

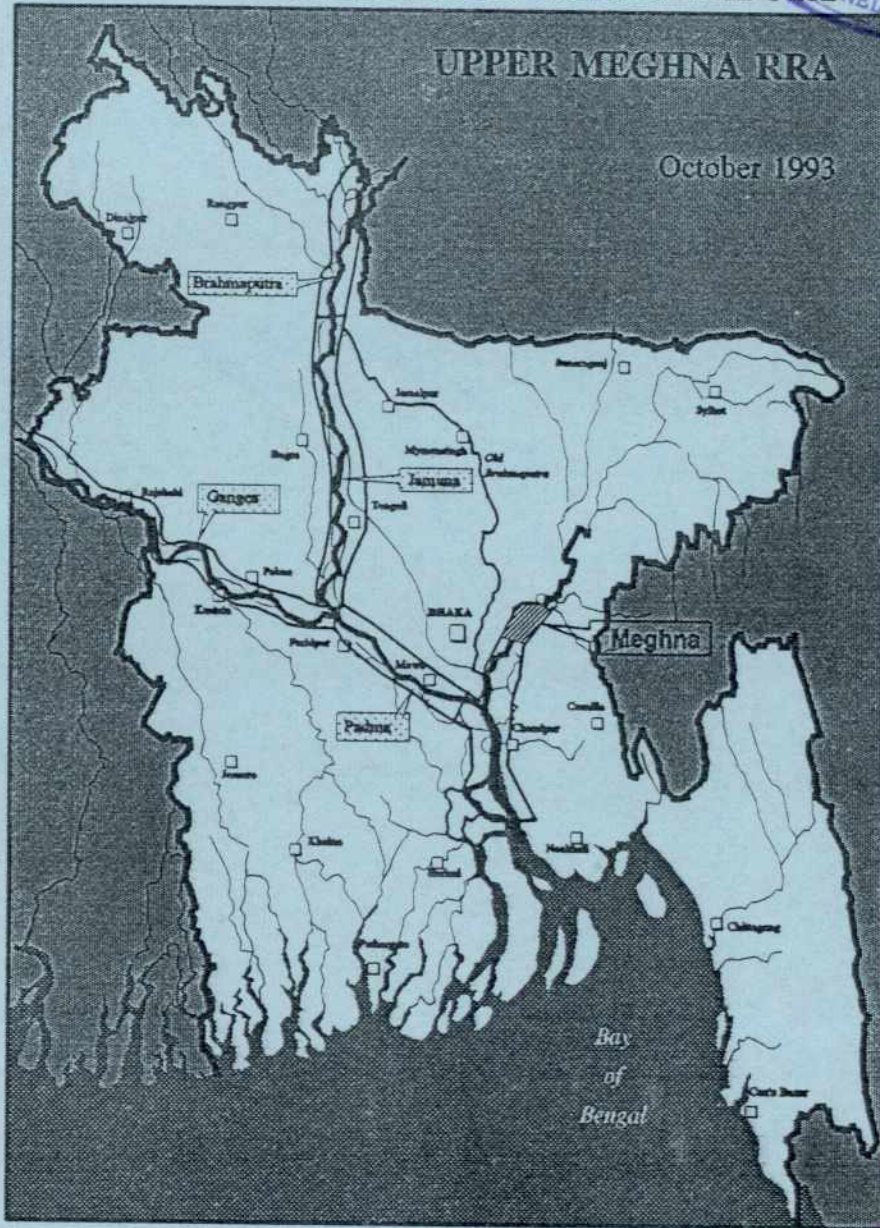
2e Call - 547  
FAP-16

27

2

# BANGLADESH FLOOD ACTION PLAN

Prepared for  
The Flood Plan Coordination Organization (FPCO)  
of the  
Ministry of Irrigation Water Development and Flood Control  
**CHARLAND STUDY SUPPORTING REPORT**



BN-434  
A-547

Environmental Study (FAP 16)  
Geographic Information System (FAP 19)

**ISPAN**  
IRRIGATION SUPPORT PROJECT FOR ASIA AND THE NEAR EAST  
Sponsored by the U.S. Agency for International Development

BANGLADESH FLOOD ACTION PLAN

**CHARLAND STUDY SUPPORTING REPORT:  
UPPER MEGHNA RRA**

**ENVIRONMENTAL STUDY (FAP 16)  
GEOGRAPHIC INFORMATION SYSTEM (FAP 19)**



Prepared for

The Flood Plan Coordination Organization (FPCO)  
of the  
Ministry of Irrigation Water Development and Flood Control

October 1993



**IRRIGATION SUPPORT PROJECT FOR ASIA AND THE NEAR EAST**  
Sponsored by the U.S. Agency for International Development



## TABLE OF CONTENTS

TABLE OF CONTENTS .....	iii
APPENDICES .....	v
TABLES .....	v
FIGURES .....	vi
PREFACE .....	vii
ACKNOWLEDGEMENTS .....	viii
GLOSSARY .....	ix
EXECUTIVE SUMMARY .....	xiii
Chapter 1 INTRODUCTION .....	1-1
1.1 Background to the Study .....	1-1
1.1.1 History .....	1-1
1.1.2 The Charland Study .....	1-2
1.2 Methods .....	1-2
1.2.1 Rapid Rural Appraisal .....	1-2
1.2.2 Field Method .....	1-4
1.3 Upper Meghna Region .....	1-6
1.4 Study Mauzas .....	1-8
NOTES .....	2-1
Chapter 2 SOCIOECONOMIC ORGANIZATION .....	2-1
2.1 Settlements .....	2-1
2.1.1 Settlement Pattern .....	2-1
2.1.2 House Types .....	2-3
2.1.3 Homestead Resources .....	2-3
2.2 Occupations .....	2-3
2.2.1 Occupational Structure .....	2-5
2.2.2 Laboring .....	2-6
2.2.3 Women's Paid Work .....	2-6
NOTES .....	3-1
Chapter 3 CHANGES IN LAND AND SETTLEMENT .....	3-1
3.1 Physical Changes .....	3-1
3.2 Erosion and Accretion Impacts .....	3-4
3.3 Land Rights .....	3-4
3.3.1 Background .....	3-4
3.3.2 Conflict between Kadmirchar and Bayer Char .....	3-5
3.3.3 Chalibhanga and Basania Darirchar .....	3-5
3.3.4 Nunertek Cluster Village .....	3-5



3.4	Social Organization of Response	3-6
3.5	Conclusions	3-6
Chapter 4	FLOOD HAZARD	4-1
4.1	Flood Frequency and Severity	4-1
4.2	Typical Flood Preparation and Response	4-1
4.3	1988 Flood Impacts	4-2
4.3.1	Warnings	4-2
4.3.2	Property Damage and Shelters	4-2
4.3.3	Livestock Impacts	4-4
4.3.4	Relief and Recovery	4-4
4.4	Potential Improvements and Interventions	4-4
4.4.1	General Preparation	4-4
4.4.2	Warning Improvements	4-5
4.4.3	Recovery	4-5
Chapter 5	AGRICULTURE	5-1
5.1	Introduction	5-1
5.2	Land Types	5-1
5.3	Cropping Patterns	5-3
5.4	Yields and Prices	5-4
5.5	Land Tenure and Land Prices	5-7
5.6	Floods and Other Problems	5-8
5.7	Potential for Improvements	5-8
Chapter 6	LIVESTOCK	6-1
6.1	Role of Livestock in Char Economy	6-1
6.2	Profile of the Livestock Resource	6-1
6.3	Fodder Resource	6-1
6.4	Commercialization of Livestock	6-3
6.4.1	Extent of Commercialization	6-3
6.4.2	Market Price of Livestock	6-3
6.4.3	Livestock Tenancy System	6-4
6.5	Livestock Problems	6-4
6.5.1	Flood	6-4
6.5.2	Livestock Diseases	6-4
6.5.3	Potential Improvements	6-4
Chapter 7	FISHERIES	7-1
7.1	Context	7-1
7.2	Who Is Fishing?	7-1
7.2.1	Incidence of Fishing	7-1
7.2.2	Lean Period Activities	7-2
7.2.3	Changes in Professional Fishing	7-2
7.3	Fish Resources, Practices and Rights	7-2
7.3.1	Fish Resources	7-2
7.3.2	Fishing Gear and Ownership	7-3
7.3.3	Fishing Rights	7-4
7.4	Incomes and Markets	7-5
7.5	Conclusions	7-5
7.5.1	Problems and Constraints	7-5
7.5.2	Future	7-5



Chapter 8	INSTITUTIONS, TRANSPORTATION, AND MARKETS	8-1
8.1	Institutions	8-1
8.2	Transport Facilities	8-3
8.3	Markets and Prices	8-3
8.3.1	Market Locations	8-3
8.3.2	Prices	8-4
8.4	Markets During Floods	8-4
8.4.1	Ananda Bazar	8-4
8.4.2	Chandanpur Bazar	8-6
8.5	Summary of Institutions, Transport, and Trade	8-6
Chapter 9	HOUSEHOLD WELFARE	9-1
9.1	Introduction	9-1
9.2	Water and Fuel	9-1
9.2.1	Water	9-1
9.2.2	Fuel	9-1
9.3	Food	9-1
9.4	Health	9-5
9.5	Overview	9-5
	NOTES	9-5
Chapter 10	PRIORITIES FOR INTERVENTIONS	10-1
10.1	Summary of Findings	10-1
10.2	Suggested Priorities	10-1
10.2.1	General Development	10-2
10.2.2	Erosion and Accretion	10-2
10.2.3	Flood	10-2
	REFERENCES	R-1

## APPENDICES

APPENDIX A	Detailed Agricultural Data	A-1
APPENDIX B	Access to Main Marketplaces	B-1

## TABLES

Table 1.1	Mauzas by Predominant Land Type in Upper Meghna Study Region	1-5
Table 1.2	Population and Area of Study Region	1-6
Table 2.1	Villages and Number of Households in Surveyed Mauzas	2-2
Table 2.2	House Type According to Char Type	2-1
Table 2.3	Primary Occupations of Households in Dry and Wet Seasons	2-4
Table 2.4	Main Work of Day Laborers by Season	2-5
Table 2.5	Daily Wages for Day Laborers	2-5
Table 3.1	Bank Erosion and Accretion 1984-93 in Study Region	3-1
Table 3.2	Erosion and Accretion in Focus Villages	3-3
Table 4.1	Damage to Houses in 1988 Flood	4-2

Table 4.2	Sheltering Strategies During 1988 Flood . . . . .	4-3
Table 4.3	Attitude to Flood Warning Improvement . . . . .	4-5
Table 5.1	Soil Types in Focus Mauzas . . . . .	5-1
Table 5.2	Mauza Areas and Percentage Under and Above Water in Dry Season . . . . .	5-2
Table 5.3	Land Use Patterns . . . . .	5-2
Table 5.4	Distribution of Agricultural Land by Elevation and Flood Depth . . . . .	5-3
Table 5.5	Typical Cropping Intensity Reported by Farmers . . . . .	5-4
Table 5.6	Summary of Cropping Patterns by Land Type . . . . .	5-5
Table 5.7	Summary of Yields and Harvest Prices of Main Crops . . . . .	5-6
Table 5.8	Land Prices in Focus Mauzas (Tk./ha) . . . . .	5-7
Table 5.9	Floods Affecting Crops in the Past 10 Years . . . . .	5-9
Table 6.1	Approximate Numbers of Livestock by Season and Mauza . . . . .	6-2
Table 6.2	Main Sources of Fodder in Meghna Char Area . . . . .	6-2
Table 6.3	Pattern of Commercial Livestock Enterprises by Village/Mauza . . . . .	6-3
Table 6.4	Market Price of Livestock by Mouza . . . . .	6-4
Table 7.1	Professional Fishermen and Fishing Types . . . . .	7-1
Table 7.2	Characteristics of Fishing Grounds . . . . .	7-3
Table 7.3	Details of Fishing Gear in Operation in Nunertek Mauza . . . . .	7-4
Table 7.4	Value of Typical Catch and Fishermen's Income by Gear Type . . . . .	7-5
Table 8.1	Percentage of Study Region Mauzas with Infrastructure and Facilities . . . . .	8-1
Table 8.2	Accessibility of Government Offices from Surveyed Mauzas by Char Type . . . . .	8-2
Table 8.3	Boat Ownership Patterns by Char Type . . . . .	8-3
Table 8.4	Average Market Price for Selected Commodities . . . . .	8-4
Table 9.1	Sources of Drinking Water . . . . .	9-2
Table 9.2	Seasonal Fuel Use . . . . .	9-3
Table 9.3	Seasonal Variation in Number of Meals Eaten . . . . .	9-3
Table 9.4	Health Care Services in Selected Mauzas . . . . .	9-4

## FIGURES

Figure 1.1	Charland Study Location . . . . .	1-3
Figure 1.2	Charland Classification . . . . .	1-4
Figure 1.3	Study Area Base Map . . . . .	1-5
Figure 1.4	Location of RRA Study Mauzas . . . . .	1-7



## PREFACE

This report is one in a series of reports covering the immediate riverine lands of the major rivers of Bangladesh—the Jamuna, Ganges, Padma, and Meghna. Riverine charlands are defined in this study as areas frequently subject to erosion and accretion within and adjacent to the main rivers of Bangladesh and unprotected by embankments. This report presents the results of a rapid rural appraisal designed to provide social and economic information to support the inventory of population and resources in the Upper Meghna River charlands. The study was carried out by ISPAN under Flood Action Plan Supporting Studies FAP 16 (Environmental Study) and FAP 19 (Geographic Information System).

The full set of reports is shown in the table below.

Overview Reports	Inventory Reports	Supporting Reports
Summary Report		
Socioeconomic Overview		
	The Dynamic Physical and Human Environment of Riverine Charlands: Brahmaputra-Jamuna	Upper Jamuna (Brahmaputra) RRA Middle Jamuna RRA
	The Dynamic Physical and Human Environment of Riverine Charlands: Meghna	<i>Upper Meghna RRA</i> Meghna Confluence RRA
	The Dynamic Physical and Human Environment of Riverine Charlands: Padma	Padma RRA
	The Dynamic Physical and Human Environment of Riverine Charlands: Ganges	Ganges RRA
	Charland Flood Proofing	

## ACKNOWLEDGEMENTS

The production of this report, the result of a team effort involving many of the staff of FAP 16, was overseen by Dr. Keith Pitman, Chief of Party, ISPAN.

The study was jointly coordinated by Dr. Mustafa Alam and Dr. Suzanne Hanchett. It involved very intensive fieldwork under rather difficult circumstances, and those who performed this work are gratefully acknowledged. The contents of the report are based primarily on information obtained from people living in the charlands, all of whom were extremely helpful in patiently providing the necessary information. Interviews were also held with government officials and NGO field workers. The cooperation of all these participants is also gratefully acknowledged.

We are grateful to the Flood Plan Coordination Organization and to its Panel of Experts for providing overall direction to this study.



## GLOSSARY

acre	-	Acre = 0.4047 ha
aman	-	Late monsoon season paddy planted before or during the monsoon and harvested November-December
amin	-	Land surveyor
arat	-	Wholesale shop
aratdar	-	Wholesale trader with warehouse
aus	-	Early monsoon paddy planted in March-April and harvested in June-July
B. aman	-	Broadcast aman paddy, usually grown in deeper water
bangsha	-	Lineage-mates
BARC	-	Bangladesh Agricultural Research Council
bari	-	A homestead, usually consisting of more than one structure arranged around a central common area
BBS	-	Bangladesh Bureau of Statistics
BDR	-	Bangladesh Rifles
beel	-	An area of open water away from a river
bhatiya	-	People from downstream
BIDS	-	Bangladesh Institute of Development Studies
bigha	-	A local unit of area most commonly equalling 0.33 acre or 0.14 ha
bir	-	Stable
boro	-	Dry season paddy transplanted in December-January and harvested in April-May
BRAC	-	Bangladesh Rural Advancement Committee
BTM	-	Bangladesh Transverse Mercator (map projection)
BUET	-	Bangladesh University of Engineering and Technology
bustee	-	Slum
BWDB	-	Bangladesh Water Development Board
catkin grass	-	<i>Saccharum</i> spp. grasses that are prevalent in the charlands
chaura	-	Original settlers in the Ganges char areas
china	-	<i>Panicum miliaceum</i> , a variety of millet
chowki	-	Bed/platform
cumecs	-	Cubic meters per second
dacoit	-	Bandit
dal	-	Any of a variety of pulses (lentils); a high-protein food staple usually eaten with rice
decimal	-	Unit of area equal to 0.01 acre
denga	-	Land near a river
desh	-	State
deshi	-	Original settlers in Ganges char area
DEM	-	Digital elevation model
dhaincha	-	<i>Sesbania aculeata</i> , a nitrogen-fixing plant used as live fencing, fuel, and building material
diara	-	The low bank of a river
district	-	A large administration unit under the authority of a Deputy Commissioner, now known as a zila
doba	-	Submerged
EIA	-	Environmental Impact Assessment
FAP	-	Flood Action Plan

FCD/I	-	Flood Control and Drainage or Flood Control, Drainage, and Irrigation
<i>fitkiri</i>	-	Alum
FPCO	-	Flood Plan Co-ordination Organization
FWC	-	Family Welfare Centre
GIS	-	Geographic Information System
GPS	-	Global Positioning System
<i>goalā</i>	-	Person trading in dairy products
<i>gur</i>	-	Locally produced molasses
<i>gushti</i>	-	Lineage-mates
<i>haor</i>	-	Deeply flooded basin of NE Bangladesh
<i>hat</i>	-	Periodic market
hectare (ha)	-	Hectare = 2.4711 acres
<i>hogla</i>	-	A bulrush ( <i>Typhus angustata</i> ) used for making mats
HSC	-	Higher Secondary Certificate
HTW	-	Hand tubewell
HYV	-	High Yielding Variety
ISPAN	-	Irrigation Support Project for Asia and the Near East
<i>jangal</i>	-	Ground cover shrubs used for fuel and as herbs
<i>jhau</i>	-	Tamarisk bush used as fuel and an herb
<i>jotedar</i>	-	Landlord
JPPS	-	Jamalpur Priority Project Study
<i>kabiraj</i>	-	Traditional healer
<i>kaisha</i>	-	A variety of catkin grass ( <i>Saccharum spontaneum</i> ) giving three cuttings a year
<i>kani</i>	-	Local unit of measure equal to .13 ha (.33 acres)
<i>karati</i>	-	Saw operator
<i>kash</i>	-	<i>kaisha</i>
<i>kayem, kayemi</i>	-	Permanent, old, or established
<i>kaon</i>	-	Fox-tail millet
<i>khas</i>	-	Publicly owned
<i>kheya</i>	-	Local boat landing point
<i>khal</i>	-	A drainage channel or canal either natural or man-made
<i>kharif</i>	-	Summer/wet season
kilogram (kg)	-	Kilogram = 1.11 sheer
kilometer (km)	-	Kilometer = 0.625 miles
<i>kutcha</i>	-	Flimsy construction of a temporary nature, in the chars usually of grass, bamboo, straw, or similar materials
<i>lathiyāl</i>	-	A stick-wielding private army employed to carry out the will of a locally powerful leader
<i>macha</i>	-	A raised platform
<i>mashkalai</i>	-	A type of pulse (lentil); see <i>dal</i>
<i>matbar</i>	-	Leader of the local community
maund	-	A unit of weight, 1 Maund = 40 sheer = 37.5 kilograms
mauza	-	A village revenue collection and cadastral mapped unit
MCSP	-	Multipurpose Cyclone Shelter Program
mile (mi)	-	Mile = 1.6 kilometers
MPO	-	Master Plan Organization (of Ministry of Irrigation Water Development and Flood Control), now called WARPO (see below)
MSS	-	Multi-Spectral Scanner (Landsat satellite sensor)





<i>musur</i>	-	A type of pulse (lentil); see <i>dal</i>
<i>nara</i>	-	Straw
NGO	-	Non-Government Organization
PACT	-	Private Agencies Collaborating Together
<i>paiker</i>	-	Wholesale trader
<i>para</i>	-	Neighborhood
PoE	-	Panel of Experts (of FPCO)
<i>pourashava</i>	-	a municipality, usually the urban center of a district
<i>pucca</i>	-	Sturdy construction of a permanent nature, usually of such materials as brick, concrete, or corrugated iron sheets
<i>rabi</i>	-	Winter/Dry Season
RDRS	-	Rangpur Dinajpur Rural Service (an NGO)
REIS	-	Riverbank Erosion Impact Study
return period	-	average interval in years between floods of a given magnitude
RRA	-	Rapid rural appraisal
<i>sadar</i>	-	The urban core (administrative headquarters town) of a thana or district
<i>salish</i>	-	local informal court
<i>samaj</i>	-	Society, community; a formal arrangement between members of a community whereby each member has certain rights and privileges
<i>sarik</i>	-	Lineage-mates
SCI	-	Service Civil International (an NGO)
<i>shabuk</i>	-	Ancient
sheer	-	A unit of weight = 1/40 maund = 0.94 kg
<i>shon</i>	-	A variety of grass ( <i>Imperata cylindrica</i> ) giving one cutting a year; also a generic term for thatching grass
SPARRSO	-	Space Research and Remote Sensing Organization
SPOT	-	System Pour Observation de la Terre
SRDI	-	Soil Resources Development Institute
SSC	-	Secondary School Certificate
<i>tahsil</i> office	-	Local land record and survey office
Taka (Tk.)	-	Bangladesh currency, US\$ 1 equalled approximately Tk. 40 in late 1992-early 1993
T. aman	-	Transplanted aman paddy
thana	-	A sub-division of a zila, or district
<i>til</i>	-	Sesame ( <i>Sesamum indicum</i> )
<i>tishi</i>	-	Linseed
TM	-	Thematic Mapper
ton	-	An imperial ton = 1,016 kg
union	-	Sub-division of a thana
upazila	-	Previous name for a thana (subdivision of a zila or district)
<i>ustha</i>	-	Bitter gourd ( <i>Momardica charantia</i> )
<i>uthuli</i>	-	An informal contract between a landholder and a temporary migrant, under which the migrant is allowed to shelter on the landowner's property in exchange for labor services
WARPO	-	Water Resources Planning Organization
<i>zamindar</i>	-	Landlord
zila	-	A large administration unit formerly known as a district

22





## EXECUTIVE SUMMARY

The chars and mainland adjacent to the main rivers are prone to the twin hazards of floods and erosion, which destroy crops, homesteads, and land, and bring death and suffering to their inhabitants. This rapid rural appraisal (RRA) investigated social and economic conditions in an area of island chars and nearby mainland (including mainland separated from adjoining areas by secondary channels) in the Upper Meghna River upstream of the Meghna bridge.

The study found that the area is relatively stable compared with charlands in the other rivers or even downstream in the Meghna. The char people in this area are quite well endowed with resources, although they also face hardships from floods and erosion. Agricultural productivity in these island chars is not notably different from the nearby mainland, although the island chars have less high land and the higher land that they have is less intensively cultivated. Even so, those who have land appear to get reasonable returns. The farming system also supports commercial livestock rearing, which is widespread and makes use of what would otherwise be seasonal surpluses of grazing land and crop byproducts to fatten cattle for market. Poorer landless households have limited access to this enterprise, as credit for this business is not available, and they may have problems getting access to grazing. There are some opportunities for them through raising animals on a share basis, but there appears to have been little attempt to encourage livestock rearing.

Farmers and landless households alike also have access to fish. This reach of the Meghna is an important fishery, and the majority of island char households get some part of their livelihood from fish for at least part of the year. This helps to explain a fairly low incidence of seasonal out-migration by the landless to find work. Instead, they can work on a share basis operating the fishing gear of others. The agricultural products, livestock, and fish produced in the area provide a surplus that reaches outside markets, principally

Dhaka, and pays for manufactured goods, bamboo, and some foods that come into the area.

The Upper Meghna char people suffered serious losses in the 1988 flood, but they are well adjusted to lesser floods. Homesteads are raised and on generally stable land, and there have been few losses since 1988. Rises in water level can be sudden on the Meghna, and there seemed, from the opinions of people and information on their past experiences, to be potential gains from improved flood warnings.

Erosion and accretion are occurring in the area, but at a much more gradual and predictable rate than on the Jamuna, progressively affecting a few households each year in a given location. Displacement due to erosion tends to be localized, and few households have reportedly left the area, despite the negligible chance that their land will re-emerge. This may be because the wealthier households are able to buy land nearby when they perceive erosion may happen, but mainly it is because people can still make a living from fishing in the river areas where they have traditional fishing rights. Land disputes were found in newly accreted areas, and mainly arose where mauza (and thana) boundaries were unclear. An attempt to distribute *khas* land to erosion victims appeared to have been channelled to the advantage of local power interests.

The Meghna Road Bridge, by improving road communications, may bring some economic development to the area, but it will not solve hazard-related problems. Measures that could help the Upper Meghna char people include: improving flood warning messages; developing a network of livestock health workers; raising mounds to shelter cattle during floods; flood proofing public buildings; improving char people's access to credit for livestock rearing and fishing; and more equitable local distribution of what little accreted land there is to help erosion victims remain in their home areas.

## Chapter 1

### INTRODUCTION

#### 1.1 Background to the Study

##### 1.1.1 History

The original design of the Flood Action Plan (World Bank, 1989) included among its components a socioeconomic study of the active floodplains of the Brahmaputra-Jamuna, Ganges, Padma, and Meghna rivers. The active floodplain was defined at that time as areas within the main river channels and nearby areas of mainland, both of which are frequently subject to erosion and accretion and cannot be protected from floods. The aims of the active floodplain study were to:

- assess present agricultural practices, settlement patterns, and disaster responses;
- estimate the number of affected households living on chars (mid-channel islands created by accretion) and within a short distance of the riverbanks;
- estimate the number of households living on existing embankments; and
- prepare guidelines to be used in feasibility studies to ensure that in project planning full account is taken of the active floodplain populations.

As the detailed terms of reference (TOR) of FAP 14, the Flood Response Study, were being drawn up by the government of Bangladesh and finalized with donor agencies, it became apparent that the intended study would not immediately be possible. A more general study first needed to establish—for the full range of flood environments inside and outside the chars—the context in which flood response occurred. In addition, the active flood-

plain study required the use of remote sensing data and satellite image interpretation, but the facilities and trained staff to achieve this within the FAP would not be ready until at least late 1991.

During 1991, the first full year of FAP studies, it became clear that regional studies were unable to devote sufficient resources to the specialized work of socioeconomic study of the active floodplain. Most used the main rivers as their study area boundaries. Of the regional FAP studies only FAP 3.1, the Jamalpur Priority Project, attempted detailed socioeconomic studies in the chars, investigating those along the reach of the Jamuna adjacent to the project in 1992 (see Section 1.1.4). In addition, FAP 14, the Flood Response Study, carried out socioeconomic surveys in 10 active floodplain villages.

Finally, in 1992 on advice from the Flood Plan Coordination Organization (FPCO) ISPAN agreed to undertake an inventory of resources and people in the main river charlands. This study, then, fulfills the need—foreseen in the Government of Bangladesh/World Bank Flood Action Plan of 1989—for a socioeconomic study of the people and resources of the active floodplain. Although it does not consider in detail the populations living long-term on embankments along the main rivers, analysis of erosion and accretion patterns has been added.

The inhabitants of the charlands are among the most hazard-prone people of Bangladesh, exposed as they are to floods and erosion. Structural flood protection measures are unlikely to benefit these people, and embankments may even raise flood



20

levels within the charlands, increasing the risks to which they are exposed. Reliable information about these areas and the people who live in them has always been scarce. The difficulty of gaining access to chars and their constantly changing environment has made studying them a complicated undertaking. As a result, prior to this study, what little information was available did not cover in any detail all the main river charlands.

### 1.1.2 The Charland Study

The Charland Study is a special study under the Bangladesh Flood Action Plan (FAP). It was executed jointly by FAP 16, the Environmental Study, and FAP 19, the Geographic Information System (GIS), both of which are undertaken by the Irrigation Support Project for Asia and the Near East (ISPAN) and funded by USAID.

This study has two objectives. The first is to develop databases and a geographic information system (GIS) that can be used as planning tools both for direct interventions in the charlands and for other interventions (such as embankments) that may affect the char areas. The second objective is to use the data collected, along with additional socioeconomic studies, to make general policy recommendations for the charlands and to test and develop means of rationally assessing the potential benefits of flood proofing measures in these areas.

The objectives have been addressed with five tasks.

- Making an inventory of resources, people, and infrastructures in the Brahmaputra-Jamuna, Meghna, Padma, and Ganges charlands and collecting additional information on hazards (led by FAP 16).
- Using digital satellite images to analyze physical changes and land use in these areas, and integrating this analysis with inventory data using a GIS (FAP 19).
- Conducting supplementary socioeconomic studies using rapid rural appraisal (RRA) methods in six river reaches (building on the Flood Response Study, FAP 14).

- Conducting detailed studies of flood losses and flood proofing potential in two areas along the Jamuna River (building on the Flood Proofing Study, FAP 23).
- Integrating the results of the above tasks into a comprehensive report.

This is a report of the findings for one of the six rapid rural appraisal (RRA) study areas—the Meghna (Figure 1.1 shows the charland per study areas).

## 1.2 Methods

### 1.2.1 Rapid Rural Appraisal

RRA methods are essentially non-quantitative, consisting of direct observation and the collecting of qualitative information from key informants or small groups in representative study area villages. The information gathering method is systematic but open-ended, and is based on standard checklists that cover all the main subject areas investigated. The information collected is cross-checked and verified with a range of additional informants and sources. Locational biases are circumvented by visiting both remote and more accessible areas, and socioeconomic biases are avoided by covering groups such as women and the landless whose opinions might otherwise not be heard. Using this iterative process of questioning and expert judgment, an experienced team of specialists from a variety of disciplines can build up a base of reliable information.

The RRAs of the Charland Study have the additional advantage of access to quantified data from the charland inventory and GIS. These data have been integrated where appropriate.

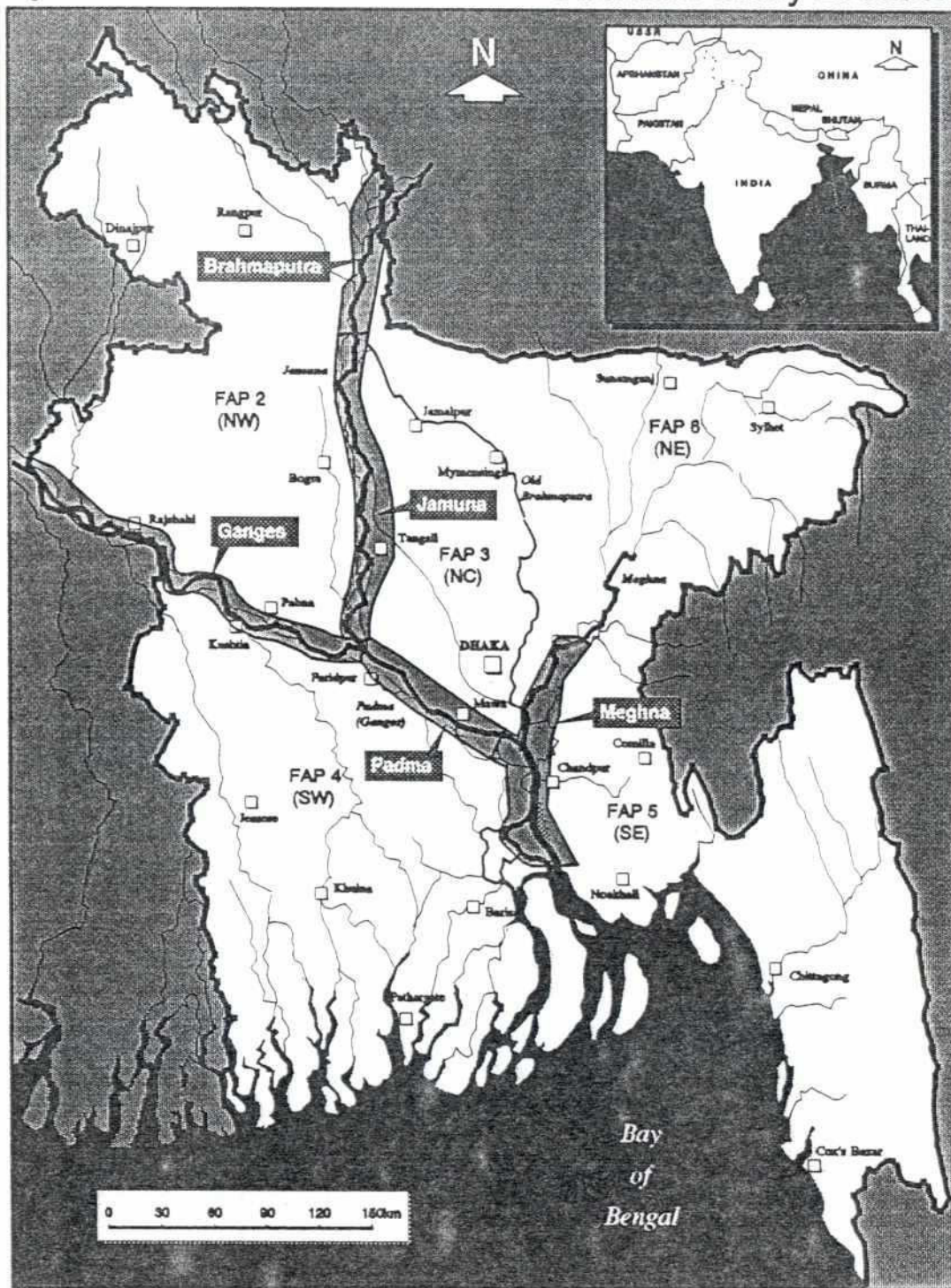
### 1.2.2 Field Method

The RRA team included specialists in: geography, economics, social anthropology, and engineering. A preliminary reconnaissance visit was made in February 1993, and the field work, which was based in Sonargaon village, took place in April



Figure 1.1

# Charland Study Location



bird-4-c.jpg



and May. The primary sources of information in the villages studied were key informants including knowledgeable farmers, members and ex-members of union parishads, schoolteachers, fishermen, traders, landless people, and women. Since access was by boat, it was not possible to walk transects through the area.

Charland has been classified in this study as shown in Figure 1.2. An island char is land that, even in dry season, can only be reached by crossing a main river channel. Attached charland may require a crossing of a lesser channel. Unprotected mainland has no embankment between it and the main river and is inundated during floods. There are no embankments in the Upper Meghna area, but there are areas of long-established land that, although otherwise similar to mainland, are separated from the mainland by channels of the Meghna. These were termed "detached mainland." A mauza's category was determined by analyzing the March 1993 Landsat image of the area. There is little attached charland in the Upper Meghna study area (see Table 1.1), and the detached mainland was very similar to the unprotected mainland. The RRA therefore concentrated on island char mauzas (five of the eight mauzas selected), and visited only one mauza in each of the other land type categories.<sup>1</sup> For the purposes of comparison with

island mauzas, the attached char, detached mainland, and unprotected mainland mauzas are grouped together under mainland in this report.

Most of the mauzas visited contain a number of villages (with the exception of Chengakandi and Paikpara which, although two mauzas, are *paras*, or neighborhoods, of the same village). The team normally split up in a mauza and each specialist collected information on his or her subject area. Where possible this was done for the entire mauza, but it often concentrated on the experiences of the inhabitants of a particular village or *para*. The discussions and tables in this report therefore refer to villages, *paras* or mauzas, as appropriate. In this way important differences between villages could be explored and more general information about the mauza could be cross-checked between different groups of informants.

### 1.3 Upper Meghna Region

The study region is located along the Meghna River opposite and upstream of Baidyer Bazar and Sonargaon, about 30 km northeast of Dhaka (Figure 1.3). The Meghna Road Bridge is its southern limit, and the large island char of Kalapatharia Union is its northern limit. The area was

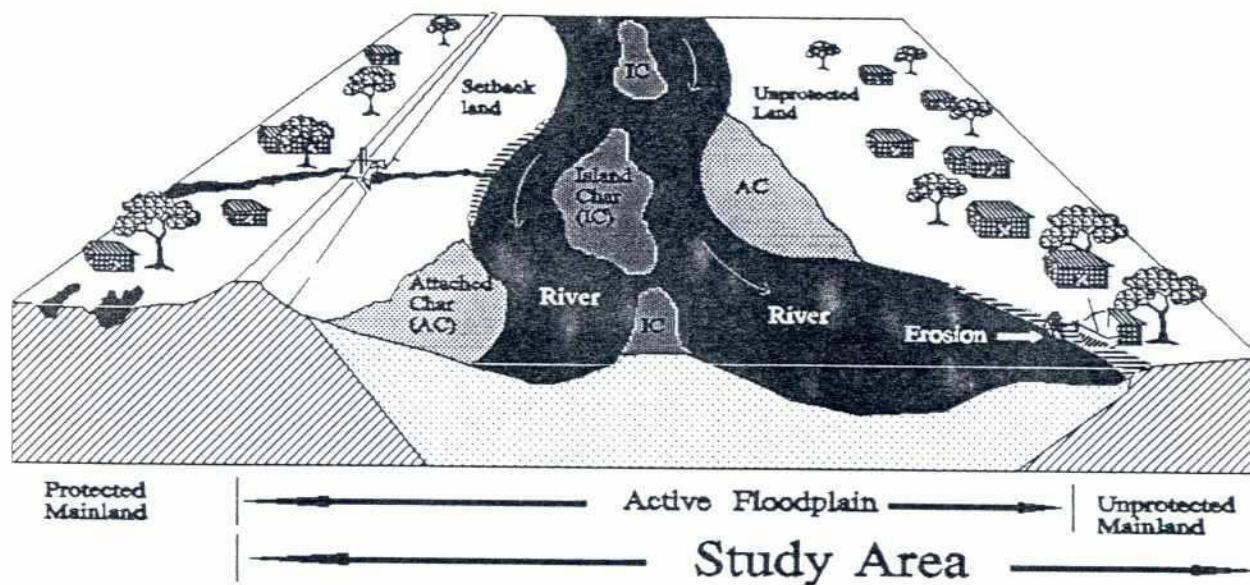
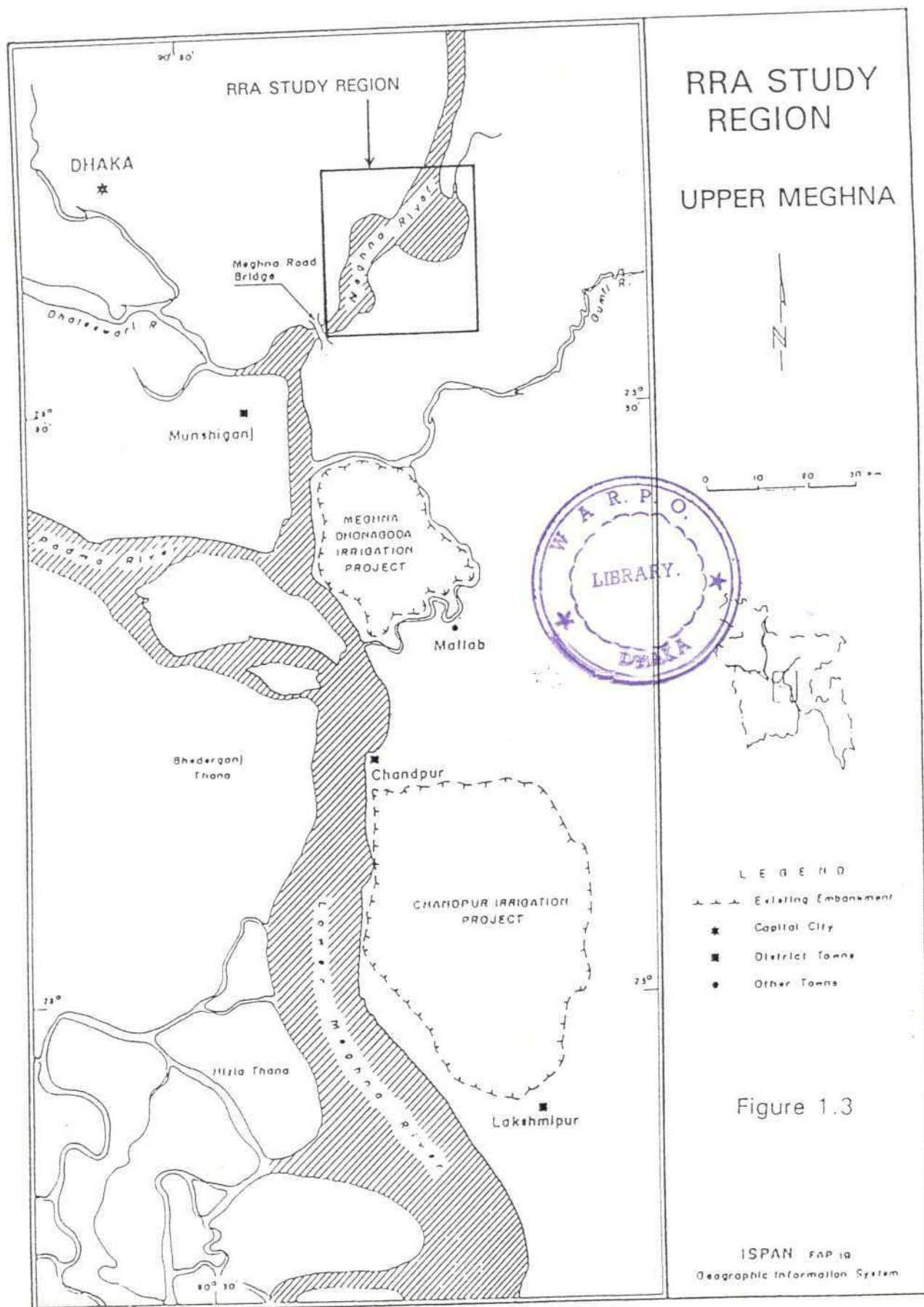


Figure 1.2 Charland Classification





purposey selected because it includes a combination of island chars, a fragment of detached mainland, and the mainland fringing the Meghna. There are no embankments along the river in this reach, and on the southeastern bank there are none planned. On the northwest bank, the Narayanganj-Narsingdi Irrigation Project has proposed an embankment, but it would not be constructed until the last phase of the project.

There are 68 mauzas in the study reach, which covered all mauzas in the Charland Study area in Araihaazar, Homna, and Banchharampur thanas, plus most of Baidyer Bazar Thana, up to the Meghna Road Bridge. The distribution of the mauzas and breakdown of the study reach is in Table 1.1. The boundaries of the mauzas visited in the RRA are shown in Figure 1.4 along with the extent of river channels and islands. The map is based on a March 1993 Landsat image. Although 46 percent of mauzas are on unprotected mainland, the island char mauzas cover almost as large an area (including water).

#### 1.4 Study Mauzas

The RRA visited eight mauzas, spread across five unions and four thanas, they were:

- Jhaukandi— island char (Kalapatharia Union, Araihaazar Thana)
- Kadmirchar— island char (Kalapatharia Union, Araihaazar Thana)
- Nunertek— island char (Baradi Union, Baidyer Bazar Thana)
- Shapmara Charergaon— island char (Chandanpur Union, Homna Thana)
- Chalibhanga— island char (Chandanpur Union, Homna Thana)
- Manikarchar— detached mainland (Radhanagar Union, Homna Thana)
- Chengakandi and Paikpara (hereafter referred to as Chengakandi)— mainland with part of island char offshore (Baradi Union, Baidyer Bazar Thana)
- Char Ramjan Sanaullah— attached char (Pirojpur Union, Baidyer Bazar Thana)

Table 1.1 Mauzas by Predominant Land Type in Upper Meghna Study Region

Thana	Submerged	Island Char	Attached Char	Detached Mainland	Unprotected Mainland
Baidyer Bazar mauzas	3	3	4	0	19
area (ha)	83	392	1,035		2,176
Araihaazar mauzas	1	7	0	0	4
area (ha)	32	3,484			1,933
Homna mauzas	1	4	0	11	8
area (ha)	8	1,933		3,413	1,978
Banchharampur mauzas	0	0	3	0	0
area (ha)			2,350		
Total mauzas	5	14	7	11	31
area (ha)	124	5,808	3,385	3,413	6,087

Source: Charland Inventory

# LOCATION OF RRA STUDY MAUZAS UPPER MEGHNA

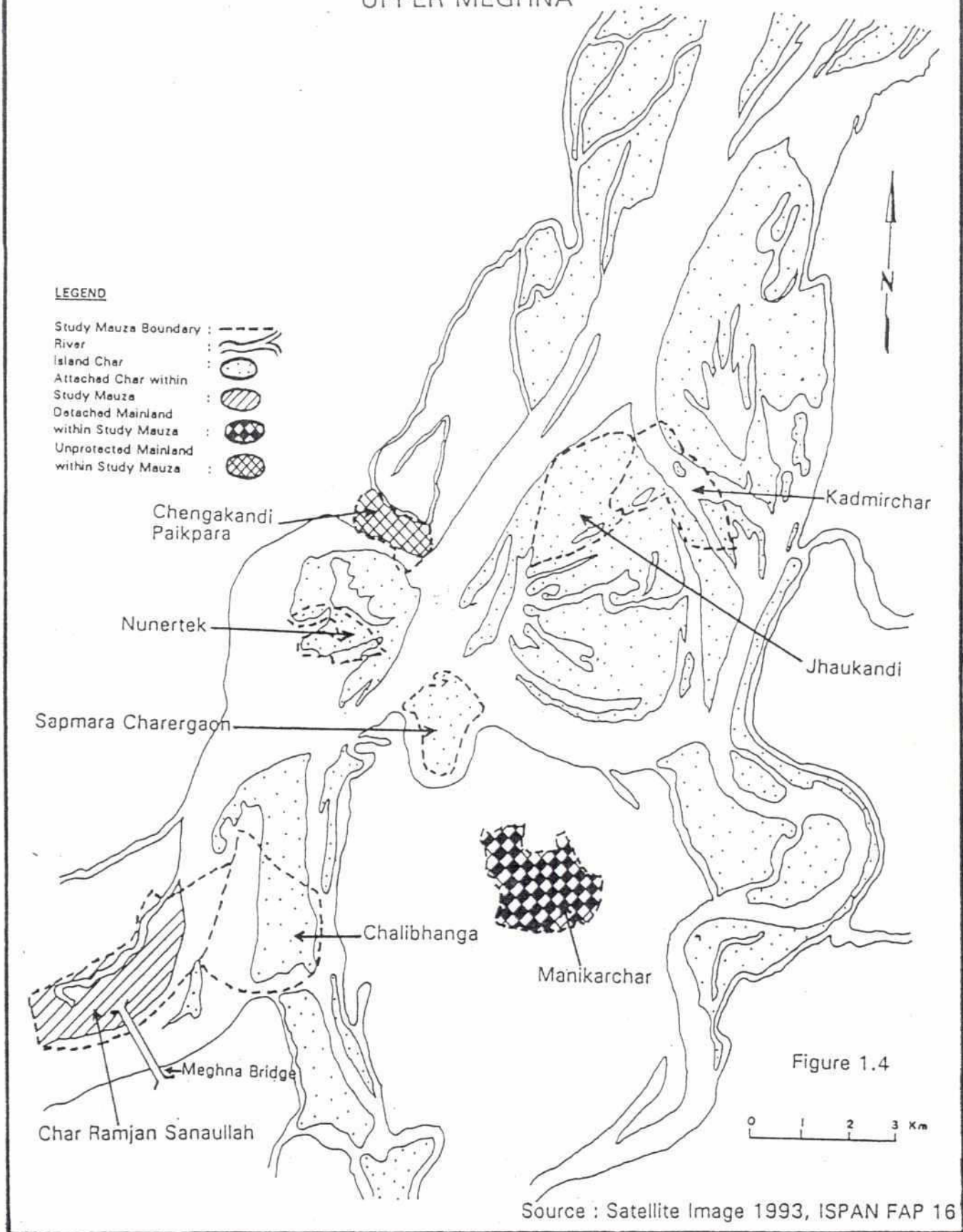




Table 1.2 Population and Area of Study Region

	Island Char	Attached Char	Detached Mainland	Unprotected Mainland	Total*
Area (ha)	5,808	3,385	3,413	6,087	18,817
% water	33	21	12	25	25
% sand	4	3	1	2	2
% land	63	76	87	73	73
1993 households	6,473	4,263	5,736	6,120	22,592
1993 population	42,470	26,961	31,082	38,566	139,079
1981 population	30,901	23,575	33,378	40,448	128,790
1981 people/km <sup>2</sup>	532	697	978	876	742
1993 people/km <sup>2</sup>	731	797	911	835	802
% increase in population 1981-93	37	14	-7	-5	8

Source: Charland Inventory, satellite image analysis

\*Includes submerged mauzas, which covered 124 ha and had 488 people in 1981.

In the process of following up on resettlement and land disputes arising from erosion and accretion, Bayer Char (Pashim Ujanchar Union), and Basania Darirchar (Chandanpur Union) also were visited. Information also was gathered in two of the main markets serving the study area: Ananda Bazar and Chandanpur Bazar.

Table 1.2 shows that there is relatively little difference in the proportion of water in each of the charland types in the study area; except for detached mainland, which has little water, hardly any have sand. Population density (relative to total mauza area, since the land area in 1981 is un-

known) was lowest in the island chars, but these had the greatest population growth rate for the period from 1981 to 1993. By comparison, the densely populated detached mainland and unprotected mainland appear to have experienced slight declines in population, suggesting an evening out of population.

The remainder of this report concentrates on data and qualitative analysis based on the information gathered in the field by the RRA.

## NOTES

1. Island chars and the main river channel were focused on for the sake of comparison with the chars in the other rivers. The unprotected mainland was considered to be similar to unprotected mainland along other rivers and similar to floodplain areas investigated by FAP 5. It was therefore not a major focus of the RRA.

## Chapter 2

### SOCIOECONOMIC ORGANIZATION

#### 2.1 Settlements

##### 2.1.1 Settlement Pattern

The chars of this reach of the Upper Meghna are relatively stable, so most settlements have existed for a long time. Table 2.1 (following page) lists the village and *para* names and populations in the surveyed area as reported during the RRA.

Homesteads in the reach are typically arranged in clusters rather than being dispersed. The detached mainland mauza, Manikarchar, had a more dispersed settlement pattern. In many cases, homesteads are arranged along ridge lines to form linear villages or *paras*. With the exception of Chengakandi and Paikpara, all of the mauzas visited have more than one village (although in some cases village and *para* may have been confused). Chengakandi and Paikpara are *paras* of the same contiguous linear village.

The main form of social organization in the study area is the society (*samaj*). This group of people is a key source of help in times of stress, and

usually is the way erosion-affected households get local assistance (Chapter 3).

##### 2.1.2 House Types

The villages of this part of the Meghna are prosperous compared with those in the Jamuna char areas. They are favored with fertile soils and productive agriculture (Chapter 5), low flood frequencies (Chapter 4), and important fisheries that provide a living for many households (Chapter 7). Consequently, the economic condition of households in this study area is fairly good.

The majority of houses are constructed with corrugated iron (CI) sheets (Table 2.2); more than 80 percent have CI sheet roofs, although about half have bamboo walls. Houses in the mainland areas are better built than those in the island chars. The island chars not only have a larger proportion of all-*kutch*a (straw and bamboo) houses, but the average construction cost of houses in each category is lower than in the mainland areas. The cost of a CI sheet house in the mainland, for example, is almost double that in the island chars.<sup>1</sup>

Table 2.2 House Type According to Char Type

Type of Char	Total Households	Percentage by Type			Average Cost by Type (Tk.)		
		All Straw/ <i>kash</i>	CI* roof, bamboo walls	All CI	All Straw/ <i>kash</i>	CI roof, bamboo walls	All CI
Mainland	800	6	59	35	1,583	10,033	59,166
Island Char	1,126	19	49	32	975	8,900	36,500

Source: Charland RRA

\*Corrugated iron

Table 2.1 Villages and Number of Households in Surveyed Mauzas

Mauza	Village/Para	Char Type	House-	Total Households	No. of Samajes
Jhaukandi	Jhaukandi	Island Char	400	1,090	2
	Madhyar Char		390		
	Purbakandi		300		
Kadmirchar	Kadmirchar	Island Char	250	494	2
	Badalpur		150		
	Nayagaon		94		
Nunertek	Diara	Island Char	250	560	NA*
	Chaitarisha		100		
	Chaudhanga		70		
	Tekpara		60		
	Raghunather Char		40		
	Shantiban		40		
Shapmara Charergaon	Mohishar Char	Island Char	160	310	2
	Baraikandi		150		
Chalibhanga	Chalibhanga	Island Char	250	451	3
	Purangaon		100		
	Beparigaon		50		
	Islampur		35		
	Munshirgaon		16		
Manikarchar	Manikarchar	Detached Mainland	400	1,090	NA
	Bara Nayagaon		200		
	Mathaberkandi		150		
	Shikirgaon		120		
	Madhabpur		100		
	Ujan Char Nayagaon		100		
	Baushia		20		
Chengakandi Paikpara	Chengakandi	Mainland	400	750	1
	Paikpara		350		
Char Ramjan Sanaullah	Jhauchar	Attached Mainland	600	940	NA
	Protaper Char		100		
	Kadirganj		80		
	Islampur		80		
	Ganganagar		80		

Source: Charland RRA

NOTE: In subsequent tables the detached mainland, attached char, and mainland mauzas are grouped together as "mainland" for comparison with the island chars.

\*NA = not available



The roof height and life of each type of house in the study area is more or less the same irrespective of location, they are typically:

- Straw (*kash*) roof and walls: average height about 4.5 feet (1.4 m), usually reconstructed every year.
- CI roof with bamboo walls: average height 5-5.5 feet (1.5-1.7 m), the bamboo pillars and walls are usually replaced every one to two years.
- CI sheet roof and walls: average height about 6-7 feet (1.8-2.2 m). This type of house lasts for a long time, but if bamboo pillars are used they are replaced every two to three years.

### 2.1.3 Homestead Resources

A wide range of fruit trees are grown in small numbers, among them: mango, guava, *jam*, *kul*, and coconut. Jackfruit trees, which are intolerant of submergence, are grown only in Char Ramjan Sanaullah and on other high mainland that is rarely affected by flood water. Only in the recently established, government-sponsored cluster village in Nunertek (Section 3.4.4) has a government program encouraged tree planting. Most of the villagers in the area have no timber trees. The majority, including people on the attached chars and mainland, said that if they were supplied with such trees either free or at low cost, they would plant them. Despite this enthusiasm, though, tree plantation for timber may be impractical. Some people reported that they had tried to grow timber trees, but failed because of flood water.

Homestead areas were last affected by flooding in 1988 (Chapter 4 gives full details of flood impacts). During that flood most villagers tried to protect the plinths of their houses by surrounding the homestead area with bamboo fences plus grass or bushes. Wave action affects homesteads in high flood years, and in most years it may threaten the cluster village in Nunertek, which is only slightly raised above normal land levels. Compared with many other char areas, however, this problem is limited to the small area of island chars.

## 2.2 Occupations

### 2.2.1 Occupational Structure

The occupational structure of the study area is an indicator of the resource base of its people, as well as the use of natural char resources. The economy of the surveyed part of the Upper Meghna is almost entirely dependent on local land and water resources for agriculture and fishing. There are some economic links outside the area through trading, seasonal migration for laboring work, and a few households with members working abroad.

Agriculture is the dominant source of livelihood in both island chars and mainland areas (Table 2.3), since most day laborers do farm work. Fishing is the second most important source of income: about 35 percent of households earn a living from fishing for at least part of the year (Chapter 7), but there are important seasonal and local variations in these patterns. In all areas more people are primarily engaged in fishing during the monsoon, when agricultural work is at a minimum and fish are plentiful. In the island chars many households farm in the dry season and then fish in the monsoon, whereas on the mainland it is mainly day laborers who switch to fishing when work is scarce. Three of the island char mauzas (Nunertek, Shapmara Charergaon, and Chalibhanga) are largely fishing villages. During the monsoon not only is fishing the main occupation but also, as in the mainland areas, the number of day laborers decreases because many of them switch to fishing.

What the table does not show is that there is considerable involvement in fishing as a secondary occupation in the island chars. The RRA found that most char people do agricultural work in the day and fish at night. Throughout the year, then, most households who are not mainly fishing are doing so as a secondary activity.

In addition to agriculture, fishing, and laboring (further details of which are in Chapters 5 and 7 and Section 2.2.2, respectively), there are a range of other income sources. These include incomes generated outside the study area (seasonal work in

Table 2.3 Primary Occupations of Households in Dry and Wet Seasons

Name of Mauza	Agriculture (%)		Day Labor (%)		Fishing (%)		Other (%)		Other occupations reported
	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	
ISLAND CHAR									
Jhaukandi	55	40	25	20	15	30	5	10	Small business Boatman Blacksmith
Kadmirchar	60	50	20	10	15	35	5	5	Small business Teacher
Nunertek	35	20	10	5	50	70	5	5	Small business Doctor Driver Fish trading
Shapmara Charergaon	30	25	25	15	40	55	5	5	Work overseas Boatman Rickshaw puller
Chalibhanga	30	25	25	20	40	50	5	5	Boatman Small business
All Island Chars	45	34	21	15	28	44	5	7	
MAINLAND									
Manikarchar	60	60	25	15	5	15	10	10	Rickshaw puller Small business Driver Work overseas
Chengakandi	55	55	20	10	20	30	5	5	Work overseas Small business
Char Ramjan Sanaullah	30	25	25	20	30	40	15	15	Sand trading Small business Rickshaw puller Driver
All Mainland	48	47	24	15	17	28	11	11	

Source: Charland RRA

towns or even abroad), as well as trading, transport, and the usual variety of crafts and services found in villages. Many households were found to supplement their income through livestock (Chapter 6)—particularly by fattening cattle, but also by selling goats, milk, and eggs. Women are often the ones involved in these income-earning activities, and some of them are able to keep the money

earned from selling eggs since they sell them to traders who visit their homes.

### 2.2.2 Laboring

All of the day laborers are mainly doing agricultural work, except in Char Ramjan Sanaullah where many are engaged in extracting sand (many



are reported to be migrant workers from other regions). This mauza, adjacent to the Meghna Road Bridge and ghat, is an important center for sand extraction and trading in Bangladesh. In flood times there is little agricultural work and some day laborers, particularly those in mainland areas (Mohishar Char, Manikarchar, and Char Ramjan Sanaullah), leave to pull rickshaws in Dhaka or the thana or district towns. Table 2.4 shows the main work undertaken by laborers (combining men and women but excluding fishing) by season.

During the monsoon season many male laborers travel to Dhaka and Narayan-ganj, which are relatively close, but some go as far as Sylhet and Barisal to seek day labor. Some of them go with their families, and those who do not try to return once every week or two. Between visits their families are left in the care of their parents, a brother, or a sister. In Nunertek mauza, because almost everyone is engaged in fishing during the monsoon, day laborers come from Mohishar Char and Chengakandi to work in the fields. In the dry season, while there is more or less sufficient agricultural

**Table 2.4 Main Work of Day Laborers by Season**

a) Agricultural Work	
Dry Season	Wet Season
Boro cultivation (L and HYV)	Aus harvesting
Rabi crop cultivation	Jute harvesting
Rabi and boro harvesting	
Weeding fields	
Aus & aman cultivation	
Aman harvesting	
b) Non-agricultural Work	
Dry Season	Wet Season
Repair houses/homesteads	No local work. People
Construct roads	go to Dhaka, Sylhet, or
Collect sand from chars (Char	other cities to pull
Ramjan Sanaullah)	rickshaws and vans, do
Raise homesteads by earth	small business, break
moving	bricks, and work in
	construction.

Source: Charland RRA

work available, wage rates are low (Table 2.5). At this time of year, a typical household of six or seven people dependent on day laboring lives a hand-to-mouth existence.

**Table 2.5 Daily Wages for Day Laborers**

Mauza	Time	Hours	Wages (Tk./day)	Meal/day
Jhaukandi	Morning-Evening	12	25	2
Kadmirchar	0700-1800	11	30	2
Nunertek	0700-1800	11	25	3
Shapmara Charergaon	0800-1400	6	25	1
Chalibhanga	0700-1800	11	25	3
Manikarchar	0700-1800	11	20	3
Chengakandi	0700-1400	6	25	1
Char Ramjan Sanaullah	Morning-Evening	12	50	0

Source: Charland RRA



29  
People reported that there had been no significant change in the area's day laboring system over time. Laborers hope that small-scale industries might be established in the area to provide more regular work.

crops. For this they get one sixth share of the harvested crops. The RRA encountered one team of day laboring women in Nunertek mauza; they mainly work raising homesteads by earth moving.

### 2.2.3 Women's Paid Work

In all of the visited mauzas there are some women day laborers. They mainly work harvesting rabi

---

### NOTES

1. A disproportionate number of wealthy sand trading households in Char Ramjan Sanaulah mauza influenced this finding.

## Chapter 3

### CHANGES IN LAND AND SETTLEMENT

#### 3.1 Physical Changes

The banklines of the main Meghna channel (excluding the secondary channel that isolates the detached mainland in the Upper Meghna) were digitized from Landsat images of the 1984 and 1993 dry seasons. This analysis ignores within-bank changes, including erosion and accretion on island chars that are in the channel. These island chars were the focus of the RRA survey, which found local erosion and accretion affecting the islands. Table 3.1 shows that there have only been small net changes in bankline between 1984 and 1993 and that the Upper Meghna banks are remarkably stable in this region.

The image analysis showed that only three of the RRA focus mauzas experienced bankline changes:

in Shapmara Charergaon 10 ha eroded between 1984 and 1993, in Chengakandi 8 ha eroded, and in Char Ramjan Sanaullah 13 ha eroded and 8 ha accreted (these are net changes, greater changes may have occurred during the period if areas accreted and then eroded).

#### 3.2 Erosion and Accretion Impacts

This section is an overview of how human settlements in the study area have changed over time in response to the process of erosion and accretion. Since it is based on information from informants in the villages visited in the RRA, the areas given for erosion and accretion should not be treated as exact but as indicative of what people have seen happening to their land.

Table 3.1 Bank Erosion and Accretion 1984-93 in Study Region

	Island Char	Attached Char	Detached Mainland	Unprotected Mainland	Total*
Area (ha)	5,808	3,385	3,413	6,087	18,817
% eroded	0.5	3.6	0.6	0.7	1.1
% accreted	0.3	0.4	0.7	2.5	1.2
% channel	90.2	13.8	6.7	28.2	41.2
% land	9.0	82.2	92.0	68.6	56.5
% mauzas with erosion	35.7	85.7	18.2	19.4	27.9
% mauzas with accretion	21.4	42.9	27.3	40.0	35.3

Source: Charland Inventory

\*Includes mauzas submerged in March 1993.



27

In general, land in the study area is stable compared with that of the Jamuna charlands. Chandanpur Bazar and Ananda Bazar, for instance, are both on river frontages and have concrete walls protecting their markets. At Ananda Bazar (unprotected mainland) the wall was constructed prior to independence, and there has reportedly been no erosion along the bank there in the past 40 years. At Chandanpur Bazar (detached mainland) the wall dates back to the British period (before 1947) and again there has been no recent erosion along that bank. The detached mainland and other mainland, then, are stable and can be treated collectively as "mainland." The island chars within the main river channel and the limited area of attached charland in this area are more dynamic.

Table 3.2 shows the areas reported to have been lost and gained in recent times in the focus villages. In general, erosion is a steady process which has been occurring at the northern end of island chars where they face the flow of the Meghna. Four island char villages briefly visited by the RRA, Bibikandi, Kamalapur, Mohishar Char, and Nal Char, have all but disappeared due to erosion over the past 50 years. Accretion has occurred at the opposite ends of the same island chars, and also appears to be filling in some branch channels of the Meghna, for example fishing and navigation were said to be affected in branch channels close to Bibikandi and Nal Char.

A number of more or less self-contained areas can be identified within which households have moved in response to erosion and accretion. Those households that move usually only go short distances, either staying within the same mauza or moving to an adjacent mauza or nearby accreting char. Since erosion has been gradual, there has even been time in some cases for a household to plan its move by buying land farther away from the erosion. In several villages it was reported that among poorer households, related families would sometimes buy a homestead plot that could then be shared by three or four households.

One factor that can keep people from moving longer distances is the great importance of fishing

in the local economy. About 45-60 percent of households derive at least part of their income from fishing (depending on the season). People whose livelihood depends on fishing could be expected to try to stay as close as possible to the locations where they have customary fishing access. Moreover, fishing in the main river is often practiced in teams and local knowledge of the fishery may be important. Households that lose all their land also appear to be more likely to remain in the area than may be the case in other charland areas, and this too may be because fishing provides them with an important source of economic support.

In every case of erosion investigated in the area it was found that households that lose their land do not continue to pay land taxes (which differs from findings on the Jamuna chars). This is because the process of erosion is slow and steady, so people do not expect that their land will reappear. If it did reappear then they expect to get preference in obtaining access to *khas* land (which is consistent with Presidential Order No. 135 of 1972 and Presidential Order and Ordinance LXI of 1975, Section 86).

One of the circles of displacement and immigration due to erosion is from Mohishar Char (Shapmara Charergaon) to Chaudhanga (Nunertek). Although households in Mohishar Char have moved within the village, concentrating the remaining households in a small area, most of the households in Chaudhanga have moved to Nunertek (a different thana and district). Most of those households depend on fishing. People did not move to Baraikandi (although that village is also in Shapmara Charergaon mauza, very few residents of Mohishar Char seem aware that it is in the same mauza) because they reportedly prefer to stay close to the main river, where they still have land and informal fishing rights. Since there is accretion at the south end of Nunertek Island (from the image analysis this is taking place within Shapmara Charergaon), they may also have hoped to occupy land there. The formal process of land settlement, however, has favored only a few of the displaced and completely landless households (see Section 3.3.4).



Table 3.2 Erosion and Accretion in Focus Villages

Village/mauza	Char Type	Erosion Period	Area Lost (ha)	Peak Years	Houses Lost	Accretion Period	Area Gained (ha)
Jhaukandi	Island	1990->	12	none	none	-	0
Bibikandi	Island	1965->	much	none	many	-	0
Bhudalpur (Kadmirchar)	Island	1985->	12	none*	none	-	0
Kadmirchar	Island	1985->	109	none	none	-	0
Bayer Char	Attached	-	0	-	-	1978->	283
Chaitarisha (Nunertek)	Island	-	0	-	-	1988->	8†
Baraikandi (Shapmara Charergaon)	Island	1973->	≈ 8	none	none	1973->	1
Chalibhanga	Island	1960->	≈ 50	1987/88	33	1983->	28
Manikarchar	Detached	-	0	-	-	-	0
Chengakandi Char	Island	1983-1989	81	1988	200‡	none recently	0
Chengakandi & Paikpara	Mainland	1983->	20	none	none	recent	very little
Protaper Char (Char Ramjan Sanaullah)	Attached	1978->	large area	1988->	50+	-	0

Source: Charland RRA

\*Erosion was reported to be worst during the early monsoon period (April-June), but as in most other villages it was reported to be a steady process.

†This land is unstable and not yet cultivated.

‡Char disappeared in 1989, households moved to Kamalapur where they had come from when this char emerged about 50 years ago. Now, because of erosion there is little land left in Kamalapur.

A second circuit of movements again involves Nunertek and the mauzas of Kamalapur (mostly underwater) and Char Kamalapur (totally submerged). Some 50 years ago Char Kamalapur and part of Kamalapur eroded. Some of the displaced people moved within Kamalapur, but others bought land on Char Chengakandi and settled there. Char Chengakandi, although within Chengakandi mauza, formed a char attached to the island char of Nunertek (i.e., part of an island char). This low-lying char started eroding about 1983 and in 1989, four years before the RRA, rapidly disappeared. The 200 households then displaced

from Char Chengakandi mostly moved to Kamalapur, where they are now crowded into the limited village areas and where no new land has accreted. Some have also moved to settle on what was low agricultural land in nearby Char Hajji. The latter was traditionally just cultivated land occupied by people of Chengakandi, but when Char Chengakandi eroded sand was deposited on Char Hajji so it could not be cultivated. Erosion victims were allowed to settle there since no one wanted to buy land there. Now that, too, has started eroding. When Char Chengakandi vanished the wealthier villagers moved and found land elsewhere, and

poorer people from the same community went with them and took shelter with the richer households.

### 3.3 Land Rights

#### 3.3.1 Background

The steady processes of erosion and deposition, and uncertainties about which mauza newly accreted land lies in, are fertile ground for disputes and conflicts over land. Fishing is an equally important component of the local economy and Chapter 6 reveals similar conflicts over fisheries access.

In three of the areas visited in the RRA local people reported current or recent conflicts over land. These illustrate the nature of social responses to the hazard of erosion and the opportunity presented by accretion. They also reveal the inadequacy of government responses, and lack of incentive for improvement in procedures.

#### 3.3.2 Conflict between Kadmirchar and Bayer Char

The north end of Kalapatharia Union, the largest island char in the RRA area, has been steadily eroding since about 1965. The most northern mauza in the union, Bibikandi, is now almost completely gone. In addition, erosion is affecting adjacent mauzas, including Kadmirchar where many people who left Bibikandi settled in Badalpur village—now the most erosion-affected part of the mauza (about 80 percent of land cultivated by village households is said to have eroded). Settlers came to Kadmirchar either because they already had land there or they could buy plots, but an increasing number of those who had land in Kadmirchar are now reported to be landless. Given the long history of erosion at the north end of this island the process is regarded as permanent and land taxes are not paid for eroded land.

While the Meghna is taking land in Badalpur it is accreting a new char (Dubar Char) to the southeast between Badalpur and Bayer Char. The people of Badalpur claim that about 475 ha (700 acres) have

accreted in recent years (this is not supported by the image analysis, which implies that accretion occurred before 1984). Although Dubar Char is across the river channel from Badalpur and Kadmirchar the villagers of those towns claim the land on the grounds that it lies within their mauza (which appears from the maps and satellite images to be a valid case). This claim is contested by the people of Bayer Char, an old attached char and mauza on the opposite side of the river channel and adjacent to Dubar Char. The new land is low-lying and seasonally inundated, and both sides in the dispute claim to plant boro in the same area. The conflict over the land was reported to have been active for five years at the time of the RRA, with planting and harvest times being particularly tense. During harvest, Kadmirchar sends teams of men to harvest the boro and fight when necessary.

An ex-chairman of Kadmirchar was reported to have taken a leading part in organizing the villagers' claim, which would appear to be a community effort involving both landless and landed people. Division of the harvest appeared unclear, except that it was reported to be sold partly to raise funds for the legal case that has been filed in the matter (the RRA was not able to verify this). Bayer Char has also filed a legal case, but since the two mauzas are in different thanas and districts (Narayanganj and Comilla), it will likely have to be settled by a higher authority. Local people recognize that technically this is *khas* land, their interest is in claiming the land for one mauza or the other. The stakes in the dispute are high, and neither side is interested in negotiating a compromise. In the meantime each side was reportedly spending Tk. 10,000 a year on its case in legal fees and other costs, so the authorities have an interest in delaying the process.

Although most of this information came from the people of Badalpur, on the whole it was more consistent than the reports of Bayer Char people who claimed that the Kadmirchar people were forcibly cultivating the disputed area and damaging crops on undisputed land. Bayer Char has the appearance of a much richer area—without erosion and with a number of large landowners. It is not



clear what the power structure on their side of the dispute is, but both sides agreed that the island char people of Badalpur (who belong to two *samajes*) are relatively more united and so can put together a strong force.

### 3.3.3 Chalibhanga and Basania Darirchar

Chalibhanga and Basania Darirchar share a large island char opposite the ghat at Baidyer Bazar. Parts of both mauzas have eroded, but Nal Char in Basania Darirchar has had the worst of it. Over the past 10 years an offshore char has emerged in the Meghna opposite the two mauzas. After first being an important fishing ground (for *chewa*, which like shallow water), the new char was seasonally grazed for about four years. For the past five years it has been cultivated with local boro and groundnuts (it is still underwater during the monsoon). After an initial dispute the two mauzas were able to reach a compromise and both have occupied part of the char without involving the administration.

In Chalibhanga different interest groups gave somewhat different reports of what happened. The overall picture that emerged, however, is that a channel (*khal*) cutting through the new char became the dividing line. The elites of the two villages agreed that the Nal Char people would have the part north of the channel and the Chalibhanga people the southern part. Chalibhanga was estimated to have about 28 ha (70 acres) of the char. There are six *samajes* in the mauza (one per *para*), and their *matbars*, along with the leader of the landless people, split up the 28 hectares. The land was reportedly distributed mainly to the landless (about 2 *kani*, .27 ha or .66 acres, per household), although some landless households may not have received land, and the *matbars* and landless leader also received some land. Since the land is not registered, however, char residents have recently been pressured by powerful people from Baidyer Bazar, which also claims access to the land (which appears to lie within that mauza's boundary). Since the char people are heavily dependent on selling fish in Baidyer Bazar they

have been forced to allow fish traders to use the new char, and about 25 percent of each side's land is now reported to be occupied by these large traders from Baidyer Bazar.

### 3.3.4 Nunertek Cluster Village

Nunertek char is relatively dynamic, with both erosion and accretion taking place; it is also the center of a large fishing community. Many households from eroded villages, among them Mohishar Char and Kamalapur, have moved to the char. Consequently, there are many landless households on Nunertek. The accreted (and very sandy) land in the south of Nunertek has been treated as *khas* land and distributed to landless people who were settled in a cluster village called Shantiban Gutcho Gram in 1989.

The settlers received free homesteads consisting of a homestead plot, low earth plinth, bamboo walls, CI sheet roofs, and a few trees. They were also given a loan of Tk. 10,000 in two installments to buy cattle (although they claimed not to have known it was a loan) and, in theory, .73 ha (1.8 acres) of land for cultivation. Little land actually appears to be cultivated for a variety of reasons. The land is very sandy and, some said, not worth cultivating (it is mostly grazed). Some settlers say they fear that other households would take their crop if they cultivated. Others claim that not all the land has been officially distributed and that they only have about 0.12-0.24 hectares each. The households are primarily engaged in fishing, but they also do some laboring, cultivating limited areas of land, and raise livestock (mostly on a share basis using loaned animals).

While the idea of settling landless people on new land and giving them a homestead, land, and credit seems good, and the administration did its job in terms of allocating newly accreted land, the method adopted and the inequity created have resulted in substantial resentment. In 1989 the intention to form the village was announced and landless people were invited to apply for consideration. The Upazila Nirbahi Officer then compiled a list of 130 completely landless households from

which 26 were selected (although the means of selection is unknown, the process was regarded as fair by all informants).

It is widely believed by those who did not receive land that during implementation by the Union Parishad Chairman (an absentee industrialist) and local influential people, the households to be awarded the resettlement were changed for political and economic reasons. The circumstantial evidence for this seems strong. All the settlers on the char are fishermen working for four powerful Nunertek men who have muscled in on one of the area's richest fishing grounds, which is immediately offshore from the village. The leader of the fishermen's society told the RRA team that individual fishermen are excluded from this area. Although the settlers complain of having no boats of their own (yet they live on an island in the monsoon) nor their own gear, fishing boats and large nets were present when the RRA team visited.

### 3.4 Social Organization of Response

The *samaj* is the main organization by which households can call on support in times of need. The previous section showed that they have a role when land accretes, but they are even more important when land erodes. A household may only belong to one *samaj* and that membership conveys certain duties or responsibilities, particularly in times of stress. The appearance is one of relative harmony. Although when land accretes there are often social conflicts, these seem more often to be between larger communities (villages or mauzas) rather than between two *samajes* in the same mauza.

The *samaj* appears often to help when members have to move—people donate labor and may help by providing land for displaced families. The importance of social support through the *samaj* suggests that this would be one way of channeling assistance to flood and erosion victims.

### 3.5 Conclusions

It was found in this reach of the Meghna, particularly from the case studies of land disputes discussed in Section 3.3, that:

- Administrative boundaries frequently follow rivers (a legacy of the stability of rivers in Britain), yet in Bangladesh even along a relatively stable river course such as the Meghna this creates a situation of administrative impasse if disputes are between neighboring districts. A review of administrative boundaries and their appropriateness, plus an improved system for arbitration are needed in such areas.
- Even if char people can reach agreements among themselves over land distribution, the problems of old mauza boundaries and difficulties of registering land mean that they are open to exploitation by outside interests.
- Formal attempts to settle landless people on new lands concentrate resources on a few of the many people made landless by erosion and other factors, and are thus particularly open to abuse.



## Chapter 4

### FLOOD HAZARD

#### 4.1 Flood Frequency and Severity

While severe floods may be infrequent in the Upper Meghna, all of the mauzas visited in the RRA were badly affected by the 1988 flood. In the 1991 flood, Jhaukandi alone reported that it had not been flooded. In that mauza people reported only two other big floods of the same order of magnitude in the period from about 1950 to 1987, and none since. There has been no flooding of houses since 1988 except in Kadmirchar, where floodwater briefly entered some houses in 1991 (apparently associated with a high tide). In 1988 flooding throughout this study area lasted from mid-late August until late September and inundated all the cultivated land to an average depth of 3 meters or more. Detailed information on a mauza or village basis was collected for the 1988 flood. Some additional information, particularly on flood impacts on agriculture and on markets is reported in subsequent chapters.

#### 4.2 Typical Flood Preparation and Response

Typical flood preparation measures taken by those who can afford it consist of readying boats and storing food. Most households in the area are too poor to have any stocks of grain to store, but those farmers who do put it in earth containers on raised platforms (*macha*) inside the house or in the rafters in jute bags. Straw, which can be used as fodder or fuel also is raised above flood level on a *macha*, on a mound in the courtyard, or on the roof. As part of normal monsoon preparations cattle are kept on raised ground in the courtyard, usually on a mound of water hyacinth or banana

trees. Women also take measures to protect the homestead, securing the house with ropes against storms and shoring up the pillars of the house. Grass mattresses are commonly used to protect the plinths from rain washing and flooding. In three of the villages most households said they raised their house plinths after the 1988 flood.

In all the mauzas visited people reported hearing about floods from the radio, but this is not the same as getting an advance warning relevant to them. Anticipation of flooding is largely dependent on past experience and interpretation of rising water levels, and in Manikarchar (the only mauza

#### Floods and Erosion

##### Char Ramjan Sanaullah Case Study

Floods and erosion are often linked, and where they occur together the chances that a family can recover from their effects are minimal. Until 1991 Ayesha Khatun's household lived in Kadirganj where they had sufficient land to support their family of nine. In the 1991 floods their homestead and land eroded overnight, and they sheltered on a boat for 15 days because no one was willing to offer shelter. Eventually members of their *samaj* helped them build a flimsy shelter, but it blew away. The family then moved to a *busti* by the Meghna bridge along with about 20 other households in similar circumstances. All of them were evicted in early 1993 by the government as part of the preparations for the SAARC summit. In May 1993, Ayesha and her family were living on someone else's land in Char Ramjan Sanaullah, but they had been told they would soon have to move again because the owner, who was about to be displaced by erosion, needed to build a new house there.

not next to the Meghna River) people reported getting news from people upstream along the river and from newspapers. People in all of the other mauzas reported that radio information was not meaningful to them or was difficult to interpret for their area.

## 4.3 1988 Flood Impacts

### 4.3.1 Warnings

There were no official flood warnings of the 1988 flood; people in the study area reported in a number of cases being caught relatively unawares. Although flood water had been rising gradually, some villages reported that a sudden increase in the level brought the water into the homestead areas and did not give much time to take protective measures (Baraikandi, Nunertek). In other villages, such as Jhaukandi and Kadmirchar,

people had some expectation of flooding just before the event because water levels in the channels (*khals*) were rising and because of the weather pattern (the people of Kadmirchar believe that an east wind with cloudy weather during the peak of the monsoon is associated with floods).

### 4.3.2 Property Damage and Shelters

*Kutcha* houses were reported to have been destroyed in as little as 2 to 3 meters of flood water, and in the island chars many were completely washed away by strong currents flowing over the land (Table 4.1).

Better-constructed houses were more frequently damaged than destroyed. Typically, their plinths were washed out and bamboo walls were damaged or destroyed. Corrugated iron (CI) walls and roofs usually were unaffected, but in a few cases storms coincided with the peak floods to damage some of

Table 4.1 Damage to Houses in 1988 Flood

Mauza	% Flooded Above Floor	% Flooded Above Roof	% Damaged	% Destroyed	% Evacuated
ISLAND CHAR					
Jhaukandi	30	10	95	5	10
Kadmirchar	100	100	60	40	40
Tekpara	80	0	25	17	70*
Chaitarisha (Nunertek)	100	unknown	65	35	unknown
Shapmara Charergaon	100	unknown	50	50	70
Chalibhanga	98	0	98	0	75*
MAINLAND					
Manikarchar	98	0	75	0	50
Chengakandi	75	50	60	0	60
Protaper Char (Char Ramjan Sanaullah)	95	3	40	60†	38

Source: Charland RRA

\*Reported in RRA, but is suspected of being too high

†Includes houses damaged by storm which were later pulled down and rebuilt



these as well. These richer households tended to remain home during the 1988 flood.

The people whose houses were destroyed or uninhabitable, the poorest in the area, moved to temporary shelter. In Jhaukandi, Kadmirchar, and Manikarchar public buildings, such as schools, were used as shelters. People in other mauzas moved to public land—the railway line about 10 km from Chengakandi, for example—and close to Char Ramjan Sanaullah many poorer families built temporary shelters on the raised approach road to the Meghna bridge. Some also reported taking shelter with relatives or richer neighbors in the same village. Others moved away from the study area altogether as in Shapmara Charergaon where

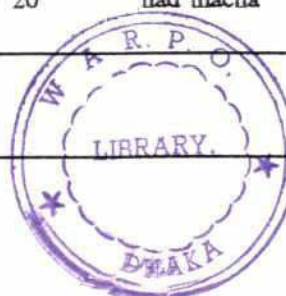
many landless families moved to towns where the household head had previously been working on a seasonal basis. Table 4.2 shows the sheltering facilities and strategies used by people of each study mauza in the 1988 flood. Normally, someone is left behind to look after the house when people evacuate, either staying on a *macha* or in a nearby house on higher land.

In some areas there was less expectation of flooding than in others. In Nunertek, for instance, people stayed on *machas* in 1988 rather than moving because they had never experienced flooding inside their houses. When the flood became severe, they had no place nearby on their island to take shelter (they now have a *pucca*

Table 4.2 Sheltering Strategies During 1988 Flood

Mauza	% HH Moving	Destination	Duration of Stay	% HH Staying	Reason/notes
ISLAND CHAR					
Jhaukandi	10	High school; relatives in village	21-28	90	had macha, not much food at shelter so only poor go there
Kadmirchar	40	Primary school in village; high school in Radhanagar	30	60	guard cattle, many men at shelter so women prefer not to go there
Tekpara (Nunertek)	70	Higher houses in village	21	30	no transport, no shelter
Chalibhanga	75	Rich people's houses	21-30	25	rich, had macha and higher school was also flooded
MAINLAND					
Manikarchar	50	High School near village	15	50	protect cattle and assets only poor women go there as get no respect
Chengakandi	60	Railway line	45	40	guard cattle; also <i>dacoits</i> beat people who stay if they find nothing to take, but not enough space for all to move
Char Ramjan Sanaullah	80	Higher village, raised road	30	20	had macha

Source: Charland RRA



school with floor above the level of the 1988 flood).

### 4.3.3 Livestock Impacts

Although island char people have adjusted their livestock enterprises to the availability of feed and space by selling cattle just prior to the monsoon (Chapter 6), safeguarding cattle is still a high priority for many people during a flood. The first response normally is to keep cattle within the homestead on mounds of water hyacinth, straw and bamboo, or other plant matter. These platforms usually are built up once water enters the homestead courtyards (see Section 4.2). But if flood water continues to rise beyond this, as in 1988, they are moved to higher ground outside the homestead. This may mean simply moving them a short distance to a relative's homestead or nearby road, or it may involve taking the cattle to an area outside of the village.

Cattle health can also be a problem during and following a flood. In Kadmirchar, for example, 40 percent of households reportedly lost cattle due to shortage of fodder and disease; Chalibhanga lost about 33 percent of its cattle; and in Nunertek, 30-40 percent died. Char Ramjan Sanaullah reported that no cattle were lost in the flood, possibly because there was dry land available near the mauza. Poor people often cannot afford to get treatment for ailing cattle since the thana veterinary officer charges Tk. 200-500 to visit and treat a sick animal. The village or *samaj* could afford to pay for the treatment and if many cattle in an area were affected, an economy of scale could be achieved, but it does not appear that pooled resources have been used in this way.

### 4.3.4 Relief and Recovery

The distribution of limited food relief supplies following the 1988 flood typically was arranged through official channels by the union parishad chairmen and members. That food reached some of the people affected by the flood. In Kadmirchar the union parishad set up a flood shelter and

provided the people in the shelter with basic foods from thana supplies. Some of the richer households in the area also reportedly donated clothes, food, and milk for children. In Nunertek it was reported that the army had supervised distribution of 1-2 kg of rice and some *dal* per household during the flood, but that nothing was provided afterwards. In Jhaukandi the union built a bamboo bridge to help communications after the flood and supplied fodder to associates of the chairman. In Manikarchar the union provided a boat for three days to help rescue people. In none of the mauzas did people think that assistance had been sufficient, none were assisted by NGOs or directly by higher levels of the government administration.

Ill health, particularly dysentery, was widespread, but 25 people reportedly died due to the floods, most of them either by drowning (predominantly children) or by illness thought to have resulted from drinking river water. In Kadmirchar boat owners helped to move the sick to a doctor or pharmacy, but generally community support seems to have been low.

## 4.4 Potential Improvements and Interventions

### 4.4.1 General Preparation

While the households in the study area make some preparations when they see or expect that a severe flood will come, they do not make flood preparations every year, reflecting the less frequent incidence of severe floods.

Boat ownership levels are high within the mauzas visited (Section 8.2), particularly in the island mauzas, so it is possible for people to reach safety if flooding is very high. Since most of these boats are small, however, the ability to move cattle is more limited. There appears to be potential demand for engine boats to move goods, livestock, and people during severe floods. There would also be benefits from high cattle shelters and from improved veterinary provisions during floods.



#### 4.4.2 Warning Improvements

Respondents in each mauza were asked whether warnings of floods would be useful and what type of warning they thought would be best for them. In general people thought that better flood warnings would be useful. In past floods they either got no warning, or the media reports were so general as not to encourage people to take any preparatory actions. It was said that radio reports of flooding usually referred to other areas and gave no indication of when or to what depth flooding might occur in the study area. In Kadmirchar it was reported that the union parishad had used loudspeakers at the peak of the 1988 flood to inform people that a temporary flood shelter had been established in a nearby market; but no advance warning of the flood was given.

Homesteads in the study area are raised above more frequent flood levels, but some villages in the area were not adjusted to the 1988 flood and had no expectation of such a high flood. In these cases people believed that a warning would have helped all households, including the poorest, to move goods, build *macha*, and protect their homesteads. It was also noted that radio warnings would be useful if they referred to specific locations known to people (the Meghna bridge, for example) and then gave specific predictions of depths and when flooding could occur. Although the radio was seen as one potential way for better messages to be disseminated, most people thought that other local warning sources would be better (Table 4.3).

#### 4.4.3 Recovery

There was a generally negative attitude towards the capability for improvements in post-flood response. In Kadmirchar people said that relief

materials from the government could only be distributed fairly if thana-level officials personally came to do it, otherwise, locally managed distribution, which is in the hands of influential people, would not reach the most needy. There was also a low expectation of collective action within the mauza because each person has his own interests to safeguard during a flood and his own opinions. Assistance to agriculture following floods has

Table 4.3 Attitude to Flood Warning Improvement

Mauza/ location	Useful	Preferred Media
Jhaukandi	yes	"government" loudspeaker
Kadmirchar	yes	NGOs if present, otherwise union parishad loudspeaker
Nunertek	yes	radio, union parishad loudspeaker in <i>hat/bazaar</i>
Baraikandi (Shapmara Charergaon)	yes	radio
Chalibhanga	yes	beating drum in <i>hat/bazaar</i> most effective; most people here are landless and do not own radios, and radio messages are not clear
Manikarchar	yes	radio, newspapers
Chengakandi	yes	local committee to disseminate message in <i>hat/bazaar</i>
Char Ramjan Sanaullah	yes	union parishad at <i>hat/bazaar</i> ; radio
Ananda Bazar	yes	from thana to union to market

Source: Charland RRA

occurred (irrigation loans and seed distribution), but has been limited and mainly resulted in increasing people's debts.

In Nunertek it was said that a flood shelter would be useful (a large *pucca* school was completed in the area in July 1992 with a floor level six inches above the 1988 flood level). This appears to be an appropriate intervention for many of the mauzas in

3

this area since the island and attached chars are relatively stable and erosion is more or less predictable, as shown in Chapter 3. Local people could identify safe sites for raised schools. Other ideas for measures to reduce flood losses tended to concentrate on local structural measures to help agriculture. In Nunertek, for example, excavation

of a channel through accreting land in order to drain older land and the removal of sand deposits were suggested. Improved relief distribution and post-flood credit also were raised. For example, it was reported in one mauza that after the army left the union did not distribute remaining relief materials fairly.



## Chapter 5

## AGRICULTURE

## 5.1 Introduction

Land use, especially for agriculture, is one of the fundamental resource bases of charland inhabitants (the other, fishing, is discussed in Chapter 7). A key aim of the RRA, therefore, was to assess the productivity of agriculture in different char types. Most of the information presented in this chapter was collected through discussions with small groups of farmers in each of the focus mauzas visited by the RRA (see Chapter 1). Information on land types, cropping patterns, yields and harvest, and land prices was obtained in this manner. More qualitative information on the impact of hazards, changes over time, and the perceived potential for improvement was also gathered.

## 5.2 Land Types

Land in the chars can be categorized by soil type, use, and elevation or typical monsoon water level. Table 5.1 shows that the three mauzas with mainland characteristics (including an attached char and detached mainland) have much less sandy soil than the island chars. The mainland mauzas also are the only ones with any clay soils. Consequently, the island chars were expected to have greater areas under such rabi crops as groundnuts and sweet potatoes, which grow well in sandy soil, while paddy cropping intensity was expected to be higher in the mainland mauzas.

In general there is little apparent trend in the proportion of mauza area that is permanent water

Table 5.1 Soil Types in Focus Mauzas

Mauza	Char Type	Soil Type		
		Sandy (%)	Sandy Loam (%)	Clay (%)
Jhaukandi	Island	50	50	00
Kadmirchar	Island	60	40	00
Nunertek	Island	66	33	00
Shapmara Charergaon	Island	40	60	00
Chalibhanga	Island	50	50	00
Manikarchar	Detached	10	40	50
Chengakandi	Mainland	20	55	25
Char Ramjan Sanaullah	Attached	20	50	30

Source: Charland RRA



Table 5.2 Mauza Areas and Percentage Under and Above Water in Dry Season

Mauza	Char Type	Total Area from BBS (ha)	Underwater (%)	Above Water (%)
Jhaukandi	Island	404	05	95
Kadmirchar	Island	160	30	70
Nunertek	Island	339	30	70
Shapmara Charergaon	Island	587	35	65
Chalibhanga	Island	350	60	40
Manikarchar	Detached	388	00	100
Chengakandi	Mainland	77	20	80
Char Ramjan Sanaullah	Attached	477	20	80

Source: BBS Small Area Atlas and Charland RRA

(Table 5.2). This is because the mainland and island char mauzas, with the exception of Manikarchar, all adjoin the main Meghna River.

whereas homestead areas in the island chars appear to be smaller per household since they are concentrated into small raised areas.

The mauza land area estimates (Table 5.3) were based on the mauza areas in the BBS Small Area Atlas. From the RRA it is apparent that in the mainland mauzas somewhat higher percentages of land are occupied by homesteads, roads, etc.,

Although little land was regarded as very low (Table 5.4) in any of the mauzas, the island chars had notably less high agricultural land than the mainland mauzas. Cultivated land in the island chars, then, is both more sandy and lower than

Table 5.3 Land Use Patterns

Mauza	Char Type	Total Land Area (ha)	Homesteads (%)	Agricultural Land (%)	Non-Cultivated Land (%)
Jhaukandi	Island	384	15	85	00
Kadmirchar	Island	112	15	80	05
Nunertek	Island	237	15	75	10
Shapmara Charergaon	Island	382	20	80	00
Chalibhanga	Island	140	20	75	05
Manikarchar	Detached	388	30	70	00
Chengakandi	Mainland	62	25	75	00
Char Ramjan Sanaullah	Attached	382	25	70	05

Source: Table 5.2 and Charland RRA



Table 5.4 Distribution of Agricultural Land by Elevation and Flood Depth

Mauza	Char Type	High Land (%) ( < 1.2m)	Medium Land (%) (1.3-1.8m)	Low Land (%) (1.9-2.7m)	Very Low Land (%) ( > 2.7m)
Jhaukandi	Island	10	20	60	10
Kadmirchar	Island	10	30	50	10
Nunertek	Island	15	20	55	10
Shapmara Charergaon	Island	10	15	65	10
Chalibhanga	Island	10	30	50	10
Manikarchar	Detached	25	30	45	00
Chengakandi	Mainland	20	50	25	05
Char Ramjan Sanaullah	Attached	30	10	60	00

Source: Charland RRA

that in other areas. Farmers reported little variation in the timing of normal monsoon inundation between locations, and only small differences between land levels. High land inundation typically lasts from late June to early October (*Ashar* to *Ashwin*); on medium land it starts a month earlier in late May (*Jaisthya*); and on low land it starts in late April (*Baishakh*) and continues until the end of October (*Kartik*) or, in slow-draining, very low land, in late November (*Agrahayan*).

Although all the mauzas visited (except Nunertek) have mechanized irrigation facilities, the incidence of irrigation is generally low: only 15-30 percent of cultivated land was reportedly irrigated. On the sandy soils found in parts of the island chars irrigation is not economically viable due to the high water requirement. The exceptions are the mainland mauzas of Chengakandi and Paikpara. In those mauzas electricity is available, and about 75 percent of land was reported to be irrigated. There, because of high and long-duration peak monsoon water levels, much of the land is single cropped with HYV boro and the remainder is double cropped with an early rabi crop followed by HYV aus (see Section 5.3 and Table 5.6). The percentage of land reportedly irrigated in the study mauzas is:

Jhaukandi	20%
Kadmirchar	25%
Nunertek	0%
Shapmara Charergaon	25%
Chalibhanga	15%
Chengakandi	75%
Char Ramjan Sanaullah	30%

Irrigation is mostly by shallow tubewell (STW) and low-lift pump (LLP) throughout the study area, except that far from the Meghna (such as in Manikarchar) LLPs cannot be used. In Manikarchar, the RRA found manually operated bamboo tubewells being used to irrigate high-value rabi crops such as chilies. This is a relatively recent innovation that spread from neighboring districts about five years ago.

### 5.3 Cropping Patterns

Farmers reported that more than half of the cultivated land in the study area was single cropped (Table 5.5); the remainder was double or triple cropped (the latter invariably a rabi crop followed by mixed aus and aman). The generally low cropping intensity reflects the limited cropping opportunities on the low-land char areas—where a

Table 5.5 Typical Cropping Intensity Reported by Farmers

Mauza	Char Type	Single Crop (%)	Double Crop (%)	Triple Crop (%)
Jhaukandi	Island	65	20	15
Kadmirchar	Island	55	30	15
Nunertek	Island	65	25	10
Shapmara Charergaon	Island	65	25	10
Chalibhanga	Island	60	30	10
Manikarchar	Detached	50	25	25
Chengakandi	Mainland	60	20	20
Char Ramjan Sanaullah	Attached	50	25	25

Source: Charland RRA

winter crop of traditional local or HYV boro is grown depending on the availability of irrigation water and the period when the land is flood-free. Full details of the mauza cropping patterns (and yields and harvest prices) are in Appendix A. The cropping pattern data summarized in Table 5.6 is the result of computing areas for each crop in each mauza visited (based on data in Tables 5.2 and 5.3 and Appendix A) and then calculating the percentage of available land under each crop. In the Appendix, as in Table 5.5, the first five mauzas are island chars and the last three are detached mainland, mainland, and attached char, respectively; these are treated as mainland in Table 5.6.

Table 5.6 shows that cropping patterns are simple on low and very low land (one crop of boro) but more complex on high and medium land. The highest land tends to be sandiest (particularly high and medium land in the island chars) and therefore has a high proportion of sweet potato, watermelons, and groundnuts. On less sandy land (medium level on the island chars and high and medium in the mainland mauzas) wheat, mustard, and *dal* are preferred rabi crops. *Til* (an oil seed) is widely grown in the late rabi-early aus season, almost always sown mixed with B. aman. Jute is likewise widely grown. Aus is an important crop on these land levels, and covers up to half of the land. All of this crop is B. aus, which is sown mixed with

aman. B. aman is the only late-monsoon crop grown in the study area.

The cropping intensity computed from detailed information given by farmer's groups, then, is broadly consistent with the intensities reported directly in Table 5.5. It appears that high and medium land in the mainland areas is cultivated more intensively than in the island chars. However, this alone is not proof that agriculture in the mainland is more productive, since this depends on the crop returns. Compared with nearby areas of floodplain surveyed as part of the FAP 12 evaluation of the Meghna-Dhonagoda Irrigation Project (FAP 12, 1992), cropping patterns are very different in the island chars and mainland areas. Local boro was not found in the interior floodplain, nor were dry-land crops grown to any substantial extent. Instead, the dominant crops were B. aman, HYV boro, and wheat.

#### 5.4 Yields and Prices

The yields and output (harvest) prices reported by farmers in each mauza visited in the RRA are summarized in Table 5.7. Since there are no conspicuous differences in yields for any crop between land levels, the levels have been combined. The table also shows that there are few if



any differences in reported yields between crops grown in the island chars compared with mainland chars (a comparison is not drawn, however, with the genuine mainland, which lies outside the study area). The only yield differences of any note are those of chili and HYV boro, which appear to be higher in the mainland mauzas, which at least in the case of HYV boro may be due to better small-scale irrigation and water management facilities. Input levels were not investigated by the RRA.

Harvest prices also exhibit no strong systematic differences between island chars and mainland chars, although farmers in the latter tended to report receiving higher harvest prices for a number of crops, particularly mustard and onions.

While the RRA did not collect information on production cost (an RRA is an unreliable means of collecting data of this type), gross returns (yield times harvest price) without allowance for input

Table 5.6 Summary of Cropping Patterns by Land Type

Crop	% Cultivated Island Char				% Cultivated Mainland			
	High	Med.	Low	V. Low	High	Med.	Low	V. Low
Sweet Potato	35	23	0	0	14	0	0	0
Watermelon	26	20	0	0	0	0	0	0
Groundnut	25	10	0	0	15	0	0	0
Chilies	7	12	0	0	13	21	0	0
Dal	3	0	0	0	2	22	0	0
Wheat	0	19	0	0	29	28	0	0
Mustard	0	7	0	0	16	17	0	0
Other	5	8	0	0	10	12	0	0
L. Boro	0	0	75	100	0	0	6	100
HYV Boro	0	0	25	0	0	0	94	0
Til (+ Aman)	13	9	0	0	50	16	0	0
Jute	28	15	0	0	11	10	0	0
B. Aus (+ Aman)	37	47	0	0	39	55	0	0
HYV Aus*	0	0	0	0	0	18	0	0
B. Aman (all sown with Aus or Til)	48	85	0	0	89	71	0	0
Cropping Intensity	227	255	100	100	288	270	100	100
Area in Study Mauzas (ha)	110	205	590	100	157	132	294	2
% of Land in Char Type	11	20	59	10	27	22	50	1

Source: Appendix A

\*Only grown in Chengakandi mauza, where all medium land is under HYV paddy during kharif I season.



8d  
Table 5.7 Summary of Yields and Harvest Prices of Main Crops

Crop	Island Char				Mainland			
	md/ac	tn/ha	Tk/md	Tk/tn	md/ac	tn/ha	Tk/md	Tk/tn
Sweet Potato	257	23.70	54	1,447	255	23.50	57	1,527
Watermelon*		17,750		39,798		-		-
Groundnut	21	1.94	486	13,023	22	2.03	520	13,934
Chilies†	43	3.97	253	6,779	51	4.70	258	6,913
Dal (average)	15	1.38	400	10,718	16	1.48	367	9,834
Wheat	23	2.12	227	6,082	22	2.03	237	6,350
Mustard	18	1.66	375	10,048	19	1.75	410	10,986
Onion	26	2.40	275	7,369	23	2.12	353	9,459
Ustha*		55,000		135,937		-		-
L. Boro	25	2.31	183	4,903	25	2.31	185	4,957
HYV Boro	54	4.98	192	5,145	60	5.53	198	5,305
Til	17	1.57	329	8,816	16	1.48	350	9,378
B. Aus (mixed)	23	2.12	178	4,770	21	1.94	183	4,903
HYV Aus	-	-	-	-	70	6.46	200	5,359
Jute	25	2.31	198	5,305	22	2.03	188	5,037
B. Aman (mixed)	26	2.40	199	5,332	28	2.58	217	5,814

Source: Charland RRA, Appendix A

\*Bitter gourd; values are gross return in Tk./acre and Tk./ha, respectively.

†Yield and price are for fresh chilies not dried.

costs can be calculated for the main crops. These reveal that crops suited to sandy soils give at least as high a financial gross return as other rabi crops (24,700-42,000 Tk./ha for sweet potato, groundnuts, and watermelon). Local paddy varieties (B. aus, B. aman, and L. boro), on the other hand, have low returns—about 9,900-12,400 Tk./ha, although these local paddy varieties are all grown under low-input practices. The somewhat lower cropping intensity on the sandier high land in the island chars, therefore, should not be a major handicap for agricultural returns (even if B. aman cannot be grown on all plots). But on low land the mainland mauza farmers get a substantially higher

value gross return (but at the cost of providing mechanized irrigation), since HYV boro gives a gross return more than double that of L. boro, and much more land in the mainland mauzas is under HYV boro.

Reported charland crop yields were similar to those of the same crops grown in the interior floodplain studied by FAP 12 (1992). Notably, FAP 12 (1992) found that sweet potatoes give one of the highest financial returns at about Tk. 16,000 per ha (comparable to HYV boro) in 1991, and that L. boro also reportedly gave a good return. It follows then that if production costs in the chars



are similar to those found by FAP 12 in the nearby interior floodplains, then the charland farmers of the study area may not face any disadvantage in a normal year compared with mainland farmers.

### 5.5 Land Tenure and Land Prices

There were no reports of significant absentee landownership in these mauzas, although a few employees and businessmen, who mainly live in the thana towns or in Dhaka, have at best 20-25 *kani* (6-7.5 acres) of agricultural land. This land is cultivated by share cropping. Generally, the sharecropper gets 50 percent of the yield, but landowners are expected to give 50 percent of production costs. The RRA found that the land mortgage system is common in the area, and that the land mortgage rate depends on the value of the land. Under the mortgage system, land will be returned just after returning the loan, until which

time the mortgager has the right to cultivate and keep the produce.

Table 5.8 shows that for each land type (with the exception of other non-cultivated land) land prices are much higher in the detached mainland and attached chars than in the island chars. Prices are about double for homestead and high land and about 65 percent higher for medium and low land. There are a number of factors behind this:

- The perceived risk of erosion in the island chars (although prices appear to become depressed only when the risk becomes immediately apparent);
- Sandy land generally has a lower value and is more common in the island chars (although this price differential appears inconsistent with the crop returns);
- Lower land is only single cropped, which keeps prices down;
- In Nunertek mauza, and probably in oth-

**Table 5.8 Land Prices in Focus Mauzas (thousand Tk./ha)**

Mauza	Erosion Hazard	Homesteads	Agricultural Land			Uncultivated Land
			High	Medium	Low	
ISLAND CHAR						
Jhaukandi	Low	494	163	205	247	-
Kadmirchar	Moderate	618	198	247	284	99
Nunertek	Very Low	198	99	124	148	49
Shapmara Charergaon	Low	284	124	161	198	-
Chalibhanga	Moderate	247	124	148	148	74
Island Char mean		368	141	177	205	44
MAINLAND						
Manikarchar	None	284	198	198	247	-
Chengakandi	Moderate	815	321	284	297	-
Char Ramjan Sanaullah	High	1,025	371	395	494	198
Mainland mean		708	297	292	346	66

Source: Charland RRA

ers, land registration fees are high relative to the value of land and there have been no land sales for perhaps 10 years (estimates of sale prices are therefore not based on recent experience), instead land changes hands through mortgaging; and

- In Char Ramjan Sanaullah land prices are exceptionally high, which puts an upward bias on the averages for mainland mauzas, in this case the mauza is adjacent to the Meghna bridge, and land is being bought for industry.

Land typically is mortgaged for about one third to one half of its market value, ranging from 37-49,400 Tk./ha in Nunertek to 123,500-148,300 Tk./ha in Char Ramjan Sanaullah.

## 5.6 Floods and Other Problems

Agriculture in the study area generally appears to be well adjusted to normal monsoon conditions and flooding. There are risks nonetheless, and when asked what problems they faced in achieving better profits from agriculture, farmers mainly pointed to natural hazards as constraints on agriculture. The following problems were reported:

In the island chars:

- Water hyacinth damage to aus, aman, and jute;
- Early flood damage to L. boro;
- Flood damage to aus, aman, and jute;
- Hail damage to rabi crops (potato, watermelon, boro, and chili);
- Sand deposition;
- Late-receding flood water; and
- Inability to get a "proper" price for produce.

In the mainland and attached chars:

- Drought;
- Waterlogging caused by heavy rainfall;
- Sand deposition;

- Flood damage to aus, aman and jute; and
- Scarcity of inputs (pesticide and fertilizer).

Waterlogging is not generally a problem, but on low land in the island chars water levels sometimes fall late, delaying the timely sowing of local boro, but this is reflected in the average yields quoted. This risk is higher in the island chars (since they are within the river channel) and is probably the reason why less land is used for growing HYV boro, which entails higher production costs. On some of the higher land, water level might not in itself prevent TL aman from being grown, but a combination of sandy soils, flood risk, and quick rising normal monsoon water levels mean that B. aman is exclusively grown. This is usually as part of a risk-minimizing crop mix of B. aus + B. aman. In Manikarchar, for example, farmers reported that in 1988 the aus crop had been harvested before the peak flood, even though they lost their aman crop.

In general, frequency of crop loss to floods is moderate in this area. The peak flood in the past 10 years was 1988 (in all mauzas), and in some mauzas crops were also damaged in 1991 and 1984 (Table 5.9). Crop flood impacts are considered with the other flood impacts discussed in Chapter 4.

## 5.7 Potential for Improvements

The existing agricultural system is adjusted to monsoon conditions in different land levels in the Meghna charlands. Farming in the area is not static or fossilized by traditional practices, and what traditions it does have are often based on sound agricultural principles. When new opportunities arise that are within farmer's means, tradition also is likely to give way to improved practices. Farmers have very logical reasons for their cultivation practices and crop choices. Rabi crops, for example, are changed between years to maintain soil fertility. Farmers that cultivate B. aman usually switch annually between the two groups of varieties (red and white stemmed). This allows



Table 5.9 Floods Affecting Crops in the Past 10 Years

Mauza	Number of Years in Past 10	Damaged Crops
Jhaukandi	3 years (84, 88, 91)	Jute, Aman
Kadmirchar	2 years (88, 91)	B. Aman, Jute
Nunertek	3 years (84, 88, 91)	B. Aman
Shapmara Charergaon	3 years (87, 88, 91)	Aman
Chalibhanga	2 years (88, 91)	Aman
Manikarchar	1 year (88)	Jute, Aman
Chengakandi	1 year (88)	Jute, Aman
Char Ramjan Sanaullah	2 years (88, 91)	Jute, Aman

Source: Charland RRA

them to keep the varieties separate and helps to keep their selections pure (rogues left from the previous year can easily be weeded out because their stems are the wrong color). Farmers also have responded to new opportunities and technologies in the past. Draught power, although still used for cultivation, is gradually giving way to more modern methods; there are already several power tillers on the island chars. Additionally, HYV paddy seed has become available through the thana agricultural offices, and less costly, more readily available small-scale irrigation equipment has led to the growth of HYV boro cultivation. In some mauzas this was even reported to have taken place on land that previously had been fallow. Similarly, farmers who saw treadle pumps being used to irrigate rabi crops, particularly chilies, in other districts subsequently adopted the technology in the study area (mainly mainland mauzas).

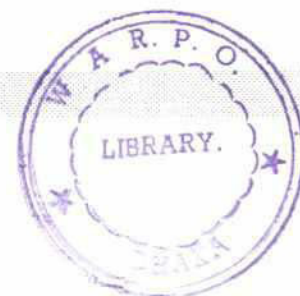
Charland farmers' access to institutional support is, however, limited. Krishi Bank loans are available for cultivation—for inputs used for HYV boro cultivation, for example—but the nearest bank is distant from the island chars and borrowers pay about 5 percent of the sum borrowed as an arrangement fee. Under the circumstances, the mortgaging system is a more convenient source of credit to raise working capital. Agricultural Block Supervisors do visit the area but did not appear to

be regarded by the farmers as helpful, while supplies of new or improved seed tend to go first to the richer and better connected farmers.

The potential for future intensification of monsoon season agriculture seems limited, although it might be worthwhile to experiment on some of the higher land with transplanting deep-water or longer-stemmed paddy varieties (which appears to be unknown in this area). There is more scope in the winter season. More HYV boro might be grown in the island chars, and higher-value rabi crops could be expanded; watermelons, for example, appear to give a good gross return,

but expansion depends on demand and a good marketing network. The southern boundary of the RRA study area is the Meghna Road Bridge. The road has already benefited the sand extraction industry and may benefit agriculture by providing ready access to urban markets (Dhaka is less than an hour away).

Raising returns to farming in normal conditions, while an important objective, should not be the only objective. Farmers are still vulnerable to natural hazards. Flood warnings might help to harvest boro or aus crops before they are damaged (they would not help aman crops). The scope for increasing rabi season cultivation after floods was reported to be limited—farmers in the island chars said that they did try to grow more rabi crops (food crops such as *dal*) after the 1988 floods, but the sandy soil provided poor yields. Some agricultural flood losses are inevitable, but under the current situation, recovery often seems to lead to indebtedness, and ultimately to greater inequality in land ownership and increased marginalization of the poorest households. Fortunately, those study area families who have become landless in the past have been able to continue or expand their time spent fishing for a living. This solution, however, may be limited in the future by the licensing system and pressure on limited fish resources (see Chapter 7).



## Chapter 6

### LIVESTOCK

#### 6.1 Role of Livestock in Char Economy

A considerable amount of livestock farming is done by people living on chars, who raise cows and female goats for their money-making potential as breeders and milk producers. For some, in fact, livestock rearing is the only means of support during periods of scarcity. While cows are commonly found in the area, buffaloes and sheep are virtually absent. Ducks and chickens are commonly kept both for egg production and food.

Since sale prices of animals are higher in chars than elsewhere, people trade in them to help repay loans from moneylenders, and to cover "social costs," too. The cattle fattening business, in particular, serves a pragmatic purpose for the char people. Since almost all the chars' crop and grazing lands are submerged for five to seven months (May through October) there is a seasonal shortage of fodder for animals. Additionally, sheltering livestock during monsoon can be difficult, and abnormal flooding makes the situation even worse. Many char people, therefore, purchase cattle after flood waters recede (November-December) and sell them when monsoon flooding commences (May-June). This allows them to use the animals for cultivation, fatten them on abundant dry-season fodder, and sell them, hopefully at a profit, just as they are heading into the season of greatest hardship.

Problems of caring for livestock are: 1) Insufficient high land shelter for them during monsoon; 2) Shortages of food for them; 3) Lack of veterinary care or facilities; and 4) Inadequate grasslands in some places.

#### 6.2 Profile of the Livestock Resource

Livestock density in the RRA study region is greatest in villages with relatively low flood risk and a location in proximity to cattle markets. For example, the number of cattle per household is high in Manikarchar (detached mainland) and Chalibhanga (island char). Both are located near cattle markets and Manikarchar also has a relatively low flood risk. Table 6.1 shows the distribution of livestock by season and mauza reported in the study mauzas. This shows that throughout the Upper Meghna there are strong seasonal fluctuations in livestock numbers, except in Protaper Char where there is space and fodder for livestock during the monsoon, as well as other business opportunities.

The strong seasonal differences in livestock numbers in Table 6.1 reflect different factors depending on the char type. For example, in Manikarchar, typical of the mainland areas (including attached chars and detached mainland), seasonal buying and selling of livestock is caused by fodder shortages that raise maintenance costs during the monsoon. In the island chars, on the other hand, the main factor is the lack of flood-free shelter in the monsoon.

Livestock in the island chars were reported to be healthier than those in the attached chars, while cattle appeared to be in poor health in the mainland area. This appears to be because the seasonal grazing area and availability of fodder is relatively high in the island and attached char mauzas. As a result, commercial cattle fattening appears to be more widespread in the island chars.



Table 6.1 Approximate Numbers of Livestock by Season and Mauza

Village (Mauza where different)	House-holds	Cattle				Goats			
		Dry		Wet		Dry		Wet	
		No.	No./HH	No.	No./HH	No.	No./HH	No.	No./HH
Purbakandi (Jhaukandi)	300	70	0.23	20	0.07	150	0.5	75	0.25
Kadmirchar (Kadmirchar)	250	700	2.8	400	1.6	500	2.0	450	1.8
Nayagaon (Kadmirchar)	94	100	1.06	70	0.74	50	0.53	40	0.43
Badalpur (Kadmirchar)	150	100	0.67	50	0.33	60	0.4	50	0.33
Nunertek	560	900	1.6	450	0.8	1,500	2.68	500	0.89
Chalibhanga	450	900	2.0	750	1.66	1,500	3.33	500	1.11
Manikarchar	400	950	2.38	500	1.25	1,500	3.75	500	1.25
Chengakandi	400	200	0.5	150	0.38	200	0.5	100	0.25
Protaper Char (Char Ramjan Sanaullah)	100	125	1.25	125	1.25	150	1.5	150	1.5
Island Char Mean			1.53		0.96		2.08		0.89
Mainland Mean			1.42		0.86		2.06		0.83

Source: Charland RRA

Table 6.2 Main Sources of Fodder in Meghna Char Area

Dry Season	Wet
Green grasses	Dried paddy straw
Sweet potato leaves	Water hyacinth
Post-harvest fresh straw (boro and wheat)	Dried wheat straw
Oil cakes with rice bran ( <i>bhusi</i> )	Dry groundnut leaves
Boiled sweet potato	Oil cakes with rice bran
Wheat bran	
Groundnut leaves	

Source: Charland RRA

### 6.3 Fodder Resource

A variety of livestock fodder is available in the Meghna chars, particularly during the dry season when there is more grazing land above water. During the monsoon only rich farmers can afford to keep enough stored fodder. In the island and attached chars natural grasses are used for grazing. This is especially true in the rare cases when a new char accretes; in the first few years the land is left to stabilize with the help of the grasses. Table 6.2 lists the main types of fodder available in the dry and wet seasons.

### 6.4 Commercialization of Livestock

#### 6.4.1 Extent of Commercialization

Many char people, as previously noted, make some part of their livelihood from cattle rearing on a seasonal basis. Their proximity to markets where they can sell their animals, therefore, is important to their economy. In the Upper Meghna RRA study area cattle raisers have access to several urban markets that are not too distant. For example, Kadmichar cattle owners generally buy cattle at a low price from Ananda Bazar and sell them in

Dhaka at Mirpur (Gabtali) or Baburhat at Narsingdi (15 miles away). Similarly, Nunertek and Chalibhanga are near Ananda Bazar and Baidyer Bazar. Manikarchar is different, since it is a fodder deficit area and most of the people generally buy cattle for draft power for cultivation when flood water recedes. After exhaustive use the weak cattle are sold before floods commence, in this way the farmers recoup some of the cost of buying the cattle and avoid further losses due to the lack of fodder in the monsoon. The "mainland" areas tend to grow less sweet potato and groundnuts (Chapter 5), which are important fodder sources for cattle in the island chars, whereas the higher intensity of HYV boro cultivation in the mainland and detached mainland areas creates a greater demand for draft power.

Table 6.3 confirms this pattern, it also shows that few households sell milk. In Protaper Char milk selling is more important than cattle fattening, reflecting draft power needs, flood-free space, and the demand from tea shops and traders near the Meghna bridge and ghat. There is a high incidence of milk selling in Kadmichar because a local milk trader collects milk from each household and sells it to a middleman who in turn sells the milk to markets in Dhaka and its suburbs.

Table 6.3 Pattern of Commercial Livestock Enterprises by Village/Mauza

Mauza/Village	Char Type	Total HH	Households Raising Livestock for Sale (%)	Households Selling Milk (%)
Purbakandi (Jhaukandi)	Island	300	17	5
Kadmichar	Island	250	60	40
Mohishar Char (Shapmara Charergaon)	Island	160	39	13
Tekpara (Nunertek)	Island	60	50	20
Chalibhanga	Island	450	45	18
Manikarchar	Detached	400	3	6
Chengakandi	Mainland	400	13	8
Protaper Char (Char Ramjan Sanaullah)	Attached	100	10	30

Source: Charland RRA



#### 6.4.2 Market Price of Livestock

Livestock prices vary little in the study area as cheap water transport facilitates marketing. Moreover, the majority of the commercially reared cattle from the island chars are marketed in the cattle markets in and around Dhaka to get higher prices; while people from the "mainland" prefer to sell cattle in local markets close to their village. Table 6.4 suggests that the sale price of livestock is relatively high in island chars with better fodder supplies and communication with cattle market centers and where cattle are raised for sale. The two villages where cattle are used mainly for draft power and then sold off (Manikarchar and Protaper Char) show among the lowest prices. Goat prices show minimal variation.

#### 6.4.3 Livestock Tenancy System

Livestock tenancy is a common practice in the study area. In this system the owner and tenant fix a market value of the calf or young goat at the time of agreement and the tenant rears the animal until it reaches peak sale value, then the sale price of the animal is shared equally between the owner and tenant after deducting the original value, which is given to the owner. In another version of the system, if there are two offspring from a goat during the period of tenancy, then one will belong to the tenant and the other one to the owner. By this means a poorer households can accumulate a small number of goats that provide them with a source of income free of the need to raise the capital cost of livestock.

### 6.5 Livestock Problems

#### 6.5.1 Flood

During abnormal floods, such as in 1988, the homesteads in the char areas were submerged and people either migrated to the highland areas

with their livestock or took shelter on *machas* or in the house rafters. Livestock were accommodated on raised platforms of banana plants and/or water hyacinth held in by bamboo poles in the courtyard. Fodder shortage and standing in water affected the health of livestock. Some livestock were lost in that flood (Chapter 4).

#### 6.5.2 Livestock Diseases

Diseases of livestock and poultry are common in most of the mauzas visited. Mauzas not on island chars (Manikarchar and Protaper Char) are reasonably served by the thana veterinary staff, but nowhere in the island chars did any farmers report that veterinary officers had ever visited. In Kadmirchar it was reported that one young man received training in livestock care and treatment from an NGO in Dhaka, and he now provides this service to his area. However, non-government initiatives in livestock enterprises and health care are completely absent in the study villages.

#### 6.5.3 Potential Improvements

The farmers and even landless people in the island char areas have developed a system of livestock

Table 6.4 Market Price of Livestock by Mauza

Mauza/Village	Char Type	Market Sale Value		
		Bullock	Cow	Goat
Kadmirchar	Island	10,000	8,000	500-1,500
Chalibhanga	Island	10,000	8,000	500-1,500
Mohishar Char	Island	10,000	8,000	500-1,200
Nunertek	Island	9,000	8,000	700-1,500
Purbakandi (Jhaukandi)	Island	8,000	7,000	700-1,400
Chengakandi	Mainland	7,000	7,000	500-1,200
Protaper Char	Attached	7,000	6,000	500-1,800
Manikarchar	Detached	5,500	6,500	500-1,200

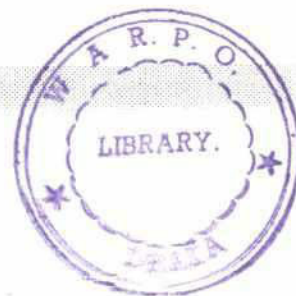
Source: Charland RRA

96

rearing that appears to make efficient use of the seasonally available fodder resources, is adjusted to the hazards of the monsoon and, to some extent, severe floods, and takes advantage of seasonal demand for livestock. Nevertheless those people who do try to keep cattle during severe floods suffer losses. Measures which might be worthwhile include:

- NGOs adapting the traditional livestock sharing system as a means of giving the poor fair access to livestock and a chance to benefit from common grazing land, this might be linked with milk collecting rounds in order to give participants a regular income;
- cattle are movable, and are one of the main assets that people move in order to protect them from loss in floods, hence warnings plus known safe places—such as raised areas in each *para* or *bari* would help those owning livestock;
- livestock health care presently is inadequate, especially during floods. Veterinary officers will never be able to reach the dispersed cattle that fall sick during and after floods, particularly given the physical and financial constraints on making visits during floods. Hence their priority should be in providing basic training to a network of "para-veterinaries" who would have sufficient training to diagnose and treat the most common treatable ailments. If this training is provided to landless people, even to destitute women, then they would have a source of livelihood and provide a much needed service to people in their area—since they would be available on-site and would charge relatively low fees.





## Chapter 7

### FISHERIES

#### 7.1 Context

The middle Meghna connects the large wetland areas of the northeastern *haors* with the Lower Meghna, and borders extensive areas of open floodplain during the monsoon. As a result, this reach of river is a rich fishing ground. Most of the people in and around the study reach, especially those who live on the chars, depend on the fisheries of the Meghna for their livelihood. Indeed, fishing and agriculture were found to be about equally important as sources of income, employ-

ment, and food for the inhabitants of the chars in this study area.

#### 7.2 Who Is Fishing?

##### 7.2.1 Incidence of Fishing

Fishing is one of the main economic activities of the Meghna charlands people (see Table 2.3). Most households fish, and they can be divided into three groups: professional, subsistence, and occa-

**Table 7.1 Professional Fishermen and Fishing Types**

Mauza	Char Type	% Households Fishing	% Owning Boats/Nets	% Fishing for:	
				Hilsha	Small Fish
ISLAND CHAR					
Mohishar Char	Island	70	20	70	95
Jhaukandi	Island	23	15	32	93
Nayagaon (Kadmirchar)	Island	25	25	25	75
Nunertek	Island	65	50	60	95
Chalibhanga	Island	50	40	60	80
All Island Chars		49	34	54	89
MAINLAND					
Chengakandi	Mainland	75	50	50	100
Manikarchar	Detached	7	5	0	50
Char Ramjan Sanaullah	Attached	32	10	20	50
All Mainland		34	19	20	63

Source: Charland RRA

sional fishermen. The professional fishing families are involved in the occupation full-time and sell most of their catch. The occasional and subsistence fishing families generally eat their catch, although they may sometimes have enough fish to sell. Table 7.1 shows that the majority of households earn part of their living from fishing. Many fishermen are dependent on others for this source of income—since they do not themselves own boats or nets they work on a share basis for people who own fishing gear. *Hilsha* (*Hilsa ilish*) are an important component of the fishery in this area.

### 7.2.2 Lean Period Activities

The lean period for fishing in the Meghna coincides with the peak of agricultural activities. Since most of the fishermen are functionally landless, they work as agricultural laborers or in other non-farm activities during the lean period in order to meet their daily needs. Some seasonal fishermen move to distant places, particularly the *haor* areas of Sylhet, to find off-season jobs as agricultural wage laborers. Some return to their original homes in Faridpur District to fish during the lean season. Some fishermen in Mohishar Char, Chalibhanga, Nayagaon of Jhaukandi, and Nunertek continue fishing operations all year, even if the catches are poor. In addition, about 40 percent of fishing households own some agricultural lands. During the lean fishing period from October to June (*Kartik* to *Jaisthya*) most of them work on their own land.

### 7.2.3 Changes in Professional Fishing

The pattern of major traditional occupations in the study area has been transformed over time by population growth and its pressure on land. In the past, most Muslims were engaged in cultivation, wage labor, and small business. Fishing was a secondary activity and was done mainly for consumption. In the past, fishing communities in this area were mostly Hindus, and there were fewer professional fishermen, but that has changed. In the study mauzas all the professional fishing families are Muslims, with the exception of a community of about 35 Hindu fishing households

in Purbakandi village of Jhaukandi mauza. This transformation from farming to fishing appears to have happened for the following reasons:

- Inadequate agricultural land to support family needs, either by loss of agricultural land to riverbank erosion, sand carpeting, or division of land owned by forefathers due to population growth;
- Over-employment in the agricultural sector and lack of other non-farm employment opportunities;
- The cost of starting fishing is low—bamboo traps cost about Tk 8-12 each—and within the reach of the poor; and
- Availability of good fishing grounds along the Meghna.

All the above factors act as catalysts in the process of converting farmers into fishermen, but it is not known whether Hindu fishermen left the area in the past.

## 7.3 Fish Resources, Practices and Rights

### 7.3.1 Fish Resources

The char people reported that they mainly catch *hilsha*, small shrimp (*icha*), *kechki* (*Mugil cascia*), and *chewa* (*Chaca chaca*). Fishing for small species is dominated by small shrimp followed by *chewa*, *bailla* (*Gobiidae*), and small fish.

Five types of fishing ground were identified in the Meghna char study area:

- main river channel;
- river branch or channel (*khal*);
- *beel*/depression linked with channel/river;
- isolated depressions/*beels*; and
- floodplains.

This study reveals that each type of fishing ground may be characterized in terms of fish habitat for biodiversity and availability of fish. Table 7.2 summarizes the socioeconomic and biological aspects of these fishing grounds.



Table 7.2 Characteristics of Fishing Grounds

	River*	Branch/ Canal	Beel Linked to Canal/River†	Isolated Beel/ Depression	Floodplain
Fish Diversity	Moderate	Low	Highest	Low	High
Fish Catch	Moderate	Low	Highest	Low	Low
Fishermen Density‡	Moderate	Moderate	Highest	Moderate	Low
Fishing Rights	License	Free access	Leased or Free	Leased or Free	Free access
Fishing Type	Professional	Professional/ subsistence	Leased/ professional	Subsistence/ professional	Subsistence

Source: Charland RRA

\*Fish diversity and fish catch in the river channel is high during flood period.

†Fish catch is highest during post monsoon (Oct. to Dec.)

‡Inferred from percentage of fishing households living in the vicinity of the fishing ground.

*Hilsha* are caught in the major channels of the Meghna. Boats and special nets (*chandi jal*, current *jal* and *dor jal*) are required for *hilsha* fishing. *Hilsha* are caught from boats by teams of four or more fishermen per unit. The major *hilsha* fishing season is from March to October (*Chaitra* to *Kartik*), with the peak in August-September (*Bhadra*). However, the people living in the chars and banks of the Meghna continue *hilsha* fishing almost year-round. *Chewa* fishing is at a peak in the Meghna channel on cloudy/rainy days during the pre-monsoon period. Fishing in the main river channel is typically commercial and done by teams of fishermen, often working at night.

In the *khals* and inundated charlands, monsoon season fishing is mainly done with small nets (*moi jal/chewa jal*) and traps (*chai*), and the catch is dominated by small shrimp, *chewa*, and small fish. Fishing for small shrimp (*icha*) is mainly done using bamboo traps placed along the shoreline of the Meghna chars. The traps are also operated in the inundated croplands and *khals* of the chars during the monsoon months. Some people also use drag nets (*moi jal*) to catch small shrimp along the shoreline of rivers. Shrimp fishing starts in May (late *Baishakh*) and continues until the end of October (mid-*Kartik*) with the peak coming in late September (*Ashwin*) when the flood waters start to recede. One fishermen may operate 50-120 traps

in a season lasting five to six months. The traps are not durable, and usually two to three sets are required in a season. These are purchased from local markets, mainly Ananda Bazar, Chandanpur, and Baidyer Bazar.

### 7.3.2 Fishing Gear and Ownership

Fishermen in the study area use four types of gear:

- *ber* net and *dor* net for small fish (*kechki*, small shrimp, etc.);
- *kona* net, *chandi* net, current net/*dor* net for *hilsha* fishing;
- *chai* (bamboo traps) for small fish and shrimp;
- *moi* net/*chewa* net for small shrimp and *chewa*;

They also use fishing boats of different sizes: small (2-3 fishermen), medium (3-4 fishermen), and large (8-14 fishermen). The typical prices of fishing gear are given in Table 7.3.

Some fishermen purchase fishing gear and boats with their own resources, some borrow a part of the capital from their relatives, and many arrange it from local non-formal sources (money-lenders/fish traders) in the form of credit under various arrangements called *dadon*. Under this system,

**Table 7.3 Details of Fishing Gear in Operation in Nunertek Mauza**

Type of Gear/ Size/Species	Cost per unit (Tk)	Fishermen per unit	License Fee (Tk/yr)*	Licensee Households
<i>Moi</i> net/ <i>chewa</i>	500-1,500	2	50	100
<i>Par</i> net/450 ft./carp	2,000-4,000	2-3	100	50
<i>Dor</i> net/450 ft./shrimp, <i>kechki</i>	10,000-12,000	2-3	150	30
<i>Kona</i> net/600 ft./ <i>hilsha</i>	15,000-20,000	4	200	6
<i>Ber</i> net/1,500 ft./small & medium species	50,000-60,000	10-15	750	10

Source: Charland RRA

\*Fishery Department licenses should be renewed annually, and fees increase by 10 percent each year.

the fishermen are bound to sell their catch to the lender at a price 5 to 10 percent lower than the market price. The amount of credit is reimbursed in installments over the fishing season (about five to six months). Access to formal credit is also possible: 70 of the fishermen in Nunertek borrowed from Bangladesh Krishi Bank to purchase fishing gear and boats, but all of them have defaulted on their loans during the past five years.

Poor fishermen, rather than buying equipment on credit, work as laborers in the fishing unit of an owner-fisherman. This share system was found to be the same in all the study mauzas. The boat and net owner (owner-fisherman; usually the same man) gets 50 percent of the day's catch as rent for the gear and craft, and the remaining 50 percent is equally distributed among the laborers. In addition to the 50 percent share for the boat and nets, the owner-fisherman also gets his share as a fishing laborer if he works in the fishing operation. Some fishermen own only nets but they can hire small boats locally, usually from fish traders, for around Tk. 200-300 per month.

### 7.3.3 Fishing Rights

Fishing rights in the river channels are obtained either by paying rent or a toll to the leaseholder or paying license fees to the Department of Fisheries. The licensing system is relatively new, and is

appreciated by those fishermen who have obtained identity cards (licenses), but those who have applied for cards and been denied are not happy with the system. The license fee varies according to the size and type of fishing gear. The system operates through fishermen's cooperative societies in each union where there are professional fishermen. The president and secretary of the society collect fees from the fishermen according to fixed rates. On behalf of the cooperative society, collected fees are then deposited with the Thana Fishery Office and licenses (identity cards) are obtained for the fishermen who paid. The cost of fishing licenses and the number of licensed fishermen in Nunertek mauza are shown in Table 7.3.

The previous system of controlling access to fisheries and raising revenue was to lease out reaches of the river for fishing. Under this system intermediaries would lease a river section and then charged fishermen a toll to gain access. Although there has been no official leasing of river sections since 1992, some non-fishermen who live on the mainland reportedly still collect on such leases. Where this occurs, the leaseholder employs his own surveillance team to collect tolls from fishermen while they are fishing. The amount of toll or rent claimed varies according to the size of fishing unit. The fishermen in Nunertek said that one nearby section of the Meghna River is controlled by non-fishermen who use the threat of force to



exclude local fishermen and then hire fishermen from other areas and monopolize this reach of the river (see Section 3.3.4). That area is particularly rich in fish—mainly *kachki*—and the catch is higher there than in other areas.

Fishing by small bamboo traps is reported to be toll-free in all the study mauzas. The trap catch is dominated by small shrimp, *kachki*, *chewa*, and other small species.

#### 7.4 Incomes and Markets

In most cases fishermen sell their catch at the fishing site. *Paikers* (middlemen or fish traders) go to the fishing site in the morning and evening by boat to purchase fish directly from the fishermen at relatively low prices. Some fishermen bypass the *paikers* and sell their catch directly to markets around their fishing grounds, both wholesale to *aratdars* and retail. Most of the middlemen jointly hire trucks in Baidyer Bazar to ship fish to Dhaka.

The average earnings per fishing day by type of gear used in the Meghna chars, as reported for a normal period, are shown in Table 7.4. This shows that the income of fish laborers is marginal, they can hardly meet family expenditure from their share of the fishing income.

**Table 7.4 Value of Typical Catch and Fishermen's Income by Gear Type**

Gear	Tk./gear day	Tk./fisherman day	Tk./laborer (share system)
Small net	40-50	20-50	NA
Par net	100	50	25
Dor net	200-250	83	42
Kona net	300	75	38
Ber net	750	75	33

Source: Charland RRA

## 7.5 Conclusions

### 7.5.1 Problems and Constraints

For the most part, severe floods and land erosion have little effect on fishing; and more fishermen appear to be active during the monsoon. Most respondents said that the monsoon increases fishing opportunities, particularly in the inundated charlands, and that the catch from traps increases. Some of those interviewed, however, reported that local erosion and the high turbidity of water during monsoon result in fish moving away. The main negative effects of severe flooding and erosion for fishermen are the same as for other char families: they damage property and force households to move.

Fishermen reported being harassed by police who check licenses; subjected to excessive toll collection by unauthorized people; and victimized by mid-river *dacoits* who steal their nets, money, and fish. Many of the fishermen in the chars do not appear to be formally organized. Only in Nunertek mauza did the RRA team find fishermen who belonged to a cooperative. There are, however, many informal arrangements among and between fishing groups that have mutual understandings about access to fishing grounds.

### 7.5.2 Future

Fish are a major source of income (and food) in the study area, the majority of households earn at least part of their livelihood from fishing. There appears not to have been any decline so far in the fishery resource, although there has been a change (probably an increase) in the fishing community over time. Charland fishermen appear to have traditional access to fishing grounds in the main river adjacent to their villages, but this has been limited by the leasing system, and more recently by the licensing system. The licensing system, it appears, while attempting to regulate fishermen fairly has also opened new avenues for their exploitation. Meanwhile, influential persons who controlled fishing

2

grounds through the old leasing system continue to do so despite the introduction of licensing. Even so, many poor people are able to support themselves from fishing either by operating on a small scale or by working under the share system with other people's equipment.

Given that fish resources are as important as land resources to the char inhabitants of this area (unlike chars in the Jamuna), it is important that this be recognized in development policies. Fishermen tend to stay close to their fishing grounds, even when homesteads are lost to erosion, and their incomes are to some extent already flood proof. The greater needs appear to be proper monitoring of the fish stock and fishing pressure so that over-fishing can be identified and controlled. In order to provide a means of managing the river fishery fairly the fishermen's cooperatives might be encouraged to set up more widely and to form an association as a means of lobbying against exploitation and exclusion by the rich and powerful. An association could also take a wider view of fish stock trends and sustainability of the fishing industry in the Upper Meghna as a whole, rather than trying just to protect the interests of some fishermen in a particular union.



## Chapter 8

### INSTITUTIONS, TRANSPORTATION, AND MARKETS

#### 8.1 Institutions

Table 8.1 indicates the presence of various institutions and infrastructure in the study region. It is readily apparent that the island chars have the least infrastructure and fewest facilities. The low percentage of unprotected mainland mauzas with primary schools is because many of these mauzas are very small—the mean distance to a primary school is reported to be 0.6 miles in these mauzas, the same as for the study area as a whole. The lack of facilities in many of the island and attached char mauzas is reflected in the reported distances to the nearest facility. Island chars report that the nearest government hospital is an average of 8.4 miles away compared with 3.4 miles in attached chars and unprotected mainland. The actual distance may not seem large, but char people clearly perceive themselves as being remote from government services. Although there are few formal

launch ghats in the island chars there are informal (*kheya*) ghats in 78 percent of these mauzas.

The RRA paid particular attention to the accessibility of primary government institutions (union parishad office, thana headquarters, and district headquarters) serving the char villages. Access, in terms of cost and time, was consistently found to be better for people not living in island chars (mainland, attached char, and detached mainland mauzas), than it was for the five island char mauzas. Table 8.2 gives mean distances, travel times, and costs (all estimated by local people) for the dry and monsoon seasons.

Union parishad offices are naturally closer to the study mauzas than the higher administrative levels, but they are more accessible and nearer to mainland areas than to island chars. In general the mainland mauzas are better connected with other

**Table 8.1** Percentage of Study Region Mauzas with Infrastructure and Facilities

Facility	Island Char (%)	Attached Char (%)	Detached Mainland (%)	Unprotected Mainland (%)	All Areas (%)
Health care	7	14	27	23	18
Primary School	57	71	82	39	52
High school	7	29	9	13	12
<i>Hat</i> (market)	7	43	46	23	24
Launch ghat	7	29	36	6	19
Electricity	0	14	0	35	18
NGO active	7	0	0	29	20

Source: Charland Inventory

Table 8.2 Accessibility of Government Offices from Surveyed Mauzas by Char Type

Char Type and Number	Average Distance from Village (with range) in km	Dry Season (one way)			Wet Season (one way)		
		Av. Time (hr.)	Av. Cost (Tk.)	Mode of Transport	Av. Time (hr.)	Av. Cost (Tk.)	Mode of Transport
a) Union Parishad Office							
Mainland (3)	2.8 (1.2-4.8)	0.53	0.34	On foot; bus	0.36	2.67	Engine boat; bus
Island Char (5)	4.8 (0.8-8.8)	0.83	1.9	On foot; engine boat	0.75	3.6	Engine boat
b) Thana Headquarters							
Mainland (3)	7.7 (2.0-12.8)	0.90	7.84	Engine boat; rickshaw; bus	0.90	8.09	Engine boat; rickshaw; bus
Island Char (5)	13.3 (11.2-16.0)	2.1	13.5	Engine boat; rickshaw	2.0	14.0	Engine boat; rickshaw
c) District Headquarters							
Mainland (3)	33.3 (21.6-56.0)	2.58	16.0	Engine boat; bus	2.58	15.0	Engine boat; bus
Island Char (5)	43.7 (27.0-53.0)	3.4	23.5	Engine boat; bus	3.4	24.0	Engine boat; bus

Source: Charland RRA

places by both river and road, whereas island char dwellers must rely on boats even in the dry season. It is notable that while travel times are shorter in the monsoon for both mainland and island chars (because more of the distance can be covered by mechanized boat), the cost increases. Table 8.2 shows that this increase is relatively greater in the mainland sites, because in two out of the three mauzas engine boats are used in the wet season.

The island char villages are almost twice as far from their thana headquarters as the mainland villages. Consequently, it takes more time and costs more to make the trip from the island chars. In the monsoon these journeys are slightly cheaper since more of the trip can be made by engine boat, which is less costly per kilometer than a rickshaw.

In most cases, the mainlanders get no advantage from the monsoon, so their cost remains about the same year-round.

Table 8.2 shows that transport cost and time remain the same in both wet and dry seasons for the longer distances to district headquarters, although once again the island chars are more remote. Because of difficult communications most of the island char people rarely visit their district headquarters except for official purposes. It should be remembered that the averages given are all for normal conditions, during flood times or bad weather travel times and costs generally increase.

The island chars, then, even in this reach of the Meghna where the unprotected area is relatively



narrow and close to urban areas, are relatively remote from the local administration, which correlates with lower infrastructure provisions. It also means that official assistance during a flood is less likely to reach the island chars than comparable areas of mainland.

## 8.2 Transport Facilities

Many island char households have their own boats (a higher level of ownership of boats than in char areas in the Jamuna), in part because fishing is one of the area's main professions (see Table 2.3). During the monsoon boats are essential to the people of the island chars, who use them to collect grass for cattle, to carry harvested paddy from the fields, and for all travel outside their island.

Table 8.3 indicates that about 82 percent of island char households own a boat. According to informants, only the landless have no boats, and they somehow manage to travel outside their island when necessary by sharing other people's boats. There are also regular engine boat services on the main market days between many villages and the markets, making it less essential to own a boat.

On the other hand, the three "mainland" mauzas are more accessible by land and fishing is not practiced commercially, except in Chengakandi which is adjacent to the main river. Since these mauzas are still close to the Meghna, and most of the agricultural land and some of the surrounding areas submerge in the monsoon, boats are still an

important form of transport, and 52 percent of households in the three "mainland" mauzas have a boat. In these villages households were reported to commonly sell off their boats after the monsoon season and buy a boat again before the next monsoon season. The reason given is the lack of permanent water bodies and *beels* where they could sink the boats during the dry season (to preserve them), the exception again is Chengakandi which is next to the Meghna.

Very few char households are rich enough to own an engine boat. The eight engine boats found in the "mainland" mauzas are mainly engaged in transporting passengers and goods, none are used for fishing. Of the 24 engine boats in the island chars one third are engaged in transporting passengers and goods, the remaining two thirds are engaged in fishing in all but 2-3 months of the year. In the lean period these boats generally switch to carrying goods or passengers and the fishermen work as day laborers.

## 8.3 Markets and Prices

### 8.3.1 Market Locations

People in the nine study villages regularly use 12 marketplaces, the nearest of which is used to buy and sell daily commodities. In all the island and mainland villages there is a marketplace within 2 km, so people do not have any problem buying necessities even in the monsoon. Full details of usage and access are given in Appendix B.

Table 8.3 Boat Ownership Patterns by Char Type

Char Type	Number of Households	Small Boat				Engine Boat			
		No. of HH with Boat	% with Boat	Total Boats	Boats/HH	No. of HH with Boat	% with Boat	Total Boats	Boats/HH
Mainland	800	414	52	430	0.54	8	1	8	0.01
Island Char	1,126	927	82	959	0.85	24	2	24	0.02

Source: Charland RRA



To sell produce and make major purchases villagers of both the island chars and mainland most often go to the large *hat* in Ananda Bazar. The exception is Manikarchar, which has its own bazaar and *hat*.

In Ananda Bazar people sell paddy, potatoes, sweet potatoes, groundnuts, and other farm produce, and buy cattle, bamboo, *muli* (bamboo fence), CI sheet, and daily necessities. Some use this market for wedding supplies and other ceremonial purchases, although there are other markets further away that also serve this need.

### 8.3.2 Prices

Because most people use Ananda Bazar, there are no big differences between villages in the prices people report for commonly purchased commodities. Table 8.4 gives the average price of selected commodities reported by people from the mauzas visited in the RRA. Average cost of travelling to market for char people in the study area is Tk. 3-5; the average transport cost for a cow is about Tk. 60-70, for a goat about Tk. 5, for one maund of paddy Tk. 5, and for one bamboo also Tk. 5.

Most Manikarchar shopkeepers buy their goods in Ananda Bazar, so the prices in that market were slightly higher, reflecting transport costs and markups. Generally, however, the area's bazaars and *hats* compete strongly, particularly for large items and the sale of produce (for example, *hats* with market taxes lower than in Ananda Bazar were said to be growing in trade volume over the past two years), so prices tend to vary little. Farmers reported that they generally get a fair price for their produce at Ananda Bazar. The *hat* is little affected by floods since much of its trade is conducted from boats. There also are very few smaller traders acting as

middlemen between the villages and Ananda Bazar.

In monsoon and flood times, while the prices of most goods increase slightly, the prices of such items as straw and bamboo increase considerably because they are less available. Livestock prices, on the other hand, are much lower then because more people are selling them to avoid the problems of keeping them during monsoon.

## 8.4 Markets During Floods

### 8.4.1 Ananda Bazar

Ananda Bazar, the main bazar serving the study area, comprises about 150 permanent shops, a daily market in the early morning (6 a.m. to 8 a.m.), and a twice weekly *hat*. The *hat* attracts more traders than private customers, and businessmen come long distances to trade here, but most of the clientele comes from within a 11-13 km radius. It was reported that about 62 percent of people come from the mainland and 38 percent

Table 8.4 Average Market Price for Selected Commodities

Commodities	Normal Price (Tk)	Monsoon Price (Tk)
Rice	8.5	11
Flour	7.0	9.5
Chili	33	36
Pulses (masur)	28	31
Edible Oil (Soybean)	40	41.5
Potato	6.5	9.0
Salt	7.0	8.5
Lungi (1, average quality)	85	90
Sari (1, average quality)	150	155
Bamboo (1, large piece)	125	170
CI Sheet (22m, average quality)	2,400	2,800
Straw (1 maund)	17.5	27.5
Cow (1, average quality)	6,500	6,000
Goat (1, average quality)	1,000	750

Source: Charland RRA



from the chars. The most distant char people come from Srimodi in Homna Thana (2.5 hours away by engine boat).

The main trades/commodities at the *hat* are:

- Bamboo (and wood)—this comes by river from Sylhet District and is mostly sold retail to local buyers for homesteads.
- Livestock—the Dhaka slaughterhouses buy cattle here and after purchase either move them by boat or walk them about 3 km to the nearest surfaced road for transport.
- Paddy and rice—mainly coming from the chars, it is bought by traders and mainlanders. Although during the previous two years the volume of paddy traded reportedly has declined, this is thought to be temporary and the general trend has been upward. However, there are now more competing markets, and Ananda Bazar has lost some business through changes in transport. There is some inconvenience in using this market because it has no proper harbor, mooring is dangerous in the monsoon and people have to wade ashore at all seasons. Now, large middlemen from outside the area come here by engine boat to buy paddy directly from the farmers.
- Fish—traders from Dhaka come each morning to buy the night's catch. The volume of trade is thought not to have changed, although there are now few *rui* and *catla* on sale in the market.

The shopkeepers interviewed reported that the market was being squeezed by several factors. The introduction of engine boats means that char people can more easily go to larger markets or urban areas for consumer goods. The *hat* lease is auctioned off each year by the union parishad, and each year the value rises; for 1993 the value is Tk. 7,32,000. The leaseholder then collects a toll from each trader on each market day, the amount depending on the goods traded. Neither the union parishad nor the leaseholder provide any services to improve the market; it is purely a revenue-raising operation. Two neighboring markets

(Shantir Bazar and Rampur) now have *hats* on the same days as Ananda Bazar and charge lower fees that are more attractive to potential sellers.

Ananda Bazar has not experienced erosion for the past 40 years, and has a concrete wall along part of its river frontage dating to the East Pakistan period. It has not had unusual flooding since 1988.

In 1988 flood water started rising gradually so the shopkeepers used boats to move their most valuable items to higher ground at Tengua village, about 6-8 km inland, or other places, but by the time many returned the flood had risen quickly and the market was already flooded. It remained flooded to a depth of about 1.2 m for a month, and roughly 50 percent of the shopkeepers' stock was lost. All but one of the market's buildings was of tin and bamboo, so wave action in the northern part of the market washed away the buildings and many have been rebuilt since. Some shopkeepers sold land to rebuild their shops, but about 50 percent of the shops reportedly went out of business because of the flood. Trade for the shops was completely suspended during the flood and was disrupted for the following two months. Itinerant traders at the *hat* were little affected because they could still come by boat and trade directly from their boats.

Since most of the shops were small businesses the relative losses were high and the level of institutional support was low. Some former shopkeepers are now pulling rickshaws. As has been noted, the union parishad collects a high tax from the *hat*, yet it did not assist the shopkeepers. Some were able to get loans from the Krishi Bank to help them recover, but the decline in business due to competing markets means that many who borrowed cannot repay the loans.

The shopkeepers interviewed were in favor of proper flood warnings—they had no official warning in 1988 and could have saved all their stock given more warning. Their preferences were for area-specific warnings, and a message from the thana to the union parishad chairman and members who would then give the warning.

#### 8.4.2 Chandanpur Bazar

This is a typical smaller market, located on the edge of detached mainland by the Meghna. The marketplace is very old and has about 60 shops; the *hat* takes place two days a week. The cattle trade was important here for many years, but following liberation and a dispute with Manikarchar over a high school, Manikarchar established a *hat* on the same two days and has since taken most of the cattle trade away from Chandanpur. Most of Chandanpur's trade now is retail, although it retains some wholesale trade in kerosene and fertilizer, and purchases agricultural produce from the chars. The char people still mainly use this market as it is on the waterfront.

The 1988 flood impacts were not very severe here. Flood water was mostly about 0.3 m above plinth level, and although some temporary shops were washed away during storms in the flood, most goods were saved either by moving them by boat to higher land or moving them into the *pucca* union parishad office located within the bazar.

#### 8.5 Summary of Institutions, Transport, and Trade

There is a low level of infrastructure provision in the study area, and the island char villages are relatively remote from all levels of government administration. Engine boats make transport to markets relatively easy (although more expensive than walking), but in emergencies (such as when needing a doctor) transportation can be more difficult to arrange.

Market prices are not much different from those in other areas, nor is there any notable variation between island chars and mainland in the study area. There appears to be strong competition between markets and traders.

While transport is more difficult during floods, for those on island chars, it does not appear to be much different from normal monsoon conditions. Losses are greater for land-based enterprises,

particularly small shopkeepers. Flood losses to such businesses may be locally important, and might easily be reduced by a combination of better flood warnings and the use of boats to move goods. The latter may already be available in sufficient quantity: more than 100 engine boats are reported to visit Ananda Bazar during a busy market day. However, the shop owners and boatmen need to know in advance of the risk of a flood, and the boatmen need to know that there is a demand for evacuation services.



## Chapter 9

### HOUSEHOLD WELFARE

#### 9.1 Introduction

This chapter is based on discussions with groups of women in the study villages.<sup>1</sup> While information from women has also been used in the other chapters, women are thought to be the best informants on the issues of food consumption, cooking and fuel use, water and sanitation, and health. While household welfare in the Upper Meghna charlands, and the attendant responsibilities of women, do not appear to differ from other parts of Bangladesh, the information gathered points to a number of specific problems faced by households in the study area, particularly during floods.

#### 9.2 Water and Fuel

##### 9.2.1 Water

The informants reported that groundwater from tubewells makes rice black if used for cooking (due to a high iron content), therefore, people prefer to use river water for cooking. Tubewell water, though, is always the preferred source of drinking water (Table 9.1, following page). In the island chars there are relatively few tubewells, so even in the dry season many poorer households must drink river water (averaging 50 percent or more of households, except for Chalibhanga where tubewell access appears to be much better).

During floods only those with their own tubewells have access to groundwater. The decrease in tubewell access during floods forces almost all households to resort to drinking river or flood water, which cause illness. Collecting water at

these times is complicated by water turbidity and rafts of water hyacinth.

There is a general lack of sanitary facilities in the area. The only *pucca* latrines are in mainland and detached mainland areas, and only a few households have *kutchha* latrines (mainly used by women). In floods these limited facilities cannot be used, causing further distress.

##### 9.2.2 Fuel

Fuel supplies, which are vital for cooking, are normally the responsibility of women. As Table 9.2 shows, fuel and fodder sources are often the same, putting these two needs in competition (see Chapter 6). This, in combination with a lack of dry land during the monsoon, limits the potential for keeping livestock at that time of year. Inundation, whether by normal monsoon or flooding, also makes it difficult to keep fuel dry (as shown by FAP 14, 1992). Unlike in the Jamuna chars, which have a high risk of erosion, it may be possible to increase local fuel production in this study area. As previously mentioned, people in the region expressed interest in growing trees. The people of the chars here do not cultivate and use *dhaincha* as fuel (Table 9.2) as often as those in the Jamuna and Padma chars. This deserves further research as *dhaincha* should be suited to the high-medium lands where *B. aman* is grown.

#### 9.3 Food

Information was collected on food consumption patterns and women's perceptions about diet.

Table 9.1 Sources of Drinking Water

Mauza	Char Type	Problems Obtaining Water, Particularly in Floods	Households by Source of Drinking Water	
			Dry	Flood
Jhaukandi	Island	People who own tubewells do not allow others to take as much water as they need. When tubewells are submerged people drink flood water.	60%-HTW 25%-Well 15%-River	15%-HTW 5%-Well 55%-River 25%-Flood
Kadmirchar	Island	At the start of flooding bank erosion is severe and river water near the bank is muddy, so people have to go to the middle of the river by boat to get drinking water.	32%-HTW 60%-River 8%-Well	20%-HTW 60%-River 20%-Flood
Shapmara Charergaon	Island	Few tubewells. People who have tubewells do not allow others to take as much water as they want.	50%-HTW 50%-River	5%-HTW 95%-River
Nunertek	Island	Very few tubewells in the area. Difficult to fetch water from the middle of the river during flood due to strong river current.	20%-HTW 80%-River	80%-River 20%-Flood
Chalibhanga	Island	Difficult to fetch water from river due to mud and water hyacinth.	90%-HTW 10%-River	70%-HTW 25%-River 5%-Flood
Manikarchar	Detached	Number of tubewells insufficient, half of them are out of order. Have to spend a lot of time to fetch drinking water from river which is far away.	70%-HTW 30%-Pond	80%-Flood 20%-HTW
Chengakandi	Mainland	Large rafts of water hyacinth force women to go neck deep in the river to fetch water. During flood people have to go by boat onto the river for drinking water.	10%-HTW 90%-River	10%-HTW 70%-River 20%-Flood
Char Ramjan Sanaullah	Attached	Have to fetch water from the middle of the river by boat.	80%-HTW 20%-River	70%-HTW 20%-River 10%-Flood

Source: Charland RRA



Table 9.2 Seasonal Fuel Use

Mauza	Village	Type of Fuel Used	
		Dry Season	Monsoon and Floods
Jhaukandi	Jhaukandi	Straw ( <i>nara</i> )	Jute stick, dried cow dung, twigs
Kadmirchar	Kadmirchar	Straw ( <i>nara</i> ), dried groundnut plants	Wood, twigs
Nunertek	Diara	Straw ( <i>nara</i> ), wood, dried groundnut plants fine rice husks ( <i>kura</i> )	Dried cow dung, twigs, dried leaves, fine rice husks ( <i>kura</i> ), dried <i>dhol kolmi</i> (poor people)
Shapmara Charergaon	Mohishar Char	Twigs, dried cow dung, straw ( <i>nara</i> )	Stored twigs
Bayer Char		Hay ( <i>kuta</i> ), straw ( <i>nara</i> )	Twigs
Chalibhanga	Chalibhanga	Straw ( <i>nara</i> ) of rice plant, dried plants of melon, cucumber, watermelon, etc.	Dried cow dung, jute stick, <i>dhol kolmi</i> plant, rice husks ( <i>tush</i> )
Manikarchar	Manikarchar	Hay ( <i>kuta</i> ) of rice plant, straw ( <i>nara</i> ), mustard plant	Jute stick, wood
Chengakandi	Chengakandi	Straw ( <i>nara</i> ), hay ( <i>kuta</i> ), potato plants	Dried cow dung, jute stick, ground rice husks ( <i>tush</i> ), wood
Char Ramjan Sanaullah	Protaper Char	Straw ( <i>nara</i> ) of rice plant, hay ( <i>kuta</i> ) of rice plant, dried groundnut plants, <i>dhol kolmi</i> plants	<i>Dhaincha</i> plant, dried cow dung, rice husks ( <i>tush</i> )

Source: Charland RRA

Table 9.3 Seasonal Variation in Number of Meals Eaten

Mauza	Percentage of Households Eating Per Day:					
	Dry Season			Monsoon		
	3 meals	2 meals	1 meal	3 meals	2 meals	1 meal
Jhaukandi	35	40	25	35	15	50
Kadmirchar	25	70	5	25	70	5
Nunertek	20	50	30	20	50	30
Shapmara Charergaon	50	50	0	40	55	5
Chalibhanga	75	25	0	75	25	0
Manikarchar	75	25	0	75	25	0
Chengakandi	50	50	0	45	50	5
Char Ramjan Sanaullah	70	30	0	60	40	0
All Island Chars	38	46	16	37	37	26
All Mainland	67	33	0	62	37	1

Source: Charland RRA



Table 9.4 Health Care Services in Selected Mauzas

Mauza	Nearest Health Center or Qualified Doctor					Visits by Health Worker
	Place Name	Distance (km)	Travel Time	Cost		
Jhaukandi	Sonargaon	11	2 hrs.	15 Tk.	Monthly	
Kadmirchar	Sonargaon	16	2½ hrs.	20 Tk.	Monthly	
Nunertek	Sonargaon	4	1 hr.	7 Tk.	Monthly (from Paikpara)	
Shapmara Charergaon	Sonargaon (Baidyer Bazar)	2	½ hr.	5 Tk. in normal time	Monthly	
		9	2½ hrs.	10 Tk. in normal time		
		Chandanpur	2	½ hrs.		5 Tk. in normal time
Chalibhanga	Homna	3	1 hr.	10 Tk.	No regular visits, occasionally from Chandanpur or Homna	
Manikarchar	Homna	10	1½ hrs.	15 Tk.	Monthly (from Homna)	
Chengakandi	Sonargaon	8	3 hrs.	10 Tk. in normal time, 25 Tk. in flood time	Monthly (from Bashchara-2 miles away)	
Char Ramjan Sanaullah	Sonargaon	4	1 hr. walk or ½ hr. by bus	6 Tk. by bus	Every 15 days	

Source: Charland RRA

Although rice is the main staple, sweet potato (a major rabi crop in the island chars) was said to be a seasonal staple from late May to early August (*Jaisthya* to *Sraban*) in all mauzas, including the nearby mainland and attached chars. The char farmers sell a lot of sweet potatoes, and their low price makes them an important component of the diet of the poor in surrounding areas. Fish, people said, is expensive and infrequently consumed. This seemingly contradicts the availability and consumption of fish reported in Chapter 7, as well as the fact that many island char households fish and presumably have access to fish for food. The

explanation may lie in the share system of fishing under which fish must be sold in order to divide the return. Additionally, the price difference between fish and pulses (as was found in the Jamuna) may mean that people sell fish and buy pulses.

Table 9.3 shows some food security differences between island chars and other locations in the study area. In three island char mauzas in particular (Jhaukandi, Kadmirchar, and Nunertek) a high percentage of poor households are unable to eat three meals a day even in the dry season. In



neither island nor "mainland" chars is there a large change in reported frequency of meals between the dry season and a normal monsoon. Although the survey did not measure the quality of meals, this finding indicates that there is not a serious seasonal shortage of food or purchasing power for basic foodstuffs. In all mauzas at least some type of vegetables are reportedly eaten every day in the dry season, but they are only eaten once or twice a week in the monsoon. There also are few fruit trees in the island chars, and few households reported being able to buy fruit.

Under 35 percent of households in all eight mauzas were said to be happy with their diet. The ideal diet in all cases involves three meals a day: lunch and dinner consisting of rice with *dal* and fish or meat (the latter not expected often, perhaps once a week), and a breakfast of either bread or rice with *dal* and often eggs were mentioned.

A majority of households said they get just about enough to eat, but the quality is perceived to be low. For the majority of households (excluding the wealthiest among them) increased income or agricultural production presumably would result in better nutrition and a higher standard of living.

#### 9.4 Health

Illness is always a risk in both chars and mainland. In floods people typically suffer from colds, fever (also a problem during normal monsoon), and diarrhoea. A lack of access to modern health facilities (Table 9.4) means treatment is often delayed or even beyond the reach of char people. The medical facility closest to the island chars in this study area is in Sonargaon (Baidyer Bazar), which is an average of 10 km distant and requires anywhere from 1 to 2½ hours of travel, primarily by boat. For two of the "mainland" mauzas, the Homna medical facility is closest, but still requires a trip of 1 to 1.5 hours by bus, rickshaw, or boat.

Given this difficulty of access, most people obtain treatment from unqualified village doctors or from a *kabiraj* (one of which can be found in or near each of the mauzas). A *kabiraj* was said to be appropriate for treating mental illness in three of seven mauzas, was used by those who could not afford a trained doctor in two out of seven mauzas, and was used by those who do not believe in modern treatment (usually older people) in three mauzas. Despite this dependence on traditional treatments, people in all but one of the mauzas reported visits by a health visitor once a month, and in all of them young children and pregnant women received immunizations.

Most childbirths in the study region are attended by a local midwife, or *dai*, locally called a *dan-kamli*. If complications arise an attempt may be made to get the mother to a doctor, but the risks of death in the journey are high, especially during floods. In Char Ramjan Sanaullah it was reported that one woman had given birth on a floating *chowki* inside her house during the 1988 flood.

#### 9.5 Overview

The RRA could not make a comparative study of the charland study area and other areas of the mainland floodplain. However, within the study area there appears to be little variation in indicators of health and well being. Access to tubewell water for drinking is not as good in the island chars as in other areas, but those people have better access to river water (the preferred source) for cooking. Many households are unsatisfied with their diet, but this is unlikely to differ from mainland areas. Access to health care facilities in an emergency is more difficult from the island chars than from floodplain areas, but coverage from the existing system of routine preventative health care is not noticeably different from coverage of mainland areas.

#### NOTES

1. These interviews were conducted by the female member of the RRA team.

## Chapter 10

### PRIORITIES FOR INTERVENTIONS

#### 10.1 Summary of Findings

There are a number of differences between the island char villages and other study area villages along the riverbank and in unprotected mainland. The char people in this region are relatively well endowed with resources, although they also face hardships from floods and erosion. Agriculture does not appear to be any less productive in the island chars than on the nearby mainland, although the island chars have less high land and the higher land they do have is less intensively cultivated. Even so, those who have land appear to get reasonable returns. The farming system also supports widespread commercial livestock rearing, which makes use of what would otherwise be seasonal surpluses of grazing land and crop byproducts to fatten cattle for market. Poorer landless households have little access to this enterprise, however, because credit for this business is not available, and their access to grazing is limited. There are some opportunities to raise animals on a share basis; and one example was found of credit given to a few members of a women's savings group to raise goats. But there appears to have been little attempt to encourage livestock rearing.

Farmers and landless households alike also have access to fish. The reach of the Meghna studied is an important fishery, and this helps to explain a relatively low incidence of seasonal out-migration by the landless to find work. Instead, they can work on a share basis operating the fishing gear of others. The agricultural products, livestock, and fish produced in the area provide a surplus which reaches outside markets, principally Dhaka which is nearby, and pays for manufactured goods,

bamboo, and some foods which come into the area.

The char people of this area, while they suffered serious losses in the 1988 flood, are generally well adjusted to lesser floods. Homesteads are raised and are on generally stable land, so there have been few losses since 1988. Rises in water level can be sudden on the Meghna, and based on the opinions of people and information on their past experiences, there seemed to be potential gains from improved flood warnings, provided reliable forecasts can be made.

Erosion and accretion are occurring in the area, but at a more gradual and predictable rate than on the Jamuna. Displacement due to erosion tends to be localized, and few households have reportedly left the area, despite the negligible chance that their land will re-emerge. This may be because the wealthier households are able to buy nearby land when they perceive erosion may happen. In the main, however, it is because people can still make a living from fishing in the river areas where they have traditional fishing rights. Land disputes were found in newly accreted areas, and mainly arose where mauza (and thana) boundaries were unclear and lead to disputes between villages. An attempt to distribute *khas* land to erosion victims appeared to have been channelled to the advantage of local power interests.

#### 10.2 Suggested Priorities

The following recommendations for interventions are based on the information collected in the RRA,



72

people's expressed needs, and an assessment of what might be feasible. They fall into three categories: general improvements to the economic position and service provision for the poor, which would as a byproduct improve their welfare in floods; measures to help where erosion and accretion take place; and measures to help during floods.

### 10.2.1 General Development

- Assistance and training for poor women to raise tree nurseries, based on the assumption that the expressed interest in growing homestead trees is limited by availability and not funds, and that fruit trees would help to improve diets.
- Formal credit seems to be little used in the area, which may reflect the distance to banks and lack of any NGO activity; as villages and land are relatively stable compared with other char areas there should not be any higher risks to creditors than in the mainland, and enterprises such as farming, livestock rearing, and fishing could all benefit.
- There is some scope for improving crop production and returns, but extension and diversification would depend on marketing opportunities.
- Fishing is a major component of the local economy, security of access for poor fishermen and credit channelled through fishermen's cooperatives might assist fishermen, but fishermen also need a long-term interest in sustainable exploitation of this resource.
- Trained paramedical health workers (and similar veterinary workers) to provide treatment in remote chars.

### 10.2.2 Erosion and Accretion

- Administrative boundaries should be reviewed in the few areas where erosion and accretion have taken place at the junctions of districts, thanas, and unions. An arbitrator independent of the conflicting dis-

trict or thana administrations would be preferable.

- Since the current laws relating to accreted (*khas*) land do not appear to be systematically followed, experiments should be conducted to allow *samajes* of nearby mauzas to allocate land themselves to their poorer members who have lost land to erosion.

### 10.2.3 Flood

- Flood warnings need to be improved in both content and dissemination. At present they are reportedly not directly relevant to the study area since no local reference points are given. Cattle are movable, and are one of the main assets which people move in order to protect them from loss in floods, hence warnings plus known safe places—such as raised areas in each *para* or *bari* would help those owning livestock. Businesses also appeared to have been hard hit in the 1988 flood, and small traders could save stock if they received directly a longer warning.
- Livestock health care is at present inadequate, and especially so during floods, veterinary officers will never be able to reach the dispersed cattle which fall sick during and after floods, particularly given the physical and financial constraints on making visits during floods. Hence their priority should be in providing basic training to a network of "para-veterinaries" who would have sufficient training to diagnose and treat the range of most common treatable ailments. If this training is provided to landless people, even to destitute women, then they would have a source of livelihood and provide a much needed service to people in their area—since they would be available on site and would charge relatively low fees.
- Although increased numbers of engine boats since 1988 may help people cope in future severe floods, arrangements are needed to make these boats available

96

where they are needed during flood emergencies, and to help poorer people meet the cost of moving goods by boat.

- Raised earth mounds as shelters—particularly for cattle—are needed within reasonable access of char people.
- Flood-proof public buildings—primary schools with raised floors, these may be *pucca* buildings in most of this study area as erosion risks are low.



## REFERENCES

- BBS. 1988. *Small Area Atlases: Dhaka and Comilla*. Dhaka: Bangladesh Bureau of Statistics.
- BBS. 1993. *1992 Statistical Yearbook of Bangladesh*. Dhaka: Bangladesh Bureau of Statistics.
- Elahi, K., Ahmed, K.S., and Mafizuddin, M. 1991. *Riverbank Erosion, Flood and Population Displacement in Bangladesh*. Savar, Dhaka: Jahangirnagar University Riverbank Erosion Impact Study.
- FAP 12. 1992. FCD/I Agricultural Study. Project Impact Evaluation: Meghna-Dhonagoda Irrigation Project. Dhaka: Flood Plan Coordination Organisation, Ministry of Irrigation, Water Development and Flood Control. (Report prepared by Hunting Technical Services in association with Bangladesh Institute of Development Studies and Sanyu Consultants).
- World Bank. 1989. *Bangladesh: Action Plan for Flood Control*. Washington D.C: The World Bank, Asia Region Country Department I.



## APPENDICES



# APPENDIX A DETAILED AGRICULTURAL DATA

Table A.1 Cropping Pattern, Yield, and Output Price; High Land

Mauza	Rabi				Kharif-1				Kharif-2			
	Crop	Area (%)	Yield md/ac	Price Tk/md	Crop	Area (%)	Yield md/ac	Price Tk/md	Crop	Area (%)	Yield md/ac	Price Tk/md
Jhaukandi	Sweet Potato	50	250	45	Aus (+ Aman)	40	20	175	B. Aman	60	24	200
	Groundnut	25	20	500	Jute	40	20	170				
	Watermelon	20	--	3,500	Til (+ Aman)	20	20	300				
	Chilies	05	45	250								
Kadmirchar	Watermelon	40	--	35,000	Jute	60	26	170	B. Aman	40	25	180
	Onion Seedling	20	--	40,000	Aus (+ Aman)	40	25	175				
	Chili Seedling	15	--	45,000								
	Sweet Potato	15	300	45								
	Chilies	10	45	250								
Nunertek	Groundnut	50	24	500	Til	10	15	300	--	--	--	--
	Sweet Potato	25	250	50								
	Watermelon	15	--	10,000								
	Chili	05	40	250								
	Usiha	05	--	60,000								
Shapmara Char- ergaon	Sweet Potato	35	200	50	Aus (+ Aman)	50	22	180	B. Aman	60	26	190
	Watermelon	35	--	20,000	Jute	40	26	175				
	Pulses	10	15	400	Til (+ Aman)	10	14	325				
	Chilies	10	40	275								
	Groundnut	10	18	500								
Chalibhanga	Groundnut	30	22	350	Aus (+ Aman)	80	--	--	B. Aman	100	22	200
	Sweet Potato	30	250	60	Til (+ Aman)	20	15	325				
	Watermelon	30	--	12,000								
	Chilies	05	40	225								
	Karala/usiha	05	--	50,000								

(continued)

Table A.1 Cropping Pattern, Yield, and Output Price; High Land

Cropping Pattern, Area, and Output by Mauza												
Mauza	Crop	Rabi			Kharif-1			Kharif-2			Price Tk/md	
		Area (%)	Yield md/ac	Price Tk/md	Crop	Area (%)	Yield md/ac	Price Tk/md	Crop	Area (%)		Yield md/ac
Manikarchar	Wheat	30	22	250	Aus (+ Aman)	75	24	180	B. Aman	85	30	223
	Chili	25	50	240	Jute	15	25	200				
	Mustard	20	20	400	Til (+ Aman)	10	15	350				
	Potato	10	200	160								
	Sweet Potato	10	250	60								
	Pulses	05	16	400								
Chengakandi (Paikpara)	Mustard	40	18	450	Aus (+ Aman)	30	15	175	B. Aman	30	28	200
	Chili	40	55	260	Jute	70	20	175				
	Wheat	10	25	225								
	Pulses	05	16	450								
	Onions	05	30	300								
Char Ramijan Sanaullah	Wheat	30	25	240	Til (+ Aman)	15	17	350	B. Aman	100	25	250
	Groundnut	30	22	520	Aus (+ Aman)	20	20	185				
	Sweet Potato	20	260	55								
	Total	10	--	50,000								
	Mustard	10	17	400								

Source: Charland RRA



Table A.2 Cropping Pattern, Yield, and Output Price; Medium Land

Mauza	Rabi					Kharif-1					Kharif-2					
	Crop	Area (%)	Yield md/ac	Price Tk/md	Crop	Area (%)	Yield md/ac	Price Tk/md	Crop	Area (%)	Yield md/ac	Price Tk/md	Crop	Area (%)	Yield md/ac	Price Tk/md
Jhaukandi	Wheat	30	25	250	Aus (+ Aman)	40	22	180	B. Aman	60	25	225				
	Onion	20	20	300	Jute	40	25	175								
	Sweet Potato	30	250	60	Til (+ Aman)	20	17	300								
	Chili	10	60	225												
	Watermelon	10	--	20,000												
Kadmirchar	Sweet Potato	35	300	55	Aus (+ Aman)	70	20	175	B. Aman	80	28	200				
	Mustard	25	20	100	Jute	20	26	150								
	Wheat	25	22	250	Til (+ Aman)	10	18	400								
	Onion	10	32	250												
	Chili	05	35	300												
Nunertek	Watermelon	35	--	15,000	B. Aus	90	--	--	B. Aman	100	25	200				
	Groundnut	30	20	525	Til	10	20	350								
	Sweet Potato	25	250	60												
	Chili	10	45	250												
Chalibhanga	Wheat	40	20	180	Aus (+ Aman)	25	25	180	B. Aman	100	28	200				
	Mustard	25	16	375												
	Watermelon	15	--	10,000												
	Groundnut	20	22	525												
Shapmara Charegyaon	Watermelon	40	--	20,000	Aus (+ Aman)	25	25	180	B. Aman	100	28	200				
	Sweet Potato	20	260	60												
	Chili	30	40	250												
	Groundnut	10	20	500												

(continued)

Table A.2 Cropping Pattern, Yield, and Output Price; Medium Land

Table A.2 Cropping Pattern, Yield, and Output Price; Medium Land												
	Rabi				Kharif-1				Kharif-2			
	Crop	Area (%)	Yield md/ac	Price Tk/md	Crop	Area (%)	Yield md/ac	Price Tk/md	Crop	Area (%)	Yield md/ac	Price Tk/md
Mauza												
Manikarchar	Wheat	25	22	225	Aus (+ Aman)	85	25	200	Aman	85	28	200
	Chili	25	50	300	Jute	15	22	200				
	Pulses	35	16	250								
	Onions	15	20	460								
Chengakandi (Paikpara)	Mustard	50	22	450	Irri	100	70	200	--	--	--	--
	Chili	30	50	245								
	Wheat	15	16									
	Onion	05	20									
Char Ramjan Sanaullah	Wheat	50	24	235	Til (+ Aman)	80	16	350	Aman	90	28	210
	Mustard	40	20	350	Aus (+ Aman)	10	22	173				
	Irri seed bed	10	--		Jute	05	20	175				
					Dhaincha	05	for fuel					

Source: Charland RRA



Table A.3 Cropping Pattern, Yield, and Output Price; Low Land

Mauza	Crop	Rabi/Boro Crops		
		Area (%)	Yield md/ac	Price Tk/md
Jhaukandi	Boro	80	24	180
	Irri	20	55	190
Kadmirchar	Boro	80	24	190
	Irri	20	55	200
Nunertek	Boro	75	26	180
	Irri	25	55	195
Shapmara Charergaon	Boro	75	28	190
	Irri	25	55	180
Chalibhanga	Boro	50	25	190
	Irri	50	50	195
Manikarchar	Irri	100	60	200
Chengakandi (Paikpara)	Irri	100	60	200
Char Ramjan Sanaullah	Boro	10	25	190
	Irri	90	60	195

Source: Charland RRA

Table A.4 Cropping Pattern, Yield, and Output Price; Very Low Land

Mauza	Crop	Rabi/Boro Crops		
		Area (%)	Yield md/ac	Price Tk/md
Jhaukandi	L. Boro	100	25	190
Kadmirchar	L. Boro	100	24	175
Nunertek	L. Boro	100	23	180
Shapmara Charergaon	L. Boro	100	25	175
Chalibhanga	L. Boro	100	22	175
Manikarchar*	--	--	--	--
Chengakandi	L. Boro	100	25	180
Char Ramjan Sanaullah*	--	--	--	--

Source: Charland RRA

\*Very low land not available.

# APPENDIX B RRA VILLAGE ACCESS TO MAIN MARKETPLACES

Mauza/Village	Char Type	Marketplaces	Purpose	Distance (km)	Mode of Transportation		Cost (Tk)
					Dry Season	Wet Season	
Jhaukandi	Island Char	Egerkandi	Buy daily commodities	1	on foot	personal boat	-
		Radhanagar Bazar	Buy/sell daily commodities	2	on foot	personal boat	-
		Ananda Bazar	Buy/sell produce, bamboo, cattle, C.I. sheet, etc.	11	engine boat	engine boat	5
Kadmirchar (Nayagaon)	Island Char	Radhanagar Bazar	Buy daily commodities	1	on foot	personal boat	-
		Gopaldj Bazar	Buy/sell daily commodities; sell groundnut	5	engine boat	engine boat	5
		Ananda Bazar	Buy/sell produce, bamboo, cattle, ground-nut, C.I. sheet, etc.	6	engine boat	engine boat	5
Nunertek (cluster village)	Island Char	Homna Thana Bazar	Buy/sell produce or daily commodities	10	rickshaw	rickshaw	10
		Ananda Bazar	All marketing	2	engine boat	engine boat	3
		Barudi Bazar	Buy/sell daily commodities	10	on foot	engine boat	5
		Chandanpur Bazar	Buy/sell daily commodities	11	engine boat	engine boat	5
Shapmara Charegaon (Boroikandi)	Island Char	Tulatuli Bazar	Buy/sell daily commodities	2	on foot	personal boat	-
		Chandanpur Bazar	Buy/sell daily commodities	3	on foot	engine boat	3
		Ananda Bazar	Sell produce; major marketing	9	engine boat	engine boat	5

(continued)



Mauza/Village	Char Type	Marketplaces	Purpose	Distance (km)	Mode of Transportation		Cost (Tk)
					Dry Season	Wet Season	
Chalibhanga	Island Char	Rampur Bazar	Buy/sell daily commodities	2	on foot	small boat	3
		Baidyer Bazar	Buy/sell daily commodities; sell fish	2	engine boat	engine boat	3
		Ananda Bazar	Sell produce, cattle, bamboo; all marketing	3	engine boat	engine boat	5
		Mugrapara Market	Marketing for weddings and ceremonies	5	engine boat + rickshaw	engine boat + rickshaw	10
Manikarchar	Attached Char	Manikarchar Bazar	Buy/sell produce, cattle, bamboo, C.I. sheet; all marketing	0.5	on foot	on foot	-
Chengakandi	Attached Char	Homna Market	Buy wood, cement, bamboo, big earthen pot for cattle	13	rickshaw + launch	rickshaw + launch	10
		Santir Bazar	Buy/sell daily commodities	2	on foot	on foot	-
		Ananda Bazar	Sell produce; all marketing	6	engine boat (also on foot)	engine boat	5
Char Ramjan Sanaullah	Attached Char	Meghna Ghat Bazar	Buy/sell daily commodities	0.5	on foot	on foot	-
		Mugrapara Bazar	Buy/sell daily commodities; buy wedding needs	1	bus	bus	1
		Ananda Bazar	Sell produce; all marketing	6	on foot	engine boat	3

Source: Charland RRA

