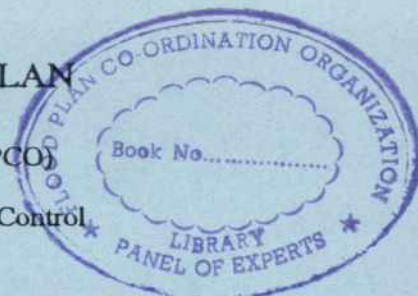


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BANGLADESH FLOOD ACTION PLAN

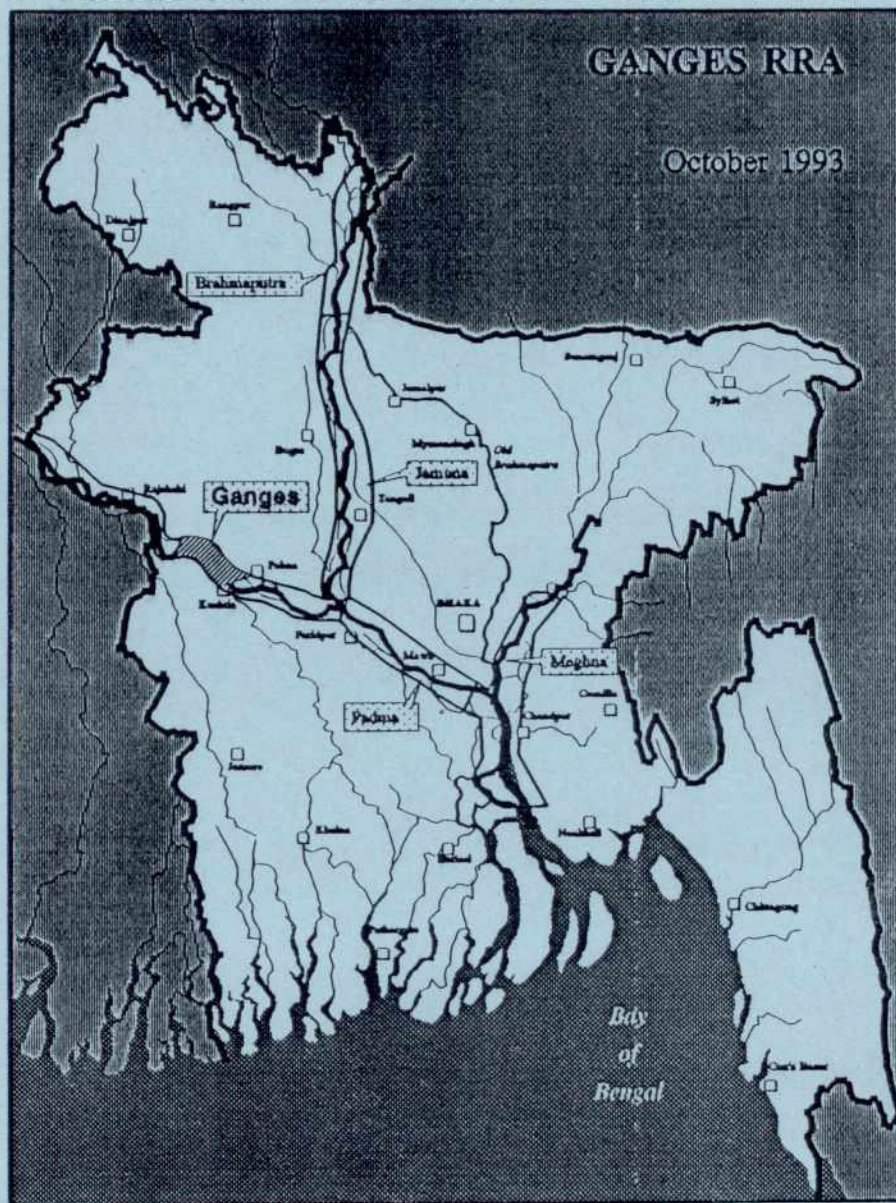
Prepared for
The Flood Plan Coordination Organization (FPCO)
of the
Ministry of Irrigation Water Development and Flood Control



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CHARLAND STUDY SUPPORTING REPORT



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



IRRIGATION SUPPORT PROJECT FOR ASIA AND THE NEAR EAST
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BANGLADESH FLOOD ACTION PLAN

**CHARLAND STUDY SUPPORTING REPORT:
GANGES 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



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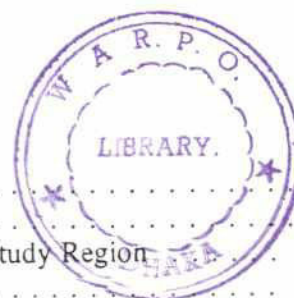


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PREFACE

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 charlands of the Ganges River. 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	Upper Meghna RRA 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	<i>Ganges RRA</i>
	Charland Flood Proofing	

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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

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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>goala</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
kani	-	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>lathiyal</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
<i>sheer</i>	-	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

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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 Ganges River.

The study found that the study area chars had relatively low population densities, probably due to extensive sand deposition which has made much of the land unsuitable for cultivation, as well as to the loss of opportunities to make a living from fishing.

As in other parts of Bangladesh, infrastructural facilities in the Ganges chars are meager. The lack of schools, medical centers, and markets is a particular problem for those living on island chars, who must travel considerable distances to meet their needs.

Despite the fact that large areas of Ganges charland should in effect be government property or *khas* land, locally influential people were found to control much of the *khas* land in extra-legal ways. Conflicts between *jotedar*-led groups vying for control of the land often were reported to result in violence. The small and marginal farmers and landless who have settled on the land with the encouragement of the *jotedars* are usually the ones who suffer the consequences of such disputes.

The main occupation of the people in the Ganges charlands is agriculture. The decline in the Ganges fisheries, brought about, according to those interviewed, by the Farakka Barrage, has relegated fishing to a minor occupation in the upper reach of the river. During monsoon, when agricultural activities come to a virtual stand-still, many char dwellers take up trading in a variety of commodities, most commonly locally produced fabric.

As in the other charland areas studied, erosion has sometimes resulted in widespread emigration from the chars, but the problem may not be as severe in the Ganges compared with the Jamuna, Padma, and Meghna, because the processes of erosion and accretion have slowed over the years. In the perception of local people, India's Farakka Barrage has a lot to do with the deceleration of the processes of both erosion and accretion, which in their opinion is a major reason for declining fertility of their land. The rate of sand deposition on topsoil reportedly has been on the increase, rendering the soil infertile. The more sandy soil was also reported to have widened the gap between the time charland accretes and when it becomes agriculturally viable.

The poor quality of the land, coupled with the fact that there is very little irrigation in the study area, have constrained cropping patterns in the Ganges chars. Certain parts of the study area have adopted extensive groundnut as a result of effective extension services provided to the farmers in the past. The availability of extensive grazing lands in many of the chars has made cattle raising a popular activity among many of the char people, as sales of cattle can bring sizable cash income.

Although the *zamindari* system in Bangladesh was abolished by the East Pakistan State Acquisition and Tenancy Act of 1950, the feudal legacy lingers in the Ganges area. Thus, despite the fact that large areas of land should in effect be government property or *khas* land, locally influential people were found to control much of the *khas* land in extra-legal ways.

Land ownership records in the study area, particularly with regard to *khas* land, were found to be lacking central coordination, at times resulting in confusions even about administrative boundaries between districts. Respondents perceived an urgent need for improving land ownership regulations and record keeping.

People in the Ganges charlands have received little institutional help in coping with erosion and the forced migration that often follows. It would be worthwhile to investigate the feasibility of temporary shelters for erosion victims and developing a plan to help them resettle, either in another rural area or in a more urban setting. Shelters could serve multiple purposes, acting as flood shelters and, in normal times, as educational institutions.

Lack of access to educational institutions is a major problem in the charlands, particularly in the island chars. The data gathered suggest that more educational institutions should be set up in the chars, and an effort should be made to keep them functional throughout the year.

Given the *rabi* crop potential of the area, beneficial agricultural extension services might include supplying improved inputs (seeds, fertilizers, pesticides), arranging for storage, and providing irrigation facilities. Agriculture could also benefit from a simplified and more pragmatic agricultural credit policy.

The raising of livestock was found to be a particularly important activity in the Ganges charlands, but support systems for the activity were in short supply. Improved veterinary services could reduce the loss of cattle to diseases, which increase significantly after flooding. Cattle shelters and evacuation plans could help people better cope with the difficulty of tending their animals during floods. Furthermore, relatively poor households could benefit from credit that would enable them to invest in livestock.

Health and sanitation facilities also require some institutional attention. Although tubewell coverage is generally satisfactory, the tubewells were found to be inoperative in the very dry months of February and March, when the underground water table drops, and during flooding, when the well heads are submerged. Installing high-lift hand tubewells could mitigate this problem. Water purification measures are needed to help people deal with shortages of drinking water during the dry season,

but particularly during the monsoon. Health workers, recruited and trained locally, could be effective in increasing awareness of health and sanitation issues, as well as providing basic first-aid services.

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

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 jointly carried out 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 Ganges River. Figure 1.1 shows the charland study areas.

1.2 Methods

1.2.1 RRAs

RRA methods are essentially non-quantitative, and involve direct observation and collecting qualitative information from a range of key informants or small groups in representative villages in the study area. The method is systematic in the sense that standard checklists form the basis of the information gathering (see Charland Methodology Report), and in the way in which information is cross-checked and verified from a range of informants and sources. Locational biases are avoided by visiting both remote and more accessible areas, and socioeconomic biases are avoided by including coverage of groups such as women and the landless whose opinions might otherwise not be heard. In this way reliable information can be built up by an experienced team of specialists covering a range of disciplines based on an iterative process of questioning and expert judgement.

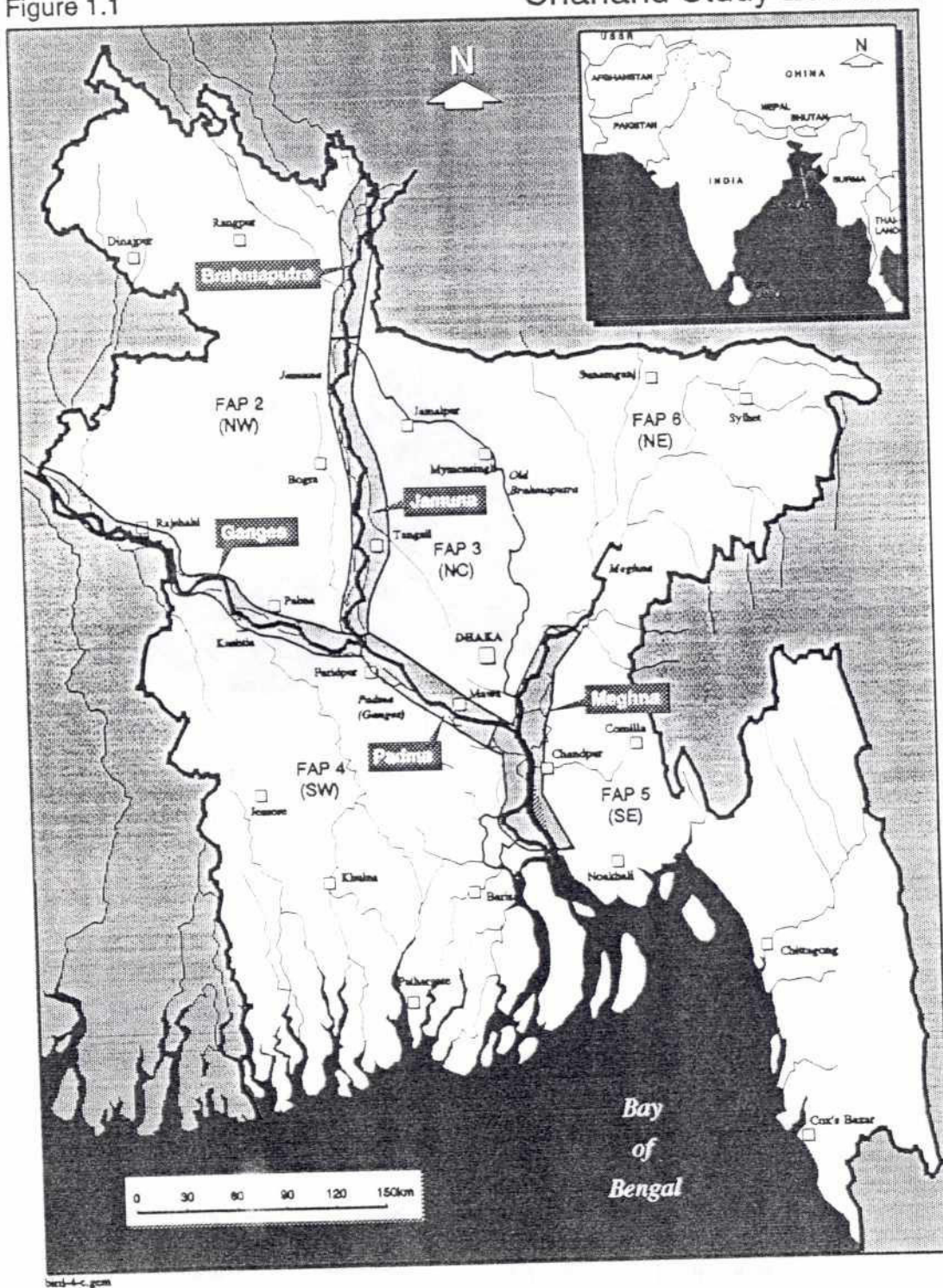
Additionally, RRAs in the Charland Study have the advantage of access to some quantified data from the inventory and GIS for all the mauzas (revenue villages) within the study reach, and this is integrated where appropriate into the RRA report.

1.2.2 Work Schedule

The RRA team included specialists in: geography, economics, social anthropology, and fisheries. The primary sources of information were key infor-

Figure 1.1

Charland Study Location



nants; for example, knowledgeable farmers, members and ex-members of union parishads, schoolteachers, fishermen, traders, landless people, and women living in charland villages. Access was by boat, so it was not possible to walk transects through the area.

The RRA team selected a group of focus mauzas in each study area and covering a range of environments. The selection was aided by a SPOT image map of the area. Each RRA covered both old and new island chars, attached chars, and

between villages could be investigated and more general information could be cross-checked between groups of informants within a mauza.

1.3 Description of the Study Region

The Ganges enters Bangladesh from India through Rajshahi and meets the Jamuna River near Pabna. The study region and location of the mauzas visited by the RRA are shown in Figures 1.3 and 1.4, respectively. Informants reported that this

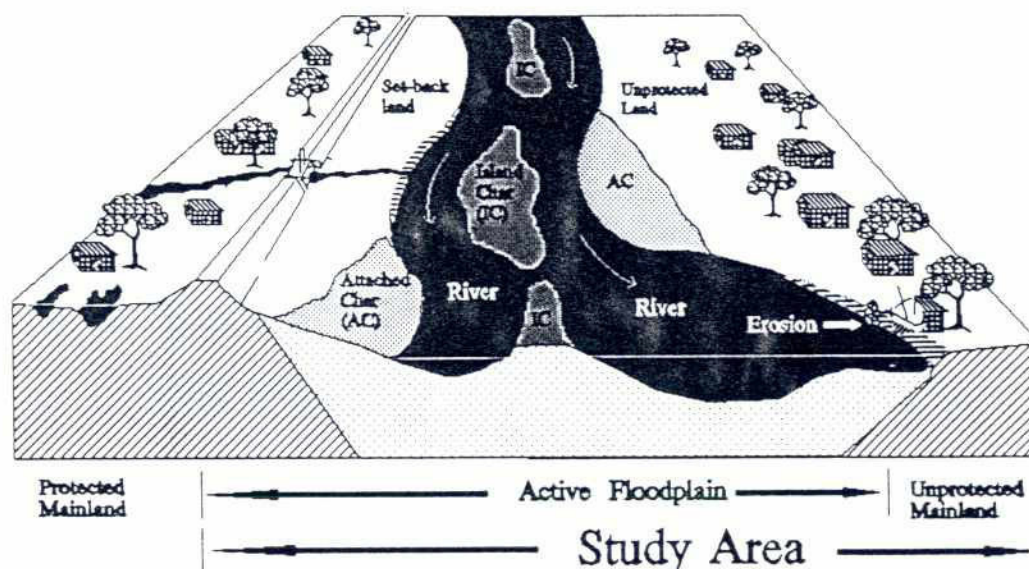


Figure 1.2 Charland Classification.

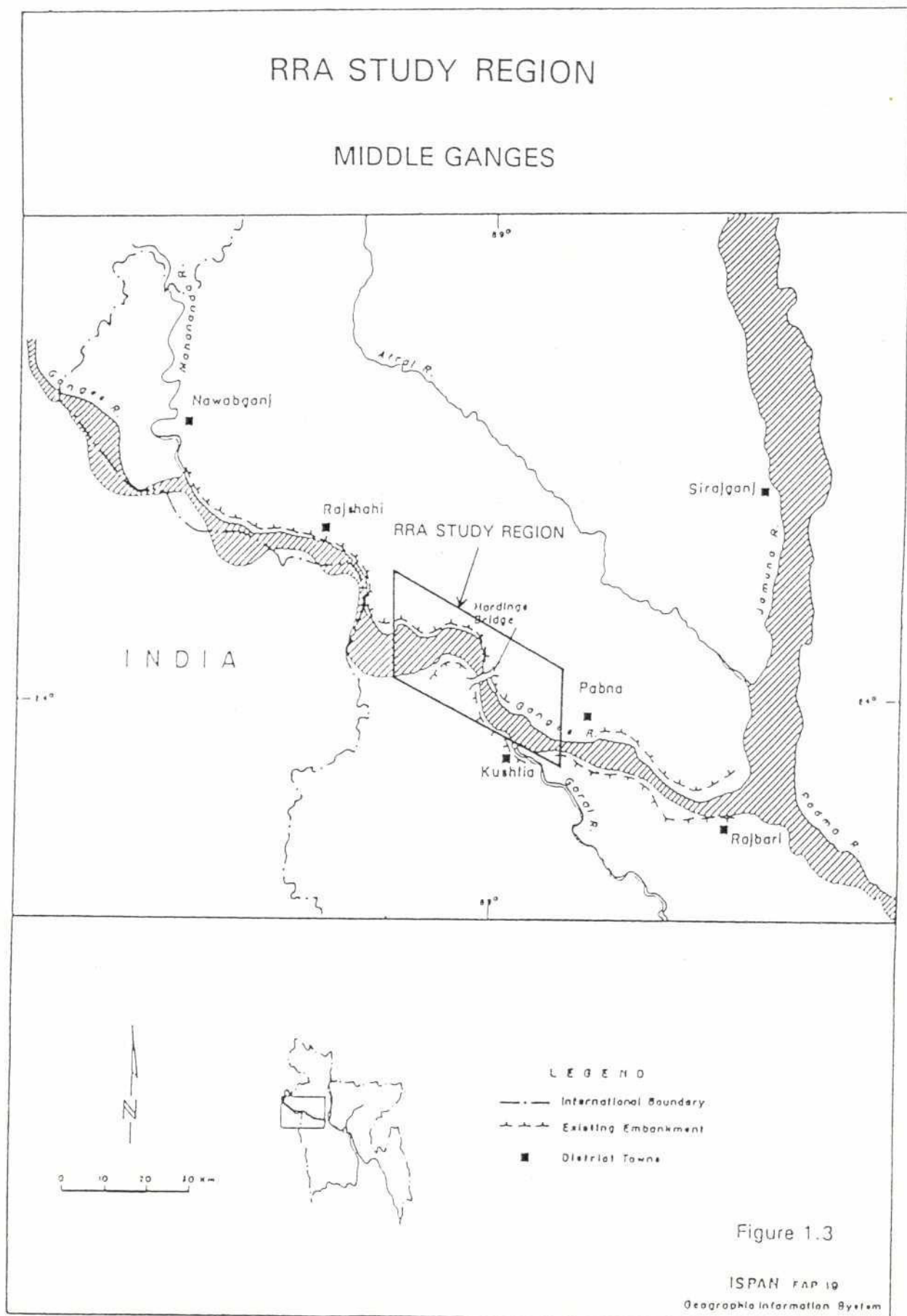
some unprotected mainland. These char types are illustrated in Figure 1.2.

Most of the mauzas visited contain a number of villages (*grams*) or neighborhoods (*paras*). Once in the mauza, the RRA team split up. Each individual team member then collected information on his or her subject area. The information gathered, while for the entire mauza when possible, concentrated on the experiences of the inhabitants of a particular village. Hence the discussions and tables refer to villages/neighborhoods or mauzas as appropriate. In this way important differences

reach of the river has become much narrower than was several decades ago, that a lot of sand has been deposited in the river bed, and that the flow of the river has shifted to the south. They believe that India's Farakka Barrage caused these alterations, and that widespread destruction of Himalayan forests has contributed to the change.

Respondents said that there are fewer island chars in the Ganges than there used to be. Since the channels that separate chars from mainland now are dry most of the year, there are more attached chars than island chars in the RRA study area.

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LOCATION OF RRA STUDY MAUZAS MIDDLE GANGES

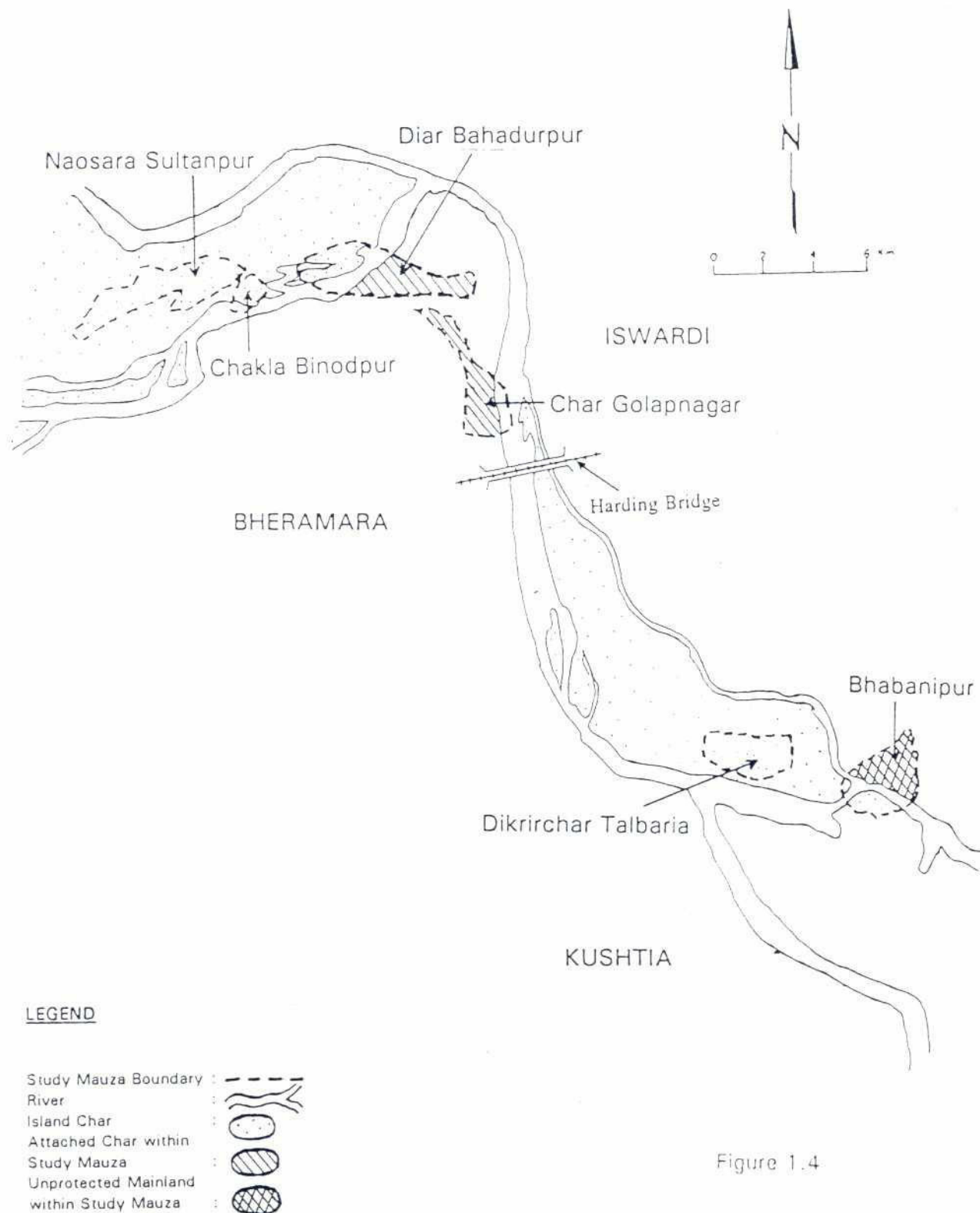


Figure 1.4

Source : Satellite Image 1993, ISPAN FAP 16

Table 1.1 Physical Description of the Ganges RRA Study Region

Land Category	Island Char	Attached Char	Unprotected Mainland	Total
Area (ha)	20,082	10,549	16,588	47,219
% of Total Area	43	22	35	100
Water (%)	21	13	10	15
Sand (%)	36	17	13	24
Vegetated/cultivated (%)	43	70	77	61

Source: Charland Inventory

Table 1.1 shows that the largest percentage of the study area consists of island chars. The island chars, however, have much smaller amounts of vegetated/cultivated land than attached chars or unprotected mainland. Only 43 percent of the island char area is vegetated/cultivated land, compared with 70 percent for attached chars and 77 percent for unprotected mainland.

Prior to the partition of India there were very few settlements on the Ganges chars, which were then primarily farmed by *zamindars* using seasonal labor. About 50 years ago, some local people began settling the chars, and they were joined by migrants from Munshiganj, Jessore, and Noakhali. These settlers often named their new villages after the places from which they had come, using names

like Dhaka Para, Noakhali Para, Pabna Para, and Kushtia Para. The migrants became known as *Bangals*, and the local people became known as *Deshis*.

Chilmari Union in Daulatpur Thana, west of Bheramara, consists mainly of charlands. During the past eight to 10 years this union has been subject to very serious erosion, and many of the displaced people have moved to nearby char areas, thereby increasing population density somewhat. Even so, the Ganges chars remain less densely populated than other charlands in Bangladesh.

Island chars are the least densely populated of the Ganges char areas (Table 1.2). While this is partially explained by the relatively larger propor-

Table 1.2 Area and Population of the Ganges RRA Study Region

	Island Char	Attached Char	Unprotected Mainland	Total
Area (km ²)	201	105	166	472
1981 Population	19,006	27,829	149,898	196,733
1993 Estimated Population	17,879	27,540	144,256	189,675
1993 Estimated Households	2,670	4,556	24,964	32,190
1981 Population/km ²	95	264	904	417
1993 Estimated Population/km ²	89	261	870	402
Estimated Population Change, 1981-'93 (%)	-6	-1	-4	-4

Source: 1981 BBS Census; Charland Inventory

Table 1.3 Char Age and Development History in the Ganges RRA Study Region

Table 1.3 Char Age and Development History in the Ganges KRA Study Region													
Attribute	Island Char							Attached Char					
	Mauzas Reporting (Total = 69)		Percent of Mauzas					Mauzas Reporting (Total = 37)	Percent of Mauzas				
			1-3 Yrs.	4-10 Yrs.	11-20 Yrs.	21-30 Yrs.	>30 Yrs.		1-3 Yrs.	4-10 Yrs.	11-20 Yrs.	21-30 Yrs.	>30 Yrs.
Char Formation	58	21	19	36	10	14	24	21	21	12	12	33	
Natural Vegetation	52	31	11	40	8	10	13	46	8	38	8	0	
Crop Cultivation	46	28	11	43	7	11	10	30	10	60	0	0	
Human Settlement	16	19	25	25	6	25	6	0	50	50	0	0	

Source: Charland Inventory

Source: Charland Inventory

Table 1.4 General Information about the Ganges RRA Mauzas

Mauza	Location	Char Type	Total Households
Chakla Binodpur	Union: Bilmaria Thana: Lalpur Zila : Nator	Island Char	29
Dikrichar Talbaria	Union: Laksmikundi Thana: Ishwardi Zila : Pabna	Island Char	145
Naosara Sultanpur	Union: Bilmaria Thana: Lalpur Zila : Nator	Island Char	260
Char Golapnagar	Union: Mokarimpur Thana: Bheramara Zila : Kushtia	Attached Char	250
Diar Bahadurpur	Union: Lalpur Thana: Lalpur Zila : Nator	Attached Char	200
Bhabanipur	Union: Hemayetpur Thana: Pabna Sadar Zila : Pabna	Unprotected Mainland	550

Source: Charland RRA

tions of water and sand in the island char mauzas, population density per km² of vegetated land is also lower in the island chars (207) than in attached chars (373) or unprotected mainland (1,129). Furthermore, population in all char types declined between 1981 and 1993, and the steepest decline has occurred in the island chars.

The relatively low population density in the Ganges charlands may in part be due to their fairly recent formation. Seventy-six percent of the island char mauzas were accreted within the past 20 years, and 54 percent of the attached chars are of similar age (Table 1.3). More than 80 percent of the island char mauzas underwent cultivation sometime during the past 20 years, and nearly 70 percent of them were settled. Data were not available for all of the Ganges chars, and the data sets are for different numbers of mauzas, therefore interpretation of the data should be done with care.

1.4 Description of the Study Mauzas

Six mauzas were covered by the Ganges RRA: Chakla Binodpur, Dikrirchar Talbaria, Naosara Sultanpur, Char Golapnagar, Diar Bahadurpur, and Bhabanipur. Table 1.4 contains additional information about the locations of these mauzas and the char types they represent.

1.4.1 Chakla Binodpur

Chakla Binodpur, an island char mauza, has been subjected to severe erosion in recent years, and most of its residents have moved out. About 30 of these households, most interrelated by kinship ties, now live in Char Jajira (Lalpur Union, Lalpur Thana), an adjacent mauza. These people claim to own land in a government-owned forest near their settlement. The forest, they reported, once covered about 24 hectares (60 acres) of land, but erosion has reduced it to 16 hectares (40 acres).

1.4.2 Dikrirchar Talbaria

The island char mauza of Dikrirchar Talbaria consists of two *paras*, East Para and West Para.

At the time of the RRA fieldwork, West Para was still accreting. The 95 households of East Para and 50 households of West Para are migrants from Chilimari and Kushtia who settled in the mauza about 10 months prior to the RRA survey. All of the households are sharecroppers working under an absentee landlord. The relatively new and very sandy land of this mauza is largely uncultivable, although there are heavy growths of catkin grass in and around the area.

1.4.3 Naosara Sultanpur

Over the past three to four years settlements in southern Naosara Sultanpur, an island char mauza, eroded and displaced many families, some of whom moved to the northern part of the mauza. About 60 families currently live in the northern settlement. About two years ago another large settlement grew in Palashir Char, a village in the western part of the mauza. About 200 families, from erosion-affected areas of Bilmari Char and Lalpur, live in this settlement.

1.4.4 Char Golapnagar

About 250 families live in the four *paras* of Char Golapnagar. The older *paras*, in the middle of the attached char mauza, were set up about seven years ago by families displaced from Chilmari. In the 18 months prior to the RRA, 50 more families had arrived from Chilmari. A large part of the land in Char Golapnagar is owned by a Union Parishad member and his family, and the settlers are sharecroppers on that land.

1.4.5 Diar Bahadurpur

The attached char mauza of Diar Bahadurpur is on the border of Kushtia, Nator, and Pabna, and confusion about the borders is commonplace among the local people. The mauza was settled in the early 1970s, and it now has four *paras*: Pabna Para/Zianagar (45 families), Lalpur Para (45 families), Shibir Para (70 families), and Kushbari Para (40 families). The residents are from Ishwardi, Daulatpur, Lalpur, and other erosion-affected areas. The mauza has a government

cluster village project and a forestry project covering 120 hectares (300 acres) of land.

1.4.6 Bhabanipur

Bhabanipur, an unprotected mainland mauza, is on the border of Kushtia Sadar and Pabna Sadar thanas. A portion of the mauza consists of land that has accreted very recently, and although people do not live there yet, farmers use it for local boro and groundnut cultivation. The Bhabanipur settlement was established in the early 1960s. The mauza has 550 households living in six *paras*. The land of Bhabanipur is quite fertile and the main occupation of its residents is agriculture. Although the land is relatively stable, part of it is threatened by mild erosion.

Chapter 2

SOCIOECONOMIC ORGANIZATION

2.1 Settlement Patterns and House Types

The Ganges charland settlements have mainly grown on the highest land in the chars. This high land is commonly a linear "spine" down the middle of the char. This area is generally cleaned of catkin growth and houses are built side-by-side along the ridge, creating a linear village. As a settlement grows, two such rows of houses usually are built with a narrow walkway separating them. These linear settlements are sometimes discontinuous in nature, particularly on chars with multiple ridges. Whether continuous or discontinuous, however, in all settlements the households live

close to one another for reasons of security and community interaction, an arrangement that is especially advantageous during calamities.

Five of the six surveyed mauzas have linear settlements, two of which are discontinuous (Table 2.1). The sixth, the unprotected mainland mauza of Bhabanipur, has clustered settlements. The discontinuous settlement of Diar Bahadurpur has arisen as a result of ownership conflicts (discussed further in Chapter 3 that have forced out-migration of some households. In Naosara Sultanpur, discontinuous settlement reflects the land ownership pattern in the northern part of the mauza. The

Table 2.1 Settlement Pattern and Housing

Mauza (Char Type)	Settlement Pattern	Percentage by Type			Cost by Type (Tk.)		
		All Straw/ Catkin	CI* Roof, Bamboo Wall	All CI Sheet	All Straw/ Catkin	CI Roof, Bamboo Wall	All CI Sheet
Chakla Binodpur (Island)	Linear	70	30	-	1,000	12,000	-
Dikrirchar Talbaria (Island)	Linear	100	-	-	1,500	-	-
Naosara Sultanpur (Island)	Discontinuous Linear	98	2	-	1,000	10,000	-
Char Golapnagar (Attached)	Linear	96	4	-	1,200	9,000	-
Diar Bahadurpur (Attached)	Discontinuous Linear	100	-	-	1,000	-	-
Bhabanipur (Unprotected Mainland)	Scattered	60	40	-	1,500	12,000	-

Source: Charland RRA

*Corrugated iron.

Table 2.2 Primary Household Occupations in Dry and Wet Seasons (percent of households)

Mauza	Dry Season				Wet Season			
	Agriculture	Day Labor	Fishing	Other	Agriculture	Day Labor	Fishing	Other
Chakla Binodpur	55	25	5	15	55	25	5	15
Dikrirchar Talbaria	60	20	10	10	55	15	15	15
Naosara Sultanpur	55	35	5	5	50	30	15	5
Char Golapnagar	60	20	5	15	60	15	10	15
Diar Bahadurpur	50	40	5	5	50	35	10	5
Bhabanipur	60	20	5	15	60	15	10	15
Average								
Island Char	57	29	7	7	52	25	14	9
Attached Char	55	29	5	11	55	24	10	11
Unprotected Mainland	60	20	5	15	60	15	10	15

Source: Charland RRA

households living there, having been displaced by erosion in the south, have chosen to build homes as near to their land as possible. Since some landowners have moved elsewhere, the settlement has remained discontinuous.

Table 2.1 also presents data on the housing construction materials used in the settlements surveyed. About 90 percent of the houses in the RRA location are built of catkin grass and require annual repair. About 10 percent of the houses have corrugated iron (CI) roofs and walls of catkin grass or bamboo. Such houses require less frequent repair than those built entirely of grass or bamboo. In Dikrirchar Talbaria and Chakla Binodpur, which are annually inundated by monsoonal flooding, the earth plinths of houses must be rebuilt after the floods recede.

2.2 Occupations and Income Sources

There is no significant occupational diversity in the Ganges mauzas visited by the RRA team; the majority of people are farmers. As Table 2.2 indicates, day labor, also primarily agricultural,

makes up the second largest category. In Dikrirchar Talbaria and Char Bhabanipur, most of the farmers are sharecroppers working on the land of absentee landlords (Table 2.3).

Day laborers, while primarily engaged in agricultural work, also perform some non-agricultural jobs as shown in Table 2.4. Agricultural work is sufficiently available during the dry season in all the mauzas studied except Diar Bahadurpur, which has very little cultivable land. In this mauza, as in

Table 2.3 Percentage of Farmers Sharecropping

Mauza	Percent Sharecropping
Chakla Binodpur	10
Dikrirchar Talbaria	50
Naosara Sultanpur	20
Char Golapnagar	20
Diar Bahadurpur	10
Bhabanipur	50

Source: Charland RRA

Table 2.4 Seasonal Work Performed by Day Laborers

a) Agricultural	
Dry Season	Wet Season
Weeding <i>rabi</i> crops	Harvesting aus
Cultivating local boro	Harvesting jute
Cultivating aus	
Cultivating/harvesting <i>rabi</i> crops	
Cleaning catkin	
b) Non-Agricultural	
Dry Season	Wet Season
Cleaning catkin	Boatman
Raising/building homesteads	Rickshaw pulling
Constructing roads	Working in brick field
Earth digging	
Working in brick field	

Source: Charland RRA

Table 2.5 Social Organization and Facilities

Mauza	No. of Samajes	No. of Mosques	Post Office Facility (distance in km)
Chakla Binodpur	1	1	Bilmara (3)
Dikrirchar Talbaria	2	-	Talbaria (3)
Naosara Sultanpur	4	2	Bilmara (2.5)
Char Golapnagar	5	2	Dhamugdia (4)
Diar Bahadurpur	3	-	Kuichamora (4)
Bhabanipur	17	3	Hemayetpur (9)

Source: Charland RRA

others, people travelled out of the mauza to find work when none was available locally.

Day wages for agricultural labor range from Tk.25 to Tk.35 and include one meal per day in all of the mauzas visited by the RRA. Non-agricultural wages for such jobs as carpentry or brick-making are somewhat higher, ranging from Tk.40 to Tk.60 per day and including three meals. Informants in Char Bhabanipur reported that some residents of the mauza work in brick fields. These workers generally stay at the brick fields for two to three weeks and send their earnings back home every week with their team leader (*sarder*).

The only female day laborers observed in the study mauzas were working on a road maintenance project sponsored by CARE, an international NGO. In the same mauza women were reportedly paid Tk.20 per day for jute processing. In all of the mauzas the RRA team found that in addition to household work, women help their husbands to weed and harvest crops, clean catkin, and collect cattle fodder.

Table 2.6 Educational Facilities and Literacy Rate

Mauza	Literacy Rate (%)	No. of Schools		No. of Students Sent Outside the Mauza		
		Primary	High	Primary	High	College
Chakla Binodpur	10	-	-	-	-	-
Dikrirchar Talbaria	6	-	-	-	-	-
Naosara Sultanpur	12	-	-	5	-	-
Char Golapnagar	15	1	-	-	2	-
Diar Bahadurpur	8	-	-	10	3	-
Bhabanipur	25	1	-	-	20	-

Source: Charland RRA



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2.3 Charland Facilities

Charlands typically have little in the way of public facilities or infrastructure. Table 2.5 shows the number of *samajes* (societies), mosques, and the nearest postal facility in the RRA survey areas. The lack of schools in the study mauzas accounts in part for the low literacy rates shown in Table 2.6. Only two mauzas, Char Golapnagar and Bhabanipur, had primary schools, and none had high schools. Charland parents who want to educate their children must rely for the most part on schools at a distance from home. Because of the distance and cost of travel, not to mention the cost of educational materials, most parents are unable to send their children to school.

Chapter 3

CHANGES IN LAND AND SETTLEMENT

3.1 Impacts of Erosion

Diar Bahadurpur, the RRA survey found, was the most stable of the Ganges study area mauzas; the last major erosion there occurred during British rule (prior to 1947; Table 3.1). Naosara Sultanpur, Char Golapnagar, and Dikrirchar Talbaria, were completely eroded in the 1950s, 1960s, and 1970s, respectively, forcing all households living in the mauzas to migrate to other places.

Two mauzas were undergoing erosion during the fieldwork for this study: 75 percent of Chakla Binodpur had eroded and 25 percent of Bhabanipur had been washed away. The respondents in Chakla

Binodpur were of the opinion that the erosion would eventually engulf the remaining portion of the mauza. Bhabanipur respondents did not expect erosion to affect the more stable part of the mauza in the near future. None of the mauzas surveyed had very much in the way of infrastructure that could be damaged by erosion, but some reported loss of earthen roads. Where there were schools, they had been moved to safer places.

Erosion-affected households generally migrated to places where they either had land or had prospects of obtaining a job (Table 3.2), in some cases staying with relatives. The migrants tended to move to areas near their mauzas. In part, this was

Table 3.1 Erosion Impacts on Land, Housing, and Infrastructure

Mauza	Last Major Erosion Event	Land Eroded (%)	No. of Households Prior to Erosion	No. of Households Moving Due to Erosion	Infrastructure Affected
Chakla Binodpur	1985-93; ongoing	75	300	290	No roads or schools
Dikrirchar Talbaria	1971-76	100	250	250	No roads or schools
Naosara Sultanpur	1950-53	100	200	200	A few earthen roads lost; one school moved
Char Golapnagar	1962-68	100	200	200	No roads or schools
Diar Bahadurpur	Before 1947; specific years unknown	Unknown	Uninhabited	Uninhabited	No roads or schools
Bhabanipur	1983-93; ongoing	25	200	50	Three UP roads lost; one school moved

Source: Charland RRA

Table 3.2 Years of Migration, Destinations, and Reasons for Destination Choice

Mauza	Year(s) of Migration	Destination(s)	Reason for Destination Choice/ Occupation at Destination
Chakla Binodpur	1985-93; ongoing	Mauza: Char Jajira Thana: Lalpur	temporary settlement; adjacent mauza/ selling milk from cows, selling catkin, fishing
		Mauza: Raita Thana: Bheramara	temporary settlement on railway land/trading in livestock and vegetables, fishing
		Village: Palashir Char Thana: Lalpur	leased government land for agriculture
Dikrirchar Talbaria	1971-76	Kalukhali Thana: Pangsha	some had land there/agricultural day labor & sharecropping
		Chilmari, Talbaria, and Bheramara	agricultural day labor, rickshaw/van pulling, petty trading (mainly paddy)
Naosara Sultanpur	1952-55	Mauza: Char Katra Fazilapur Thana: Bheramara Maricha Thana: Daulatpur	agricultural day labor & sharecropping agricultural day labor
		Bilmari Thana: Lalpur	agricultural day labor, rickshaw/van pulling
		Ishwardi Town	rickshaw/van pulling
Char Golapnagar	1962-68	Ansarbaria Jessore	agricultural day labor, rickshaw/van pulling, petty trading (paddy, pulses)
		Gouripur Thana: Lalpur	some had land there/agricultural day labor
		Muladuli Thana: Atgharia	some had land there/agricultural day labor
		Mauza: Golapnagar Thana: Bheramara	temporary settlement on railway land; near to own mauza
Bhabanipur	1986-93; ongoing	Mauza: Mangalbari & Haripur Thana: Kushtia Sadar	went to relatives, bought homestead land/jobs as porters, agricultural day labor & sharecropping

Source: Charland RRA

due to their familiarity with the areas adjacent to their homes, but it was also important because they would be nearby if their land resurfaced.

At least one group of people availed themselves of *khas* land. Many of the erosion-affected households of Chakla Binodpur moved to Raita, where the government had vacated some railway land. It was a *samaj* decision to relocate to Raita, and the group moved together. In most cases, these households had not leased the land in question from the government.

Migrants who moved from the charlands to other rural areas usually took jobs as day laborers or become sharecroppers. Many engaged in fishing either as a primary or secondary occupation. Those who migrated to relatively urban locations often became petty traders (of catkin, milk, livestock, etc.), rickshaw/van pullers, or porters.

3.2 Accretion of Land, Initiation of Agricultural Activities and Settlement

Accretion, the survey found, could be a lengthy process. In Diar Bahadurpur, for example, accretion had been continuous since the 1960s, and in Char Golapnagar and Naosara Sultanpur accretion occurred over periods of 13 and 14 years, respectively (Table 3.3). In none of the mauzas, even

those where accretion had not occurred for some time, was all area above water during peak dry season (February-March). All but Chakla Binodpur had 75 percent or more of their area above water.

Once accretion started, it was still a long time before agricultural activities could begin. Char Golapnagar and Bhabanipur were only brought under agriculture after about 15 years of accretion; in Naosara Sultanpur it took 13 years, and in Dikrirchar Talbaria it took seven years.

When a char area is accreted and becomes cultivable, people converge on the char from neighboring areas to make use of the land. In Diar Bahadurpur, for example, groups of people came from four adjacent areas (Figure 3.1). The settlement of this mauza was not without conflict, however.

Although some agricultural activity started in Diar Bahadurpur around 1975, prior to its settlement most of the land was covered by catkin grass. Use of the land was claimed by the people of both Lalpur and Kuichamora. The people from Lalpur, who had been harvesting catkin in the mauza, claimed to have the permission of the chairman of Lalpur Union to use *khas* land in the mauza and accordingly began cultivating and settling the land. On one occasion, people from Kuichamora forcibly took the crops they had planted, but the

Table 3.3 Accretion and Beginning of Agricultural Activity

Mauza	Accretion Year(s)	Peak Dry Season (Feb.-Mar.) % of Mauza Above Water	Year Agricultural Activity Started
Chakla Binodpur	currently eroding	25	agriculture very old
Dikrirchar Talbaria	1983; ongoing	75	1990
Naosara Sultanpur	1965-78	80	1978
Char Golapnagar	1971-85	85	1986
Diar Bahadurpur	ongoing since 1960s	75	1975
Bhabanipur	currently eroding	75	1965

Source: Charland RRA

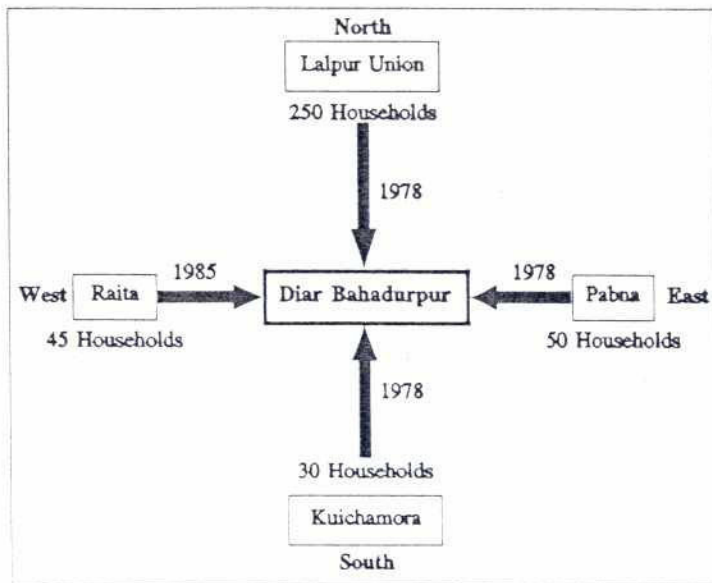


Figure 3.1 Immigration of Households to Diar Bahadurpur

Kuichamora people could not sustain their claim against the large number of people immigrating from Lalpur.

About 1985, seven years after the Lalpur settlers moved in, the Kuichamora people burnt down most of the settlers' houses and stole their livestock. Some reported that even small items such as pans and utensils were taken. According to the respondents, the "aggressors" took their action with the blessing of the chairman of Bahadurpur union, within which Kuichamora is located.

As a result of the conflict, the settlers fled to Lalpur. Three weeks later about 25 of them returned. When the others learned that the returnees were left undisturbed, most of them also came back. The evicted people meanwhile, with the help of their chairman, had filed law suits. Ultimately, the chairman of Bahadurpur opted for peaceful settlement and the court cases were withdrawn in 1991. Relations between the two groups at the time of the fieldwork were reportedly stable under the assurance of the Bahadurpur union chairman that there would be no further trouble.

The people of Diar Bahadurpur are currently working *khas* land, and enjoy the products of the land without having to give shares to anyone, but they would like to have official ownership status. Without proper ownership documents their hold on the land is insecure, and the government or powerful outsiders may choose to evict them.

Given these circumstances, in 1992 the people of Diar Bahadurpur asked their M.P. to arrange official documents declaring them owners of certain parts of the mauza. The minister had come to the area to inaugurate construction of a government cluster village, and when the people learned that they would not be given any land in the village they were resentful. The minister convinced them to allow the urban destitute of nearby towns to use the cluster village and reportedly promised each mauza household six

bighas (two acres) of land, two bundles of corrugated iron sheets, and a cash amount of Tk.500. At the time of the June 1993 fieldwork they had not received any of these and were not optimistic about receiving them in the future. Construction of the cluster village also appeared to be at a standstill, and the people did not expect it to be completed.

3.3 Land Rights Issues

The Ganges RRA area and its adjoining areas have a high proportion of *khas* land. The reason may be that vast sections of the region were controlled by *zamindars* (feudal lords) under British rule, and in comparison with the rest of Bangladesh there was relatively more land to be turned into *khas* land following enactment of the East Pakistan State Acquisition and Tenancy Act in 1951.

Nonetheless, much of the *khas* land is not under the control of the government. Descendants of the *zamindars* have continued to own and control land, often getting around land ownership ceilings by

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registering property in the names of other family members. A large percentage of *khas* land has been forcibly occupied by powerful outsiders. In some cases these people have initially leased a small amount of *khas* land, and later grabbed huge amounts of surrounding territory. This process has often resulted in serious conflicts between contending groups, sometimes culminating in armed battles. In some areas where the government has leased out *khas* land under an arrangement called DCR (Duplicate Carbon Receipt), inhabitants of the land opposing the lease have driven the lease holder off the land.

The government has shown some interest in bringing *khas* land in Chakla Binodpur and Diar Bahadurpur under forestation, but this has been opposed by the residents, who resent government "encroachment" on their land. Where the government has resolved land ownership questions and established forest, the land and forests have both been eroded away.

Many attached char landowners, respondents said, live on the mainland and in the past showed little interest in their charland property, mainly earning money from the land by selling its catkin grass through middlemen. When a major erosion event displace a large number of people in Chilmari Char, the consequent increased demand for land made it more profitable to see that the charland was cultivated. Now that much of the land has been cultivated, many of the landowners have become quite interested in the property. Although most are still living on the mainland, some come to the chars to cultivate their land; others are satisfied to engage day laborers or make share-cropping arrangements.

Where there is a lot of controversy about land ownership, as in Dikrirchar Talbaria, powerful people have tried to lure settlers to the land under their control by promising that they will be able to keep all of two consecutive crops without having to share them with the "landowner." These settlers have then been used to fend off outside aggression, and gradually establish the landowner's absolute rights over the land in question. In reality

the settlers have often been unable to reap the benefit of their agreement, either because the owner has broken his promise or because violent conflicts with others resulted in the loss of the harvest.

In some areas inhabitants of *khas* charlands have attempted to solidify their claim to the land they occupy by offering to pay property taxes. Government authorities refuse to accept their money on the grounds that the land belongs to the government. The respondents who reported this are concerned that if the government does not accept the tax, they may eventually lose what they see as their land.

Land must be resurveyed almost annually in the survey area because deposits of sand and silt following the monsoon can change property lines. People usually avoid calling in government surveyors for this task since they may, in their opinion, create unnecessary confusions and complications. Instead, the surveying is done by local *amins*. Study area residents reported that land in their area was recorded by the government in 1922, 1942, 1962, and 1974, but the respondents believe that these records are faulty, in part because they were usually done without the presence of the landowners. Problems caused by these errors are still lingering, resulting in confusion over administrative jurisdiction. In one case, a district had reportedly collected tax on a piece of land that another district had leased out.



Chapter 4

FLOOD EXPERIENCE



4.1 Introduction

The Ganges chars experienced severe flooding in 1987, 1988, 1990, and 1991 (Table 4.1), the worst of which was the 1988 flood. Normal monsoon season inundation of the charlands usually occurs between August and September, when the river reaches its maximum discharge. The longest duration of flooding occurs in the island chars of Chakla Binodpur, Dikrirchar Talbaria, and Naosara Sultanpur, which are flooded for two to two and a half months. The attached chars, Char Golapnagar and Diar Bahadurpur are flooded for one and a half months, and the least flooding occurs in the unprotected mainland area of Bhabanipur, which only floods for about a month.

4.2 Sources of Flood Warning Information

In a normal monsoon season the char people of the Ganges rely mainly on past experience and obser-

vations of rising river level and weather, particularly heavy rainfall, to assess the possibility of flooding in their area. Informal communications networks were also found to play some part in people's knowledge of flooding, as in Diar Bahadurpur, where information was gathered from people who occasionally travel to India. In other cases, markets and other public gathering areas offer opportunities for information exchange about river conditions.

Broadcast radio warnings are also an important source of flooding information in the chars. Almost all of those interviewed, however, expressed a need for earlier warnings that were more frequent and specific about the potential for severe flooding as well as the areas that would be affected. Adequate preparation, most said, could only be made if warnings came 20 to 30 days prior to the flood. Such a long lead time would require the active cooperation of India with flood forecasting authorities in Bangladesh. Only in Diar Bahadur-

Table 4.1 Flooding Events in the Ganges RRA Mauzas, 1983-1993

Mauza	Year(s) Flooding Occurred	Worst Event (1988 in all mauzas)	
		Timing	Duration (days)
Chakla Binodpur	1987, 1988, 1990, 1991	Mid-August to mid-September	30
Dikrirchar Talbaria	1987, 1988, 1990, 1991	Mid-August to late September	45
Naosara Sultanpur	1987, 1988, 1990, 1991	Mid-August to mid-September	45
Char Golapnagar	1987, 1988, 1990, 1991	Early September to late September	30
Diar Bahadurpur	1987, 1988, 1990, 1991	Early September to late September	30
Bhabanipur	1988, 1991	Early September to late September	30

Source: Charland RRA

pur did people say that the radio warnings had given them enough time to prepare for the 1988 flood.

4.3 Flood Preparations

The inhabitants of the Ganges char areas generally remain in their homes during monsoon inundation. When there is a possibility that water will enter the house, they build indoor platforms (*machas*) to raise themselves and their assets above flood level. In Dikrirchar Talbaria, Naosara Sultanpur, and Chakla Binodpur, where settlements are on low land, this precaution is taken even during normal rainy seasons. Residents of Bhabanipur, which is on high land, rarely build *machas*.

Cattle are generally kept nearby during normal inundation. The cattle are protected from the rain and floods by keeping them on *machas* made of straw, banana plants, and other vegetation.

4.4 1988 Flood Experience

The flood of 1988 inundated the Ganges chars in August and September and lasted an average of 30 days in all mauzas. The longest flooding duration occurred, as in normal years, in the island chars,

particularly Dikrirchar Talbaria and Naosara Sultanpur, which were flooded for almost 45 days.

In most of the surveyed mauzas, people were ill prepared for the 1988 flood, primarily because they had too little warning of its severity. As a result, the chars suffered widespread damage and destruction of houses, crops, and livestock. One or two people also were reported to have died in each of the mauzas.

4.4.1 Housing Losses

Virtually all of the land in the surveyed mauzas was underwater; 58 to 100 percent of the houses were flooded to floor level, and 70 to 95 percent were flooded above floor level (Table 4.2). Strong currents and high waves associated with the flood were largely responsible for the destruction of houses. In the surveyed mauzas, 30 to 60 percent of the houses were destroyed, and 35 to 50 percent were damaged. In Bhabanipur, the comparatively lower number of houses destroyed was attributed to the fact that trees kept the wave action of the flood to a minimum.

Many people in the Ganges chars had built *machas* in preparation for the flood, and when the *machas* proved inadequate, some moved onto boats near their houses. The majority, however, evacuated to

Table 4.2 1988 Flood Housing Damage

Mauza	House Flooding (%)				House Damage (%)	
	Floor Level	Above Floor	Roof Level	Above Roof	Destroyed	Damaged
Chakla Binodpur	90	75	35	-	50	40
Dikrirchar Talbaria	100	95	75	5	60	35
Naosara Sultanpur	90	80	30	-	40	50
Char Golapnagar	85	75	40	-	45	40
Diar Bahadurpur	100	90	40	8	50	40
Bhabanipur	85	70	20	-	30	50

Source: Charland RRA

safer mainland areas and sheltered on embankments, in Union Parishad offices, or on other high ground, such as schools and markets (Table 4.3). To guard against theft, one or two male members of the household usually remained with or near the house. In virtually all mauzas, normal monsoon preparations were insufficient for the flood of 1988, and even many of the additional measures, such as moving to higher land, proved inadequate when that land too was inundated.

The people of Diar Bhabanipur, for example, took shelter in three nearby government cluster villages (locally called *shibir*). Within 10 to 12 days, however, the flood waters reached the high land of the cluster villages and submerged them as well. With help of the union, upazila, and zila administrations, these people were then evacuated by boat to a school in Lalpur, where they remained for another 20 to 25 days. Following the 1988 flood, the three *shibirs* were raised by about one and a half meters.

4.4.2 Livestock Losses

As with the household preparations, the usual precautions taken to protect livestock also proved inadequate in 1988. When livestock *machas* could no longer keep cattle above the flood water, people moved their livestock to the mainland. The people of Chakla Binodpur and Naosara Sultanpur took their animals to Bilmari where they kept them on high ground or with relatives or friends.

Table 4.4 1988 Flood Livestock Losses

Mauza	Number of Livestock Lost		
	Goats	Cows	Buffalo
Chakla Binodpur	25	30	-
Dikrirchar Talbaria	25	5	-
Naosara Sultanpur	40	12	-
Char Golapnagar	15	6	2
Diar Bahadurpur	12	4	-
Bhabanipur	40	25	-

Source: Charland RRA

Table 4.3 Evacuation During the 1988 Flood

Mauza	People Evacuated (%)	Evacuation Duration (days)
Chakla Binodpur	60	30-35
Dikrirchar Talbaria	85	35-40
Naosara Sultanpur	90	30-35
Char Golapnagar	75	30-32
Diar Bahadurpur	95	10-12
Bhabanipur	50 (20% stayed on boats near house)	25-30

Source: Charland RRA

Although few cattle were actually lost during the flood, afterwards many succumbed to diseases brought on by prolonged exposure to flood water or hunger from lack of fodder. Livestock losses due to the 1988 flood are shown in Table 4.4.

4.4.3 Crop Losses

There were no standing crops in the Ganges charlands during the 1988 flood as the harvest had occurred before the flooding started. A lack of time between the harvest and the flood, however, prevented proper drying and storage of the harvest. All the mauzas reported that the 1988 flood caused severe crop damage (Table 4.5). Naosara Sultanpur and Bhabanipur experienced 100 percent loss in the crops of jute and sugarcane, respectively. Loss of aus crop was also very high in Bhabanipur. Jute losses were also reported from two other mauzas. Following the 1988 flood, the people of Naosara Sultanpur, Chakla Binodpur, and Char Bhabanipur's were unable to cultivate jute because the river's strong currents and muddy water damaged the crop. The people interviewed in Dikrirchar Talbaria lost no crops in 1988 because they were living in Chilmari Bazumara mauza at the time.

Table 4.5 1988 Flood Depth, Crop Damage, and Recovery Strategies

Mauza	Percentage of Land Flooded	Average Water Depth in Agricultural Land (m)			Crop Affected	Crop Damage (%)	Recovery Strategy
		Low Land	Medium Land	High Land			
Chakla Binodpur	100	4	2.5	1.5	Jute Aus	40 75	Increased cultivation of pulses and wheat
Dikrirchar Talbaria	100	4.5	3	2	No crop	-	-
Naosara Sultanpur	100	4	2	1.5	Jute	100	Increased cultivation of pulses, wheat, and groundnut
Char Golapnagar	100	4	2	1	Aus Jute	70 50	Increased day laboring and cultivation of jute, pulses, wheat, and groundnut
Diar Bahadurpur	100	5	3	2	Aus	70	Increased day laboring and cultivation of pulses, wheat, potato, and chili
Bhabanipur	100	3.5	2	1	Aus Sugarcane	70 100	Increased day laboring and cultivation of pulses, wheat, potato, and oil seed (<i>tishi</i>)

Source: Charland RRA

To recover from the massive crop losses many of the char residents in the survey area took day laboring jobs. Those that were able to return to their land and had sufficient resources to do so increased cultivation of *rabi* crops such as pulses, wheat, and groundnuts.

4.5 Disaster Relief and Recovery

Relief and rehabilitation programs during and after the flood of 1988 generally were reported to have

been good. In almost every mauza, the Union Parishad, with the help of Upazila Parishad, distributed relief supplies consisting of two to three kilograms of rice and three to four kilograms of wheat to every family in the flood-affected areas. Although the food was insufficient for people's needs, it was helpful. The people of Char Golapnagar also reported receiving cooked food and assistance with shelter provision. As a result of these efforts, most people had food and shelter during the flood. Nonetheless, many of the informants would like to have had cooked food and

Table 4.6 Relief and Recovery Activities, 1988 Flood

Mauza	Active Organization(s)	Services Provided		People's Comments on Services
		Relief	Recovery	
Chakla Binodpur	Union Parishad	Union Parishad distributed rice and wheat.	Union Parishad distributed wheat seed.	Need assistance arranging shelter for livestock.
Dikrirchar Talbaria	Upazila and Union Parishads; Unidentified NGO	NGO distributed food and clothing.	Upazila and Union Parishads distributed bamboo, catkin, and rope. Union Parishad distributed wheat seed.	Improve seed distribution to reach everyone affected.
Naosara Sultanpur	Union Parishad	Union Parishad distributed rice and wheat.	Union Parishad distributed pulse seed.	Additional needs: agricultural loans and distribution of housing materials.
Char Golapnagar	Union Parishad; unidentified NGO	Union Parishad distributed rice and wheat.	Union Parishad distributed jute seed. The NGO distributed biscuits and tinned fish.	Would like assistance arranging shelter for flood-affected people.
Diar Bahadurpur	Upazila and Union Parishads	Upazila Parishad, with help from district administration, arranged rescue operations and shelter. Union Parishad distributed rice and wheat at flood shelter.	Union Parishad distributed wheat seed and watermelon seed.	Would like distribution of housing materials for most severely affected people.
Bhabanipur	Union Parishad		Union Parishad distributed wheat seed to some of those most severely affected.	Arrange fair distribution and ensure adequacy of service.

Source: Charland RRA

assistance with shelter for themselves and their cattle during floods.

The real trouble started after the flood. In many places the Union Parishad distributed wheat seed, *dhal*, and jute to the most severely affected families. In Dikrirchar Talbaria thana authorities distributed to each family seven or eight bamboo poles, 300 bunches of *kash*, and a kilogram of

rope to rebuild their houses. Many of those interviewed felt that these distributions should have been extended to all of the families affected by the flood (Table 4.6).

There were no NGOs working in the Ganges charlands prior to the 1988 flood, but during the disaster one or two unidentified organizations reportedly distributed relief goods in the area.



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. 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 Soil Type

Mauza	Char Type	Sandy (%)	Sandy Loam (%)	Clay (%)
Chakla Binodpur	Island	80	20	0
Dikrirchar Talbaria	Island	75	25	0
Naosara Sultanpur	Island	80	20	0
Char Golapnagar	Attached	50	50	0
Diar Bahadurpur	Attached	65	35	0
Bhabanipur	Unprotected Mainland	35	65	0

Source: Charland RRA

Table 5.1 shows that the three mauzas with mainland characteristics (including two attached chars and a detached mainland mauza) have much less sandy soil than the island chars, and none of the surveyed mauzas reported any clay soil. 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.

Table 5.2 Mauza Areas and Percent Under and Above Water in Peak Dry Season (Feb.-Mar.)

Mauza	Total Area (ha)	Below Water (%)	Above Water (%)
Chakla Binodpur	202*	75	25
Dikrirchar Talbaria	374	35	65
Naosara Sultanpur	724	25	75
Char Golapnagar	567	20	80
Diar Bahadurpur	872	25	75
Bhabanipur	704	25	75

Source: Charland RRA & BBS

*Based on villagers' estimates.

Table 5.3 Land Use Pattern

Mauza	Total Land Area (ha)	Land Use		
		Homestead (%)	Agricultural (%)	Non-Cultivated (%)
Chakla Binodpur	51	1	50	49
Dikrirchar Talbaria	243	1	40	59
Naosara Sultanpur	543	1	35	64
Char Golapnagar	453	2	80	18
Diar Bahadurpur	631	1	35	64
Bhabanipur	528	10	75	15

Source: Charland RRA and BBS

The data on dry season submergence (Table 5.2) indicates that the highest percentage of area under water during the dry season was in Chakla Binodpur (75 percent), which was undergoing erosion at the time of the survey. Dikrirchar Talbaria, with the next highest percentage submerged (35 percent), was completely eroded in the 1970s and was accreting at the time of the survey.

The mauza land area estimates in Table 5.3 were based on the mauza areas in the BBS Small Area Atlas. As the table indicates, small percentages of land are devoted to homesteads with the exception of the unprotected mainland mauza of Bhabanipur.

Generally, the high percentages of non-cultivated land in the survey mauzas are due to sand carpeting that renders the land unusable. This is particularly the case in the island chars. The unusually high percentage of non-cultivated land in Diar Bahadurpur, while partly the result of heavy sand deposition almost every year following monsoon, may also be due to conflicts over land ownership in the mauza (Chapter 3), which may have made people reluctant to cultivate.

The generally low flow of the Ganges is reflected in the elevation figures presented in Table 5.4. None of the land was cate-

gorized as very low (more than 2.7 meters of water during high monsoon season) by respondents, and the percentages of high land (less than 1.2 meters of water) are much larger than in the other rivers covered by the Charland Study. With the exception of Chakla Binodpur, which has lost most of its low land to erosion, the island chars had more low land than attached chars or unprotected mainland.

The timing of normal monsoon inundation (Table 5.5) also appears to be affected somewhat by the

Table 5.4 Elevation of Agricultural Land*

Mauza	High (%)	Medium (%)	Low (%)
Chakla Binodpur	50	25	25
Dikrirchar Talbaria	10	40	50
Naosara Sultanpur	10	40	50
Char Golapnagar	60	25	15
Diar Bahadurpur	25	60	15
Bhabanipur	30	20	50

Source: Charland RRA

*Land elevations were generally defined by char dwellers as follows: High = Less than 1.2 meters of water on land during high monsoon; Medium = 1.2-1.8 meters of water on land during high monsoon; Low = 1.81-2.7 meters of water on land during high monsoon.

Table 5.5 Timing of Normal Monsoon Inundation of Agricultural Lands

Land Elevation	Inundation Period	Inundation Recedes
High	Early August to Mid-August	Mid-September
Medium	Mid-July	Early October
Low	Mid-June to Late June	Early to Mid-November

Source: Charland RRA

low flow of the Ganges, with inundation of high land lasting only about a month, on average.

Of the mauzas visited, only Char Golapnagar, an attached char, had irrigation facilities. Shallow tubewell irrigation covered more than 25 hectares of char's land, and as a result cultivators were able to produce such *rabi* crops as potatoes and wheat. Potato yields have been particularly high in recent years, and local farmers were found to have used cold storage facilities in the nearby township of Ishwardi.

5.3 Cropping Patterns

Farmers reported that most of the agricultural land in the study mauzas was double cropped (Table 5.6), and none of the mauzas reported any triple cropping. The tendency for double cropping is likely the result of the high proportions of high and medium elevation land reported in Section 5.2, which allows more *rabi* crop planting than in the other rivers covered by the Charland Study. In the unprotected mainland mauza of Bhabanipur, the agricultural land includes relatively new low land along the river, where only one crop can be grown in a year. This explains the mauza's high percentage of single cropped land.

Full details of the mauza cropping patterns are in Appendix A and are

summarized in Table 5.7. The cropping pattern data summarized in the table is the result of computing areas for each crop in each mauza visited (based on data in Tables 5.2 and 5.3) and then calculating the percentage of available land under each crop.

The predominant crop in all mauzas is aus paddy. In *rabi* season, local boro, which is grown on low

land, is also an important crop. Aman is not grown in any of the RRA survey mauzas because of the low water content of the sandy soil during the early period of the crop cycle, as well as the danger of damage to the crop at later stages due to inundation.

Groundnut is an important *rabi* season crop in all the survey mauzas because of the generally high level of sandy soil in the chars. High agricultural land in all the study mauzas produces good yields of various pulses. The medium land, which has the least sandy soil, during *rabi* season is mostly devoted to the cultivation of wheat.

Many people in the study mauzas grow vegetables of various kinds in kitchen gardens that sometimes yield more than is necessary for household consumption. The excess, respondents said, was sold in local markets to earn extra cash income.

Table 5.6 Cropping Intensity

Mauza	Single Cropped	Double Cropped
Chakla Binodpur	20	80
Dikrirchar Talbaria	25	75
Naosara Sultanpur	20	80
Char Golapnagar	20	80
Diar Bahadurpur	15	85
Bhabanipur	50	50

Source: Charland RRA

Table 5.7 Cropping Pattern by Land Type (percent of cultivated land)

Crop	Island Char			Attached Char			Unprotected Mainland		
	High	Medium	Low	High	Medium	Low	High	Medium	Low
RABI									
Wheat	18	47	-	10	47	-	40	40	-
Pulses (<i>masur</i>)	27	17	-	40	5	15	40	-	-
Peas	35	10	-	35	23	10	-	-	-
Mustard	-	7	-	-	8	20	-	-	-
Groundnut	-	3	38	5	5	20	-	40	-
Pulses (<i>khesari</i>)	-	16	7	-	-	-	-	-	-
Potato	-	-	3	10	10	-	-	-	-
Oil Seed (<i>tishī</i>)	-	-	-	-	-	5	20	-	-
L. Boro	-	-	30	-	-	20	-	-	50
Other	10	-	-	-	2	10	-	-	-
KHARIF I & II									
B. Aus	75	97	42	90	87	65	100	60	50
Millet (<i>kaon</i>)	17	3	7	-	-	-	-	-	-
Jute	8	-	-	10	13	-	-	-	-
Sugarcane	-	-	-	-	-	-	-	40	-
Cropping Inten- sity	190	200	149	200	200	165	200	180	100
Total Area (ha)	72	109	131	281	288	100	119	79	198
% of Land in Char Type	23	35	42	42	43	15	30	20	50

Source: Charland RRA

Table 5.8 Yield and Harvest Prices of Main Crops

Crop	Island Char				Attached Char				Unprotected Mainland			
	md/ac	tn/ha	Tk/md	Tk/tn	md/ac	tn/ha	Tk/md	Tk/tn	md/ac	tn/ha	Tk/md	Tk/tn
Wheat	17	1.57	190	5,090	28	2.58	210	5,626	20	1.84	188	5,037
Pulses (<i>mossuri</i>)	15	1.38	481	12,887	11	1.01	475	12,726	12	1.11	500	13,396
Peas	15	1.38	450	12,056	13	1.20	450	12,056	-	-	-	-
Chili	50	4.61	400	10,716	-	-	-	-	-	-	-	-
Mustard	15	1.38	450	12,056	15	1.38	500	13,396	-	-	-	-
Groundnut	19	1.75	550	14,735	19	1.75	550	14,735	-	-	-	-
Pulses (<i>khesari</i>)	15	1.38	220	5,894	-	-	-	-	12	1.11	240	6,430
Potato	210	19.37	320	8,573	240	22.13	365	9,779	-	-	-	-
Millet	13	1.20	116	3,107	-	-	-	-	-	-	-	-
Radish	150	13.83	160	4,286	-	-	-	-	-	-	-	-
Bitter Gourd (<i>ustha</i>)	-	-	-	-	30,000*	-	-	-	-	-	-	-
Oil Seed (<i>gujee</i>)	-	-	-	-	20	1.84	550	14,735	-	-	-	-
Oil Seed (<i>tishi</i>)	-	-	-	-	10	0.92	450	12,056	8	0.74	450	12,056
L. Boro	18	1.67	175	4,688	30	2.77	175	4,688	18	1.67	175	4,688
Aus	15	1.38	182	4,876	20	1.84	193	5,171	17	1.57	180	4,822
Jute	20	1.84	200	5,358	25	2.30	200	5,358	-	-	-	-
Sugarcane	-	-	-	-	-	-	-	-	300	27.66	180	4,822

Source: Charland RRA

*Values are gross return in Tk/acre

5.4 Yield and Price

The yields and output (harvest) prices reported by farmers in each mauza visited in the RRA are summarized in Table 5.8. 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). Input levels were not investigated by the RRA.

Yields appear to be best in the attached chars, particularly for wheat, perhaps because of the availability of irrigation in Char Golapnagar. Farmers in all the surveyed areas reported good yields for local boro, and groundnut yields were high in both attached and island chars. Although the island chars reported high yields of chili, it is difficult for farmers to cultivate it extensively because it requires irrigation.

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 pulses. Attached char farmers, however, generally report higher prices than their counterparts in either island chars or unprotected mainland, particularly for wheat, mustard, and potato. The reasons for this include the island chars' lack of access to markets and storage facilities.

5.5 Trees

The trees grown in char areas are used for building and repairing houses, as well as to protect the houses from strong winds, storms, and the extreme heat of the sun. Because of the threat of erosion, few fruit trees are grown in the chars as a rule, the exceptions being quick-growing trees like banana and papaya. There is also a tendency for fewer trees on island chars as opposed to attached chars and setback land.

Two island char mauzas, Dikrirchar Talbaria and Naosara Sultanpur, were resettled only recently, and therefore have very few trees. Diar Bahadurpur, which is somewhat older, has banana trees in the homestead areas and some *shimul* and *jiga* trees, but because the people living there do not own the land they have no incentive to grow more permanent trees. Chakla Binodpur, as previously mentioned has a government forest (the trees therein are locally known as *shishu* or *babla*).

Char Golapnagar, an attached char mauza, has mango, jackfruit, *pakur*, *babla*, *jiga*, papaya, and bamboo. The unprotected mainland area of Bhabanipur has the widest variety of trees, including mango, plum, guava, jackfruit, rain trees, bamboo, coconut, betel, tamarind, *jiga*, *shimul*, *babla*, *nim*, *kul*, *shishu*, and others.

5.6 Land Tenure and Land Prices

Some absentee landownership was found in the study mauzas (see Chapter 3). Their land is most commonly cultivated under sharecropping agreements, with a 50-50 sharing of both input and output by the tenant and the landowner. Cash renting of property, locally known as *shan karali*,

Table 5.9 Cost of a One-Year Lease of Average Agricultural Land

Mauza (char type)	Cost per Hectare (Tk.)
Chakla Binodpur (Island)	3,700
Dikrirchar Talbaria (Island)	3,700
Naosara Sultanpur (Island)	3,000
Char Golapnagar (Attached)	7,400
Diar Bahadurpur (Attached)	3,000
Bhabanipur (Unprotected Mainland)	7,400

Source: Charland RRA

Table 5.10 Land Prices (Tk./ha)

Mauza	Homestead	Agricultural	Non-Cultivated
Chakla Binodpur	15,000	18,500	3,700
Dikrirchar Talbaria	26,000	25,000	15,000
Naosara Sultanpur	9,000	9,000	2,500
Char Golapnagar	60,000	50,000	22,000
Diar Bahadurpur	6,000	6,000	3,000
Bhabanipur	86,000	72,000	30,000
Average			
Island Char	16,666	17,500	7,066
Attached Char	33,000	28,000	12,500
Unprotected Mainland	86,000	72,000	30,000

Source: Charland RRA

was also found but it was not as common as sharecropping.

The cost of land leases (Table 5.9) reflect the quality of the land and its expected cropping intensity. Therefore, leases are least expensive in the island chars and in Diar Bahadurpur, which has a high proportion of sandy land. Char Golapnagar and Bhabanipur, the most stable and fertile of the mauzas surveyed, have the highest land prices.

Table 5.10 shows that for each land type land prices are much higher in the unprotected mainland and attached chars than in the island chars. The average land price increases by a factor of about two between island chars and attached chars, and by a factor of 2.5 or more between attached chars and unprotected mainland. There are a several reasons for 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;

Land prices in the attached char mauza of Diar Bahadurpur were relatively low because of its sandy soil, but this is more than offset in the average by the high prices of land in Char Golapnagar. Although the land in Chakla Binodpur was very productive, land prices there was depressed because of the continuous erosion to which it has been subjected.

5.7 Floods and Other Problems

Agriculture in the study area 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.

Table 5.11 reports data on the occurrence of floods during the past 10 years. Five study mauzas were affected by flood during three of the 10 years for which data were collected. The remaining mauza, Char Golapnagar, was affected in two of those years. All mauzas reported that the 1988 flood caused the most severe agricultural damage.

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Table 5.11 Floods During the Past 10 Years and the Year of Most Severe Crop Damage

Mauza	Years Flooding Occurred	Most Severe Damage	
		Crops Damaged	Percent Damaged
Chakla Binodpur	1987, 1988, 1991	Aus	75
		Jute	50
Dikrirchar Talbaria	1987, 1988, 1991	Boro	50
		Aus	50
Naosara Sultanpur	1987, 1988, 1991	Jute	100
Char Golapnagar	1988, 1991	Jute	50
		Aus	70
Diar Bahadurpur	1987, 1988, 1991	Aus	70
Bhabanipur	1987, 1988, 1991	Aus	80
		Sugarcane	100

Source: Charland RRA

In that year, Naosara Sultanpur lost 100 percent of its jute crop and Bhabanipur lost all of its sugarcane. Bhabanipur also lost 80 percent of its aus crop. Jute losses were also reported by two other mauzas. Aus and local boro, respondents said, are often damaged by early flood or even early monsoon. Following the 1988 flood the people of Naosara Sultanpur, Chakla Binodpur, and Char Bhabanipur were unable to cultivate jute because strong river currents and muddy water damaged the crop.

Waterlogging was found to be a problem only in the unprotected mainland mauza of Bhabanipur, where about 50 acres of land cannot be cultivated before January.

While floods can be disastrous for agriculture, the respondents suggested a number of other constraints on their ability to achieve better profits from their land, among them were:

- Sandy nature of the soil (often accentuated by sand deposition caused by floods);
- Lack of irrigation facilities;
- Early flood causing damages to aus and local boro;
- Danger of inundation preventing aman cultivation;

- Scarcity of funds needed to clear catkin;
- Confusion and conflict over *khas* land and land ownership
- Scarcity of seeds, fertilizer, and pesticide
- Muddy water preventing proper soaking of jute
- Communication problems

5.8 Potential for Improvements

The existing agricultural system is adjusted to monsoon conditions in different land levels in the Ganges 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 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.

Charland farmers' access to institutional support is, however, limited. Krishi Bank loans are avail-

able for cultivation—for agricultural inputs, 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.

While there may be room for improvement in the cropping practices of Ganges charland farmers, it is, for the time being at least, limited by the declining flow of the river. Many respondents expressed the opinion that unless and until something could be done about this situation, they would be unable to improve their lot.

Raising returns to farming in normal conditions, while an important objective, should not be the only objective. Farmers are still vulnerable to natural hazards. Timely flood warnings might help farmers to harvest boro or aus crops before they are damaged. The scope for increasing rabi season cultivation after floods is limited—the sandy soils of charlands provide 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

Considerable 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, buffalo 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 chars people. Since almost all the chars' crop and grazing lands are submerged for four to seven months (June through November) there is a seasonal shortage of fodder for animals. Additionally, sheltering livestock during monsoon can be diffi-

cult, 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 (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 ownership data from the RRA study region is shown in Table 6.1. For the entire study area 70 percent of households raise cattle, 63

Table 6.1 Livestock Ownership (percent of households)

Mauza	Cattle	Buffalo	Goats	Chickens	Ducks
Chakla Binodpur	97	7	100	100	-
Dikrirchar Talbaria	15	-	25	60	-
Naosara Sultanpur	100	6	100	100	-
Char Golapnagar	73	3	17	100	26
Diar Bahadurpur	62	2	50	97	-
Bhabanipur	70	6	80	100	-
All Mauzas	70	4	63	96	5

Source: Charland RRA

Table 6.2 Average Number of Livestock per Household

Mauza	Cattle	Goats	Buffalo	Chickens
Chakla Binodpur	7.7	2.0	0.24	8.0
Dikrirchar Talbaria	0.28	0.48	-	4.2
Naosara Sultanpur	3.2	5.0	0.18	10.0
Char Golapnagar	3.1	4.8	0.08	7.0
Diar Bahadurpur	2.3	1.2	0.06	5.0
Bhabanipur	2.8	2.4	0.13	7.0
Average	3.2	2.6	0.12	6.87

Source: Charland RRA

percent rear goats, and 96 percent keep chickens. Buffalo ownership in all the mauzas was very limited and ducks were found only in Char Golapnagar, a very stable attached char. Three households in that mauza raise ducks commercially and have a total of 650 ducks. Most of these ducks are sold during the dry season because they require water for foraging.

Livestock ownership was highest in Naosara Sultanpur and Chakla Binodpur. The people of these two mauzas reported that most of their cultivable land was eroded in 1991 forcing large numbers of people to migrate out of the chars. The land that is left is sandy, and crop production on the land is very poor, but the two mauzas still have considerable fodder resources and grazing lands. Most of the people that have stayed in Naosara Sultanpur and Chakla Binodpur are long-term residents who have traditionally been cattle and milk traders. This trend is also evident in the data presented in Table 6.2, which indicate that the two mauzas also have the highest number of cattle per household. In Chakla Binodpur, 29 households reportedly sold about 80 kilograms of milk per day.

Dikrirchar Talbaria, the only other island char, has the lowest livestock resources both in terms of percentage of households and livestock per household. This is due to the relatively recent settlement of the char (1992) and the limited resources of the

households living there. If the char stabilizes there may be greater opportunity for its residents to increase their cattle resources, particularly since the island has an abundance of catkin grass, which is a major source of fodder.

Of the two attached chars, Char Golapnagar, the most stable, has the highest level of livestock ownership. Bhabanipur, the only unprotected mainland mauza, also has considerable livestock resources.

After cattle, goats are the second most important source of livestock income in the surveyed charlands. Goats are most often cared for by the women and children of the char households. The ownership pattern for goats is much the same as for cattle, with the highest levels of ownership in Chakla Binodpur and Naosara Sultanpur and the lowest in recently settled Dikrirchar Talbaria mauza. Char Golapnagar also had a high number of goats per household.

With the exception of Dikrirchar Talbaria, almost all of the households in the chars surveyed raise chickens. The rearing of chickens, which provide income through the sale of eggs, is done by the women of the char households.

6.3 Fodder Resource

The charlands of the Ganges have a rich diversity of fodder resources, particularly during the dry season. The most common fodder sources are green grass, catkin, rice straw, groundnut leaves, *chaitali bhusi* (pulse straw), and oil cake and rice bran. Grass is the dominant fodder in the dry season, while dried rice straw and catkin are the major wet season fodder sources. Groundnut leaves and *chaitali bhusi* are also used as dry season fodder. Table 6.3 lists the main types of fodder available by season for each of the surveyed mauzas.

Table 6.3 Fodder Source by Season

Mauza	Grass		Catkin		Straw		Groundnut Leaves		Pulse Straw		Bran with Oil Cake	
	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
Chakla Binodpur	✓	-	-	✓	-	✓	✓	-	✓	-	✓	✓
Dikrirchar Talbaria	✓	-	✓	✓	✓	✓	-	-	-	✓	-	✓
Naosara Sultanpur	✓	-	-	✓	✓	✓	✓	-	✓	-	✓	✓
Char Golapnagar	✓	-	-	✓	✓	✓	✓	-	✓	-	✓	✓
Diar Bahadurpur	✓	-	✓	✓	-	✓	-	-	✓	-	-	-
Bhabanipur	✓	-	-	✓	✓	✓	-	-	✓	-	✓	✓

Source: Charland RRA

6.4 Livestock Markets and Market Prices

Many char people, as previously noted, make some part of their livelihood from cattle rearing on a seasonal basis. Their proximity to markets, therefore, is important to their economy. In the Ganges RRA study area there are several cattle *hats* where people from study mauzas go to buy and sell their livestock: Kushtia, Mirpur, Hajirhat (Pabna), Tebunia (Pabna), Lalpur (Nator), Chawk Rajapur (Bagha), Chilmari (Doulatur), Sonatola (Doulatur), and Orenkhola (Ishwardi).

The sale prices of livestock, which can vary according to the age, variety, size, and potential of the animal, were fairly consistent in all the RRA

study mauzas. Table 6.4 shows that the average bullock price ranged from Tk.4,100 to Tk.8,200, cows cost Tk.4,500 to Tk.9,300, buffalos Tk.8,500 to Tk.12,600, goats Tk.500 to Tk.1,900, and chickens Tk.53/kg to Tk.60/kg. Milk and egg prices exhibited little seasonal variation, milk ranging from Tk.9/kg to Tk.11/kg and eggs ranging from Tk.1.75 to Tk.2.25 each.

In all the mauzas, milk-trading middlemen, called *goalas*, visit cattle owners daily to purchase milk, which they then resell at a profit in either local or distant markets. The *goalas* usually come from the same mauza or an adjacent one. Chickens and their eggs are normally sold directly by the owners at the local market.

Table 6.4 Market Price of Livestock

Mauza	Sale Value of Livestock in the Market (Tk./head)					Milk (Tk./kg)	Egg (Tk./piece)
	Bullock	Cow	Buffalo	Goat	Chicken		
Chakla Binodpur	5,000	7,500	10,500	1,200	55	10	2
Dikrirchar Talbaria	5,500	6,500	-	800	55	11	2.5
Naosara Sultanpur	5,500	6,000	10,000	1,300	55	9	2
Char Golapnagar	8,500	8,000	12,000	1,000	60	10	2
Diar Bahadurpur	4,000	5,500	10,000	1,300	55	10	2
Bhabanipur	8,500	8,000	10,000	1,500	60	11	2.5
Average	6,000	7,000	10,500	1,200	56	10	2

Source: Charland RRA

The best prices for cattle are available just prior to Eid-ul-Azha, and understandably that is the preferred time to sell. About 5 percent of the cattle were found to be sold just before monsoon, when keeping cattle in the chars can be hazardous. People were also found to sell cattle when they needed to meet major household expenses such as a marriage, building a house, or buying a piece of land.

6.5 Livestock Tenancy System

Livestock tenancy is a common practice in the study area. Under the *barga* system, as it is called, 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.

The *barga* system was found to be particularly common in attached char mauzas of the Ganges RRA study area. On Chakla Binodpur, which has a high level of livestock ownership, there is no *barga* system in operation.

6.6 Livestock Problems

6.6.1 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).

6.6.2 Livestock Diseases

The most common livestock diseases in the Ganges RRA area were reported to be foot and mouth (*khura rog*) and bad air (*daba*), which usually occur in October and November (*Kartik-Agrahayan*) just following the monsoon season. A rare disease called *poch pochi*, the symptoms of which are muscle softening, foul odor, and eventual death, also sometimes occurs after monsoon season. Rheumatism and diarrhoea were also common in the area.

Veterinary services are available in local bazaars and at the Thana headquarters (Lalpur, Mirpur, Beel Baria, Talbaria, Pabna, etc.), but villagers also depend on traditional healers (*kabiraj*) and herbal medicine for the treatment of ailing livestock.

6.7 Potential Improvements

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

- provision of credit (at low interest rates) for poor families and women to purchasing cattle and goats;
- 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;

- R
- cattle 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;
 - ensure availability of boats that can be used for quick evacuation of cattle during flooding;
 - 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.
 - Community awareness programs that can help livestock owners deal with the threat of thieves.

There are ample opportunities for the development of family-based livestock resources in the char areas as a major source of household income and livelihood. The generally abundant fodder resources and grazing lands of the Ganges chars can accommodate much more livestock than currently exists. There are already enough dry season feed resources in the surveyed chars that people from the Chilmari-Bajumara region, north of the RRA survey area, bring 600 to 700 head of cattle to graze there every year for four to six months.

Chapter 7

FISHERIES

7.1 Introduction

The fisheries resources of the upper reach of the Ganges have been severely limited by the river's low flow. The fish population of the river is much lower than in the Meghna and Jamuna, both of which have rich fishing grounds. As a result, agriculture and livestock play much larger roles in the local economy than fishing does. Nonetheless, fishing remains a major source of income for the char people in this area, although commercial fishing is a primary livelihood for only a very few families.

Table 7.1 shows that, while 60 percent of the households surveyed fish, only about 8 percent of them do so professionally. Most of the households that reported fishing do so on a subsistence level. Virtually all of the fishing households were Muslim families that had taken up fishing after losing their land to river erosion.

7.2 Fishing Season and Types

Fishing, whether professional or subsistence, is at its most intense during the monsoon season, when the waters of the Ganges are at their highest level. As the dry season nears, and fish habitats in and around the river begin to dry up, fish become scarce, and for the five months of the dry season from mid-November through mid-April (*Agrahayan* to *Chaitra*) most professional fishermen take jobs such as earth cutting, agricultural labor-

ing, *kaisha* (catkin) selling, etc. Those few who continue to fish have poor catches and earn very little from their occupation.

Small species dominate the catch in the Ganges, and there is very little *hilsha* fishing in the area. In Chakla Binodpur, for example, none of the households fish for the species. Only 34 percent of the professional fishing households in the survey area were found to engage in *hilsha* fishing, the season for which starts in June or July (*Ashar*) and continues until late-September/early October (*Ashwin*) with the peak occurring in August and September (*Bhadra-Ashwin*). Only in Naosara Sultanpur do the fisherman catch *hilsha* in their local area (within about 15 km of the mauza. *Hilsha* fishermen from Bhabanipur, Dikrirchar Talbaria, and Char Golapnagar prefer to do their fishing downstream in the Goalonda area near the confluence of

Table 7.1 Percentage of Households Engaged in Fishing

Mauza	Professional	Subsistence
Chakla Binodpur	7	90
Dikrirchar Talbaria	20	70
Naosara Sultanpur	10	30
Char Golapnagar	8	80
Diar Bahadurpur	7	90
Bhabanipur	5	30
All Mauzas	8	52

Source: Charland RRA

the Ganges and Jamuna rivers. At the end of the *hilsha* season, some of these fishermen switch to operating *moi jal* and catching small shrimp (*icha*) and other small fish species.

7.3 Fishing Arrangement

There is no licensing system for fishing in the upper Ganges River. Instead, fishermen using boats and nets must pay leasing fees (*jalkor*) to people who control the river. The amount of *jalkor* varies depending on the type of fishing gear being used. For big boats and nets operated by eight to 12 people the rate is Tk.2,000 to Tk.3,000 per year. Small boats operated by two or three people usually pay a *jalkor* of 5 to 10 percent of their catch on daily basis. If the catch is worth less than Tk.100, respondents said, the *jalkor* payment is usually waived. Fishing by *moi jal* using boats operated by two or three people pay a rate of Tk.500 to Tk.600 per year.

Fishing by bamboo traps (*duars*) and smaller nets such as *jhaki jal*, *thela jal*, and one-man *moi jal* are almost tax free, and the fishermen using such equipment enjoy use of the river and adjacent floodplains as common property resources.

7.4 Types of Fishing Gear Used

Most of the fishing in the Ganges RRA area is done in the river channel. But during the monsoon, fishing activity extends to the charlands and inundated floodplain. In addition to the nets called *moi jal*, *jhaki jal*, *thela jal*, hooks and lines are also used. Many subsistence fishermen also catch fish by hand. Table 7.2 shows the common types of fishing gear used in the Ganges RRA area.

Hilsha fishing is generally done using three types of nets: *current jal*, *shanglay jal*, and *bauli jal*. Not all the professional fishing families own boats or nets; on average, 20 to 30 percent of the fishing households have boats and nets, the rest work as fishing laborers on a share (*bhagi*) basis. The

Table 7.2 Fishing Gear Used

Fishing Gear	Professional Fishermen	Subsistence Fishermen
Current <i>jal</i>	✓	-
Shanglay <i>jal</i>	✓	-
Bauli <i>jal</i>	✓	-
Moi <i>jal</i>	✓	✓
Thela <i>jal</i>	✓	✓
Jhaki <i>jal</i>	✓	✓
Hooks & Lines	✓	-
Duars	✓	✓

Source: Charland RRA

bhagi system is more or less similar to that found in other areas: the owner of the boat and net gets half of the catch and the other half is shared equally shared among the fishing laborers.

Bamboo trap (*duar*) fishing was found to be a popular practice in the survey area. *Duar* fishing starts in April (*Baishakh*), continues until November (*Kartik*), and peaks during September-October (*Ashwin*), when flood water recedes from the chars. *Duars* are set along the shoreline of the river as well as in the inundated paddy fields in the charlands. The major catch of *duar* is small shrimp (*icha*) followed by *bailla* and other small species of fish.

7.5 Income from Fishing

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 (Ishwardi, Lalpur, Kushtia, Bheramara, Beel Baria, Goalonda), both wholesale to *aratdars* and retail.

Fishing income varies depending on the type of gear and the season. Since income is also directly

related to the size of catch, it is highest during the monsoon season and just after the monsoon, when catches are at their peak. The lamentable state of the Ganges fisheries makes fishing an uncertain way to make a living. Respondents in the survey area reported that in a usual week they will have no catch at all on one or two days. On a particularly good day they might catch enough to support a family for two or three days.

financial resources to help them finance the purchase of boats and nets. It is even difficult for many to purchase relatively inexpensive bamboo traps. Unlike in the other major rivers, there were no fishermen's societies found in the Ganges RRA survey area and therefore no institution to which they could turn for credit that could help them improve their opportunities.

Table 7.3 **Income by Fishing Gear Type**
(Tk./person/day)

Fishing Gear/Type	Peak Period	Lean Period
<i>Hilsha jal</i>	80-150	50-60
<i>Moi jal</i>	50-60	30-40
<i>Jhaki/Thela jal</i>	30-40	20-25
<i>Duars</i> (10 per unit)	50-70	20-40

Source: Charland RRA

The average earnings per fishing day by type of gear used in the Ganges chars, as reported for a normal period, are shown in Table 7.3. This shows that the income of fish laborers is marginal, and they can hardly meet family expenditure from their share of the fishing income.

7.6 Conclusion

The continuing decline of the Ganges fisheries, caused RRA respondents said by the construction of the Farakka Barrage, make fishing a relatively poor source of income in the upper reach of the river. Although few people can rely on the occupation year-round, many make use of the resource on a seasonal basis by fishing for subsistence. In the charlands surveyed, most of the people rely more on agriculture and livestock to provide a reasonable living. Respondents reported that it was mainly mainlanders living along the river banks that were involved in professional fishing in the Ganges.

Among those who do try to make a living on the fisheries of the Ganges, most reported a lack of



Chapter 8

INSTITUTIONS, TRANSPORTATION, AND MARKETS

8.1 Introduction

The Ganges charlands are at a comparative disadvantage to mainland areas by virtue of their relative isolation from infrastructural facilities. While those in attached chars and on unprotected mainland have more access to mainland facilities, the fact that they are subject to flooding and erosion makes them poor candidates for the construction of schools, roads, markets, or other permanent facilities. In the island chars, where people depend on river transportation to take advantage of mainland facilities, there often are not enough boats to serve their needs.

8.2 Institutions

Table 8.1 shows the infrastructural facilities found in the RRA survey mauzas. The table indicates clearly that the unprotected mainland is best served by public facilities. In the attached chars, perhaps because they have some access to mainland facilities,

there is very little in the way of infrastructure. This is most striking in the case of markets; even the island chars have more markets than the attached chars.

8.2.1 Schools

More than a quarter of the island and attached char mauzas were reported to have primary schools, but there were fewer high schools in these areas than in the unprotected mainland, and none at all in the attached chars. Since sending very young children to distant schools is a problem, people in all the RRA mauzas expressed a strong interest in having a primary school within their own mauza. The number of primary schools in the charlands is deceptive, however. In many cases schools were reported to be non-functional during large parts of the year due to lack of teachers and natural calamities like floods and erosion.

While it is somewhat easier to send older children to more distant high schools, in fact, many families,

Table 8.1 Public Facilities in Ganges RRA Study Region

Facility	Island Char	Attached Char	Unprotected Mainland	Total
Health Care	5	5	13	10
Primary School	26	32	48	41
High School	5	0	24	16
Weekly Market (<i>hat</i>)	21	9	35	28
Launch Ghat	0	0	1	1
NGO Activity	26	27	31	29

Source: Charland Inventory

lies cannot afford to do so. Those that do usually send their children to live with relatives on the mainland. The RRA survey found that the attached chars were particularly disadvantaged in terms of high schools, but the people living in these areas would be better able than those on island chars to send their children to mainland high schools.

8.2.2 Local Government Offices

The accessibility of local government offices is important for charland dwellers mainly in times of difficulty when the Union Parishad or Thana Headquarters may offer assistance to those who need help. The Union Parishad, through the Food for Work program, can also be a source of temporary employment for those in need of work. Table 8.2 contains information on distances of the study mauzas from their Union Parishad office and Thana Headquarters, as well as the modes of transportation used to get to them in dry and wet seasons. The data must be used with caution, however. Since the number of mauzas in each

category shown in the table is rather small, it would be unwise to infer anything about the access of different char types to government offices only by looking at the data on average distances.

Walking is often the main mode of transportation for char people, particularly during the dry season. Transportation to and from the charlands becomes easier during the monsoon because more waterways become navigable, and engine boat transportation is more available. As a result, travel times to local government offices are shorter, but the cost of travel goes up, which can prevent those who are in straitened circumstances from getting to the source of assistance.

8.3 Transport Facilities

Since boats are a major mode of transportation in the charlands, and for the island chars the only means to connect people with mainland facilities, water craft can be important assets for charland

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

Char Type	Average Distance From Mauza (with range) in km	Dry Season (one way)			Wet Season (one way)		
		Average Time (hr)	Average Cost (Tk)	Mode of Transport	Average Time (hr)	Average Cost (Tk)	Mode of Transport
a) Union Parishad Office							
Island Char	2.16 (1.5-3)	0.75	1	On foot; boat	0.5	4	Engine boat
Attached Char & Unprotected Mainland	7 (4-9.5)	1.5	2	On foot; boat	1.35	2.5	On foot; boat
b) Thana Headquarters							
Island Char	14 (8-24)	2.6	4	On foot; boat; rickshaw	2	7	Engine boat; rickshaw
Attached Char & Unprotected Mainland	11 (7-16)	2	4.35	On foot; boat; rickshaw; bus	1.85	5.7	On foot; engine boat; rickshaw; bus

Source: Charland RRA

Table 8.3 Boat Ownership by Char Type

Char Type	No. of Households	Small Boat				Engine Boat			
		No. of HH with Boat	% of HH with Boat	Total Boats	Boats/ HH	No. of HH with Boat	% of HH with Boat	Total Boats	Boats/ HH
Island Char	434	9	2	9	0.02	1	0.25	1	0.002
Attached Char & Unprotected Mainland	1,000	32	3	38	0.04	2	0.2	2	0.002

Source: Charland RRA

dwellers. As Table 8.3 indicates, however, the RRA found that a very small percentage of people had such an asset. For the most part, those who had their own transportation owned small country boats. Only three households owned engine boats.

One of the reasons for the small number of private boats could be the lack of fishing opportunities in the study area (Chapter 7). Some of the other RRA surveys, such as the one done in the upper Meghna, found that fishing was an important incentive to owning a boat. The low flow of the Ganges has also probably made private boat ownership a somewhat dubious advantage. During the rather long dry season in the Ganges area, widespread drying up of the river and associated canals render boats largely useless. Those who do own boats reported finding it difficult to find suitable places in dry season to keep their boats submerged to prevent the wooden hulls from cracking in the sun.

As a result of the low level of boat ownership, the people in the Ganges survey area were found to rely almost entirely on commercial river transportation. Commercial boatmen operating in the area were commonly paid for their services either seasonally or annually in paddy.

8.4 Marketing

8.4.1 Markets and Prices

No one market was found to be of particular importance to the char people of the Ganges study

area. This is perhaps because of the relatively low population density in the chars studied, which may have failed to encourage the growth of a major, central market in the area. Instead, the people of the Ganges chars made use of a number of nearby markets. The names of these markets, some of which were quite far into the mainland, and the types of transactions made in those markets are detailed in Appendix B.

The distance to local markets and the cost of transporting goods to market, as well as the loss of a day's work, often influence farmers to sell their produce to middlemen who periodically visit the chars. Traders in rice, wheat, and other crops usually come to the chars immediately after harvesting times. Middlemen also regularly come to the chars to buy chickens, eggs, and milk (the latter is particularly important in Naosara Sultanpur and Chakla Binodpur; see Chapter 6).

Average market prices of selected commodities for the dry season and monsoon are presented in Table 8.4. The data indicate that there is a general trend of price increases during monsoon season, the only exception being cattle. The main reason cattle prices are lower at that time of year is that it becomes more difficult to tend cattle during monsoon; the shortage of fodder and the fact that animals are more prone to disease in the wet season tend to make those that do come to market less valuable. Price increases are especially significant for catkin, chili, and wheat flour.

The price of catkin goes up because demand rises during the monsoon, when catkin is extensively

Table 8.4 Average Market Price of Selected Commodities

Commodity & Unit	Normal Price (Tk.)	Monsoon Season Price (Tk.)	Percentage Difference
Rice (kg)	8	10	+25
Flour (kg)	7	9.5	+36
Chili (kg)	40	60	+50
Pulses (<i>masur</i>) (kg)	29	32	+10
Mustard Oil (kg)	48	49	+2
Potato (kg)	8	9.5	+19
Salt (kg)	6.5	8	+23
<i>Lungi</i> (average quality)	75	80	+7
<i>Sari</i> (average quality)	145	150	+3
Bamboo (one large piece)	80	100	+25
CI Sheet (22 meters)	2,400	2,500	+4
Catkin (100 bundles, 2.5 kg each)	65	100	+54
Cow (one, average quality)	5,500	4,900	-11
Goat (one, average quality)	900	650	-28

Source: Charland RRA

Bamboo prices also go up by 25 percent mainly because of demand for the commodity. Early in the monsoon season bamboo is used extensively for strengthening houses and for building elevated platforms (*macha*) in the event of floods.

8.4.2 Kuichamora: A Market Study

Kuichamora Bazar has been in existence for a long time and currently covers about 12 bighas (4 acres) of land in Bahadurpur mauza, Bheramara thana. Until 1991, when the government closed the railway line serving the area (the tracks had been removed a few months prior to the RRA field visit), the bazar was an important center for trading in betel, turmeric, jute, and vegetables. Now the main route to Kuichamora is a road in poor condition that connects it with Bheramara.

Despite the loss of the railway line, Kuichamora Bazar, which serves an area of about nine

used as fodder and fuel. The price of chilies rises mainly because it is in low supply during monsoon (chilies are generally harvested in March and April).

The data also indicate a sizable 25 percent increase in the price of rice during monsoon season, although it does not go up as much as wheat flour, the cost of which goes up by 35 percent. One reason for this price differential could be the greater demand put on flour, the relatively lower-priced commodity. In addition to being less expensive than rice, a given amount of flour can feed more people than the same amount of rice (particularly when the flour is cooked in the form of a paste).

square miles, is still a key market for the local people, and the RRA respondents generally considered it to be more important than two other nearby markets, Bahadurpur and Dhamugdia. The respondents claimed that relatively higher volumes of supplies in this market kept prices generally lower compared to the other markets.

There are about 145 permanent shops in Kuichamora Bazar, most of them grocery stores and fabric and garment shops. There also are more than a dozen hotels and tea stalls, a mosque, an *Eid Gah* (area specified for Eid congregation), and about 10 pharmacies. On Fridays, one of the pharmacies has a doctor; a practitioner from Bheramara Hospital who comes to spend his

weekends in his village home. Some of the other pharmacies offer the services of homeopathic and village doctors. The market has five or six locally owned warehouses (*arats*) where wholesalers purchase commodities such as jute, turmeric, and pulses from middlemen (*farias*) and, sometimes, directly from the grower. The wholesalers generally ship these commodities by truck to urban areas. The market also has three rice mills.

Kuichamora has no permanent sheds for fish trading. Most of the rather small catch is usually sold to middlemen either at the point of catch or on the river bank. The small amounts of fish that find their way to Kuichamora Bazar do not require any permanent structures for the transactions involved.

Trading in betel leaves continues to be a major activity in Kuichamora Bazar. Every Monday and Friday, from 8 a.m. to 2 p.m., nearly 2,500 people gather in the market to buy and sell betel leaves. The betel leaves sold in the market are grown in the nearby mainland areas of Mokarrampur, Bahadurpur, and Jhuniadaha unions. The leaves are brought to the market by buses, rickshaw vans, and bicycles. The buyers come from relatively nearby areas in Lalpur and Ishwardi thanas, as well as from more distant places as Sirajganj. Their bulk purchases are then shipped to Dhaka, Chittagong, and other parts of the country.

General marketing in Kuichamora is done on Saturdays and Wednesdays between 2 p.m. and 8 p.m., when 1,500 to 2,000 people come to the bazar to buy and sell vegetables, groceries, fishes, and daily necessities. Among the agricultural commodities retailed in the market are paddy, rice, potatoes, onions, chilies, pulses, and vegetables. Although some of the area chars produce a lot of groundnuts, Kuichamora was not found to be a major center for trading in the crop. Most of the wholesale groundnut traders were found to be in Bilmaria and other area markets.

About 12 percent of the people using Kuichamora market were reported to be from the chars of Basudebpur, Chakla Binodpur, Char Golapnagar,

Diar Bahadurpur, and Naosara Sultanpur. Although many of the people from these chars go to Bilmaria market during the dry season, they find it more convenient to come to Kuichamora during the rainy season since the widening of the river at that time allows them easier access to this market.

The char people come to Kuichamora to sell agricultural produce and buy daily necessities. The catkin grass they bring to market is in particularly high demand just after monsoon, when betel leaf growers use the grass to make the canopies under which betel vines have to be grown. The catkin grass sells at one taka per small bunch.

Space in the market is leased differently for the betel market and the general market. Leases for betel traders are informal and in the hands of the authorities of a local college, who ostensibly use the proceeds to help finance the college's development programs. The college reportedly earned about Tk.100 per market day in this way (a remarkably low figure given the volume of transactions that was reported). Leases for the general market are more formalized and cost Tk.10,000 per year.

Kuichamora Bazar was unaffected by the 1988 flood, but the flood of 1971 completely inundated the market. The flooding, which was two to three feet deep, lasted for about a month. Fortunately, the railway line adjacent to the market remained dry, and many of the sellers set up shop there. Since there was very little in the market at the time of the flood, moving merchandise to the dry land was not a big problem. Respondents credited a flood control embankment about half mile away, which was constructed between 1975 and 1978, for sparing the market from the 1988 flood. Since Kuichamora Bazar is located quite far from the banks of the river it has never been affected by bank erosion, nor is it used very often by people affected by either floods or erosion. These people are more likely to seek shelter on railway property in Raita, which is quite high and free of erosion.

The people interviewed felt that Kuichamora Bazar could be much more effective if the road connect-

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ing it with Bheramara were to be improved and maintained properly. With such improvement, they thought, the market would be able to provide livestock trading services.

Chapter 9

HOUSEHOLD WELFARE

9.1 Introduction

This chapter is based on discussions with groups of women in the study villages. 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 Ganges 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 and Sanitation

Tubewells were the major source of drinking water for most of the year in all of the RRA study area mauzas with the exception of Dikrirchar Talbaria, where the settlement was very new (Table 9.1). Many of the tubewells, however, were often inoperative. During the driest period of the year, between February and March, the lowering of the underground water table made water unavailable, and during floods many of the tubewells were inundated and could not be used.

Table 9.1 Availability of Tubewells and Latrines

Mauza & Char Type	No. of Tubewells	Households per Tubewell	Households Drinking Tubewell Water (%)	Households with Latrines (%)	
				Kutcha	Pucca
Chakla Binodpur (Island)	5	6	100	30	-
Dikrirchar Talbaria (Island)	-	-	-	-	-
Naosara Sultanpur (Island)	8	33	95	25	-
Char Golapnagar (Attached)	22	11	75	70	-
Diar Bahadurpur (Attached)	4	50	60	30	-
Bhabanipur (Unprotected Mainland)	7	79	80	40	-

Source: Charland RRA

Table 9.2 Fuel Type and Availability by Season

Mauza	Fuel Type(s) Used	Availability by Season			Comments
		Dry season	Monsoon	Flood	
Chakla Binodpur	Wood and branches of trees, leaves, bushes, cow dung, remains of paddy and rabi crops.	No Scarcity	No Scarcity	Scarcity	Wood is also collected from trees in the neighborhood by Forestry Department.
Dikritchar Talbaria	Catkin grass, remains of paddy and rabi crops.	No Scarcity	No Scarcity	Scarcity	Women help in storing fuel for the monsoon months. Catkin is sold as fuel to the main-land people during dry season.
Naosara Sultanpur	Catkin grass, <i>dhaincha</i> , cow dung, remains of crops.	No Scarcity	No Scarcity	Scarcity	-
Char Golapnagar	Catkin grass, <i>dhaincha</i> , remains of paddy and rabi crops, cow dung, leaves and branches of trees.	No Scarcity	No Scarcity	Scarcity	Catkin grass is sold as fuel in nearby markets during both dry and wet seasons. It fetches higher prices during monsoon.
Diar Bahadurpur	Catkin grass, <i>dhaincha</i> , remains of rabi crops, cow dung.	No Scarcity	No Scarcity	Scarcity	Flood-time scarcity of fuel is accentuated by the fact that many households have to move to places where they do not have any fuel stored.
Bhabanipur	Wood from trees, catkin grass, cow dung, leaves, remains of crops.	No Scarcity	No Scarcity	Scarcity	The scarcity of fuel during flood is mainly the result of an inability to move bulky stored fuel when they are forced from their homes.

Source: Charland RRA

The use of tubewells also depends on their geographical distribution. Thus, although the number of households per tubewell in Char Golapnagar was quite small, the percentage of households relying on tubewell water for drinking purposes was not very high because there are two main settlement areas separated by about half a kilometer, and the tubewells were not evenly distributed between these locations. In the unprotected mainland mauza of Bhabanipur the percentage of households served by tubewells was quite high, but because of the mauza's high population density the number of households per tubewell was the highest of the study mauzas.

Table 9.1 also indicates that none of the RRA mauzas had any *pucca* latrines, including the most stable of the mauzas, Bhabanipur and Char Golapnagar. In Char Golapnagar, at least, a majority of households had *kutchha* latrines, but in all the other mauzas most households had no latrine at all, and in Dikrirchar Talbaria, the mauza with relatively new settlement, no households reported having latrines.

9.2.2 Fuel

Fuel supplies, which are vital for cooking, are normally the responsibility of women. The RRA found that all mauzas had ample supplies of fuel of various types (Table 9.2). No scarcity was reported either for the dry season or for the monsoon

months. Although fuel was generally available, however, all the mauzas experienced fuel shortages during floods. Inundation, whether by normal monsoon or flooding, makes it difficult to keep fuel dry (as shown by FAP 14, 1992), and when people are forced to evacuate their homes they are usually unable to take bulky fuel stores with them.

The use of wood for fuel, rare in most of the other areas covered by the Charland Study is fairly common in Chakla Binodpur, an island char that has a government forest. Wood was also found to be used in Bhabanipur, which also has good supply of trees.

9.3 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 means treatment is often delayed or even beyond the reach of char people. Common diseases of the people in the Ganges RRA mauzas are reported in Table 9.3. Cold, fever, and diarrhoea are common in all areas, and occurrences of diarrhoea increase in the aftermath of flooding.

Although the nearest health center may not be particularly far away (except in Dikrirchar Talbaria and Diar Bahadurpur), people in all mauzas

Table 9.3 Common Diseases Among Char People

Mauza	Cold & Fever	Diarrhoea	Skin Disease	Dysentery	Chicken-pox	Distance to Nearest Health Center (km)
Chakla Binodpur	✓	✓	✓	-	-	3
Dikrirchar Talbaria	✓	✓	✓	✓	-	7
Naosara Sultanpur	✓	✓	-	-	✓	2
Char Golapnagar	✓	✓	✓	-	-	3
Diar Bahadurpur	✓	✓	✓	-	✓	6
Bhabanipur	✓	✓	✓	✓	-	4

Source: Charland RRA



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reported that they must get to the center on foot, even during monsoon. Respondents also said that they were unfamiliar with the procedures required for admission to the health centers. Many of them therefore suggested that arrangements be made for them to receive better medical services locally. The lack of local medical services was reported to be a particular problem for child-bearing women who develop post-natal complications.

Given the difficulty of health center access, most people obtain treatment from unqualified village doctors or from a *kabiraj*. Such services are generally a less expensive alternative because the service fees and treatment are cheaper and there are little or no transportation costs involved. If a disease worsens, however, people reported that they are more likely to seek more modern methods of treatment.

Chapter 10

CONCLUSIONS

10.1 Summary of Findings

The chars in the study area were found to have relatively low population densities. In fact, the inventory data show that the population density within the river reach covering the RRA mauzas has declined over the years. This is probably due to extensive sand deposition which has made much of the land unsuitable for cultivation, as well as to the loss of opportunities to make a living from fishing.

As in other parts of Bangladesh, infrastructural facilities in the Ganges chars are meager. The lack of such facilities is a particular problem for those living on island chars, who must travel considerable distances to meet their needs. Although the attached chars did not have very many facilities within their mauzas, the people in these areas were in many cases had access to facilities available in the adjoining mainland. For example, while the people in island chars in general found it extremely difficult to send their children to mainland schools, people in the attached chars were able to do so. The same was true for marketing facilities.

Although the *zamindari* system in Bangladesh was abolished by the East Pakistan State Acquisition and Tenancy Act of 1950, the feudal legacy lingers in the Ganges area. Thus, despite the fact that large areas of land should in effect be government property or *khas* land, locally influential people were found to control much of the *khas* land in extra-legal ways. Conflicts between groups vying for control of the land often were reported to result in violence. Those who have settled on the land with the encouragement of such people

are usually the ones who suffer the consequences of such disputes.

The main occupation of the people in the Ganges study area mauzas was agriculture. The decline in the fisheries of the Ganges, brought about, according to those interviewed, by the Farakka Barrage, has relegated fishing to a minor occupation in the upper reach of the river. During monsoon, when agricultural activities come to a virtual stand-still, many char dwellers take up trading in a variety of commodities, most commonly locally produced fabric.

Each of the study mauzas had been subjected to erosion, sometimes extreme erosion, in the past. These events resulted in widespread emigration from the chars. The migrants went both to other rural locations, where they either had some agricultural land or could find jobs as agricultural day laborers or sharecroppers, and more urban locations, where they worked as petty traders, rickshaw/van pullers or porters. There was evidence that erosion-affected people often went to their relatives in other places mainly as a temporary arrangement.

In the perception of local people, India's Farakka Barrage has a lot to do with the deceleration of the processes of both erosion and accretion, which in their opinion is a major reason for declining fertility of their land. The rate of sand carpeting on topsoil reportedly has been on the increase, rendering the soil infertile. The more sandy soil was also reported to have widened the gap between the time charland accretes and when it becomes agriculturally viable.

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In agriculture, there was a general tendency toward double-cropping in the study area, with the predominant crop being aus paddy. Floods often damage the aus crop, however, so farmers often end up relying more on *rabi* crops. Aman cultivation was absent due to the low water content of the soil during early part of the crop cycle and the danger of flooding during the maturing period. Very little irrigation was found in the study area. Certain parts of the study area have adopted extensive groundnut as a result of effective extension services provided to the farmers in the past. The availability of extensive grazing lands in many of the chars has made cattle raising a popular activity among many of the char people. Sales of cattle can bring sizable cash income to those who can afford to own or raise cattle.

Private ownership of boats is uncommon in the Ganges RRA area, and most people rely on commercial boats. People have less incentive to invest in private boats because fishing is generally poor and canals are unnavigable most of the year. It was also reported that during the dry season the bank line shifts far away from most settlements so that people do not easily find appropriate water bodies near their houses to submerge their boats in order to preserve them.

10.2 Suggested Priorities

Land ownership records in the study area, particularly with regard to *khas* land, were found to be lacking central control, at times resulting in confusions even about administrative boundaries between districts. Respondents perceived an urgent need for improvements in land ownership regulation. Rules pertaining to leasing of *khas* land should be reviewed and properly implemented and monitored. The current law, which converts land once eroded and later accreted to government ownership, should be reviewed as well. This law, when it is implemented, results in landlessness for many households; and it is nearly impossible to ensure its redistribution among the landless when the land is so easily controlled by those who can take it by force.

People in the Ganges charlands have received little institutional help in coping with erosion and the forced migration that often follows. It would be worthwhile to investigate the possibility of establishing temporary shelters for erosion victims and developing a plan to help them resettle, either in another rural area or in a more urban setting. Shelters could serve multiple purposes, acting as flood shelters and, in normal times, as educational institutions.

Lack of access to educational institutions is a major problem in the charlands, particularly in the island chars. The data gathered suggest that more educational institutions should be set up in the chars and that an effort should be made to keep them functional throughout the year.

While the mauzas surveyed were found to have had agricultural extension services in the past that were focused on groundnut cultivation, extension services for other crops are needed. Given the *rabi* crop potential of the area, beneficial extension services might include supplying improved inputs (seeds, fertilizers, pesticides), arranging for storage, and providing irrigation facilities. Agriculture could also benefit from a simplified and more pragmatic agricultural credit policy.

The raising of livestock was found to be a particularly important activity in the Ganges charlands, but support systems for the activity were in short supply. Improved veterinary services could reduce the loss of cattle to diseases, which increase significantly after flooding. Cattle shelters and evacuation plans could help people better cope with the difficulty of tending their animals during floods. Furthermore, relatively poor households could benefit from credit that would enable them to invest in livestock.

Health and sanitation facilities also require some institutional attention. Although tubewell coverage is generally satisfactory, the tubewells were found to be inoperative in the very dry months of February and March, when the underground water table drops, and during flooding, when the well heads are submerged. Installing high-lift hand tubewells

could mitigate this problem. Water purification measures are needed to help people deal with shortages of drinking water during the dry season, but particularly during the monsoon. Health workers, recruited and trained locally, could be effective in increasing awareness of health and sanitation issues, as well as providing basic first-aid services.

APPENDICES

APPENDIX A: Detailed Agricultural Data

Table A.1 Crop Pattern, Yield, and Price on High Elevation Agricultural Land

Mauza	Rabi*				Kharif I			
	Crop	% of Land	Yield/acre	Price/md (Tk)	Crop	% of Land	Yield/acre	Price/md (Tk)
Chakla Binodpur	Peas	40	15	500	Aus	50	15	200
	Potato	30	210	320	Jute	25	20	200
	Chili	20	150	400	Millet	25	15	100
	Radish	10	150	160				
Dikrirchar Talbaria	Wheat	25	15	175	Aus	100	15	175
	Pulses (<i>masur</i>)	40	12	450				
	Peas	35	12	450				
Naosara Sultanpur	Wheat	30	12	200	Aus	75	15	175
	Peas	30	12	450	Millet	25	10	125
	Pulses (<i>masur</i>)	40	10	475				
Char Golapnagar	Pulses (<i>masur</i>)	30	12	500	Aus	80	24	175
	Wheat	20	30	210	Jute	20	25	200
	Potato	20	240	350				
	Peas	20	18	500				
	Groundnut	10	18	550				
Diar Bahadurpur	Pulses (<i>masur</i>)	50	12	450	Aus	100	18	175
	Peas	50	12	450				
Bhabanipur	Pulses (<i>masur</i>)	40	12	500	Aus	100	15	180
	Wheat	40	15	175				
	Oil seed	20	8	450				
	(<i>tishi</i>)							

Source: Charland RRA

*Villagers called them *Chaitali* crops

Table A.2 Crop Pattern, Yield, and Price on Medium Elevation Agricultural Land

Mauza	Rabi				Kharif I			
	Crop	% of Land	Yield/acre	Price/md (Tk)	Crop	% of Land	Yield/acre	Price/md (Tk)
Chakla Binodpur	Wheat	50	30	200	Aus	100	15	200
	Pulses (<i>masur</i>)	50	21	550				
Dikruchar Talbaria	Wheat	50	18	175	Aus	100	15	175
	Pulses (<i>khesari</i>)	50	10	200				
Naosara Sultanpur	Wheat	40	15	200	Aus	90	15	175
	Peas	30	16	400				
	Mustard	20	15	450		10	10	125
	Groundnut	10	20	550				
Char Golapnagar	Wheat	40	30	220	Aus	75	24	250
	Potato	20	240	380		25	24	200
	Mustard	15	15	500				
	Pulses (<i>masur</i>)	10	15	500				
	Groundnut	10	18	550				
	Bitter Gourd	5	-	30000				
Diar Bahadurpur	Wheat	55	24	200	Aus	100	18	180
	Peas	45	10	400				
Bhabanipur	Wheat	40	24	200	Aus	60	15	180
	Pulses (<i>khesari</i>)	40	12	240		40	300	180
	Sugarcane	20	-	-				

Source: Charland RRA

Table A.3 Crop Pattern, Yield, and Price on Low Elevation Agricultural Land

Mauza	Rabi				Kharif I			
	Crop	% of Land	Yield/acre	Price/md (Tk)	Crop	% of Land	Yield/acre	Price/md (Tk)
Naosara Sultanpur	Pulses (<i>masur</i>)	75	12	450	Aus	100	16	180
	Groundnut	25	18	550				
Dikrrechar Talbaria	L. Boro	50	15	170	Aus	25	15	175
	Groundnut	30	20	550				
	Pulses (<i>khesari</i>)	20	10	240				
Chakla Binodpur	Groundnut	60	15	550	Millet	20	15	100
	L. Boro	40	21	180				
Char Golapnagar	L. Boro	40	30	175	Aus	80	20	200
	Mustard	40	15	500				
	Oil seed (<i>gujee</i>)	20	20	550				
Diar Bahadurpur	Groundnut	40	20	550	Aus	50	15	180
	Pulses (<i>masur</i>)	30	10	450				
	Peas	20	10	450				
	Oil seed (<i>tishi</i>)	10	10	450				
Bhabanipur	L. Boro	50	18	175	Aus	50	21	175

Source: Charland RRA



APPENDIX B: Access to Main Marketplaces from Surveyed Mauzas

Mauza	Market(s)	Goods Bought and Sold	Distance (km)	Mode and Cost of Transportation		
				Dry season	Cost (Tk)	Wet season Cost (Tk)
Chakla Binodpur	Bilmaria Bazar	Daily needs	3	On foot; boat	1	Engine boat 4
	Kuichamora Bazar	Daily needs	6.5	On foot; engine boat	4	Engine boat 6
	Gopalpur Bazar	Cattle	11	Rickshaw van	7	Rickshaw van 8
Diknirchar Talbaria	Talbaria Bazar	Daily needs, agri. produce	3	On foot; boat	3	*
	Mirpur Hat	Cattle	48	Boat, rickshaw van; bus	10	*
	Ranakur Hat	Daily needs	6.5	On foot; boat	1	*
	Tirmoni Bazar	Daily needs, agri. produce, wedding supplies	8	On foot; boat; rickshaw van	5	*
Naosara Sultanpur	Bilmaria Bazar	Daily needs	2.5	On foot; boat	1	Boat 2
	Chandipur Bazar	Cattle	18	Rickshaw van	11	Rickshaw van 12
	Gopalpur Bazar	Cattle	11	Rickshaw van	7	Rickshaw van 8

(Continued)

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Mauza	Market(s)	Goods Bought and Sold	Distance (km)	Mode and Cost of Transportation		
				Dry season	Cost (Tk)	Wet Season
Char Golapnagar	Dhamugdia Bazar	Daily needs	5	On foot	-	On foot; boat
	Ishwardi Bazar	Wedding supplies, clothes, agri. produce	8	On foot; boat; van	5	Boat; rickshaw van
	Aronkhola Hat	Cattle	11	On foot; boat; van	8	Boat; van
Diar Bahadurpur	Kuchamora Bazar	Daily needs, agri. produce, dried cow dung, catkin	4	On foot	-	Boat
	Lalpur Bazar	Daily needs	6.5	On foot; boat	3	Engine boat
	Shatbari Bazar	Cattle	19	On foot; boat; bus	8	Boat; bus
Bhabanipur	Buddir Hat	Daily needs	8	On foot; boat	1.50	Boat
	Kashipur Bazar	Catkin	9.5	On foot; boat	1	Boat
	Hazir Hat	Cattle, seeds, clothes	19	Horse cart	6.50	Horse cart
	Horipur Bazar	Daily needs, catkin	8	On foot; engine boat	5	Engine boat
	Charkatra Hat	Daily needs, bamboo	9.5	On foot; boat	1	Boat
	Shalikdiar Hat	Clothes, daily needs	8	On foot; boat	1	Boat

Source: Charland RRA

*Villagers were recent settlers and had not yet experienced rainy season.

