton and other one zooplankton (Table 5). Many other small animals were present in small quantities, e.g. Fish Eggs, Fry etc. Fisheries resources are largely influenced by aquatic vegetation. These vegetation are responsible for providing of food, shelter, protection for fish and fisheries items. The vegetation includes different algae and a group of plants which are submerged plants, emergent plants, floating plants and spreading plants. The algae are branched, filamentous, single celled or colonial. *Spirogyra*, *Cladophora*, *Oedogonium*, *Euglena*, *Volvox* etc are the example of algae where as *Najas sp*, *Hydrilla sp*, *Nymphaea sp*, *Lemna sp*, *Nuphar sp*, etc. are the aquatic plants. These aquatic plants are used in many purposes. Water hyacinth is used as food for cattle which sometimes moderated to compost, ash and use in agriculture. Duck weed is favorite food for duck. *Hingtsha repens* has a medical use. Seed and flower of water lily used as food. Bind weed used as vegetable and also has medicinal value. The lentic water constrains plankton which are the main sources of food for the aquatic animals such as fish.

Table 1. Monthly average fluctuation of water level (m) in the study area of the Mahananda river

Month	Water level (meter)		Average water level (meter)
	Highest	Lowest	
April	12.61	12.32	12.46
May	13.11	12.62	12.86
June	15.01	13.18	14.09
July	18.13	14.75	16.44
August	19.49	17.46	18.47
September	19.50	18.08	18.79
October	19.02	14.90	16.96
November	14.87	13.65	14.26
December	13.63	13.22	13.42
January	13.22	13.02	13.12
February	13.01	12.84	12.92
March	13.89	12.37	13.13

Table 2. List of fishes observed in the river Mohananda at Nawabganj area

Sl.	Scientific name	Local name	Length (cm)	Seasonal availability	Breeding seasons	Abundance
1.	<i>Tenualosa ilisha</i>	Ilisha, Hilsa	23-30	R	Jan-March	V.R
2.	<i>Ilsha motius (Hamilton)</i>	Khorchona	-	-	-	F
3.	<i>Gadusia chapra</i>	Chaipla	4-15	A	-	V.C
4.	<i>Gadusia variegata</i>	Khari	2-7	R.A	-	C
5.	<i>Gonialosa manmima</i>	Chapila	3-11	R	April-July	C
6.	<i>Corica soborna</i>	Gura Much	2.5-5	All	Not known	C
7.	<i>Notopterus Notopterus</i>	Phali	14-30	All	May-July	V.C
8.	<i>Notoperus chitala</i>	Chital	20-50	All	April-July	V.C
9.	<i>Setipinna phasa</i>	Phasa	10-18	R	Feb-March	V.R
10.	<i>Setipinna taty</i>	Feoah	8-15	R	-	R
11.	<i>Chela atpar</i>	Chela	5-20	A	-	V.C
12.	<i>Chela laubuca</i>	Dankens	5-15	R.A	-	F
13.	<i>Oxygaster bacaila</i>	Katari	6-15	All	April-Aug	V.C
14.	<i>Oxygaster phulo</i>	Chellya	4-12	All	May-Oct	V.C
15.	<i>Oxygaster gora</i>	Gora-chela	5-21	R	-	R
16.	<i>Rasbora elanga</i>	Sephaila	5-10	All	Apr-July	C
17.	<i>Rasbora daniconius</i>	Daria	3-8	All	Apr-July	V.C
18.	<i>Rasbora rasbora</i>	Darkina	3-5	R	-	F
19.	<i>Danio devario</i>	Banspata	4-9	All	Apr-July	C
20.	<i>Danio shunensis</i>	Debari	4-5	R	-	R
21.	<i>Danio rerio</i>	Darika	2-3	R	-	F
22.	<i>Rohtee cotio (Hamilton)</i>	Pithali	3-5	R	Apr-July	I
23.	<i>Esomus danricus</i>	Mol	20-65	All	Aug-Oct	V.C
24.	<i>Amblypharyngodon microlepis</i>	Moa	3-8	All	Apr-Nov	V.C
25.	<i>Amblypharyngodon microlepis</i>	Kagchi	2-5	All	-	V.C
26.	<i>Puntius sarana</i>	Sar puti	8-15	R	Apr-July	R
27.	<i>Puntius chola</i>	Chola puti	4-9	All	Apr-July	V.C
28.	<i>Puntius stigma</i>	Dento-puti	5-8	All	Apr-July	V.C
29.	<i>Puntius conchoniuis</i>	Moina punti	4-6	A	Apr-July	V.C
30.	<i>Puntius ticto</i>	Tit-punti	3-6	All	Apr-July	V.C
31.	<i>Punrius phutunio</i>	Phutani punti	2-3	A	Apr-July	R
32.	<i>Puntius sophore (Hamilton)</i>	Jati punti	3.5-6	All	Apr-July	C
33.	<i>Puntius gelius</i>	Khudir punti	3-4	A	-	R
34.	<i>Aspidoparia jaya</i>	Jaya	3-8.5	All	Dec-Feb	V.C
35.	<i>Aspidoparia morar</i>	Piali	-	-	-	-
36.	<i>Labeo rohita</i>	Rui	17-80	All	April-July	V.C
37.	<i>Labeo calbasu</i>	Calbaus	12-40	All	April-July	V.C
38.	<i>Labeo nandina</i>	Sada baas	11-22	R	April-July	C
39.	<i>Labeo bata</i>	Bata	9-17	A	-	R
40.	<i>Labeo pangusia</i>	Baitka	-	-	-	-
41.	<i>Catla catla</i>	Katol	14-55	All	April-July	V.C
42.	<i>Cirrhinus mrigala</i>	Mrigel	13-26	All	May-July	C
43.	<i>Cirrhinus reba</i>	Raikhor bata	5-11	All	April-July	V.C
44.	<i>Cyprinus Carpio (Lineaus)</i>	Common carp	12-30	R	-	R
45.	<i>Cyprinus Carpio</i>	Mirror carp	12-30	R	-	R
46.	<i>Hypophthalmichthys molitrix</i>	Silver carp	12-24	R	-	F
47.	<i>Ctenopharyngodon idellus</i>	Grass carp	12-33	R	-	F
48.	<i>Crossocheilus latius</i>	Calabata	-	-	-	-
49.	<i>Botia dario</i>	Bau-mach	5-10	All	-	V.C
50.	<i>Batia dayi (Hora)</i>	Rani mach	4-9	All	-	V.C
51.	<i>Lepidocephalus guntea</i>	Gutum	4-8	All	-	V.C
52.	<i>Lepidocephalus irrorata</i>	Poi	3-7	A	-	C
53.	<i>Lepidocephalus berdmorei</i>	Pulya	3-7	A	-	V.C
54.	<i>Nemachilus botia</i>	Bati-chata	-	-	-	-
55.	<i>Wallago attu</i>	Boal	25-90	All	May-Aug	V.C
56.	<i>Ompok pabda</i>	Pabda	9-18	All	-	C

S = Summer, R = Rainy, A = Autumn, W = Winter, All = All the season, VR = Very rare, R = Rare, F = Few, C = Common, VC = Very common

Table 3. Monthly average rainfall (mm) records of the study area

Month	Monthly average rainfall (mm)/ day	Monthly average rainfall (day)
April	9.2	4
May	12.74	15
June	15.75	12
July	5.61	23
August	16.57	15
September	17	17
October	7.28	5
November	3.67	3
December	0.00	Nil
January	0.00	Nil
February	6.4	4
March	11.7	4

Table 4. List of hydrophytes prevailing in the study area of Mahananda River along with their ecological niche during study period

Sl. No.	Scientific name of plants	Floating hydrophyte	Submerged hydrophyte	Rooted emergent hydrophyte	Mesophytic plants
1	<i>Utricularia sp.</i>	√			
2	<i>Utricularia stellaris</i>	√			
3	<i>Alternanthera philoxeroider</i>				√
4	<i>Nymphaea stellata wild</i>		√		
5	<i>Ipomoea aquatica (Forsk)</i>				√
6	<i>Commelina sp.</i>				√
7	<i>Ludwingia repens</i>	√			
8	<i>Eichornia crassipes</i>	√			
9	<i>Pistia stratiotes lim</i>	√			
10	<i>Enhydra fluctuans</i>				√
11	<i>Lemna perpusilla torry</i>	√			
12	<i>Spirodella polyrhiza</i>	√			
13	<i>Wolffia arrhiza</i>	√			
14	<i>Hydrilla sp.</i>	√	√		
15	<i>Najas sp.</i>	√			
16	<i>Leersia Hexandra</i>				√
17	<i>Nupar sp.</i>		√		
18	<i>Potamogeton Crisps L.</i>		√		
19	<i>Schoeouoplectus articulatus</i>			√	
20	<i>Aeschynomene indica L.</i>			√	
21	<i>Aponoget sp.</i>		√		

Table 5. A checklist of plankton found in the study area of the river Mahananda

Sl.	Type	Major group	Genera
1	Phytoplankton	Myxophyceae (Cyanophyceae)	<i>Microcystic, Anabaena, Nostoc, Aphanocapsa, Crysocapsa</i>
		Chlorophyceae	<i>Volvox, Ulothrix, Scenedesums, Zygnema, Ankistrodesmus, Protococcus, Conserium, Ocdogonium</i>
		Bacillariophyceae	<i>Melosira, Navicula, Synedra, Nitzschia, Diatoma, Cyclotella, Frustulia</i>
		Dinophyceae	<i>Ceratioum, Perdinium</i>
		Xanthophyceae	<i>Thibonema</i>
		Euglenophyceae	<i>Phacus, Trachelomorur, Euglena</i>
2	Zooplankton	Desmidiaceae	<i>Closterium, Cosarium</i>
		Rotifera	<i>Brachionus, Polythra, Keratella, Hexarthra, Filinia, Asplonchna, Trichocera, Rotaria, Notholca, Philodina</i>
		Cladocerans	<i>Bosmina, Daphnia, Latonopis, Ceriodaphnia, Latodora, Simocephalus, Eurycerus</i>
		Copepods	<i>Cyclops, Diaptomus</i>
		Protozoa	The proto zooms were present in small quantities and not identified
	Insects	<i>Notanecta, Chironomid larvae, Clocnymorph, Bacles nymph, Larva of Culex, Nepa cinerea</i>	

Phytoplankton organisms, collected from the mahananda river at Nawabganj area, belonged to major groups of Myxophyceae, Chlorophyceae, Bacillariophyceae, Dinophyceae, Xanthophyceae, Euglenophyceae and Desmidiaceae. The record zooplankton organisms were Rotifera, Cladocerans, Copepods, insects, Larvae of insects, protozoans and other small animals. Hygiene problem is increasing day by day for the poor fishermen and who live far away from the health center. The common diseases of working fishermen are bronchitis, fever, fungal and bacterial disease and ring worm. Besides these, the poor fishermen are always susceptible to and exploited by power groups. They are ignored socially and economically and the possessors of broken health.

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