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Flood Action Plan

North West Regional Study (FAP-2)

DRAFT FINAL REPORT

VOLUME 15

HEALTH, NAVIGATION AND CULTURAL HERITAGE

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PART 1
PUBLIC HEALTH

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GLOSSARY

Gano	:	People
Kabiraj	:	Traditional Herbal Practitioner
Kendra	:	Centre
Mahila	:	Women
Niketan	:	Home
Pangu	:	Paralysed
Samity	:	Association
Sahajogi	:	Collaborative
Shangstha	:	Organisation
Shishu	:	Children
Somobay	:	Co-operative
Unnayan	:	Development

ABBREVIATIONS

BAM	:	Brothers for All Man
BRAC	:	Bangladesh Rural Advancement Committee
BWHC	:	Bangladesh Women Health Coalition
CCDB	:	Christian Commission for Development in Bangladesh
CWCD	:	Centre for Woman and Child Development
DPHE	:	Department of Public Health Engineering
EPI	:	Expanded Programme for Immunization
GMSS	:	Gurudhaspur Mahila Somobay Samity
GUK	:	Gano Unnayan Kendra
KDAB	:	Korean Development Agency in Bangladesh
LRTI	:	Lower Respiratory Track Infection
LWF	:	Lutheran World Federation
MCH	:	Mother and Child Health
MOHFP	:	Ministry of Health and Family Planning
MUAC	:	Mid-Upper Arm Circumference
NWR	:	North West Region
ORS	:	Oral Rehydration Solution
PKLD	:	Post Kala-Azar Dermal Leishmaniasis
PSN	:	Pangu Shishu Niketan
RAA	:	Rapid Area Appraisal
RDRS	:	Rangpur Dinajpur Rural Services
SCF	:	Save The Children Fund (UK)
TDH	:	Teree Des Homes (Switzerland)
USS	:	Unnayan Sahajogi Shangstha
VAC	:	Vitamin A Capsule
VL	:	Visceral Leishmaniasis
WIF	:	Worldview International Foundation
WPT	:	Water Purifying Tablet

CHAPTER 1

INTRODUCTION AND METHODOLOGY

1.1 Study Objectives

This study was specially commisioned for FAP 2 and was undertaken by Md. Azam and Advocate Afsana Wahab. The objectives of this study were to:

1. Assess the existing public health and nutritional status of the population in the NWR, in general, and of the people living within and outside the poldered areas in particular.

2. Assess, the past and present conditions of the medicinal flora used in the area.

3. Identify and prioritize the environmental elements which might be improved or compromised by changes in the hydrology of the area.

The study was carried out in advance of any knowledge of the details of any specific engineering proposals as finally detailed in the planning conclusions for the Gaibandha Improvement Project or for the North West Region (NWR). It therefore only provides outline guidance on certain existing health conditions which should be considered in the final impact analysis.

1.2 Study Area

Stretching from Lalmonirhat in the North to Santhia in the South, a Rapid Area Appraisal (RAA) was undertaken in the regions situated along the Western banks of the rivers Jumuna/Brahmaputra and Northern banks of the Padma. Actual field surveys were carried out in the following four sites over a period of 4 weeks (see **Figure 1 - Map**).

1. Foliarghop (Embankment dwellers along the BRE)
   Gidari Union
   Gaibandha Sadar Upazila

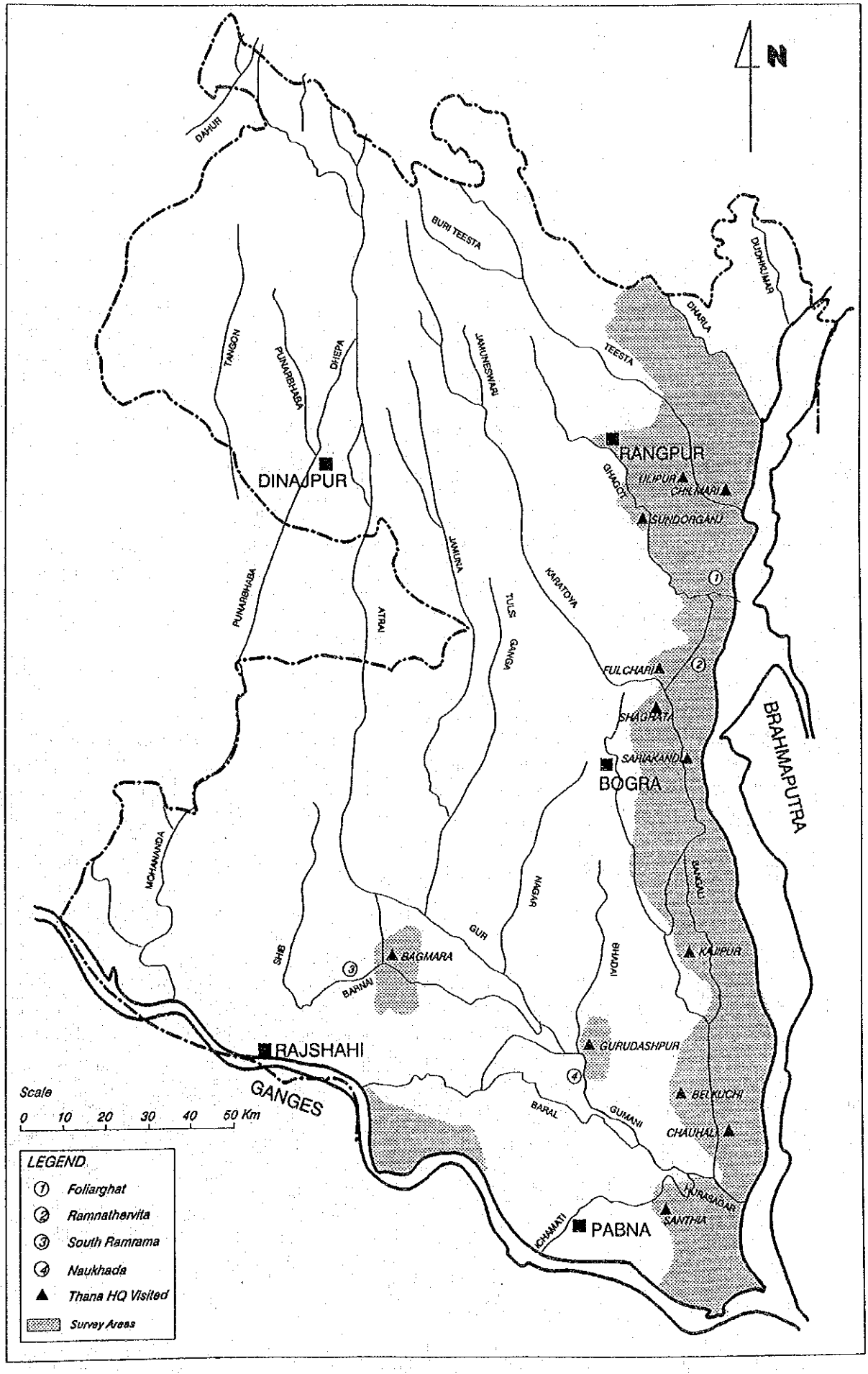
2. Ramnathervita (Inside the polder area of the Sonali embankment)
   Badiakhali Union
   Gaibandha Sadar Upazila

3. Naukhada (Outside the polder A, village on the river bank)
   Taras Union
   Taras Upazila

4. Ramrama
   (Inside the embankment of polder D)
   Goaleandi Union
   Bagmara Upazila

Figure 1

HEALTH SURVEY LOCATIONS



The population in the Foliarghop are mainly mobile, having come there during the floods or immediately before, while the rest are more established.

1.3 Overall Study Approach

The major focus of the study was on taking an account of the public health and nutritional problems of the areas which have been affected, both positively and adversely, by the change in hydrology or habitat. To establish this, present and retrospective epidemiological data, i.e. case mortality, disease prevalence and the seasonal morbidity pattern were studied. A comparison between the exposed and the poldered areas of the region was made. Attempts were made to confirm its probable direct and indirect causes.

In addition to the above, the changing roles of natural and cultural flora and fauna in medicinal and nutritional survival strategies was also examined. For this purpose an analysis of the use of herbal health practice and its attributes was undertaken.

To recommend mitigating proposals the study reviewed current project options and the Government's and the NGO sector's flood preparedness public health measures.

1.4 Study Methods and Sampling

The study followed both the quantitative and qualitative methods. Data collected thus were compared and weighed for a balance. The methods used were document review, field observations, community survey and interviews of health service providers from the private, public and NGO sectors.

1.4.1 Document Review

The study commenced with an examination of the available secondary data on the public health and nutritional problems of the region in general, and the Gaibandha area, in particular . These were collected from the local, regional and national head quarters. To establish a comprehensive and compatible pattern, efforts were made to critically, analyze the available statistics. The documents mentioned in the bibliography were reviewed for this purpose which is contained in the main EnvironmentalImpact Assessment Volume.

1.4.2 Field Observation

For a general understanding of the nature of the people's lives and the surrounding habitat/hydrology, the survey team visited all the riverine Upazilas of the districts of Gaibandha, Kurigram, Bogra, Sirajgang and Pabna and some selected Upazilas of Nator and Rajshahi Districts. Emphasis was given to visits embankments, areas within the polders, chars/beel areas and the areas within the meandering of the river/canals.

In the Gaibandha area two large, isolated chars, one in Kamarjani and another in Erendabari Union were visited for general observation and in depth discussions with the key community informants there.

1.4.3 Community Surveys

Community surveys were carried out in four sites of the region, two in the Gaibandha project area and two in the Rajshahi, Chalan Beel area for primary data collection. These included a household survey, an under-five child nutrition survey and focus group discussions.

a. Purpose:

The purpose of the community surveys were to determine the prevalence of some selected diseases, nature of public health problems, present herbal health practice, and the current nutritional status of children.

b. Sampling Method:

The selection method for the study sites was purposive: one exposed and one within the polder, from each study area. This was in keeping with other FAP- 2 survey sites. 50-53 households were selected from each survey site, by the systematic method, using a sampling frame of three and five. A total of 208 households were surveyed. This included overall 27.3% households of the four sites and between 20% - 30% from each area.

For the nutrition survey all children under five years were considered as the study population. Anthropometric measurements were taken for 436 children. The response rates were between 75% - 86%.

c. Study Instruments:

i. Household survey questionnaire

A questionnaire with both closed and open ended questions were used for data collection during household survey. The mother in the family, in their absence the father or an adult woman member, were interviewed.

ii. Nutritional measurement instruments

Nutritional anthropometric measurements were taken for assessing the nutritional status of the children under five years. Specially designed field survey instruments were used for this purpose. A local event calendar, for the past five years, was constructed to check, as accurately as possible, the stated ages of the children. Weights were taken using a CMS (Salter) spring scale read to the nearest 0.1Kg with the child sitting in a large plastic bowl. The scale was standardized initially and at the start of each session. Heights were taken using a purpose made vertical measuring wood stick with base incorporated (port of a QUAC stick) read to the nearest 0.5 cm. Length measurements were taken using a baby board for children who could not stand without support. Mid-Upper Arm circumference (MUAC) measurements were taken using a non elastic tape measure read to the nearest 0.1 cm, applied to the mid point of the left arm, with the arm held relaxed at the side.

iii. Focus group discussion

For the community, problem identification and collection of historical information on the role of natural and cultural flora and fauna, four focus group discussions in each survey site were held with village elders, school teachers, health practitioners and traditional herbal healers. Conversation logs and field diaries were used for recording the findings of the focus group discussions.

1.4.4 Interview of Health Service Providers

a. Government Health Services

The Upazila health complexes of Gaibandha, Sunderganj, Fulchari, Shaghata, Ulipur, Chilamari, Sariakandi, Kajipur, Belkuchi, Santhia and Gurudaspur were visited and available MOHFW Upazila health managers were interviewed. Disease surveillance statistics were reviewed and the possible causes were identified. Experiences of the government's public health and nutrition interventions during floods, their adequacy and appropriateness were discussed. Health managers opinion on flood preparedness public health and nutrition needs were also sought.

b. NGO Health Services

Visits were made to leading international and local NGO projects. They included the projects of RDRS, TDH(S), BRAC, WIF, KDAB, USS, FATEMA, GUK, BWHC, SCF(UK), CCDB, GMSS, BAM and PSN. Information on the local public health problems and their experiences from tried NGO mitigation interventions were collected.

c. Private Practitioners

All available private health practitioners, both qualified and traditional herbal healers, were interviewed at the four survey sites. Village elders, who are not commercial practitioners but are volunteer advisers, were also included under this category. A total of 13 village doctors, 7 kabirajes (herbal medicine practitioners), 5 religious leaders, 8 teachers and 7 farmers were interviewed for this purpose.

1.5 Analysis Methods

The secondary data, available mostly in a disorganized form, required a systematic analysis for establishing a comprehensive and compatible pattern.

During the analysis attempts were made to check the existence of seasonal patterns in the disease prevalence. Comparisons of findings between the riverine and other administrative units of the area were made. Comparison was also made between exposed and poldered areas.

Primary data were entered into a computer and analyzed using the "Epi info" computer software package. Frequencies were counted and tables prepared.

CHAPTER 2

RESEARCH RESULTS FOR GAIBANDHA IMPROVEMENT PROJECT AREA

2.1 General Overview

With regard to public health and nutrition Gaibandha District presents one of the worst pictures in the North Western Region. Rates of malnutrition and prevalence of the common diseases are very high in the district, in general, and the riverine Upazilas in particular. The changes in hydrology and habitat and their procreated problems are the direct attributes of this condition. Some of the problems are as follows:-

2.2 Safe Drinking Water

Availability of safe drinking water is still a major problem in the chars of Gaibandha Sadar Upazila. For instance, chars in Kamarjani Union have one DPHE tube well for 141 people whereas, in Gobindaganj there is one tube well for 51 people. Then again, whatever tube wells exits they remain non functioning for a considerable period of time every year e.g.in Erendabari Union over 75% of the total tube wells are submerged every year during the floods.

Though statistics show installation on the records, many tube wells are not actually available at the sites. Those were lifted before erosion and were never re-installed. About 30% wells are broken or have their parts missing

2.3 Sanitation

The use of proper sanitary latrines in the Gaibandha District in general, is low. In the riverine areas, particularly in Sunderganj, Fulchuri and Shaghata, the figure is even lower. The table below shows the sale of sanitary latrines in the various Upazilas of the district.

Table 1 - Ratio of Population and Number of New Latrines

Upazila	Population	# Sold	Population:New latrines
Fulchari	139,546	738	189
Sunderganj	372,375	1,374	271
Shaghata	203,572	1,884	108
Sadullapur	245,671	2,123	115
Palasbari	206,886	3,191	64
Gobindaganj	176,646	2,522	70
Gaibandha	331,236	4,494	73

2.4 Prevalence of Common Diseases

The study findings show that certain diseases have a higher rate of occurrence in the riverine Upazilas of the Gaibandha project area and have a definite pattern associated with the flood period. Figure 2. shows the prevalence of diarrhoea in the Gaibandha District during the year 1991. There is an increasing trend in the incidence of diarrhoea beginning in the month of June. The trend continues throughout the months of July, August, September and October reaching its peak in November.

During 1987 and 1988 Cholera, in epidemic forms causing several deaths, were reported from two beel villages "Dhakoa" and " Majeder vita" under Shaghata Upazila, which is also an area with higher prevalence of Gardia. Figure 3. shows similar tends in the existence of night blindness and anaemia, two nutrient deficient diseases.

An analysis of the retrospective visits during April 1990 - March 1992 to the MCH clinic at Harichandi char, under Erendabari Union of Gaibandha District also depicts a similar trend of seasonal morbidity pattern of diarrhoea and Lower Respiratory Track Infection (LRTI) during the flood months (Figure 4).

The prevalence rate of endemic Goitre in the Gaibandha area is high. About three out of ten people suffer from this iodine deficiency disorder disease. Figures from a national survey shows a much higher rate for the riverine Upazilas as shown in Figure 5.

Xerophthalmia is a nutritional deficiency disease caused by the lack of vitamin A intake in food. The affect of hydrology on the flora has a direct affect on the people's intake of leafy vegetable, which are rich in Vitamin A. The Figure 5 below shows that the riverine Upazilas of the district have recorded a much higher number of Xerophthalmia cases against their child population than Upazilas on the main land (Figure 6).

Malnutrition is a general problem for the project area and a major concern for the riverine villages. A round the year nutritional survey has established a seasonal pattern of prevalence of malnutrition which has association with the occurrance of flood (Figure 7.)

From the available epidemiological statistics it appears that during 1991 there have been more suspected Malaria reported (slide collected) and positive cases detected from the riverine Upazilas as against the Upazilas of the mainland of the district. Out of the total 139 positive cases in the district, 131 were from Gaibandha Upazila and the remaining 8 were from Sunderganj Upazila. There was no positive case reported from any other Upazilas of the district.

Figure 2.

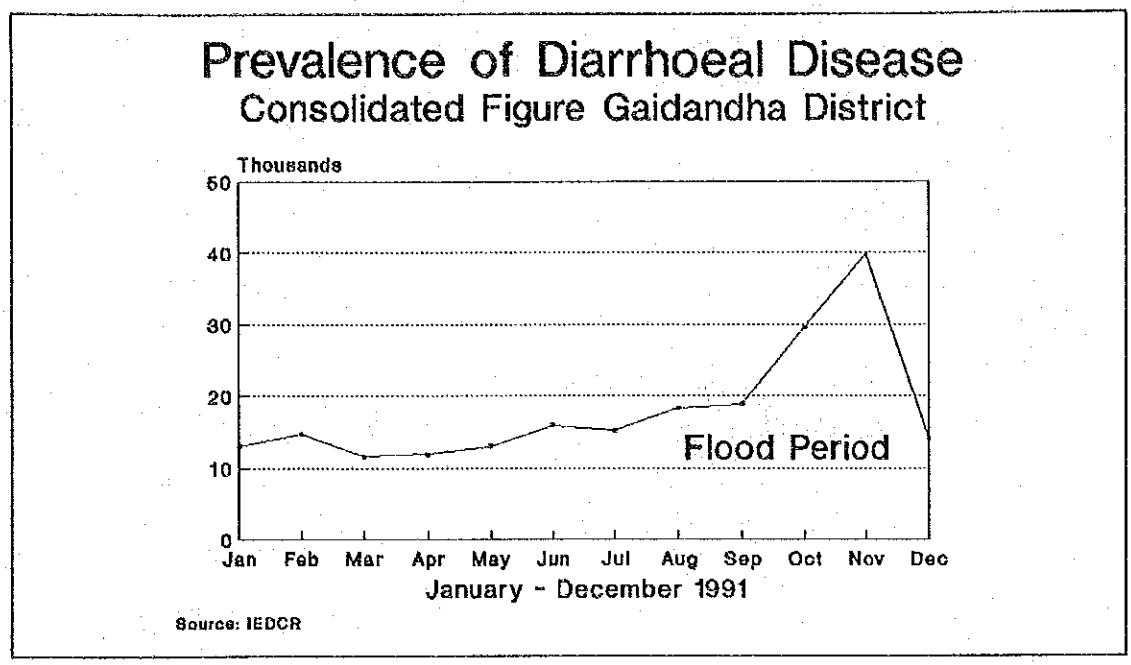


Figure 3.

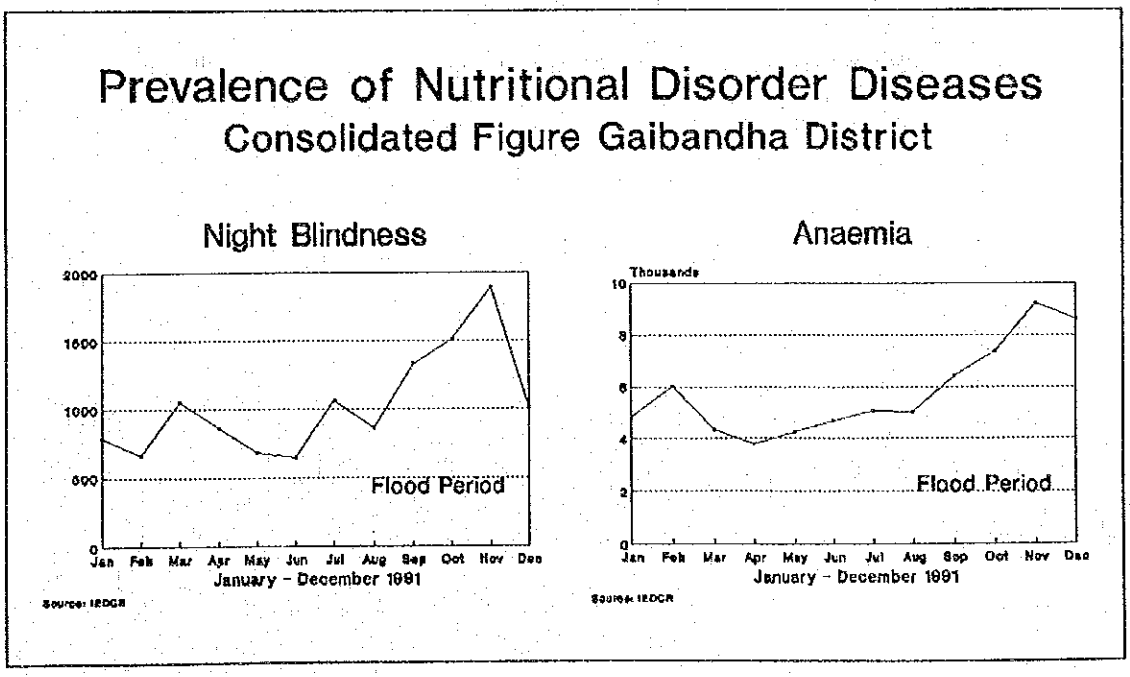


Figure 4.

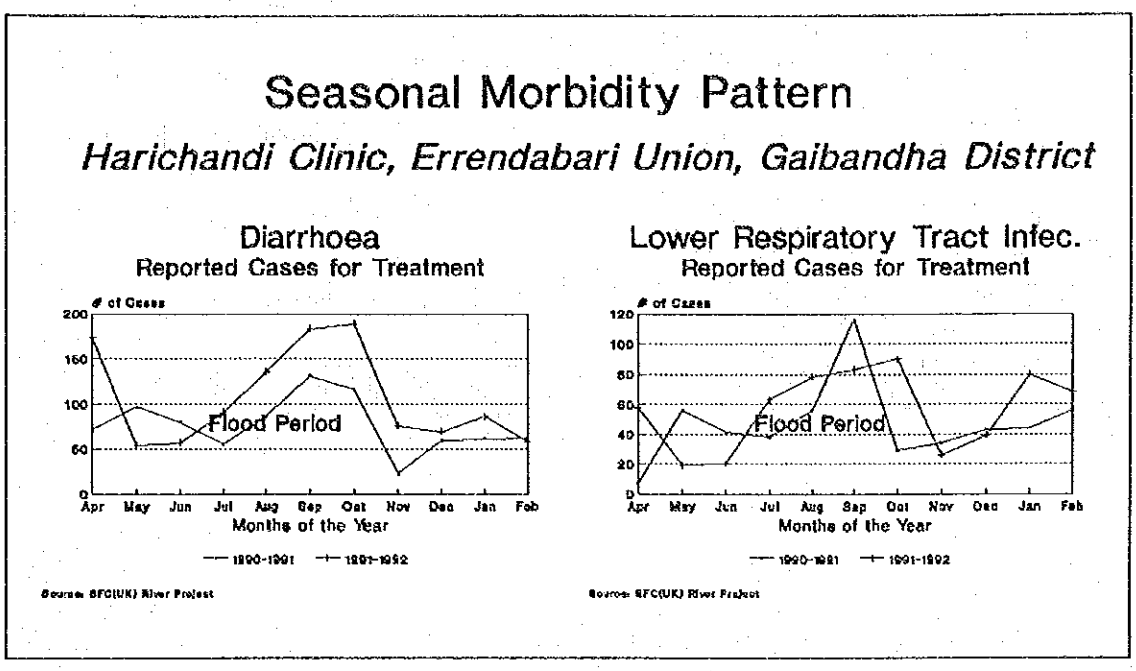


Figure 5.

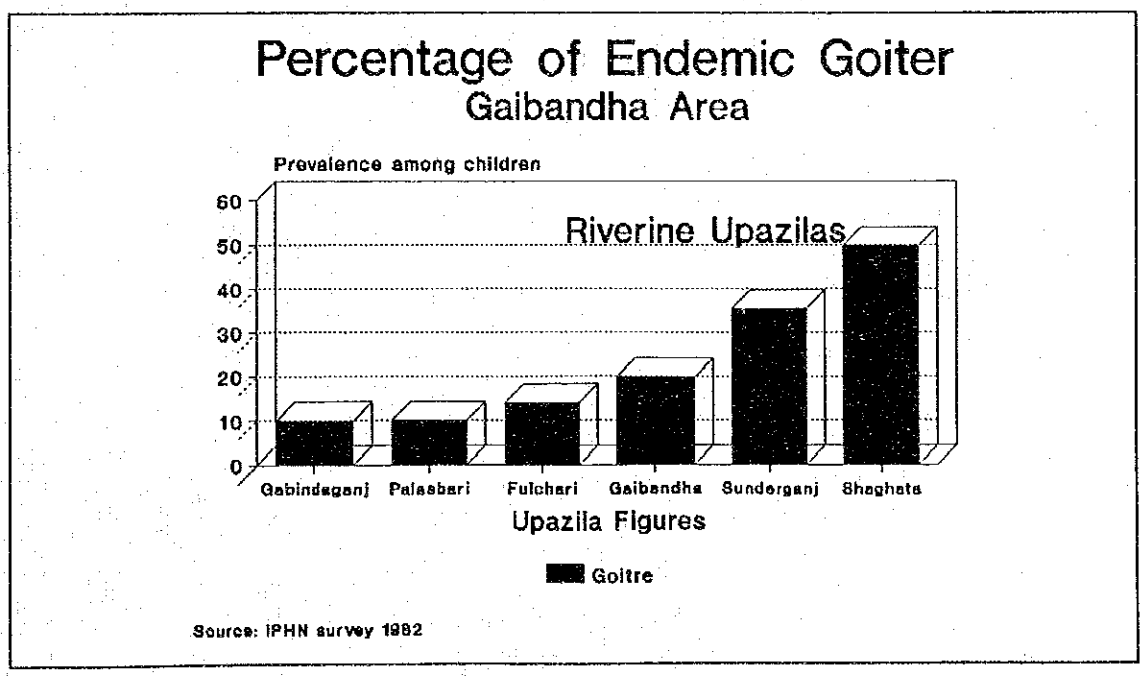


Figure 6.

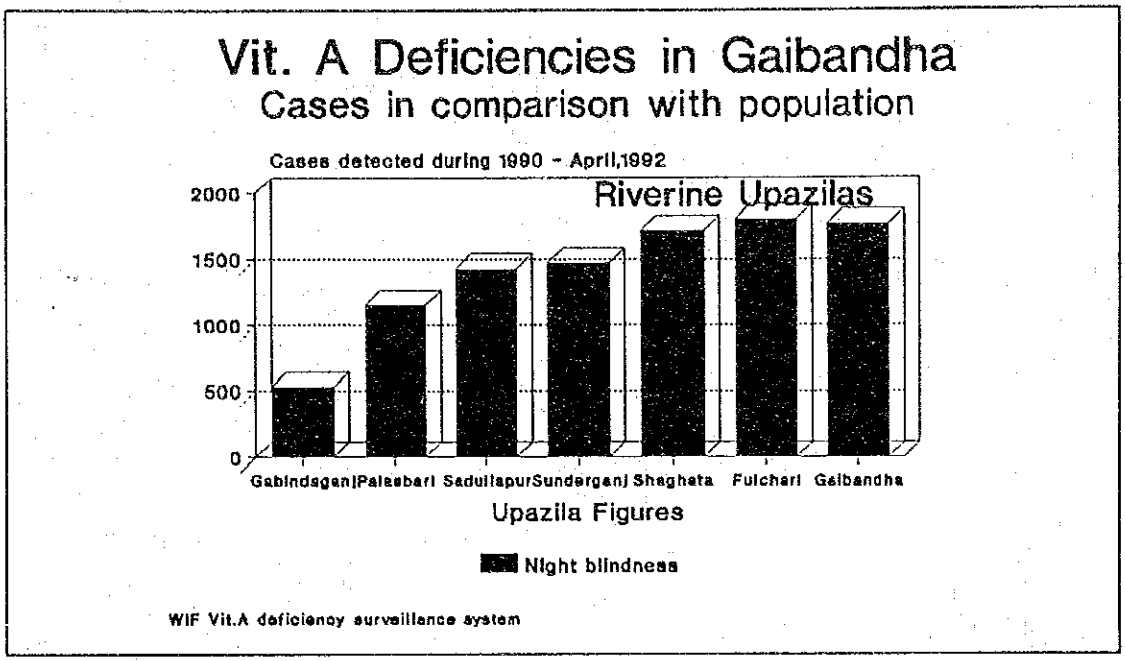


Figure 7.

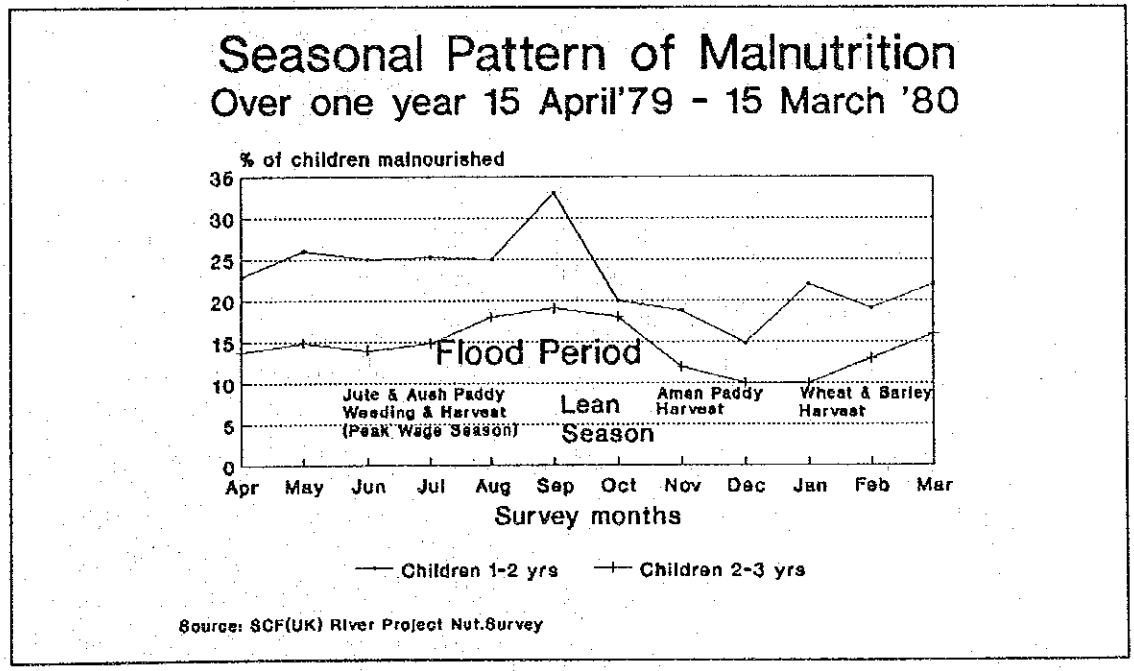


Table 2 - Upazila Suspected Malaria and Positive Malaria During the Year 1991.

Upazila	Population	Suspected Cases	Positive
Fulchari	139,546	1,720	189
Sunderganj	372,375	14,088	271
Shaghata	203,572	2,517	108
Sadullapur	245,671	148	115
Palasbari	206,886	7	64
Gobindaganj	176,646	314	70
Gaibandha	331,236	10,640	73

2.5 Public Health and Nutrition Situation in Exposed and Polder Villages

The household and nutritional anthropometric survey findings show a major difference in the diseases prevalence and nutritional status between the a polder village and an exposed village. The table below highlights some key indicators.

Table 3 - Comparison of Disease Point Prevalence in Exposed and Polder Village.

Diseases	Foliarghop	North Ramnathervita
	(Exposed Village)	(Polder Area)
Diarrhoea	3.53	1.67
Blood Dysentery	7.77	3.67
Goitre	22.00	13.46
Night Blindness (among children	12.88	7.86
Angular Stomatitis (among children)	25.00	15.26
Scabies (among children)	21.86	16.79

Table 4 - Comparison of Nutritional Status of Children Under 5 Years in Exposed and Polder Villages

Nutritional Indicator	Foliarghop (Exposed Village)	North Ramnathervita (Polder Area)
Undernutrition (wt/Age <60%)	12.5	6.87
Wasting (Wt/Ht <80%)	17.18	9.16
MUAC <12.5 cms	28.13	18.33

2.6 Use of Iodized Salt

No household in both the exposed and polder villages uses iodized salt.

2.7 Health Complaints During Flood

The table below presents the findings from the surveyed exposed and polder villages in Gaibandha project area regarding the respondent's health complaints as experienced during floods.

Table 5 - Health Complaints During Floods Foliarghop (Exposed) Village and Ramnathervita (Polder) Village

Complaints	Foliarghop (Exposed)	Ramnathervita (Polder)
Diarrhoea	100%	100%
Dysentery	35%	79%
Influenza	54%	64%
Gout	42%	5%
Other	21%	24%

The significant differences are: increased complaints of Dysentery from the polder village and increased Gout from the exposed village. The reason for higher percentage of dysentery in the poldered area is frequent use of stagnant, contaminated water. The reason for increased Gout is staying for long stretches of time in submerged areas.

2.8 Impact on the Use of the Local Flora and Herbs as Medicine

Over 80% respondents from both the exposed and polder villages reported the past use of flora as traditional medicine. When asked about which disease were not treated due to unavailability of plants, Dysentery, Conjunctivitis, Cough, Scabies, Gout and dysentery were mentioned commonly.

Table 6 - Diseases Which Were Not Treated Traditionally Due to Unavailability of the Required Flora

Complaints	Foliarghop	Ramnathervita
	(Exposed)	(Polder)
Dysentery	61.0%	56.0%
Conjunctivitis	46.0%	1.8%
Cough	47.0%	47.0%
Gout	19.0%	18.0%
Scabies	45.0%	3.7%
Diarrhoea	9.6%	7.5%

The findings above show scarcity of all medicinal plants in both the areas. Plants used for treatment of scabies and conjunctivitis are more scares in the exposed area.

Below are the plants which were mostly used for treatment of the various diseases.

1. Khudimun, Dlulimun: used for : 29% Dysentery cases
   : 25% Diarrhoea "
2. Kalo keshor: used for : 27% Dysentery "
   : 11% Gout "
   : 43% Conjunctivitis "
3. Lal Gochani: used for : 13% Dysentery "
   : 50% Blood Dysentery "
4. Tulshipata: used for : 31% Cough "
   : 56% Conjunctivitis "
5. Harbalasak: used for : 18% Cough "
6. Nimpata: used for : 79% Scabies "
7. Obud Nangra: used for : 33% Gout "
   : 25% Diarrhoea "

2.9 Public Health Services

2.9.1 Government Health Services

There are permanent health complexes, with both OPD and in-patient facilities in the Gaibandha, Sunderganj and Shaghata Upazilas. Even a slight rise in the normal water level during flood months submerges the Shaghata health complex ground floor under 4 - 5 feet of water. Due to this, last year the hospital abandoned its normal functions for three months and acted only as a temporary flood shelter.

In Fulchari Upazila there is no proper hospital building. The Govt. health department is operating out of a small rented premise.

The Govt. health system in the Gaibandha project area lacks proper facilities for delivering emergency medical services during floods i.e river transport, equipment for setting up mobile medical camps and other logistics.

There is a provision for maintaining a buffer medicine stock for flood preparedness. But due to the inadequacy of the normal drug supply for the health complex and its sub centres this can not be adhered to. Emergency supplies of ORS, WPT and Bleaching Powder can be had on request. However the problem remains with the timely, adequate supply of the essential drugs that are needed for the flood emergencies.

The Govt. health department does not have a budgetary provision even for renting of country boats during floods for mobility of personnel, supplies and patients.

Due to lack of planning and administration of the flood shelters, proper sanitation and supply of safe drinking water becomes a problem.

2.9.2 Non Government Organization

World View International(WIF) operates a blindness preventive programme throughout the Gaibandha District. Bangladesh Women Health Coalition operates a health centre in Shaghata Upazila.

Until recently the Save the Children Fund(UK) was operating a MCH clinic and community health programme in Harichandi char of the Errendabari Union under Fulchari Upazila. SCF has a project disaster monitoring system and it operates supplementary feeding programme for malnourished children, in selected chars , pregnant women and lactating mothers as and when needed.

GUK, USS and FATEMA (three small local NGOs) are working with children and women groups in the field of health related awareness building. Both GUK and USS construct and distribute sanitary latrine. However their efforts, as compared to the needs of the area, are limited by their resource constraints.

CHAPTER 3

REGIONAL STUDY RESULTS

3.1 Northern Riverine Area

3.1.1 Goitre

The northern area in general and the greater Rangpur and Bogra Districts in particular are high risk, endemic goitre prevalent zone. While the national average rate of endemic goitre is 10% the figure for greater Rangpur and Bogra Districts are respectively 27.98% and 14.92%. In Rangpur the highest prevalence rate is in Zaldkaka Upazila 68.90% and in Bogra the highest rate is in Dhunot Upazila 79.35%.

3.1.2 Malnutrition

Malnutrition is a general problem for Chilmari, Ulipur, Nageswari and Sariakandi area.

3.1.3 Cholera

Reported incidence of cholera outbreaks during 1987, 1988 and 1991 at Chilmari Upazila of Kurigram District.

3.2 Lower Jamuna Basin Area

3.2.1 Visceral Leishmaniasis (VL), Kala-azar

In the past, Kala-azar has been endemic; epidemics occurred almost regularly every 15 - 20 years. It was thought to have been eradicated as a secondary effect of the malaria eradication programme on the sandfly vector. kala-azar and post kala-azar dermal leishmaniasis (PKLD) are now prevalent in the lower Jamuna basin area of the region. The rate of prevalence is particularly high in Singra Upazila of Nator District, Shanthia Upazilas of Pabna and Sahajadpur, Kazipur and Belkuchi Upazila of Sirajganj District. Singra and Kazipur Upazilas reported over 300 cases each during last year. Further details on FAP 16 surveys in the Singra area are given in the Environmental Impact Assessment Volume 3.

3.2.2 Diarrhoea

The prevalence rate of diarrhoeal disease is high in the LJB riverine belt. Three separate studies of the national disease surveillance programme has shown two and three fold increase point prevalence rate in Kazipur and Shanthia area as against the figure of the northern riverine area and the national rural average.

Table 7 - Comparison of Diarrhoea Point Prevalence Rates in the Lower Jamuna Basin Area and Northern Riverine Area

Study	Northern Riverine Area	Lower Jamuna Basin Area	National Average (Rural)
April, 1991	7.3	23.3	15.0
June, 1991	7.8	23.8	13.1
August, 1991	10.2	19.3	12.9

3.2.3 Cholera

Reported incidence of cholera outbreaks during 1988 and 1991 at Belkuchi Upazila under Sirajganj District. During 1991 epidemic, approximately 900 cases were reported from Daulatpur, Azupara, Jantail, Gabrakhai, Srimatia and Chala Unions. Though no hard data is available, according to the local Upazila health and family planning officer the out break in 1988 was the severest in recent history.

3.2.4 Malnutrition

Prevalence of child malnutrition is high in Kazipur. The table below shows increased percentage of wasting (Wt/Ht $<80\%$) cases at Kazipur in comparison with the national average for rural area at the same time.

Table 8 - Comparison of Wasting Cases Between Kazipur and National Average (rural)

Studies	Kazipur	National Average
February, 1991	10.2	6.8
April, 1991	15.1	10.3
June, 1991	9.9	10.3

3.3 Comparison Between Exposed and Polder Villages

The comparative findings from the surveyed exposed and polder villages in Chalan Beel project area on disease point prevalence, respondent's health complaints as experienced during floods and use of flora as medicine are mentioned below.

3.3.1 Disease Prevalence and Nutritional Condition of Children

There is no significant difference in disease prevalence and nutritional condition of children between the exposed and polder villages. Naukhada has a slightly higher rate of angular stomatitis, scabies and prevalence of wasting. The table below presents the study findings.

Table 9 - Comparison of Disease Point Prevalence: Naukhada (Exposed) and South Ramrama (Polder) Village.

Diseases	Naukhada (Exposed Village)	South Ramrama (Polder Area)
Diarrhoea	2.21	3.91
Blood Dysentery	6.62	6.05
Goitre	0.30	0.70
Night Blindness (among children)	6.10	4.50
Angular Stomatitis (among children)	11.80	7.60
Scabies (among children)	14.40	5.30

Table 10 - Comparison of Nutritional Status of Children < 5yrs Naukhada and South Ramrama Village

Nutritional Indicator	Naukhada (Exposed Village)	South Ramrama (Polder Area)
Undernutrition (wt/Age <60%)	10.00	10.00
Wasting (Wt/Ht <80%)	10.69	4.55
MUAC <12.5 cms	32.73	29.00

3.3.2 Health Complaints During Flood

People in the exposed villages have experienced more influenza and scabies whereas the people within the polder have experienced more diarrhoea.

Table 11 - Health Complaints During Floods Naukhada and South Ramrama Villages.

Complaints	Naukhada (Exposed)	South Ramrama (Polder)
Diarrhoea	53%	95%
Dysentery	21%	18%
Influenza	70%	36%
Gout	2%	2%
Scabies	20%	4%

3.3.3 Use of Iodized Salt

No household in both the exposed and polder villages reported the use of iodized salt.

3.3.4 Impact on the Use of the Local Flora and Herbs as Medicine

Over 50% of the respondents from both the exposed and polder villages reported the past use of flora as traditional medicine. When asked about which diseases were not treated due to unavailability of plants, Scabies (26%), Influenza (15%), Gout(11%) and Paralysis (10%).

Table 12 - Diseases Which Were Not Treated Traditionally Due to Unavailability of Required Flora

Complaints	Naukhada (Exposed)	South Ramrama (Polder)
Scabies	38%	17%
Influenza	20%	11%
Paralysis		20%
Cough	44%	47%
Gout	6%	18%

Below are the plants which were mostly used for the treatment of various diseases:

1.	Ahorjun tree: used for	:	80% Weakness
		:	50% Diarrhoea
2.	Tulshipata: used for	:	56% Influenza
3.	Kalo Dutara: used for	:	70% Paralysis
4.	Nimpata: used for	:	100% Scabies
5.	Hatishur: used for	:	45% Gout
6.	Kalna: used for	:	23% Scabies
7.	Bath tree: used for	:	50% Gout
		:	12% Weakness

3.4 Public Health Services

3.4.1 Northern Riverine Area

a. Government Services

Upazila hospitals in Ulipur, Chilmair, and Sariakandi are functioning out of permanent health complexes providing basic health services. Upazila health authorities do not have "flood preparedness" programmes. The practice of maintaining the buffer stock are not adhered to. Repeat performances of crises management during past floods.

b. Non Government Organization

Terre Des Hommes (TDH), Switzerland is running a large health and nutrition rehabilitation programme in the Kurigram, Ulipur and Chilmari Upazilas since 1975. Their health complexes have facilities for MCH OPD, hospital services and nutrition feeding programme. The newly constructed Chilmari hospital has been built keeping in mind the need for setting up emergency flood shelter.

Korean Agency for Development in Bangladesh (KADB) has started a new community development project in Chilmari with programme on health components.

Brothers for All Man (BAM) is running a health programme in Sariakandi Upazila operating six sub-centres. The Present Upazila health complex is built and equipped by BAM.

RDRS (LWS) is running a large development programme including public health and primary health care services in Kurigram. A separate Community health unit, based in Lalmonirhat, monitors the public health and nutrition situation in the area. It has a char development programme operating in the Nageswari Upazila.

3.4.2 Lower Jamuna Basin Area

a. Government Services

Upazila hospitals in Kazipur, Belkuchi, Shanthia and Gurudaspur are functioning out of permanent health complexes.

The Kazipur health complex was out of operation during the last flood. Part of the hospital complex has already been badly damaged by flood and river erosion. Because of this the Directorate of Health Services has decided to auction off this purpose built health complex . Hospital and activities of the Upazila health authorities will operate out of rented premises until a new health complex can be built.

There are no "flood preparedness" programmes or the practice of maintaining the buffer stock for flood emergencies.

b. Non Government Organization

BRAC is operating in Shanthia Upazila with community health awareness programme emphasizing promotion of oral rehydration therapy (ORT).

A local NGO ARCHES is working in Kajipur Upazila concentrating on water and sanitation aspect of public health. They also run programmes for nutrition awareness and kitchen gardening.

CCDB, and a local NGOs Banga Janani are working in Gurudashpur Upazila with water, sanitation, health and nutrition programme. GMSS a women's cooperative society is working with income generating activities and functional education.

Despite their willingness, due to resource constraint none of these local NGOs were able to operate feeding programmes during the past floods.

CHAPTER 4

IMPACT ANALYSIS

4.1 General Significance of the Research Findings

4.1.1 Lack of Safe Drinking Water and Sanitation

There is lack of Govt. tube wells in the riverine Upazilas of the Gaibandha project area. The use of sanitary latrines is also very low. The provision of safe drinking water and proper sanitation is of utmost importance at the best of times. This takes on an even greater importance during emergencies i.e. floods.

4.1.2 Seasonality of Disease and Malnutrition Prevalence

The study findings show a seasonal pattern of diarrhoea, lower respiratory tract infection, malnutrition and other nutrient deficient diseases.

4.1.3 Diarrhoea

Epidemiological statistics on diarrhoea cases over a one year period, from the Gaibandha District and reported cases from Erendabari at Harichandi clinic over a two year period, has characterized the seasonality of diarrhoeal diseases. There is an increasing trend of cases reported beginning, immediately with the onset of the monsoons. It continues to rise during the flood months and peaks in October or November.

The increase in prevalence of Diarrhoea during the flood months are due to a general lack of safe drinking water and contamination of tubewell water in the affected areas. Improper sanitation facilities both in the community and at the flood shelters is a major contributing factor to the spreading of the disease. Consumption of spoiled food also facilitates the proliferation of diarrhoea.

4.1.4 Lower Respiratory Tract Infection (LRTI)

Patient attendance at Harichandi clinic in Errendabari Union during April 1990 - February 1992 indicates a seasonal pattern in the incidence of LRTI. This increase is due to an increase in risks of infection and decline in body resistance caused by nutrient deficiencies. Damp living environment, lack of covered shelter and inadequate protective clothing abet the increase in LRTI.

4.1.5 Anaemia and Night Blindness

In the Gaibandha area, an increase in the number of cases of Anaemia and Xerophthalmia are observed from August onwards. This is largely due to the unavailability, during and after flood, of green leafy vegetables, the only source of iron and vitamin "A" intake for the majority of the people.

4.1.6 Malnutrition

The year round nutrition survey pointed to a higher prevalence of malnutrition during August, September and October. Between the exhaustion of the Aush crop in June and the harvesting of the Aman in November, is the period of off peak wage earnings. This, coupled with the occupance of seasonal floods increases the risk of malnutrition in the flood prone areas of the region.

4.1.7 Cholera Endemic in Shaghata

Cholera has been endemic in Dhakoa and Majedervita villages: epidemics had erupted here in 1987, 1988 and again in 1991. These two are beel villages having large areas of stagnant water.

4.1.8 Increased Risk of Diarrhoea and Cholera in LJB

The study identified an increased prevalence of Diarrhoea and incidence of cholera in the Lower Jamuna Basin (LJB). In the Belkuchi Upazila a large number of cholera cases were reported. One of the reasons for this may be, being situated downstream of the Jamuna, the LJB acts as a store house and receptacle for the contaminated/polluted water.

4.1.9 Inadequate Public Health Care Service During Flood

During the floods the health miseries of people in the affected area are heightened due to the inadequacies of necessary public health care services. Though floods are a regular feature of the area no systematic flood preparedness measures are undertaken either by the NGOs or the Govt. agencies in the Gaibandha project area. As a result of this during floods, by the time preparations to deliver services are completed, disease already takes its toll and sometimes reaches epidemic proportions.

4.1.10 Iodine Deficiencies

Iodine deficiencies are more prevalent in the riverine Upazilas of the Gaibandha project area as compared to the Upazilas of main land. Goitre is a medical as well as social problem. It is epidemiologically associated with endemic cretinism and thyroid insufficiency at birth.

4.1.11 Effect on Medicinal Flora

The unavailability of medicinal plants due to flood deprived the inhabitant's accessibility of traditional remedies for disease. As a result minor elements become major complications and take on an acute form. People are compelled either to spend a greater proportion of their earning on treatment or to leave the disease totally untreated. People who want to use traditional remedies often have to travel long distance to accrue the required flora and herbs.

4.2 Relationships, Issues and Process

4.2.1 Risks in Exposed Area

There are increased risks of diarrhoea, malnutrition and nutrient deficient diseases in the exposed villages. As has been already discuss earlier the reasons for increased diarrhoea are lack of safe water and proper sanitation. Massive in flow of contaminated water during flood pollutes not only standing tube wells but also all other fresh water sources of the area. Leaving behind in its wake an environment that is life threatening to the surviving inhabitants. The thick deposits of sand is unfit for cultivation of crops and vegetable resulting malnutrition and nutrient deficiencies.

The survey findings show an increase in incidence of malaria in the riverine Upazilas. This is because at the time of recession pools of dirty flood water are left stagnant. Very soon these become ideal breeding ground for malaria causing mosquitos.

4.2.2 Effects of Embankments

Status of health and nutritional condition of children has been found to be improved in the polder village. The construction of embankments has been successful in bringing about some semblance of normality to the life of the inhabitance living within the polders. This has made production of crops and vegetable possible. It has played a significant role in creating employment. This has also given them the urge to occur knowledge and awareness relating to health and nutrition issues. However the existence of unplanned embankments gives rise to internal flash flooding sometime even with greater severity.

CHAPTER 5

MITIGATION PROPOSALS

5.1 Issues Which Can Be Mitigated

Some health and nutrition interventions are proposed below for mitigating the public health and nutrition problems.

5.1.1 Tube Wells

To make safe drinking water available and accessible to the flood risk population more DPHE tube wells should be sanctioned for the Gaibandha project area. Considering the facts that the community is scattered over a large area and the problems of movement due to floods the population eligibility for DPHE tube wells should be reduced to a maximum of 50 persons per tubewell.

Since a considerable number of tube wells are not actually available at the site of installation or are non functioning a physical count should be conducted to determine the real tube well use rate in all the riverine Upazilas of the region.

Installation of tube wells above flood water levels in the low lying and char areas, the repairing of the non-functioning tube wells and the intensive training of community volunteers on their maintenance should be undertaken as a matter of routine flood preparedness.

5.1.2 Latrines

DHPE should increase their capacity for the production of more hygienic latrines. Local NGOs like GUK, USS, FATEMA and other social groups in the Fulchari, Sunderganj and Shaghata areas should be involved for social mobilization, raising health awareness and the production and sale promotion of such latrines.

Similar programmes should also be undertaken in other riverine Upazilas in collaboration with local NGOs of the area.

5.1.3 Iodized Salt and Lipoidal Injection

Iodized salt should be made available through, private business sectors, NGOs and local government authorities in the northern areas of the region, including the Gaibandha project area. Govt. health, Family planning field workers, school teachers, and NGO workers should incorporate iodine deficiency problem awareness messages in their health and functional education programmes. Govt. and NGO health services should run routine iodine supplementation programmes in specially high risk areas in the form of lipoidal injections.

5.1.4 Vitamin "A: Capsule (VAC) Distribution

Govt. and NGO health services should give an increased importance to Vitamin A capsule distribution programme specially in the riverine Upazilas. VAC should be distributed to children routinely, during flood and at times of diarrhoeal episodes.

5.1.5 Flood Preparedness, Health Intervention Plan

There should be a local flood preparedness, public health intervention plan for all the Upazilas of the Gaibandha project area and in other riverine Upazilas of the region detailing all emergency activities. The plans should include list of resources which are to be mobilized and estimates of logistic support needs. Such plan should include inputs from NGOs, cooperative groups and local social organizations. Advance mobilization of the required resources; materials, logistics and training of field workers and community volunteers must be ensured. Some of the preparedness activities are mentioned below.

a. Flood Shelters

Prior identification of available premises as prospective flood shelters. Provisions for adequate, functioning tube wells and latrines and proper sanitation. Advance agreement and management responsibility.

b. Buffer Medicine Stock for Flood Emergency

The Upazila health authorities should strictly maintain the buffer medicine stock for flood emergencies. Items used or out dated should be replaced immediately. Adequate, essential drugs, dressing articles i.e gauge, bandage and cholera fluids must be included in the stock list.

c. Equipment for Field Medical Camps

Upazila health authorities should be well equipped for setting up field camps with necessary materials and medical equipments.

d. Contingency for River Transport

The Upazila health authority there should have contingency fund ear marked for hiring river transport for the quick and efficient mobility of medical teams and supplies during the flood months.

e. Coordination of NGO Activities

For optimum utilization of voluntary services, ensuring coverage and avoiding duplication of services a mechanism for the coordination of NGO activities should be established.

5.1.6 Health Nutrition Awareness Programme

Considering the present poor health and nutritional status of the population in the flood affected area and the future risks involved, mass health and nutrition awareness programme should be launched in all the Upazilas of the Gaibandha project area and in all other riverine Upazilas of the region. Efforts should be made to reach the remotest population in chars. The programme should lay emphasis on the following:

a. Water, Sanitation, Iodine and Vitamin "A" Deficiencies

Use of safe drinking water and latrines. Knowledge regarding Iodine and vitamin "A" deficiencies.

b. Food Preservation for the Lean Season

Community food storage and provisions for food ration during flood emergencies. Knowledge about household preservation of nutrient food for use during the lean season and child feeding.

c. Treatment of Diarrhoea

Knowledge and skill in the preparation of oral dehydration solution with locally available ingredients. Knowledge about signs of Cholera.

5.1.7 Supplementary Feeding for Lean Period

Provisions for supplementary feeding programmes for malnourished children and pregnant/lactating mothers for the lean period. Securing World Food Programme assistance. Invitation to NGOs to undertake such programme.

5.1.8 Promotion of Cultivation of Winter Vegetable and Medicinal Plants

Promotion of cultivation winter vegetable in kitchen gardens and supply of medicine plants. Agriculture department and NGO,s should an take active part in such activities.

5.1.9 Chlorination of Ponds and Water Reservoirs After Floods

Measures should be taken for the chlorination of all ponds and water reservoirs immediately after the floods.

5.1.10 Spraying Water Logged Ditches

After the floods polluted, water logged ditches should be sprayed thoroughly as they are the reservoirs for the breeding of mosquito.

5.2 Issues Which Cannot be Mitigated

Due to the geographic and geological conditions of the area and the economic constraints of the inhabitants the following issues can not be mitigated immediately.

5.2.1 Purchase of Latrine by All Members

Financial poverty together with lack of awareness among the inhabitance regarding matters of proper sanitation makes it difficult to deal with this issue in its entirety at this moment in time.

5.2.2 Use of Iodized Salt

Though the study proposes wide distribution and consumption of iodized salt, in practice, this can not be achieved immediately due to bad communication with the region and the low purchasing capacity of the people.

5.2.3 Summer Vegetables in the Lowland and Char Area

Regular flooding of the low lying areas makes the cultivation of traditional summer vegetables almost impossible. Scarcity of resources also makes it difficult for the production of early varieties of summer vegetables.

Annex-A

Detailed Findings of Gaibandha Project Area Household Survey

Table - 1 Households Interviewed

Site	Total HH in the village	# of HH Interviewed
Foliarghop (Embankment)	153	50
North Ramanathervita	243	52

Table - 2 Children's Anthropometric Measurement Taken

Site	#	% of total children
Foliarghop (Embankment)	64	76.00
North Ramanathervita	101	75.00

Table - 3 Household Reported Prevalence of Malaria During Past Year

Site	#	%
Foliarghop (Embankment)	11	22.00
North Ramanathervita	08	15.38

Table - 4 Household Reported Current Cases of Malaria

Site	#	%
Foliarghop (Embankment)	04	8.00
North Ramanathervita	00	0.00

Table - 5 Prevalence of Malaria During Past Year

Site	#	%
Foliarghop (Embankment)	20	7.07
North Ramanathervita	09	3.00

Table - 6 Malarial Point Prevalence

Site	#	%
Foliarghop (Embankment)	5	1.77
North Ramanathervita	0	0.00

Table - 7 Household Reported Prevalence of Diarrohoea During Past Mongh

Site	#	%
Foliarghop (Embankment)	13	26.00
North Ramanathervita	07	13.48

Table - 8 Household Reported Current Cases of Diarrohoea

Site	#	%
Foliarghop (Embankment)	09	18.00
North Ramanathervita	04	07.69

Table - 9 Prevalence of Diarrhoea During Past Month

Site	#	%
Foliarghop (Embankment)	16	5.65
North Ramanathervita	11	3.67

Table - 10 Diarrhoea Point Prevalence

Site	#	%
Foliarghop (Embankment)	10	3.53
North Ramanathervita	05	1.67

Table - 11 Household Reported Current Cases Blood Dysentery

Site	#	%
Foliarghop (Embankment)	16	32.00
North Ramanathervita	10	19.23

Table - 12 Blood Dysentery Point Prevalence

Site	#	%
Foliarghop (Embankment)	22	7.77
North Ramanathervita	11	3.67

Table - 13 Household Reported Cases of Goiter

Site	#	%
Foliarghop (Embankment)	22	44.00
North Ramanathervita	14	26.92

Table - 14 Goiter Point Prevalence

Site	#	%
Foliarghop (Embankment)	31	10.95
North Ramanathervita	17	05.67

Table - 15 Household Reported Case of Night Blindness (Children upto the age of 15)

Site	#	%
Foliarghop (Embankment)	11	22.00
North Ramanathervita	07	13.46

Table - 16 Night Blindness Among Children Point Prevalence

Site	#	%
Foliarghop (Embankment)	17	5.12
North Ramanathervita	11	1.62

Table - 17 Household Reported Use of Iodized Salt

Site	#	%
Foliarghop (Embankment)	0	0.00
North Ramanathervita	0	0.00

Table - 18 Household Reported Use of Tube Well Water

Site	#	%
Foliarghop (Embankment)	50	100.00
North Ramanathervita	52	100.00

Table - 19 Prevalence of Undernutrition by Wt/Age <60% and Wt/Age <75%, Prevalence of Stunting Ht/Age <90% and Prevalence of Wasting Wt/Ht <80% at Foliarghop and Nort Ramanathervita, April, 1992

Site	Wt/Age <60%	Wt/Age <75%	Ht/Age <90%	Wt/Ht <80%
Foliarghop (Embankment)	12.50	57.81	56.25	17.18
North Ramanathervita	06.87	61.83	58.02	09.16
Chilmary, April, 91	07.80	63.50	70.07	06.40

Table - 20 Household Respondent About Public Health Probles Due to Caused Due to Frequent Flooding

Problems	Reasons	#
Diarrhoea (53)	- Contaminaed Water - Contaminated Food - Unhygienic Living Condition	34 17 02
Dysentery (30)	- Contaminaed Water - Contaminated Food - Unhygienic Living Condition	18 17 04
Influenza (34)	- Contaminated Water - Bad Weather	19 15
Gout (3)	- Bad Weather	03
Blood Dysentery (3)	- Contaminaed Water	03
Malaria (3)	- Contaminated Water	03
Goiter (2)	- Marooned Water	02
Measles (2)	- Bad Weather	02
Scabies (2)	- Unhygeinic Living Condition - Contaminated Water	01 01
Pox (2)	- Bad Weather	02
Cholera (2)	- Contaminated Food	02

Table - 21 Household Respondent About Public Health Problem due to Frequent Flooding

Problems	Reasons	#
Diarrhoea (52)	- Contaminaed Water - Contaminated Food - Unhygienic Living Condition - Irregularity of Food Taking	25 09 10 08
Influenza (27)	- Contaminated Water - Contaminated Food - Bad Weather	20 04 03
Gout (21)	- Contaminated Water - Maooned Water	09 12
Dysentery (14)	- Contaminated Water - Contaminated Food	07 07
Goitre (4)	- Unknown	04
Blood Dysentery (3)	- Contaminaed Water - Contaminated Food	02 01
Scabies (2)	- Contaminated Water	02
Measles (1)	- Contaminated Water	01
Cholera (2)	- Contaminated Water	01

Table - 22 Prevalence of Children with a MUAC < 12.5 cm and > 12.5 cm < 13.5 cm at Foliarghop and Ramanathervita, Gaibandha, April 1992

Site	< 12.5 cm		> 12.5cm - < 13.5cm	
	#	%	#	%
Foliarghop (Embankment)	18	28.13	15	23.44
North Ramanathervita	24	18.33	30	22.90
Chilmari, April '91		08.60		

Table - 23 Clinical Reports of the Children Under 5 years of Age at foliarghop and North Ramanathervita, Gaibandha, April 1992

Site	Condition Present				
	XN	Angular Stomatitis	Oedema	Anaemia	Scabies
Foliarghop (Embankment)	6.25	25.00	0.00	34.37	21.87
North Ramanathervita	5.34	15.26	1.52	41.22	16.79

Table - 24 Household Respondent about Herbal Health Practice at Foliarghop (Embankment), Gaibandha, April 1992

Disease	Name of the Herbal Plants	#
Dysentery (31)	- Khudimum, dulimum	10
	- Ahorjun	02
	- Munder Chal	02
	- Nol Khui	04
	- Khalo Kashori	07
	- Bhui tita	03
	- Jhikhor	03
Conjunctivities (23)	- Khalo Kashori	10
	- Thulshipata	13
Cough (23)	- Thulshipata	15
	- Herbakasha	05
	- Pata Shishir	01
	- Dulamon	01
	- Khalokashori	01
Scabies (22)	- Nimpata	17
	- Takamanikpata	03
	- Golnigach	02
Gout (8)	- Kalo Kashori	01
	- Nimpata	01
	- Kanshisa	01
	- Hatisur	01
	- Obud Nangra	02
	- Gollar Gach	02
Diarrhoea (4)	- Dulamon	02
	- Babla	02
Blood Dysentery (3)	- Lalgochani	02
	- Kalo Kashori	01
Meanstrual Bleeding (2)	- Takamanikpata	01
	- Lazzaboti Gach	01
Angular Stomatitis (1)	- Kalo Khashori	01

Table - 25 Household Respondent about Herbal Health Practice at Ramanathervita, Gaibandha, April 1992

Disease	Name of the Herbal Plants	#
Dysentery (30)	- Khudimum, dulimum	08
	- Bish Khalla	02
	- Munder Chal	02
	- Lal Gochani	04
	- Khalo Kashori	10
	- Chatim Tree	02
	- Takamondir	02
Conjunctivities (01)	- Joyantho Ful	01
Cough (25)	- Thulshipata	10
	- Herbakasha	04
	- Chatim	03
	- Golni	06
	- Khaet Pupra	02
Scabies (2)	- Nimpata	02
Gout (10)	- Kalo Kashori	01
	- Nimpata	01
	- Pitti Raj	01
	- Bilai Ashra	01
	- Obud Nangra	04
	- Gollar Gach	02
Diarrhoea (4)	- Dulamon	02
	- Obud Nagra	02
Night Blindness (1)	- Aloandhari	01
Gastric (1)	- Bijol Ghanta	01
Pneumonia (1)	- Akanda pata	01
Malaria (5)	- Lazzaboti	03
	- Golnai	02
Constipation (1)	- Joyantiful	01

Annex-B

Detailed Findings of Chalan Beel Area Household Survey

Table - 1 Households Interviewed

Site	Total HH in the village	# of HH Interviewed
Nawkhada (Adjacent to River)	180	53
South Ramrama	148	53

Table - 2 Children's Anthropometric Measurement Taken

Site	#	% of total children
Nawkhada (Adjacent to River)	110	77.00
South Ramrama	131	86.00

Table - 3 Household Reported Prevalence of Malaria During Past Year

Site	#	%
Nawkhada (Adjacent to River)	10	18.87
South Ramrama	05	09.43

Table - 4 Household Reported Current Cases of Malaria

Site	#	%
Nawkhada (Adjacent to River)	04	7.55
South Ramrama	04	7.55

Table - 5 Prevalence of Malaria During Past Year

Site	#	%
Nawkhada (Adjacent to River)	16	5.05
South Ramrama	07	2.49

Table - 6 Malarial Point Prevalence

Site	#	%
Nawkhada (Adjacent to River)	7	2.21
South Ramrama	6	2.14

Table - 7 Household Reported Prevalence of Diarrohoea During Past Mongh

Site	#	%
Nawkhada (Adjacent to River)	12	22.64
South Ramrama	07	13.21

Table - 8 Household Reported Current Cases of Diarrohoea

Site	#	%
Nawkhada (Adjacent to River)	08	15.09
South Ramrama	08	15.09

Table - 9 Prevalence of Diarrhoea During Past Month

Site	#	%
Nawkhada (Adjacent to River)	14	4.42
South Ramrama	07	2.49

Table - 10 Hiarrhoea Point Prevalence

Site	#	%
Nawkhada (Adjacent to River)	07	2.21
South Ramrama	11	3.91

Table - 11 Household Reported Current Cases Blood Dysentery

Site	#	%
Nawkhada (Adjacent to River)	16	30.19
South Ramrama	14	26.42

Table-12 Blood Dysentery Point Prevalence

Site	#	%
Nawkhada (Adjacent to River)	21	6.62
South Ramrama	17	6.05

Table - 13 Household Reported Cases of Goiter

Site	#	%
Nawkhada (Adjacent to River)	01	01.89
South Ramrama	02	03.77

Table - 14 Goiter Point Prevalence

Site	#	%
Nawkhada (Adjacent to River)	01	00.32
South Ramrama	02	00.71

Table - 15 Household Reported Case of Night Blindness (Children upto the age of 15)

Site	#	%
Nawkhada (Adjacent to River)	07	13.21
South Ramrama	06	11.32

Table - 16 Night Blindness Among Children Point Prevalence

Site	#	%
Nawkhada (Adjacent to River)	09	6.08
South Ramrama	06	4.85

Table - 17 Household Reported Use of Iodized Salt

Site	#	%
Nawkhada (Adjacent to River)	1	1.89
South Ramrama	1	1.89

Table - 18 Household Reported Use of Tube Well Water

Site	#	%
Nawkhada (Adjacent to River)	50	94.34
South Ramrama	53	100.00

Table - 19 Prevalence of Undernutrition by Wt/Age <60% and Wt/Age <75%, Prevalence of Stunting Ht/Age <90% and Prevalence of Wasting Wt/Ht <80% at Nawakhada (Adjacent to River) and South Ramrama, May, 1992.

Site	Wt/Age <60%	Wt/Age <75%	Ht/Age <90%	Wt/Ht <80%
Nawkhada (Adjacent to River)	10.00	53.64	51.82	04.55
South Ramrama	10.69	64.12	48.85	14.50
Chilmary, April, 91	07.80	63.60	70.70	06.40

Table - 20 Household Respondent About Public Health Probles Due to Caused Due to Frequent Flooding at South Ramrama

Problems	Reasons	#
Diarrhoea (48)	- Contaminaed Water - Contaminated Food - Unhygienic Living Condition	38 05 05
Influenza (19)	- Contaminaed Water - Contaminated Food - Unhygienic Living Condition - Bad Weather	07 01 01 10
Blood Dysentery (8)	- Contaminated Water - Contaminated Food	
Goiter (3)	- Contaminated Water	02
Sabies (2)	- Unhygianic Living Condition	02
Gout (1)	- Contaminated Water	01
Malaria (1)	- Contaminated Water	01

Table - 21 Household Respondent About Public Health Problem due to Frequent Flooding at Nawkhada (Adjacent to River)

Problems	Reasons	#
Influenza (37)	- Contaminated Water - Bad Weather	15 22
Diarrhoea (28)	- Contaminaed Water - Contaminated Food - Unhygienic Living Condition	21 04 03
Dysentery (11)	- Contaminated Food - Contaminated Water - Unhygienic Living Condition	03 06 02
Scabies (10)	- Contaminated Water	10
Measles (4)	- Bad Weather	04
Jaundice (4)	- Bad Weather	04
Malaria (1)	- Contaminated Water	01
Gout 91)	- Bad Weather	01
Conjunctivities (1)	- Bad Weather	01

Table - 22 Prevalence of children with a MUAC < 12.5 cm and > 12.5 cm < 13.5 cm at Nawkhada (Adjacent to River) and South Ramrama, Rajshahi, May, 1992

Site	< 12.5 cm		> 12.5cm - < 13.5cm	
	#	%	#	%
Nawkhada (Adjacent to River)	15	13.64	36	32.73
South Ramrama	25	19.09	38	29.00
Chilmari, April '91		08.60		

Table - 23 Clinical Reports of the Children Under 5 years of Age at Nawkhada (Adjacent to River) and South Ramrama, Rajshahi, May 1992

Site	Condition Present				
	XN	Angular Stomatitis	Oedema	Anaemia	Scabies
Nawkhada (Adjacent to River)	0.91	11.82	4.55	25.45	14.45
South Ramrama	0.76	07.63	0.00	15.26	05.34

Table -24 Household Respondent about Herbal Health Practice at Nawkhada (Adjacent to River), May 1992

Disease	Name of the Herbal Plants	#
Influenza (10)	- Hoshti Palasha - Tulshi Pata - Shajna Pata	03 04 03
Paralysis (120)	- Khalo Duthra	07
Scabies (8)	- Nim pata	08
Diarrhoea (3)	- Babla Tree	03
Gout (3)	- Hati Shur	03
Injury (3)	- Lal Dakhaeth	03
Meanstrual Bleeding	- Lazzaboti Pata	03
Dysentery (2)	- Ahorjun	02
Conjunctivities (2)	- Tulshipata	02

Table - 25 Household Respondent about Herbal Health Practice at South Ramrama, may '92.

Disease	Name of the Herbal Plants	#
Scabies (19)	- Nim Tree - Kalna	14 05
Gout (9)	- Bath Tree - Hati Shur - Shajna Tree	06 02 01
Weakness (9)	- Ahorjun Tree - Bath Tree	08 01
Influenza (6)	- Tulshipata - Isshormul	05 01
Injury (2)	- Sundorban Tree	02
Dysentery (1)	- Bth Tree	01

PART 2
NAVIGATION

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GLOSSARY

Beel	:	Low land where water stands for long time in a year.
Hat, Ghat	:	Places where boats anchor for loading and unloading
Khal	:	Pool
Majhee	:	Leader of the crew in boat.
Sromik	:	Labour

ACRONYMS

BRE	:	Brahmaputra Right Embankment
FCD	:	Flood Control Drainage
GIP	:	Gaibandha Improvement Project
JRC	:	Joint River Commission: consisting of Bangladesh and Indian Govt. representative to mitigate problems regarding the share of water.
NER	:	North-East Regional mainly Sylhet, Kishorganj, Jamalpur, Sunamganj, Moulobibazar.
NWR	:	North-West Regional Consist of grater Pabna, Rajshahi, Bogra, Ranpur and Dinajpur.
TRE	:	Teesta Right Embankment

CHAPTER 1

INTRODUCTION

This study was carried out by Md. Shahid Ali (Consultant) as part of the environmental impact surveys for the North-West Regional (NWR) Study (FAP-2). The field surveys and data collection were carried out between May and August 1992. Feasibility level surveys were undertaken for Gaibandha Improvement Project (GIP). For the regional study it was decided to focus on the issues in the Lower Atrai as resources were insufficient to cover every planning unit in any detail. The navigation study was confined within the GIP area which covers five upazilas including Gaibandha Sadar, Sadullahpur and Sundarganj in Gaibandha district and Pirgacha and Kaunia in Rangpur district. The following provides assessments for both study areas together. Part 1 deals with the Regional Study and Part 2 with the GIP study.

1.1 Transport Systems and Their Development

The NWR covers the major part of Rajshahi Division and contains the high Barind tracts and the low-laying Teesta and Jamuna floodplains and the wetlands of Chalan Beel. The Jamuna and Padma rivers and a part of India surround the region. The Atrai, Korotoya, Baral, Barnai, Puran Jamuna with their distributaries, tributaries and floodplains provide the basis of the internal water network of the NWR. The region is also served by the main river routes of the Brahamputra and the Padma which forms the boundaries to the region. The NWR still has to depend to a considerable extent on its water ways.

Agricultural activities dominate in the NWR. Paddy, wheat, jute, sugar-cane, fruits and vegetables are the major agricultural products. Local industries have not developed here like Narayangonj or Khulna. A few agro-industries are established. Sugar mills, jute mills and cotton mills are big industries in the NWR. Handlooms in the only cottage industry but this is rapidly declining due to lack of patronage by government. There are hundreds of locally important small business centres on the banks of Atrai, Boral, Korotoa, Barnai.

The NWR, being completely agricultural with no major industrial centres, has not had a strong national emphasis for developing road transport. No significant metalled road has been built, although roads and railways are significant as infrastructure. Two parallel metal roads run from Nagarbari to Nawabganj and Nagarbari to Panchagar. One road links Bogra with Mohadevpur. There are two connecting roads between Baghabari - Nawabganj and Baghabari - Panchagar. Two diversion roads start from Bogra and Manda and meet at Natore and Rajshahi respectively. A few local towns are well connected with this metal road. Most Upazilas do not have easy access to the road networks. As most agriculture is in the interior these roads do not provide much help much to the sector.

In the dry season rice, paddy, sugarcane and other major crops are carried manually or by ox carts. But in the monsoon, when the area is submerged by flood water this sort of transportation is not possible. Even in the areas which do not submerge, the roads become completely muddy making them impossible for the ox carts to move. Other manual systems also become useless and only waterways can play the vital role in transportation and the country boats become a prime means of carrying cargo. All the trades, domestic activities and social visits are done by the country boats. In the remote parts of the Chalan Beel nobody can move without country boats. In the Barind, the situation does not become so hard, but transportation is very difficult. From the Lower Singra to Baghabari the people have to move by boats

for more than 5 months in a year. The Atrai, Puran Jamuna and Barnai are the main river routes, along which hundreds of hats and bazaars have been established, dozens of big business centres have flourished; but most of the centres are not connected with road communication. The farmers and the traders have been availing their own marketing facilities in these centres from long past. Figure 1. shows the business and port centres along each route. A list of the main centres going from North-West to South-East are as follows:

1) Balughat	2) Kaslipur	3) Rangamati	4) Patnitala
5) Katabari	6) Mohisbatan	7) Mohadevpur	8) Shibganj
9) Pathakata	10) Atrai	11) Kashibari	12) Shameshpara
13) Singra	14) Ekannobigha	15) Chanchkoir	16) Chikola
17) Astamonisha	18) Mirjapur	19) Demra	20) Baghabari.
21) Nakalia			

All the incoming and outgoing cargoes are being distributed to or from the centres through waterways. So the importance of the routes cannot be underestimated. Figure 2. and 3. show the seasonality of the main types of outgoing and incoming cargo.

1.2 The Importance of Country Boats

Country boats are the traditional mode of transport in many areas of the NWR. Historically, this vast informal sector formed the backbone of the country's transport sector and is part of Bengali culture, as evidenced in the writings of famous poet Jasimuddin. Before Partition country boat movements had few limits. Vessels plied from Calcutta in India, to Assam in the North via the Jamuna, and all over the then undivided Bengal. Nakalia was the most flourishing transit river port in the NWR. All agricultural commodities and incoming industrial commodities to and from the region were exported through this transit port and then were distributed and carried by the country boats to the hinterland river ports and business centres.

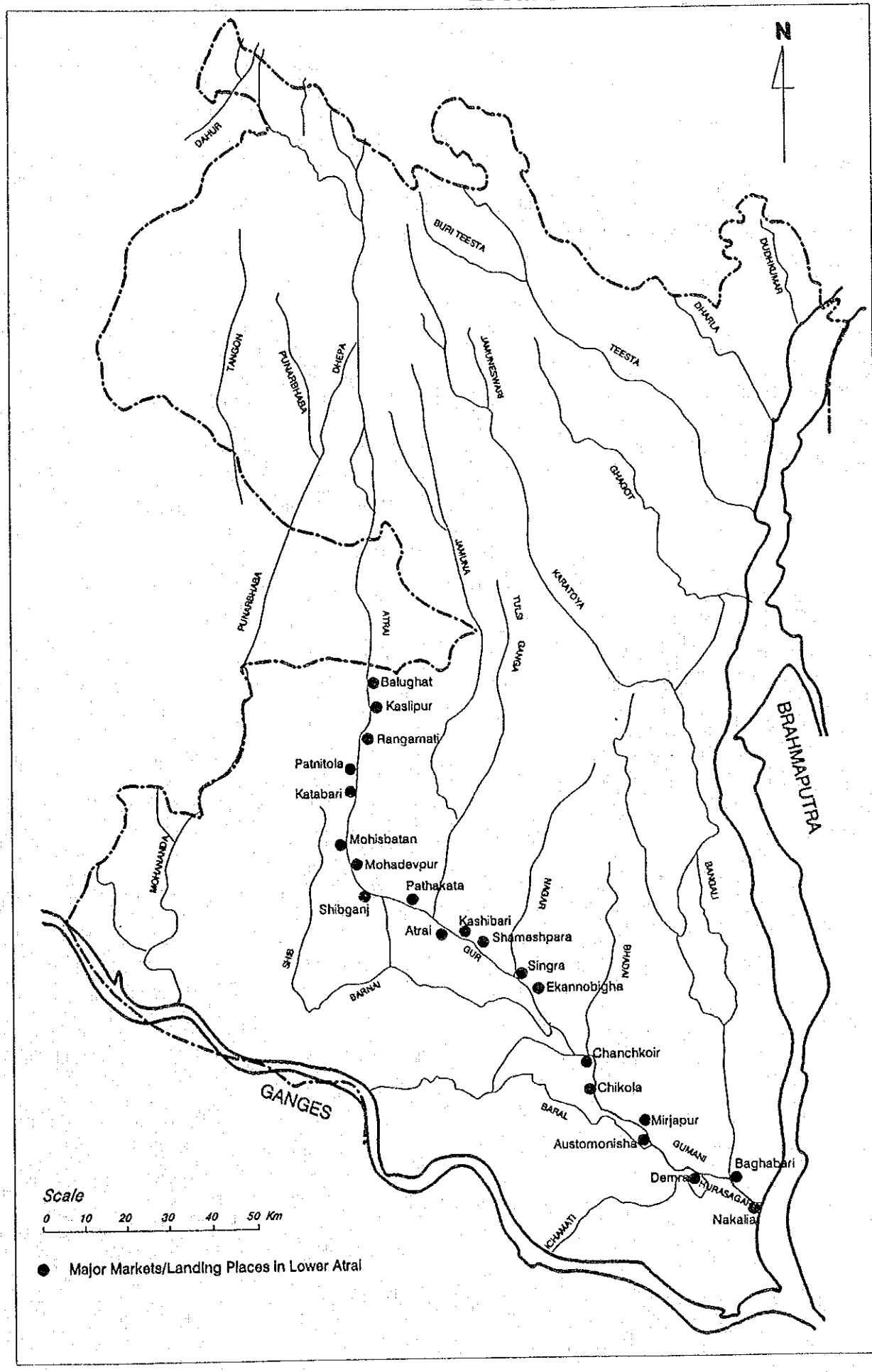
Before road transport was developed, this informal sector nationally supported 700,000 or more different types and size of vessels. They carried at least five times more cargo than all other modes of transport combined. Bera-Nakalia, Shahzadpur, Faridpur and Ullapara in Pabna, Khanpur in Bogra, Chilmary in Kurigram, Gurudashpur, Singra and Atrai in Rajshahi were famous for country boats. Malar, Chadi, Bhadi, Shoronga, Chip, Panshi, Ubory and Chowdhury types were the prominent boats.

In Bangladesh, railway, road and Government-run water transport are highly subsidized and are being modernized. The importance and role of country boats still cannot be under-estimated but has been neglected by government and donors alike until quite recently. This informal sector remains fundamental in transporting cargo, passenger carrying, fishing and social visits. Of the seven lac country boats more than 250,000 carry cargo, and others are used for passengers, fishing and domestic purposes. They provide jobs to millions of rural people and supported the livelihoods of millions of others.

The sector has the highest value added capacity to the national economy earning 55% to 60% profit. It also provides the country with low cost transport facility. There is no other mode that can carry cargo or passenger at such rate of freight. It is completely an indigenous sector. In comparison with other modes and government water transport services the involvement of foreign aid and money is very negligible. It has the highest accessibility to many remote parts of rural Bangladesh. Roads and railways so far have able to connect 20 - 25 % of the villages; but the country boats connect almost every village in the monsoon. This flexibility of country boats has made the sector popular.

Figure 1

Location of Hats in Lower Atrai



As raised in the Health Study for FAP 2 there are other major advantage which the country boat sector can offer. River boat ambulances would have major benfits to isolated rural people and could also assist local government and other institutions in carrying out rural development activities.

Figure - 2 Seasonality of Outgoing Cargo Goods

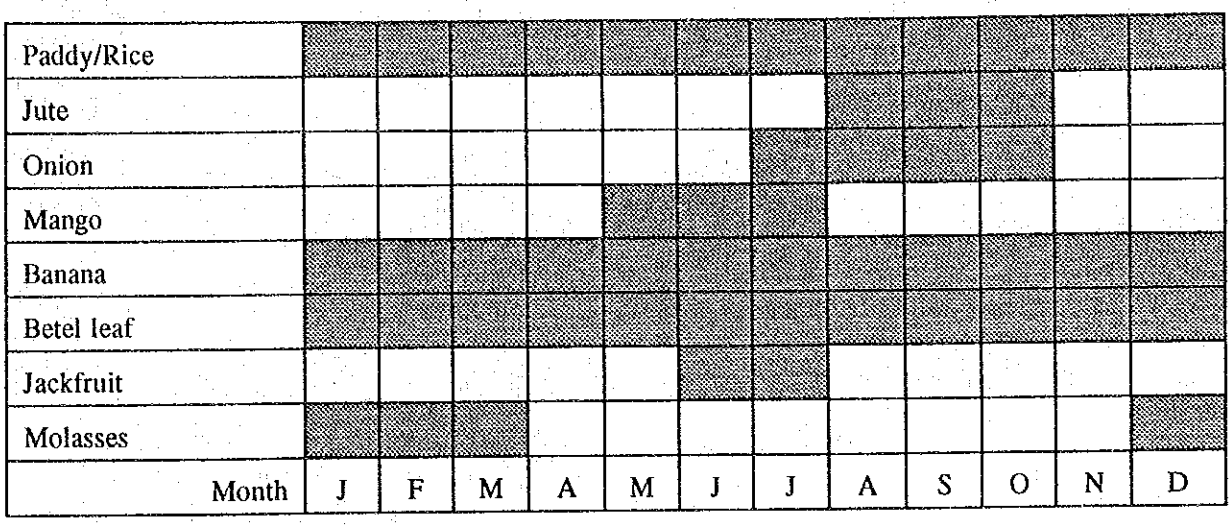
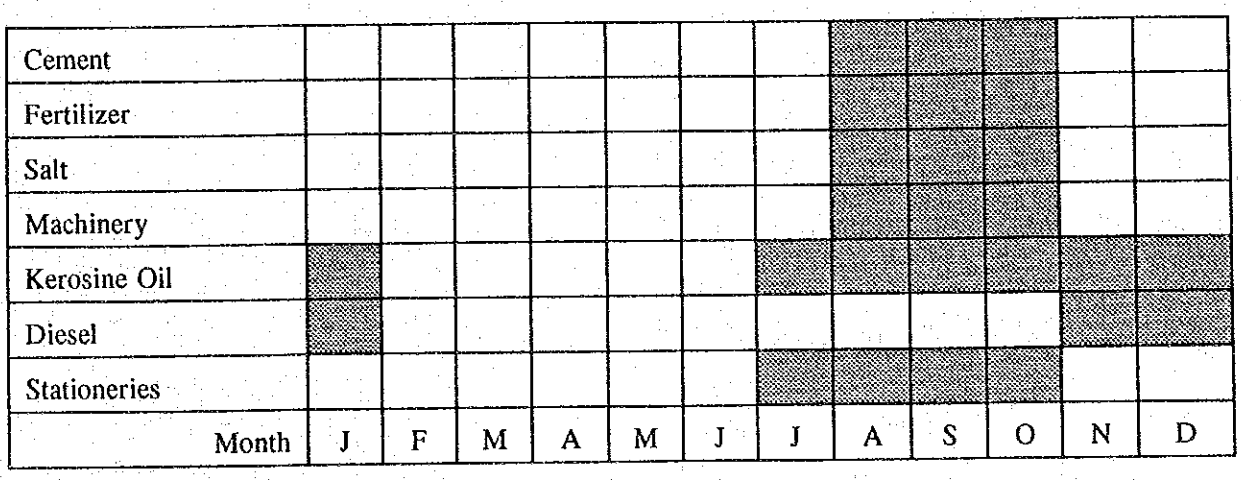


Figure - 3 Seasonality of Incoming Cargo Goods



* In the dry season from mid-October to mid-May most incoming and outgoing cargo is transported by truck. In the monsoon traders prefer to use country boat.

CHAPTER 2

NAVIGATION SYSTEM

2.1 General

Most rivers in the NWR meander in beds of fine, sandy material. Longitudinal sections show an irregular pattern of deep bends and shallow crossing. Most water ways are natural rivers and their navigability therefore is affected by the river morphology and hydraulics. For IWT planning, river behaviour needs a long term perspective, and a detailed knowledge of the interactive behaviour of river and drainage networks. The important routes, like Nagarbari-Badalgashi, Nagarbari-Patnitala via Baghabari have become completely useless during the dry season. The important route from Baghabari to Ghoraghat along the river Karotoya faces the same problem. The national IWT navigational standards specify that both routes should have minimum LAD of 1.5 meters. In practice the routes do not have the necessary minimum flow.

2.2 Route Classification

Major recognised navigation routes are classified by the Inland Water Transport Authority (IWTA) for route classification, Least Available Depth (LAD) and length. Navigation along other unrecognized routes includes the khals, canals and shallow lower parts of the rivers which connect the feeder routes and the business centres of the rural area. Non-routed short and long distance navigation during the rainy season in the flood plains including khals and beels which make a unique navigation system for the country boats connecting the villages, village markets and bazaars.

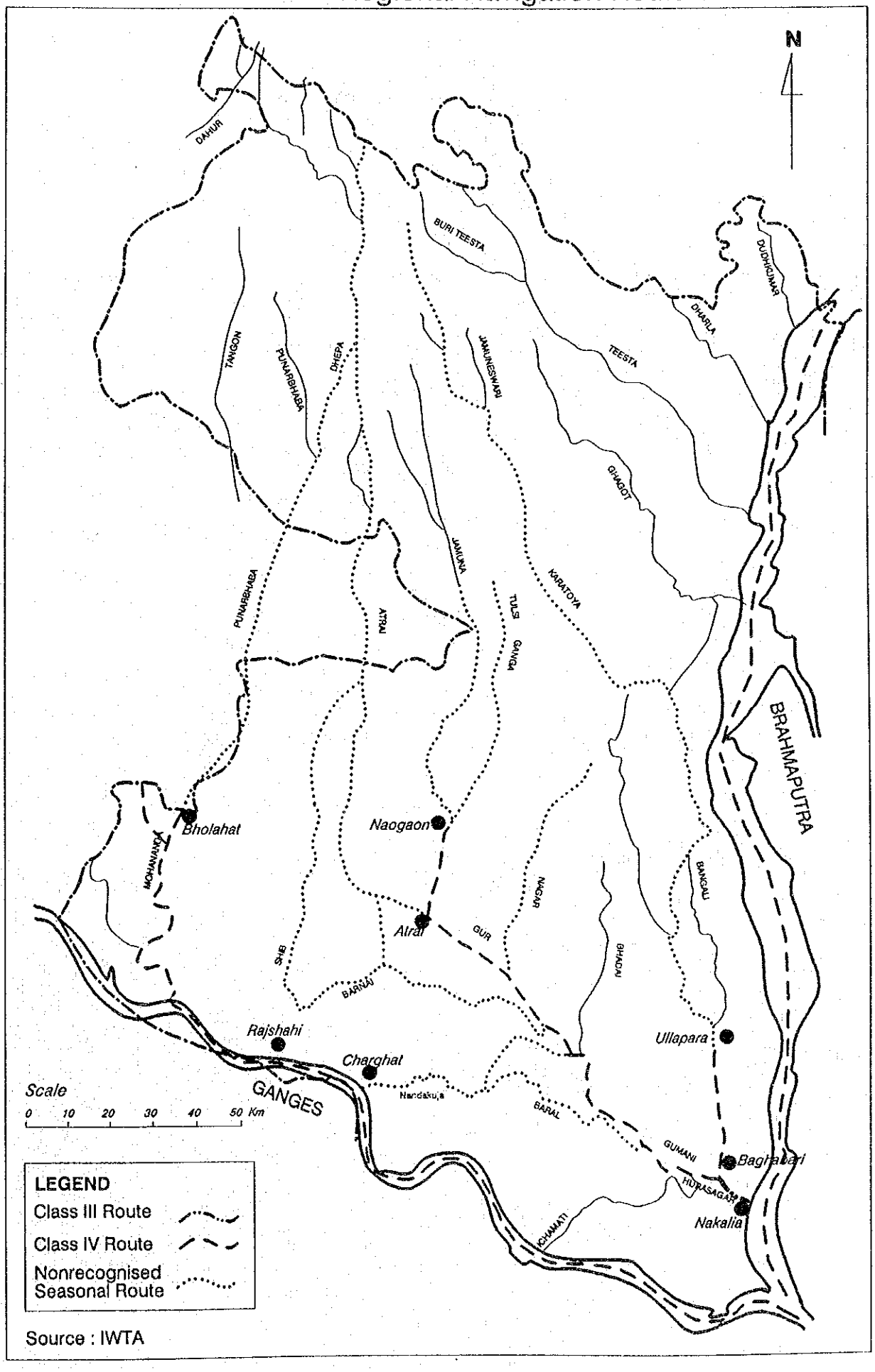
CLASSIFICATION		LAD (M)	National Length (Km)
1.	Perennial Routes that Connect the National Routes, the Sea Port and the Big River Routes	3.60 - 3.90	885 Km.
2.	Perennial Links with the Major Hinterland	2.10 - 2.40	1,000 Km.
3.	Unusual not Perennial Routes, Basically Transit or Feeder Routes Connecting Class 1 and 2 Routes	1.50 - 1.80	1,900 Km.
4.	Basically Seasonal Feeder Routes	1.5	2,400 Km.

In the monsoon all the low lying areas and the crop lands are considered as river routes for the country boat operation. There are no class 1 and class 2 routes in the NWR. A short stretch of 15 km of class 3 route does exist from Nakalia to Baghabari along the Hurasagar. There are 534 km of class four routes. Figure 4 indicates these routes as follows:

1 Aricha to Bholahat via Rajshahi Godagari through Padma and Mahananda - 307 Km
2 Aricha to Baghabari via Nagarbari and Nakalia through the Jamuna and Hurasagar - 32 Km
3 Baghabari to Badalgachi through the Baral, Gumani, Atrai and Puran Jamuna - 163 Km
4 Baghabari to Ullapara through the Koroyotoa - 32 Km

Figure 4

Regional Navigation Route Classification



Source : IWTA

2.3 Transport Cost Comparisons

The traders and Arotders data are shown in Table 2.1 concerning the cargo freight rates both by boats and trucks to and from different places. This shows that road transport is 30% to 50% more costly than the country boats. Table 2.2 shows the cost comparison between boat and truck in the wet season. Table 2.3 gives details on the operational costs for three typical boats. It can be seen that wet season competition from boats leads to a reduction in the freight rates charged by the truck sector which otherwise has a monopoly in the dry season.

Table - 2.1 Freight Distances and Dry Season Cost Comparisons in Lower Atrai

Route	Unit	Dist.	Cost		Cost	
		(Km)	(Tk./maund)		(Tk./maund/km)	
			Boat	Truck	Boat	Truck
Mohadevpur-Dhaka	Maund Rice	290	14-16	20-24	0.04-0.05	0.08-0.09
Singra-Dhaka	Maund Paddy	240	12-14	20-24	0.05	0.08-0.09
Mohadevpur-Chandpur	Maund Molasses	340	16-18	32-36	0.05	0.09
Naogaon-Naryangonj	Bell Jute	290	40-45	75-80	0.04-0.05	0.09-0.10
Taherpur-Dhaka	Maund Onion	280	12-14	24-26	0.03-0.04	0.06-0.07
Taherpur-Dhaka	Bundle Betel Leaf	280	16	28-30	0.05	0.10-0.11

Table - 2.2 Cost Comparison between Boat and Truck in the Wet Season

Cargo From	Cargo to	Distance (Km.)	Goods Transported	Freight Rate Tk/Mnd	Freight Rate Tk/Mnd	Taka/maund/m.	
				Boats	Truck	Boat	Truck
Mohadevpur	Dhaka	290	Rice	10.00	17.00	0.03	0.06
Singra	Dhaka	240	Paddy	9.00	15.00	0.04	0.06
Mohadevpur	Chandpur	340	-	-	-	-	-
Naogaon	Narayanganj	260	Jute	12.00	25.00	0.05	0.10
Taherpur	Dhaka	240	Onion	-	25.00	-	0.10
Taherpur	Dhaka	240	Betal leaf	12.00	30.00	0.05	0.13

Table - 2.3 Operational Cost for Three Major Boat Types, Their Income and Expense Distribution

Trip No.	Type of Boat	Size (Foot)	Capacity in Maunds	Cargo From	Cargo To	Cargo Weight (Maunds)	Total Freight (Taka)	Duration (Days)	Expenses (Taka)					
									Fuel	Oil	Spare Parts	Tax	Subscription	Food
1	Malar	57x15x35	1100	Baghabari	Norshindi	1050	6,777	8	2036	x	x	30	150	1,300
2	"	"	"	Norshindi	Nagarbari	800	4,000	7	1930	x	x	20	150	1,200
3	"	"	"	Bera	Gopaldi	1100	7,000	12	2050	x	x	30	150	1,000
4	"	"	"	Chandpur	Bera	1002	4,500	10	2000	x	x	30	100	900
1	Ghasi	40x11x03	350	Kapacia	Tongibari	286	2,860	6	434	17.5	x	20	35	320
2	"	"	"	Barmi	Madanganj	260	2,660	7	448	x	x	20	50	332
3	"	"	"	Raniganj	Fatulla	300	3,150	10	x	17.5	x	10	80	410
4	"	"	"	Palash	Danga	228	600	3	118	x	75	10	20	182
1	Kosha	50x08x1.5	150	Taherpur	Baghabari	110	1,400	3	600	x	x	10	50	100
2	"	"	"	"	"	110	1,400	3	600	x	x	10	50	110
3	"	"	"	"	"	110	1,400	3	600	x	x	10	50	100
	"	"	"	"	"	110	1,400	3	600	x	x	10	50	100

CHAPTER 3

COUNTRY BOAT OPERATIONAL REVIEW

3.1 Boat Numbers and Role

No data exists on the number of boats in the new district setup of the NWR. Four sources provide information on the number of country boats. For the country as a whole Jensen, E, et al report about 720,000. A National Oceanographic and Maritime Institute (NOAMI) study reports a total of 700,000. The agricultural census (1983/84) indicate a number of 890,000. The statistical year book (1986) records a total of boats 721,000. The statistical yearbook also provides more detailed breakdowns as shown in Table 3.1

Table - 3.1 Numbers of Country Boats by District in the NWR

District	No. Country Boats	
	1977	1983
Rajshahi	26,800	14372
Pabna	24,000	18995
Bogra	2,600	1722
Rangpur	12,800	5678
Dinajpur	542	301
Total	66,742	41266

Source: Statistical Yearbook 1986 for 1977 data and Agricultural Census 1988 for 1983 data.

The statistical yearbook records numbers of fishing boats in the region then as 7,977. Data collected from district sources for each Planning unit indicate current figures at around 11,000 fishing boats. It is estimated that 30 to 40% of households along Lower Atrai own a boat of one form or another. Fishing community often depend solely on their boats and nets for their means of livilihood. The statistical yearbook gives estimates that there are about 29,579 domestic boats owned by 35,000 families - some boats being in joint ownership. These boats roughly serve about 90,000 families.

Nationally, from the estimates of 720,000 boats in Bangladesh, the boat sector generates employment to some 2,000,000 people and provide livelihood for 3,000,000 families. From this it can be estimated that 16,000 commercial boat and 5,221 fishing boat in Chalan Beel area can jointly generate employment for 63,000 people and provide livelihood for 90,000 family. Meanwhile 29,579 domestic boat can generate services for more than 100,000 families. The statistical yearbook (1986) indicates some five thousand fishing families owing 5,221 fishing boat. These groups are dependent on the Atrai and other rivers, canals and khals (pools) in the Chalan Beel area.

From the field surveys local people interviewed gave the breakdown on the likely number in the Chalan Beel area as shown in Table 3.2. Table 3.3 gives the survey data for five specific centres visited on the numbers of boats during the monsoon season.

In the dry season the number of operation boats is considerably less than during the monsoon season. At this time those which are not operable for reason of blockages or draft problem are moored or sunk to keep their hulls wet. In the monsoon high water season operational boat numbers increase by three to four times in every centre. Also engines would be installed and boats from remote areas and big boats from Bera-Nakalia, Manikgonj, Dhaka would also become regular traffic. Table 3.4 shows the seasonal changes in transport types.

Table - 3.2 Number of Boat in Chalan Beel Area

Type	Commercial	Fishing	Domestic	Total
Approx. No.	@ 16,000	@ 5,221	29,579	50800
Cargo mnds 1977.	1,628,100			

Table - 3.3 Number of Boats at Five Centre Visited in Wet Season Survey (August 1992)

Centre	Type of Boats						
	Malar Type	Kosha Type	Ubory Type	Panshi Type	Chow-dhury	Other	Total
Mohadevpur	17	105	22	x	x	31	175
Atrai	7	72	39	x	5	105	227
Chanchkoir	26	250	x	180	x	107	563
Taherpur	x	102	x	x	x	25	127
Singra	17	122	x	45	x	39	223
Total	67	651	61	225	5	307	1,315

Table - 3.4 Seasonal Changes in Transport Types

Centre	Dry Season Trade Nov.-May.				Wet Season Trade Jun. - Oct.			
	Local		Inter-District		Local		Inter-District	
	Road	Water	Road	Water	Road	Water	Road	Water
Mohadevpur	90%	10%	100%	00%	50%	50%	10-20%	80-90%
Atrai	90-95%	5-10%	100%	00%	40%	60%	00%	100%
Chanchkoir	90%	10%	100%	00%	10%	90%	00%	100%
Taherpur	90%	10%	100%	00%	50%	50%	75%	25%
Singra	70%	30%	100%	00%	5%	95%	25%	75%

3.2 Country Boat Types

The boats seen in the Lower Atrai surveys are not big. Only a few Chowdhury (traditional Manjhee) types are large being 35'x15'x4' in size with a capacity of about 200-1,000 mds. These sized boats have faced difficulty in operating and have been in decline. Two big Chowdhurys seen in the surveys were in a very bad condition.

Other local types include the Ubory (presently called Kosha) Finish (known as Kosha in other parts of the country), Panshi, Chip, Dingi and Donga. Besides these, others like Malar, Palowary and Ghashi, visit the centres in the peak of the monsoon from June to October. Table No. 3.5 shows the size, capacity and operational period round the year. Figure 5 shows the seasonal movement of boats.

Table - 3.5 Country Boats Types in the Lower Atrai

Boat type	Size of Boat (ft x ft x ft)		Capacity (maunds)		Operational period
	From	To	From	To	
Finish	25x6x1.5	50x12x3	40	350	Jan - Dec
Ubori/Kosha	35x7x1.5	45x10x2	150	300	Jan - Feb Jun - Dec
Chowdhury	35x8x2	45x12x4	200	600	Jun - Dec
Panshi	45x7x2	55x10x2.5	150	300	Jan - Feb Jun - Dec
Chip	45x7x2.5	55x10x3	200	350	Jun - Dec
Malar	45x10x2.5	55x20x5.5	350	1500	Jun - Oct
Ghashi	35x10x3	45x15x4	300	600	Jun - Oct
Palo-wari	35x10x3	45x16	350	800	Jun - Oct
Dingi	20x4x1.25	35x6x2	15	40	Jan - Dec
Donga	12x3.5x.7	20x5x1.25	8	25	Jan - Dec