Livelihood Dynamics and Disaster Vulnerabilities of Char Land Areas

Submitted by:

Sabkat Kamal

MASTER OF URBAN AND REGIONAL PLANNING

Department of Urban and Regional Planning

Bangladesh University of Engineering and Technology

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Sabkat Kamal

Roll no: 100715004F

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Abstract

The char lands of Bangladesh have one of the highest propensities of natural disaster. Char land is settled by the poorest and the most vulnerable community. The land less marginalized displaced settle here is search of new livelihood; have to fight hazard, remoteness, poverty and poor economy. Everyday livelihood in the char is impacted by disaster events which increases their vulnerability. Livelihood, disaster and their associated vulnerability is linked to each other. In search of the cause(s) of the vulnerability and its linkages to livelihood, the study conducted in Char Manushmara at the Brahmaputra River. The char has an area of about 6.5 sq. km, with population 1861. People are migrating in this char since 1998 from nearby chars and mainland. Agricultural land use (65%) is the dominant land use of the area and population is dependent on share cropping. Rice and jute are principle crops though pulse, watermelon, chili, peanut etc are also produced. Each of the household in the char passes early built up and mature stage to form a part of settlement. Infrastructures are poor in states, in terms of construction material and location. The study found that performance of public institutes is also very poor. 80% vegetation is done under community based program. On an average household own 3.9 livestock. 7% animals are produced on tenure. Lack of seasonal variation cause people to migrate. Existing labour force work 12-14 hours during harvesting Flood and Erosion are the two major disasters faced by the population. Due to low elevation 65% land inundates in regular monsoon. In case of flood entire char went under water. Erosion is regular 2% year, in case of flood the rate of erosion triples. High rates of erosion increase the rate of land loss and displacement of population. Livelihood in the char is poor, limited and intensified by poverty and displacement. Social and physical components of char are highly dependent on river characteristics. In char, disaster and livelihood are found to be under a chain of cohesion. As the poor and marginalized people settle to this highly disaster prone char, the livelihood dynamics is greatly influenced by disaster; making them more vulnerable. Therefore, livelihood

dynamic is shaped by poverty, remoteness, poor economy and migration. All this together intensifies vulnerability in the char land. Considering the fact, they research has attempted to reveal livelihood dynamics and disaster vulnerability in char land area.

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Abbreviation and Acronyms

CBDRR-Community Based Disaster Risk reduction

CBO- Community Based Organization

CDSP-Char Development Settlement Program

CLP-Char Livelihoods Program

DFID-*Department for International Development*

IFAD-International Fund for Agricultural development

FFW- Food For Work

GO-Government

NIRAPAD-Network for Information Response And Preparedness Activities on Disaster

NGO-Non-Government

RDRS- Rangpur-Dinajpur Rural Services

SSC-Secondary School Certificate

UNISDR-United Nations International Strategy for Disaster Reduction,

UP-Union Parishad

VGD- Vulnerable Group Development

Chapter One

Background of the Study

1.0 Background

Bangladesh is recognized as one of the high risk countries recurring to natural disasters in the world (Baqee, 1998). From historical time Bangladesh has been subjected to different types of natural disasters. Catastrophic flood, droughts, cyclones, tornados, earthquake often visited this country with devastating consequence. They destroy human life properties, infrastructure and interrupt normal functioning of the society. Between, 1970-2010, 234 hazards such as cyclones, storm-surges, droughts, floods and river erosion killed an estimated half million people and affected more than 400 million people (NIRAPAD, 2010). Natural hazards visit Bangladesh in many forms, particularly floods and cyclones, are continuing to claim the lives of hundreds to thousands every other year. Flood is the most devastating disaster in terms of damage to crops and physical properties. Another disaster normally accompanies flood is riverbank erosion. On an average ten million people are affected by flood and river bank erosion every year (Haque and Hossain, 2003).

Bangladesh is a country of deltaic basin within flood plains of three great rivers. The Brahmaputra-Jamuna, the Padma and the Meghna (Sarkar, et al., 2003). All these rivers are contributing a in hydro-morphological system of Bangladesh; depositing enormous amount of silt into the Bay of Bengal. Char land[1] can be considered as by product of the hydro-morphological dynamics of the rivers (Banglapedia, 2010). Char land in Bangladesh with exceptional geographic status constitutes population of about 6.5 million, which is around 5% of the total population (Islam, et al., 2006).

The riverine areas of Bangladesh have been identified as areas; 'most liable to famine' (Currey, 1979) and as home to the poorest, most marginalized and vulnerable communities in the country (DFID, 2002). The riverbanks and char islands in river courses of Bangladesh are regularly subjected to floods, massive and rapid erosion, siltation and occasionally drought. Outsiders may view living on char lands, as a risky undertaking and hence find it difficult that anyone would settle here voluntarily.

[1]Char lands are the sandbars or new lands that emerge through the continual process of erosion and deposition in the major rivers and coastal areas or as a result of the dynamics of erosion and accretion in the rivers of Bangladesh. Once vegetated, such lands are commonly called in local Bangla language as 'Chars' (Small islands) in Bangladesh.

Increasing population pressure, unequal access to land, lack of employment opportunities and poverty force marginalized people to settle in such high-risk areas such as the active floodplains of Bangladesh. The popular assumption is that people choose to settle in hazard-prone physical and social environments only because they have no other options. Landless-displaced people move to char because they offer newly accreted land extremely fertile land for settlement and cultivation (Barton, et al., 1993). Living and working conditions on these newly emerged lands are harsh in terms of social and environmental context (Rahman,et al, 2005).

The Char dwellers are the poorest people in Bangladesh for obvious reasons. In addition to the major physical risks associated with the rivers, chars-dwellers in particular are marginalized from the benefits of mainland people for their poor communication networks (Rahman,et al, 2005). They have very limited access to public or private sector provision such as healthcare, basic services, education, banking or policing. A key dimension of the physical environment is the isolation of char dwellers from the government services, market, NGOs and from each other-which results from poor to non-existent transport and communications links within the chars. Communities are largely excluded from mainland services and do not represent a priority for mainland lased government administration. The level of awareness with respect to health, water & sanitation, environment, rights and gender is at a minimum. These multiple vulnerabilities (physical, social, economic, political.) are the under lying cause of chronic and persistent poverty on the chars (Kabir, 2006).

The Char dwellers mainly depend on agriculture and agriculture related activities. Opportunities for off farm activities are marginal. As a result of river erosion cultivable land, crops and homestead are often damaged or devoured by rivers regularly. Livelihood strategies linked to environmental change and variability (Anderson, 1995). Traditional development approaches, lack of basic services and governance representation and dependence on limited and seasonally variable resource are common scenario (Howes, 2006). Access demands highly innovative and diversified livelihood strategies but this also leads to considerable social inequity. ‘Root causes’ as unequal access to land and rural power structures lead to the ‘breakdown of rural economy and exodus of losers to chars’. In short, economic and social marginalization leads to spatial marginalization (Wisener et al, 2004). High food insecurity and low income results in the out migration

of at least one household member (usually adult male) to find employment, leaving women and children to subsist. As a result there are many women headed households in the Chars and poorer women are burdened with household, crop cultivation and income generating (often food processing) demands (Cameron and Trivedi, 1998). In addition these settlers lack secure title, only occupying land with the consent of powerful "land grabbers" who illegally control this public land. Without secure title, settlers are unwilling to invest in improving their land or houses. This further discourages the commercialisation of agriculture. As a result, newly emerged chars are a pocket of extreme poverty (Baqee, 1998).

The char land is unstable and prone to annual flooding. The char dwellers are some of the poorest and most vulnerable people (Cameron and Trivedi, 1998). Char communities suffer from seasonal flooding, erosion and the river that expected to continue widening substantially and shifting in future. Individual and household mobility is high and temporary or permanent displacement is common (Cannon, 1994). People face structuring access to productive land and their other resources are also highly vulnerable (Soussan, et al., 2000). Erosion and char go together. Erosion is largely unpredictable catastrophic livelihood shock through which household loose their land, their shelter and other assets. In a life time a char dweller experience moving to several chars for erosion, the number depends on the nature of the river adjacent to char they live (EGIS, 2000). They loose almost every physical and social asset. They loose their community bondage as once a char erodes. The dwellers move to different places and make different community. It's like replanting and starting life again almost from zero (Kohler, 2004). They need to find new shelter, new schools for their children, new arrangement for livelihood, establish new social relation. On the other hand annual cycle of monsoon and drought is regarded by char dwellers as a 'way of life' and they adopt a range of strategies which enable them to cope (within limit) with seasonal variation (Kabir, 2006).

Char areas are particularly prone to the effects of frequent climatic shocks (floods, drought and cyclones), which increase the instability of poor people's lives by wiping out their assets and pushing them deeper into poverty (Bender, 1999). Life and livelihood face acute vulnerability because of their location and socio-economic involvement (Howes, 2006). The vulnerability made people exposed to in risk in many fold. Vulnerability is complex and interdependent to each other (Davis, Wisner, et al., 2003).

People living in the char land are marginalized and landless. They are exposed to disaster and their livelihood is often enhanced by chronic levels of poverty (Anderson, 1995). Although 'vulnerability' is 'the conceptual nexus that links the relationship that people have with their environment to social forces and institutions and the cultural values that sustain or contest them' (Wisner, B, 2005). Identified as the 'entry point' for this high-profile endeavor, char communities were deemed as being 'amongst the poorest, most vulnerable, least served and chronically marginalized in Bangladesh' (DFID, 2002).

People in the char land try to adapt to the threatening situation with their limited resources and try to secure livelihood in pre-disaster times (Howes, 2006). Disasters attacking not only damages the livelihood but also made them more vulnerable to the subsequent hazard events. To understand the lives and livelihoods of the people and their vulnerability to disasters, it is necessary to explore how human needs and wants intersect with nature (CDSP, 2009). Therefore, the study attempts to reveal livelihood dynamics in char land area and disaster risk as well as vulnerability of people associated with it. It will make an attempt to explore to linkage how disaster is linked with livelihood and vulnerability of that area. It is, therefore, important to know the degree to which socioeconomic system or physical assets are either susceptible or resilient to the impact of natural hazards and environmental changes because vulnerability is determined by the interplay of a combination of several factors.

1.1 Rationale of the Study

People in the char land live in the adverse situations that oblige them to inhibit regions and places that are affected by natural hazards. Char lands develops along the river bed and the area is increasing day by day. Once created it is localized by some poor land less migrant people. People suffering from riverbank erosion, landlessness and ultra poverty force to settle in char land, in search of new life and livelihood. People fight to disaster in their day to day life. The geography of char has significant involvement in life and livelihood. This is later impacted and intensified by disaster. The study extent focuses on the livelihood dynamic options that is impacted and intensified by disaster.

Usually the resources available on char land are cultivable lands, natural vegetation, grazing land, various indigenous trees, open-water fish resources and domestic animals (Baqee, 1998). Moreover the successful uses of these resources are highly limited by the restricted mobility and the isolation which is further increased during disasters and natural

hazards. Because, all char dwellers have established livelihood strategies which enable them to survive in the chars environment but for the poorest, these strategies merely permit survival and do not enable them to accumulate sufficient assets to break the spiral of poverty (EGIS, 2000). They live at the edge in perspective of environmental and social context the way of life there in char is little different then to mainland people. The major characteristics of people are their settlement pattern, way of living, professional disturbance due to absence of principle occupation, coping strategies against the social and natural hazards, uneven mobility pattern due to river erosion. The fact is most of the people live under the threat of natural hazards and also the threat of local power elite. People settle there in case of gambling with their life and families.

The process of erosion and accretion in the world's largest river delta is the major driver of poverty in these "chars", which are lands newly emerged from the water as a result of accretion (Rahman,et.al., 2005). Rapid erosion of farmland makes many people landless, who then move to newly accreted land on emerging chars which have unfavorable conditions for agriculture and are extremely vulnerable to flood and river bank erosion (CDSP, 2009). In addition these settlers lack secure title, only occupying land with the consent of powerful "land grabbers" who --illegally control this public land. Without secure title, settlers are unwilling to invest in improving their land or houses. This further discourages the commercialization of agriculture. As a result, newly emerged chars are a pocket of extreme poverty (CDSP, 2009).These areas are highly vulnerable to sudden and forceful flooding as well as erosion and loss of land, which makes living in the chars both hazardous and insecure.

Within the field of hazard research, vulnerability studies have been central to inducing a shift in the perspective on disasters as being primarily inflicted by geophysical events to that of apprehending disasters as destructive outcomes of particular social as well as hazardous environmental condition. However, the inherent tendency within vulnerability studies to classify certain areas or people as 'vulnerable' may in some cases also serve to reinforce popular and ingrained prejudices, negative stereotypes and dubious explanations of the living conditions and fate of specific communities that become so labeled (Wisner, et al., 2003). The riverbanks and char in river courses of Bangladesh have long been portrayed as home to the 'poorest' and most vulnerable communities, the widespread assumption being that people would only live in such riverine environments because they

have no other options. People are force to settle in such hazard-prone physical and social environments. Hence, the popular assumption is that people live there only because they have no other options; that increasing population pressure, unequal access to land, lack of employment opportunities and poverty force marginalized people to settle in such high-risk areas such as the active floodplains of Bangladesh (Brammer, 1996).

Char lands are the result of enormous river action. Char land areas are developing day by day. This growth in required adequate planning to address multiple disaster and their associated vulnerability for such unique location. Numerous regional and multi-state entities are working in adjacent mainland, but for char there is no such entities are working to sustain disaster and associated vulnerability. Regional planning requires hazard management at pre-hazard planning and mitigation programs aimed at reducing vulnerability (Mileti 1999). Analyzing livelihood and their disaster vulnerability is subject to Regional planning and Management. Applying vulnerability analysis is a systematic approach to recognizing hazards that may affect demand for the services or its ability to provide those services, utilizing micro-zoning (hazard map). The risks associated with each hazard are analyzed to prioritize planning, mitigation, response and recovery activities. It provides opportunities for sustainable development and regional management. Vulnerability analysis is intended to identify critical thresholds where current and future system states may change and have fundamental effects on spatial planning. This outline strategic vulnerability analysis is a first step in illustrating how spatial planners should address the big picture. Provision of regional guidelines can be observed prior to, during, and following large-scale disasters. Technology transfer, including socioeconomic efficiency and vulnerability evaluation will enhance. It will be possible to address networking and dissemination to the planning authorities and those involved in disaster management. Char land and their vulnerability tools must be incorporated into regional development planning and implementation, as regional conditions vary under their respective socioeconomic conditions and hazard-related circumstances.

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In Char lands disaster is not a single, discrete event. In char lands people living there often suffer repeated, multiple, mutually reinforcing and some times simultaneous disasters to their families, settlements and to their livelihood. Thus repeated disaster erodes whatever attempts have been made to accumulate resources and savings. River bank erosion, regular flood make char land vulnerable. Restricted mobility, remoteness, regular land loss, limited livelihood options also intensifies unsafe condition. Limited livelihood options, frequent hazard event, migration intensified by some social facts. Livelihood, vulnerability associated with disaster is an interrelated event. The study undertaken at upper reach of Brahmaputra, to reveal the underlying relationship between livelihood, subsequent disaster event and their vulnerability is an important subject matter to be explored.

1.3 Objective

Char lands are location of some of the most marginalized people. Limited livelihood options make life harder many folds. Thus, vulnerable lands less people force to live in vulnerable locations creating most vulnerable community in Bangladesh. Considering livelihood and vulnerability in char land is interrelated, the following objectives have been taken;

1. To identify livelihood dynamics of people living in char land area.
2. To analyze the vulnerability of people living in char land.
3. To explore linkage between livelihood and disaster risk in char land area.

1.4 Scope and Limitation

Char land is a unique creation of geography. Once a piece of land is raised; land less, river eroded and marginalized people migrate to newly accreted land in search of livelihood, knowing the factor that life in the char is harsh and uncertain. Char land offer newly accreted land but the livelihood options are extremely limited and impacted by seasonality. Migration, remoteness, isolation from main land force people to choose livelihood vibrant but extremely limited. Agriculture is the prime source of livelihood. People in the char land are landless labour force; migrate to large cities for job. Limited agricultural options, isolation, prolonged monsoon and hazard events creates individuality in terms of their life and livelihood. Entire livelihood and its options are affected and impacted by frequent hazard events. Because of location factor, a moderate hazard event can prove to be severe. Regular erosion and annual flood destroys agricultural activity, the only livelihood option for them. Inconsistency in agriculture intensifies risk factors pushing them deeper into poverty. Landless people migrate here in search of life, because they offer considerable amount of cultivable land. Life is dependent on the mercy of river and subsequent hazard events. People migrate to cities for seasonal employment. Limited resource, hazard event, frequent migration and poverty represent individual but interrelated aspects. They are deeply rooted to some factors that stylize their vulnerability cohesion. It will be an opportunity to link vulnerability with livelihood through identifying livelihood options, hazard event and their root causes raising vulnerability.

Char land has many unresolved issues needed to be prioritized. But for the scope of the study, it limits to predetermined livelihood issues *i.e* education, migration and institutional accessibility. Apart from that livelihood options major social and land related issues were overlooked. Flood and erosion are focused overlooking other hazard events.

Also, detailed causes and consequences were overlooked. Distance from mainland and inadequate time also limits the scope of the work and availability of information. The study undertaken selected those variables and parameters that prove to have significant linkage to livelihood and vulnerability. It has discarded that information that may not necessary to establish the linkage.

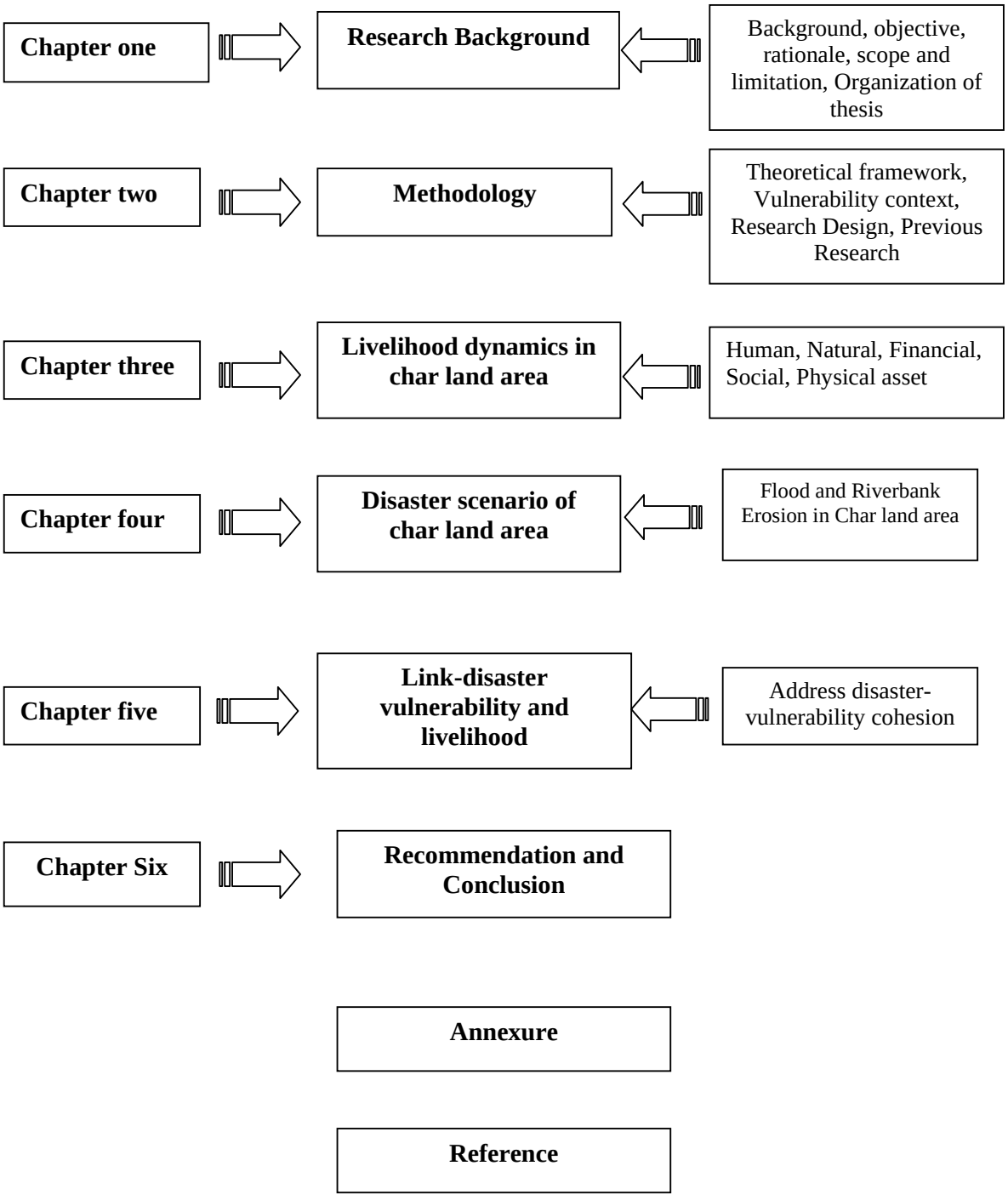
1.5 Organization of the thesis

The research study "Livelihood Dynamic and Disaster Vulnerability of Char land Areas"- is oriented to recognize livelihood options in char land area and associated disaster vulnerability linked with it. The research included livelihood assets (human, natural, financial, social and physical capital) that are closely associated with disaster and disaster risk in char land area. Later the research attempts to bridge the livelihood assets and disaster vulnerability of the char land area to clarify priority issues to explain relationship. These are the issues covered in this thesis study.The research is organized in six chapters. Figure 1.1 states the organization and relationship of each chapter. Each chapter begins with an abstract to give an overview of the respected chapter.

The first chapter provides the background of the research. It also includes objective, rationale, scope and limitation of the research. Second chapter provides the methodology employed in the research. This chapter implies theoretical framework sustainable livelihood model, access model, vulnerability context, Venn diagram, previous research and research design. Third chapter elaborates livelihood options where they discuss human capital, natural capital, financial capital, social capital and physical capital also the activities and capabilities of the char land area. Labor capacity, literacy rate, wage, land status, water source, wage, credit, relationship status with GO, NGO relatives and changes associated with it. Income generating activities, indigenous technology etc. discussed. All the variables indicate and help to create a scenario of char land. Fourth chapter discusses disaster (flood and erosion) in detail. It includes seasonal calendar, scenario of the char land. In this chapter intensity, frequency and damage features are depicted. Chapter five, attempts to sort the disaster and livelihood dynamic and apply it with "Access model" to link both perspectives, it will further help to explore cause-effect relationship that intensify progression of vulnerability. Finally, chapter six concluded the research by summarizing research findings of the livelihood dynamics and disaster vulnerability of the char land area.

Total thesis represented in six major chapters, apart from that annexure and reference has been included to support study.

Figure 1.1 Organization of the thesis



Chapter Two

Methodology and Research Design

2.0 Introduction

The research has taken a comprehensive approach to address the livelihood dynamics and disaster vulnerability of char. It seeks to utilize all possible alternatives to gather information to address livelihood dynamics and disaster risk in char land area. Char Manushmara at the river Brahmaputra is selected for study. Both primary and secondary data were used to collect information. In case of primary data, information was collected from char land dwellers about their livelihood and disaster risks. Local institution's and organization's information was also collected along with intensive review from available study reports, policy papers, articles, to find out the gaps and further challenges that need to be addressed. "Sustainable Livelihood Framework" and "Access Model" was used to address the linkage between livelihood dynamics and disaster risk at appropriate level.

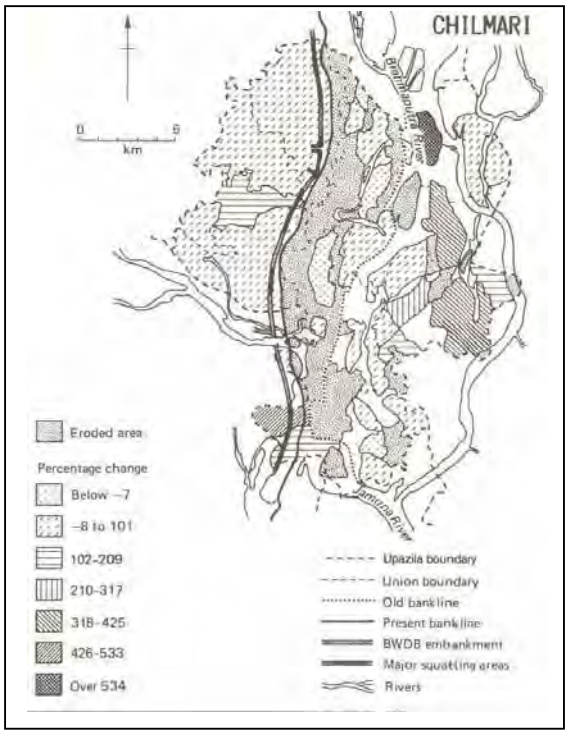
2.1 Char Dynamics

Char Classification

Riverine chars are two different kinds of chars; island char and attached char. Island chars are defined as land that can be reached from the mainland only by crossing a main channel, even in dry season. Attached chars are accessible from the mainland without crossing a main channel during the dry season (EGIS, 2000).

Dynamics of char

Char dynamics relates to the erosion process, formation, cultivation and settlement process. Those are;



Erosion

Bank erosion process in the river is an important aspect associated with char. Erosion in the char varies with meandering and braided river. In meandering river accretion occurs at inner bends and in braided river *e.g.* Brahmaputra erosion occurs simultaneously at both banks.

Figure 2.1: Erosion and Accretion Dynamics of Char

Formation

Char formation is the next dynamics. It varies with lengthwise direction. Chars in the upstream carries coarser materials compared to those downstream. Water level surrounding char depend on annual water level variation. When the char emerges, it consists of sand of some coarseness as the bed material of the river reach. However, at the lee side of a material or a point bar fine materials would deposit. When char elevation reaches average flood levels a layer of silt and clay is deposited over the sand layer, facilitating the development of vegetated land.

Cultivation and settlement

Car land offer opportunities of settlement as well as agricultural activities. In upper reach of the Jamuna, newly accreted land is sandy and less suitable for agricultural activities. Char development and settlement is constrained by the instability of chars and flood hazards.

Livelihood and char

Livelihood is a "means to a living' which merely indicates the way of living or income earning, not just the net result in terms of income received or consumption attained (Chambers and Conway, 1992). Char land offer agriculture, livestock rearing and fishing as major livelihood options. Livelihood is limited, seasonal and prone to hazard events.

Displacement

Erosion along the river beds cause displacement of population and settle in the char land. Despite of the harsh environment they settle in newly emerged land to continue livelihood.

Land ownership

Land in char is an important issue in the formation of social and cultural identity and in the organization of life. It is also an enormous political resource, defining power relations between and among individuals, families and communities. Leasing is one of the means through which many landless and semi-landless poor either access land for cultivation. Land administration and management system is a complicated one since land ownership in char is claimed by many. This is mainly because of difficult, confusing, time consuming legal procedures, inadequate financial support and non availability of land record. Often land records and the existing land information system are very traditional

and inadequate, which makes it difficult to identify the land owners and their land ownership.

2.2 Theoretical Framework

For successful completion of the project theoretical framework is needed. For the research design theoretical framework help in clarifying research quires. The research used 'Sustainable Livelihood Framework' and access model to determine the livelihood dynamics and disaster vulnerabilities of char people. The following section provides a description of the two models.

2.2.1 The Sustainable Livelihoods Approach

The Sustainable livelihood approach was developed by Chambers and Conway in 1992 (Figure 2.1). They stated that, "A livelihood comprises the capabilities, assets (including both materials and social resources) and activities required for a means of life. A livelihood is sustainable when it can cope with and recover from stress and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base." The sustainable livelihoods approach improves understanding of the livelihoods of the poor. It organizes the factors that constrain or enhance livelihood opportunities, and shows how they relate. It can help plan development activities and assess the contribution that existing activities have made to sustaining livelihoods. It helps formulate development activities that are; People-centered, Responsive and participatory, Multilevel, Conducted in partnership with the public and private sectors, Dynamic, Sustainable.

The sustainable livelihoods approach facilitates the identification of practical priorities for actions that are based on the views and interests of those concerned but they are not a panacea. It does not replace other tools, such as participatory development, sector-wide approaches, or integrated rural development. However, it makes the connection between people and the overall enabling environment that influences the outcomes of livelihood strategies. It brings attention to bear on the inherent potential of people in terms of their skills, social networks, and access to physical and financial resources, and ability to influence core institutions. Appreciative inquiry—originally developed as a tool for industry to avoid negative approaches to problem solving—extends this constructive outlook. It is a highly inclusive process that maximizes the positive (as opposed to minimizing the negative) in which a community takes responsibility for generating and

gathering information and then forms strategies based on the most positive experiences of the past. Figure 2.1 presents the sustainable livelihood framework.

Capital Assets

The sustainable livelihoods framework helps to organize the factors that constrain or enhance livelihood opportunities and shows how they relate to one another. A central notion is that different households have different access livelihood assets, which the sustainable livelihood approach aims to expand. The livelihood assets, which the poor must often make trade-offs and choices about, comprise:

• **Human capital,** e.g., health, nutrition, education, knowledge and skills, capacity to work, capacity to adapt

• **Social capital,** e.g., networks and connections (patronage, neighborhoods, and kinship), relations of trust and mutual understanding and support, formal and informal groups, shared values and behaviors, common rules and sanctions, collective representation, mechanisms for participation in decision-making, leadership

• **Natural capital,** e.g., land and produce, water and aquatic resources, trees and forest products, wildlife, wild foods and fibers, biodiversity, environmental service.

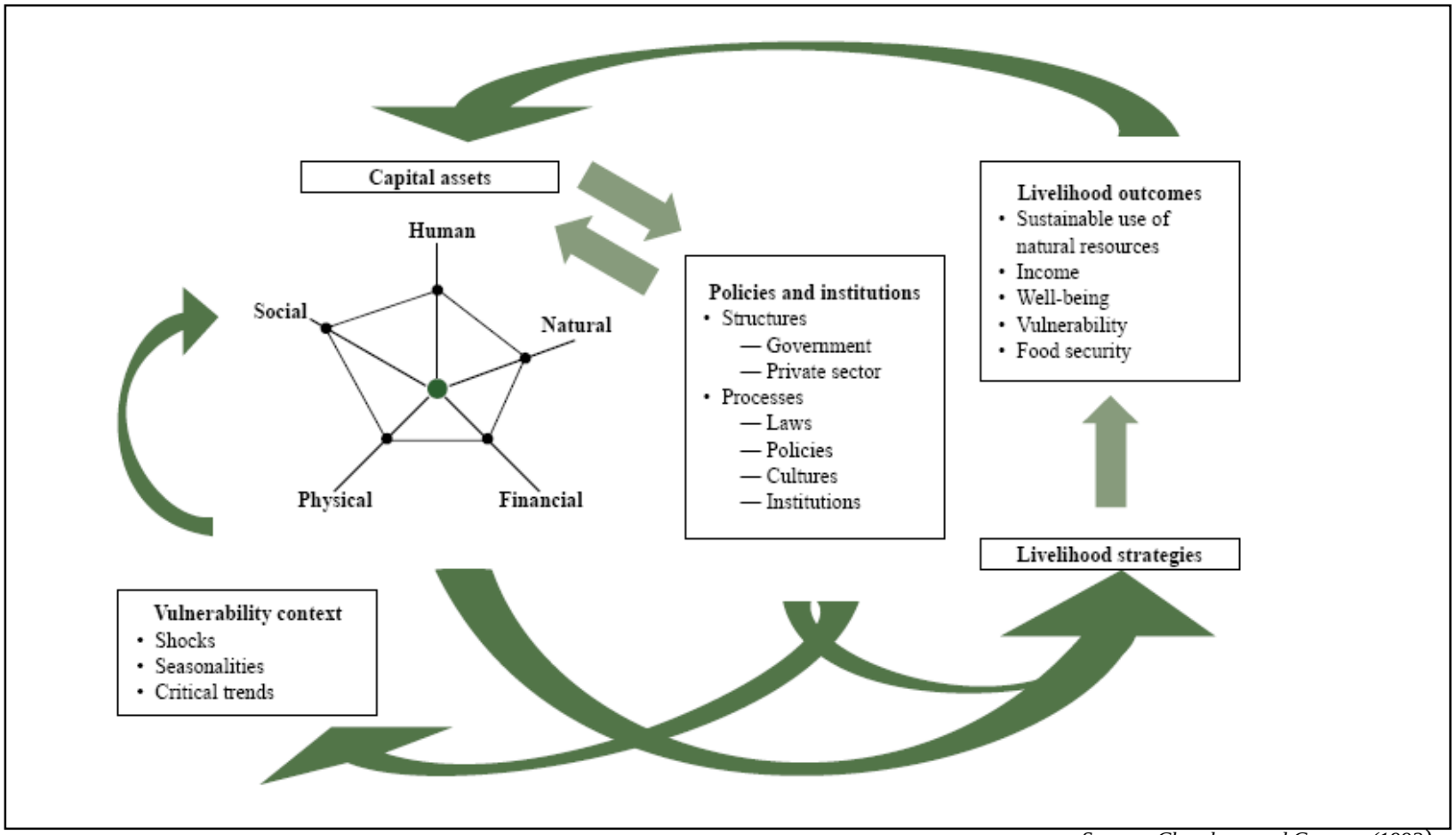
• **Physical capital,** e.g., infrastructure (transport, roads, vehicles, secure shelter and buildings, water supply and sanitation, energy, communications), tools and technology (tools and equipment for production, seed, fertilizer, pesticides, traditional technology)

• **Financial capital,** e.g., savings, credit and debt (formal, informal), remittances, pensions, wages.

The sustainable livelihoods approach frees development practitioners from conventional approaches that are often restricted to identifying problems and finding solutions. It invites them to look at contexts and relationships so that development activities can become more process-oriented. It compels them to look for multiple entry points and to move beyond a homogenous “community” view and a narrow sectoral perspective. In particular, the sustainable livelihoods approach stresses the importance of understanding institutions by mapping the institutional framework and linking the micro to the macro and the formal to the informal. Therefore, it calls for a new style of policy appraisal that moves from universal prescriptions to context-specific approaches that allow alternative, local perspectives to reveal themselves in the policy framework. Chambers and Conway (1992) claim that, sustainable livelihoods approach is only one way of organizing the

complex issues that surround poverty. It must also be made appropriate to local circumstances and local priorities.

Figure 2.2: The Sustainable Livelihoods Framework



Source: Chambers and Conway (1992)

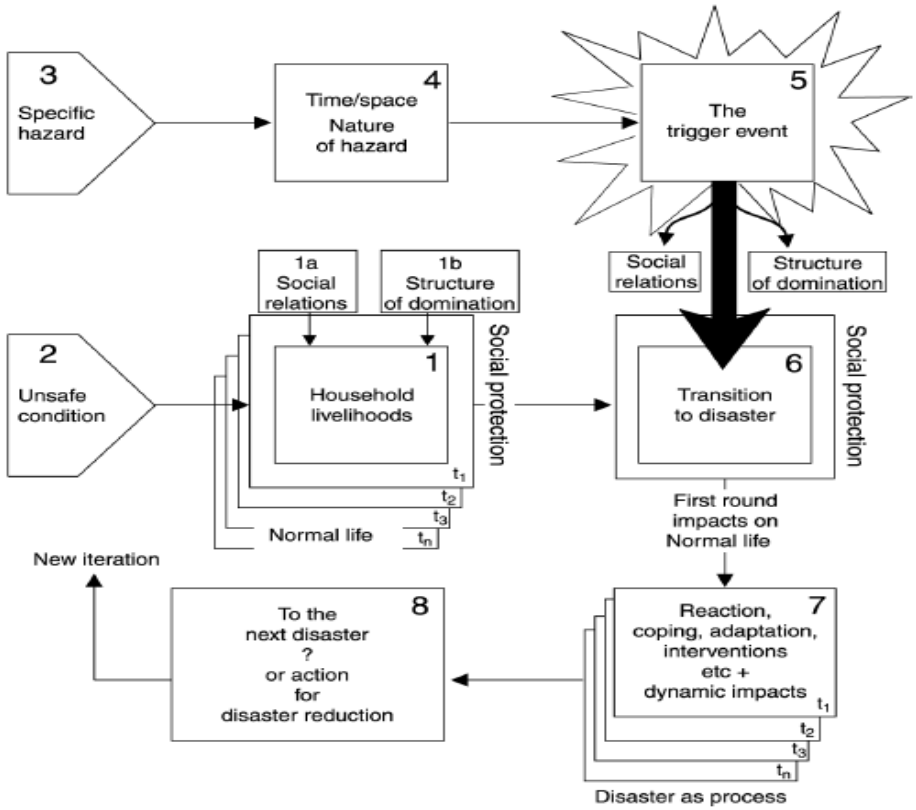
2.2.2 Access Model

Access model, deals with the amount of 'access' people have to the capabilities, assets and livelihood opportunities that will enable them (or not) to reduce their vulnerability and avoid disaster. Access model is designed to understand varied sets of social and environmental events and longer-term process that may be associated with disaster. Most of the literature designates disaster relate to natural event trigger and is specific to famine, flood, cyclones and so on. On the other hand there are generally shared characteristics in the way that vulnerability is generated. It is essentially dynamic and repeats through time to provide a precise understanding of how people are impacted by hazard event and their trajectories through that event. It sets out to explain at a micro-level the establishment and trajectory of vulnerability and its variation between individuals and households. Access model picks up the state of 'normal life' and explain how people earn a livelihood with differential access to material, social and political resources. This focuses on the way unsafe condition arise in relation to the livelihood process. Figure 2.2 is the Access model, that expresses the linkage and repeat affects resulting vulnerability form disaster.

Each of these boxes representing a set of closely related ideas, an event or distinct process. Households earn their livelihoods in normal times (Box 1), and are subject to unsafe conditions (Box 2) and the political economy in which they all live is also shaped by social relations and structures of domination (Boxes 1a and 1b). The trigger event occurs and impacts upon social relations and structures of domination and upon households themselves (Box 6). The heavy black arrow is depicted as bursting through an outer layer, called 'social protection', and as impacting on different households in a process termed 'transition to disaster' (Box 6). Subsequent iterations of unfolding impacts and human responses occur through time (Box 7). Box 8 asks the question 'To the next disaster?', and indicates altered conditions of vulnerability, social protection and actions for preventing future disasters.

Each individual has an initial 'state of well-being', primarily defined by physical abilities to withstand shocks, prolonged periods of stress and deprivation specific to the particular disaster being addressed. At later stages in the disaster process, well-being will be affected and is likely to be shifted negatively from the initial conditions. (Davis, Wisner, et, al., 2003).

Figure 2.3: Access Model



Arrows provide linkage and also repeat affects that can shape causes.

Source: Davis, Wisner, et al., (2003)

The model synthesizes the process of earning a living as a set of decisions made at the household level, individual decisions are always made in a political-economic environment, and this is indicated by two boxes (1a and 1b) labeled 'social relations' and 'structures of domination'.

1. **Life in normal times** is characterized by repeated decisions about how to obtain a livelihood, decisions which are made every season in an agricultural setting (for example, a cropping strategy, investment in new inputs or agricultural equipment). The iterative character of a livelihood is suggested by repeated cycles of livelihood decisions, arranged in the diagram labeled 't1', 't2', indicating subsequent iterations of decision making year by year.
2. **'Social protection'** symbolizes the presence (or absence) of hazard precautions and preparedness that is provided by the state and local collective action. It is the local expression of the more generalized 'unsafe (or safe) conditions'. This links the broader scale of disaster causes to the microcosm of normal life. The social protection at household level are varied in scope and may include flood protection embankments, concrete storm shelters, enforcement of building regulations as well as community coping mechanisms, self-help and communal charity. This can be defined spatially (for example, an area threatened by a specific and severe natural hazard, a particular village or a quarter in a city), or defined by ethnic group, class or other characteristic which may render the chosen group of households more vulnerable.
3. **Structures of domination** (Figure 1, Box 1b), and refers to the politics of relations between people at different levels. These include relations within the household, between men and women, children and adults, seniors and juniors. These relations shape, and are shaped by, existing rights, obligations and expectations that exist within the household and which affect the allocation of work and rewards (particularly crucial in terms of shock and stress). The structures of domination also include the wider family and kinship ties of reciprocity and obligation at a more extended (and usually less intensive) level, and those between classes that are defined economically (such as employer and worker, patron and client) and between members of different ethnic groups.
4. The **specific hazard(s).** The time and place characteristics of the hazard (where, how often, when) are examined in more detail and illustrated in Box 4, labeled 'nature of the hazard'. The scene is now set for the disaster process to start, following the hazard strike (stylized as 'the trigger event', in Box 5).

5. It must be noted here that some disasters occur without a clear-cut, single, natural hazard trigger, nor perhaps with an identifiable event in the political economy. Instead, there are multiple contributing events which together constitute a 'complex emergency', which then unfolds in all its intractable complexity over a long period of time.
6. The example to be used here involves a disaster that is **triggered** by a definite hazard event. It is a composite event, but not an unusual one, involving high winds, coastal storms, intense rainfall, landslides, flooding of rural areas.
7. This event now **attacks 'normal life'** and the first round of impacts are shown in Box 6. Some of the immediate consequences are facilitated or bounced by the safety measures in place, while other impacts penetrate these safety measures (depicted by the 'impact arrow' striking through the outer protective barrier) and fall upon different households with varying degrees of severity.
8. Within the miniature of households, adaptations, coping strategies and access to safety become urgent as a potential disaster starts to overtake what is no longer 'normal life'. This is the transition from normal life in Box 1 to transitions from the first round of impacts in Box 6, labeled 'transition to disaster'.
9. Then, in subsequent repetitions, the disaster unfolds in a series of 'time sheets' labeled 'disaster as process' in Box 7. The process of recovery, and return to normal life (or, in some cases, to a more vulnerable life, waiting, as it were, for the next disaster) is suggested in Box 8.

'Access' model focuses on the way unsafe conditions arise in relation to the economic and political processes that allocate assets, income and other resources in a society. But it also allows us to integrate nature in the explanation of hazard impacts, because we can include nature itself, including its 'extremes' (as they are experienced by people with different characteristics, in the workings of social processes and social change). In short, we can show how social systems create the conditions in which hazards have a differential impact on various societies and different groups within society. Nature itself constitutes a part of the resources that are allocated by social processes, and under these conditions people become more or less vulnerable to hazard impacts

Access to resources varies between households and the significance this has for potential loss and rate of recovery. Those with better access to information, cash, rights to the means of production, tools and equipment, and the social networks to mobilize resources from outside the household, are less vulnerable to hazards, and may be in a position to avoid

disaster. Their losses are frequently greater in absolute terms, since they may have more to lose in terms of monetary value, but they are generally able to recover more quickly. After a famine poor and disadvantaged households can recover but may compromise their resilience to the next famine (Sen, 2003).

Those variations in level of vulnerability to hazards are central in differentiating the severity of impact of a disaster on different groups of people. In general, rich people almost never starve. Some avoid hazards completely and many recover more quickly from events that are disastrous for others. However, a major explanatory factor in the creation (and distribution of impacts) of disasters is the pattern of wealth and power, because these act as major determinants of the level of vulnerability across a range of people. We therefore need to understand how this distribution is structured in normal life before a disaster, explaining in detail the differential progression of vulnerability through the triggers of natural and other events into disasters.

The idea of 'access' (to resources of all kinds, material, social and political) is central to this task. Access involves the ability of an individual, family, group, class or community to use resources which are directly required to secure a livelihood in normal, pre-disaster times, and their ability to adapt to new and threatening situations. Access to such resources is always based on social and economic relations, including the social relations of production, gender, ethnicity, status and age, meaning that rights and obligations are not distributed equally among all people. Therefore, it is essential that assets and the patterns of access to them remain central to this project and do not become detached from the underlying political economy which shapes them.

Each individual has an initial 'state of well-being', primarily defined by physical abilities to withstand shocks, prolonged periods of stress and deprivation specific to the particular disaster being addressed. At later stages in the disaster process, well-being will be affected and is likely to be shifted negatively from the initial conditions, as subsequent discussion will show. Each individual in a household has a collective claim which may be termed as access to resources.

2.3 Vulnerability

Vulnerability is characterized as insecurity in the well-being of individuals, households, and communities in the face of changes in their external environment. People move in and out of poverty and the concept of vulnerability captures the processes of change better than poverty line measurements. Vulnerability has two facets: an external side of shocks, seasonality, and

critical trends; and an internal side of defenselessness caused by lack of ability and means to cope with these. The vulnerability context includes, shocks, e.g., conflict, illnesses, floods, storms, droughts, pests, diseases, seasonality, e.g., prices, and employment opportunities, critical trends, e.g., demographic, environmental, economic, governance, and technological trends (UNISDR, 2009)

2.4 Previous Research

Char lands are unique creation of nature. But they are reluctant and deprived of facilities they require. Considering the fact CDSP (Char Development and settlement Project) and CLP (Char Livelihoods Program) has undertaken research initiatives regarding char land.

Char Development Settlement Project is an initiative undertaken southern Bangladesh found, "Char lands in Bangladesh populate almost 5 million people. Most of them are severely land less. Chars in a sense are home of some extreme poor As well as being poor, char communities face multiple vulnerabilities including cyclones and storm surges, floods and drainage congestion, droughts and salinity intrusion, erosion and deteriorating ecosystems. Apart from these physical risks, these chars are largely out of reach of the state and this, combined with the illegal nature of land occupation, results in a high degree of lawlessness and consequent risk of loss and physical harm for char settlers.

A number of factors, that stem from living on newly accreted and low lying chars, specifically impact on the lives of women. Life for women is harsh. Lack of fresh water and fuel, and need to frequently repair homesteads damaged by tidal floods, and absence of men (most migrate to look for work elsewhere), mean women face a life of unremitting hard work. Unproductive agriculture and the low level of economic activity means there is little wage employment women. Education opportunities are minimal (there are no government schools). Lack of secure land tenure, lack of independent income and voice, widespread polygamy, and absence of male family members, mean women suffer from high levels of violence, both within and outside the home. Teenage girls are at particular risk so families arrange for them to be married as soon as they reach puberty. This early marriage, lack of family planning services (health service providers are absent), and traditional attitudes, mean women have significantly larger families than is now the norm in Bangladesh – so placing a further burden on women. Larger families are also an indicator of insecurity – when people have some confidence in the future they will choose to have smaller families. By selecting these newly emerged chars, the project has been able to reach a particularly poor and

disadvantaged population. The vast majority (over 90%) of the population fall in IFAD's target group in terms of poverty levels (below the poverty line) or land ownership (landless, small and marginal farmers).

Char Livelihood Programme-CLP is a successful progamme addressing char land and livelihood issues. The programme stated that, **"**CLP's interventions are primarily on island chars as these islands contain the bulk of the poorest char dwellers. The programme area is located in the Jamuna chars, in the districts of Kurigram, Gaibandha, Jamalpur, Sirajganj and Bogra. CLP establish to develop a perspective on the additional costs of living on the chars and of displacements due to flooding and erosion. It has been found that the districts of riverine chars are amongst the poorest in Bangladesh. Chars areas are characterized by a set of specific features that set them apart from other parts of Bangladesh and that justify different approach. In physical terms, chars are nearly accreted from the river/sea and are consequently low lying .This makes char dwellers vulnerable to flood and erosions. The soils are relatively high salinity with relatively low contents of organic materials, which causes low fertility compared to mainland. Individual and household mobility is high and displacement is common in char areas. A fragile physical environment, limited assets, reduced income opportunities, remoteness and absence of mainland institutions and services together make char dwellers' livelihoods particularly vulnerable to extreme poverty and destitutions. There fore, CLP focused that people are better able to respond to local needs and demands, will deliver improved services and infrastructure through public/private partnership at both local and chars-wide level, improving agriculture production through support to poor and vulnerable households, and development of business development services and financial services for the poor. CLP highlights infrastructure development, livelihood support and social development.

Disaster is cross cutting issue and char lands are severely vulnerable to disasters in manifold. Since livelihood is concerned with people it is by default vulnerable to disaster. But the study liking disaster, livelihood and vulnerability is scare. There fore, in the literature review few disaster and livelihood related studied are discussed.

Bayes and Hossain, (2009), claims, Livelihood is option which is always under transformation, which creates gaps in developing livelihood strategies. This impacts income and poverty of rural households. It is important to link farm and non farm activities all together. It should include rural market, institutions and infrastructure that influence rural

income as well as external factors those changes in livelihood and income. The purpose is to understand the interactions and interfaces those affect rural livelihood.

Davis, Wisner, et al., (2003), reveals what makes people vulnerable. Often this requires linkage between poverty and vulnerability. But it is important to take account of different social groups that suffer more in extreme events. Vulnerability is also increased by global environmental change and economic globalization which often creates new risks. Analytical models are often important to understand the vulnerability. Pressure and Release a model and Access model helps to link remote and distant root causes to unsafe condition and also uses the concepts of access and livelihood to understand why some households are more vulnerable than others.

Lein, Haakon (2009), stated that, within the field of hazard research, vulnerability studies have been central to inducing a shift in the perspective on disasters as being primarily inflicted by geophysical events to that of apprehending disasters as destructive outcomes of particular social as well as hazardous environmental conditions. However, the inherent tendency within vulnerability studies to classify certain areas or people as 'vulnerable' may in some cases also serve to reinforce popular and/or ingrained prejudices, negative stereotypes and dubious explanations of the living conditions and fate of specific communities that become so labeled. The riverbanks and islands in river courses of Bangladesh have long been portrayed as home to the 'poorest' and most vulnerable communities, the widespread assumption being that people would only live in such riverine environments because they have no other options. Drawing on an examination of existing literature on *char* settlements in Bangladesh and data from a field site in the Jamuna River, this paper argues that the prevailing perceptions and labeling of *char* dwellers as 'vulnerable' people is based on a far too simplistic understanding of both rural migration patterns and the livelihoods obtained in these riverine areas".

Rabbi and Islam (2008) expressed that, Bangladesh is characterized by precious ecological and socio economic conditions that result in high vulnerability levels to many natural hazards, both in urban and rural areas. Due to socio-economic factors, a group of people is forced to live in more vulnerable and hazard prone areas, i.e char lands. Disaster impacted these peoples more to their livelihood. Environment cause prolonged impact on their livelihood mostly on income. After SIDR livelihood pattern in term of income has

remarkably changed. Lives in main lands were hard to restore. In char and remote places it was beyond description even after months gone".

Laws on char land tenure

According to existing **Bangladeshi laws**, submerged land re-emerging from the river after 30 years automatically becomes government land (*khas*) which is supposed to be redistributed to landless and marginal farmers. Before 1994 there was no such 30-year limit and all re-emerging land previously lost by diluvium became *khas* land. According to law, this led to an underreporting of both submerged and *khas* lands. It seems that powerful local elites often are able to gain control over *khas* land through force and bribery, as well as through various arrangements enlisting dependent poor households in the settling process (Baqee, 1998).

All aspects regarding char, livelihood and vulnerability is discussed in the literatures discussed above. But the linkage and the profound relationship is never discussed intact way. For this reason the study is an attempt to discuss all the issues together to address the root to their vulnerability.

2.5 Research Design

2.5.1 Selection of the study area

To assess livelihood dynamics and disaster vulnerability of the char land, it is important to select area where livelihood is regular and dynamics can be penetrated as well. Also, the char land area has a prominent disaster feature and vulnerability can be assessed through data survey. Poverty and its physiographic feature is a prominent factor in the char land. Livelihood is strictly controlled by remoteness, hazards. For this reason, livelihood dynamics in char land is limited and uncertain. Immense natural disaster causes livelihood pattern to change remarkably. Char population are migrants. Livelihood controlled by the disasters impacting the char almost entire year. There is threat of eviction from land since the land ownership is controversial issue. Char land contain as huge number of poor population deprived of different basic needs that make the difference in their living environment and they are living in a vulnerable condition. Livelihood dynamics and associated vulnerability in char are the criteria for selecting area for collecting data for above mentioned reason. Char Manushmara of Chilmari Upazila were selected. Char Manushmara is on river Brahmaputra. In terms of livelihood status, migration pattern, disaster seasonality char Manushmara offer

all the criteria require identifying livelihood dynamics and disaster vulnerability and these facts are taken into consideration for selection of the study area.

2.5.2 Data collection

Both primary and secondary information was collected to conduct the study. The empirical data presented here were collected from the char.

Primary data collection

Selection of the study area, rationale of the study and objective were the indicators showing all required information to be collected from primary data source. Primary data collection engaged Focus Group Discussion, PRA tools (Seasonal Mapping, Mobility chart, Venn Diagram etc). Life History and Questionnaire survey were conducted as per need. The target population from the selected study area was sampled using judgment sampling method.

Focus Group Discussion (FGD)

FGD assembled qualitative information, respectively with elderly and young men, young and elderly women, and men farmers. The themes discussed varied between the groups, but generally covered issues linked to livelihood, actions taken in pre-during-post disaster situation, relationship status with main land kin and powerful char land owner, their action taken in case of severe disasters and erosion were selected for Focused group discussion. Both male and female participation were ensured in 6 FGD's.

Participatory Rural Appraisal (PRA)

Participatory Rural Appraisal techniques were applied, including preparing a sketch map of the area outlining a generalized crop calendar, and establishing a timeline of important events, seasonal calendar, wealth chart, disaster vulnerability. It helped to collect information about wealth in a village, social cohesion and associated vulnerability. PRA is also conducted to reveal progression of vulnerability.

Life History

Life history applied in this study. People especially senior settlers have traveled many chars before settling here. Their life history answered the question, how disaster, livelihood is linked to char land.

Secondary data collection

The synthesis was the disaster risk and livelihood dynamics. It gave a brief description of what is already known in terms of studies done in the area. It also indicated how existing work may contribute to the proposed research, and vice versa, how the proposed research moves beyond existing information. Literature reviews were categorized in following issues: Livelihood dynamics, Char land areas in Bangladesh, Livelihood theory, Access theory, Risk and threats of Char land areas. Data collected will be coordinated in following phases.

Archival Literature

During the first phase, data was gathered through archival literature, that helped explore about the existing status of char land area in Bangladesh, livelihood options practiced in this area, and the disaster risks faced in that area. The desk literature review helped to prepare guideline for data collection.

Key Informants Interview

The second phase involves the identification of key informants; upon them the data collection guideline was applied. Respondent was people living in char land areas. First and second generation people were interviewed. First generation or senior citizens revealed the social, physical and geographical changes and second generation were interviewed to reveal the changes the relationship status with their mainland relatives. New migrants were interviewed for the study. New migrants expressed causes and consequences and facts of their migration. In the study new migrated people (people living in char below 5 years). Their causes of migration helped assess vulnerability. Respondent from Governmental and NGOs will also be chosen for collection of information.

Data Collection from Existing Organization

During the third phase, methods were used to gather information from local community concerning livelihood and disaster. Information was collected from concerned organizations RDRS and Union Parishad to receive disaster and hazard specific information concerning damage, loss and impact.

2.6 Analysis

Analysis of the thesis was based on Sustainable Livelihood Approach (SLA) and Access Model. Data variables selected to identify livelihood dynamics was based on SLA (Asset, Activities and Capabilities). Data were then collected from pre designed questionnaire, prepared on the basis of SLA. Data collected then were analyzed using MS-excel and SPSS.

Access model used to analyze cause-effect relationship that exists between livelihood and hazard event of the char land. Access model helped establish the relationship as well as the root causes of vulnerability associated with livelihood.

2.7 Preparation of report

The collected quantitative and qualitative data was processed and analyzed by using appropriate statistical packages to make it presentable in the report. The collected data was categorized, grouped and interpreted aiming at objectives of the study. Different statistical tools like pie-chart, bar diagram, correlation, mean etc. was used for study. All the data were interpreted and analyzed to illustrate field oriented information that was needed to get the exact picture of livelihood condition and disaster vulnerability of char land area. The report was prepared following logical sequence. It was completed with a result of responses of study asking, findings, drawbacks, recommendations, lessons learnt, and indigenous technical knowledge.

Chapter Three

Livelihood Dynamics of Char Manushmara

3.0 Introduction

Chars are subject to active fluvial action in all seasons. The rivers not only erode land, causing settlements to be constantly on the move, but they also throw up new, virgin lands through accretion for newer settlements and agricultural activity. These *char* are inhabited by some of the most desperate people in the country. There is a relentless, perpetual struggle on shifting sands with the elements of nature. Living in these far-flung fragile environments means abidance in the midst of natural hazards -- some sort of co-existence with a hostile environment. And the poor peasants living, from generation to generation, have coped with its fallout.

3.1 Study Area Profile

Location

Manushmara is located on north-east of Rowmari and south-west of Chilmari Upazila (Map3.1) under Kurigram District. To its north Nayarhat, to the south west is Chilmari, to the south Capasia and Mohanganj, to the east char Kodalkati and Jadur char. Time distance from Rowmari is 2.5 hours under favorable condition using river Brahmaputra. The settlement is under Chilmari Upazila and Astomirchar union. It has three wards, West

Kalikapur (Ward no 01), Mudafat Kalikapur (Ward no 02) and Adarsha gram (Ward no 03) (Astomirchar *Union Parishad, 2009).*

Geography

The geography of char Manushmara is vibrant and undulated. The area is surrounded by River Brahmaputra. Soil is sediment coarse sand and medium high porosity. The soil of this char is sandy and coarse and texture appears to be bends and point bars formed through secondary currents. Land elevation is; in the central part 7.5-5.0 feet, slope (next to central part) and river bank is <5.0-3.0 feet and <2.5-0 feet respectively (RDRS, 2009).

Char area

Due to active fluvial action of river Brahmaputra in upper stream land in Char Manushmara is inconsistent. Erosion and accretion is common. For this reason char land area increases and decreases eventually.

Table 3.1: Char area in the year 1984, 1993, 1999, 2001 and 2007

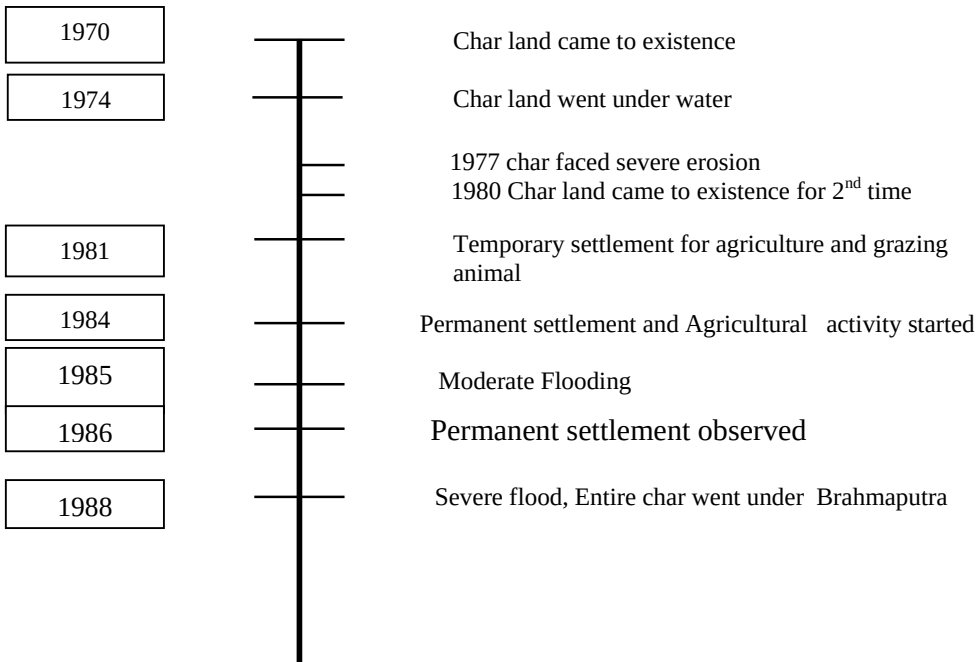
Year	1984	1993	1999	2001	2007
Area	0.5 sq.km	1.9 sq km	6 sq km	5 sq km	6.5 sq km

Source: Char Livelihood Program, 2005-2009.

History of char Manushmara

The char land area first came to existence in 1970-73's. The settlement procedure began after 1981. At that time claimed owner of Manushmara was Nasrat Ali Miah and his family. They had controlled land till 1994. In 1994 the controlled taken over by Nazem Ali Chowdhori, till date his family holds control over land. Time line of char formation is presented in figure 3.1.

Figure 3.1: Time line of Char Manushmara



1989	85% of the char land area formed 150 families settled in char. Land fight to claim ownership
1994	Fighting between two groups to claim char. Former owner lost his claim and present owner
1998	Severe flood
2004	Severe flood and erosion in Mudafat Kalikapur, entire char went under water UP office established in char
2007	About 70 decimal lands eroded in Brahmaputra River
2009	55 decimal lands eroded and 50 decimal lands accreted.

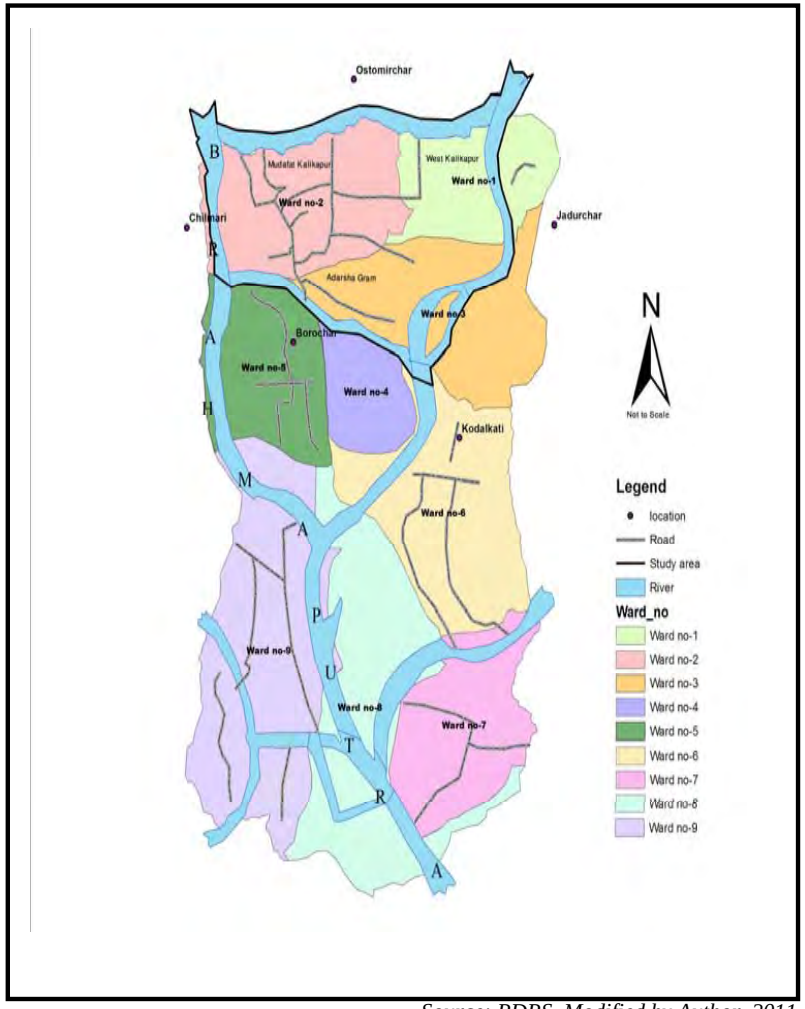
Source: Life history, Astomirchar Union Parishad (2004), RDRS (2007)

Land Ownership

Ownership of land has been a dominant by Nasrat Ali Miah in char Manushmara. They gain control over newly emerging land through outright occupation, secured by deploying poor farmers dependent upon them for employment. The char owner is a businessman, who lives in the mainland, but monitors his land through musclemen or representative.

Map 3.1 Char Manushmara

Source: Graphosman, 2002



Source: RDRS, Modified by Author, 2011

Population

Total population of char Manushmara is 1861 of them 46.86% male and 53.14% is (Field survey, 2010). On an average, total 16 people live per square km. The average household size is 7.85 (Field survey, 2010 and Union Parishad Report, 2004). There are 237 households. Female population is 7% higher than male population. Male population migrates to cities and women left behind char to take care of families and possession.

Education Status

Manushmara has only one primary school in the vicinity. It is broken down and has been moved four times. During the regular floods the school isinaccessible for the 95% children. Many children living in distant vicinity can neither read nor write. Total literacy rate is only 20%. In char land, 93% male are literate and 7% female are illiterate. 13% female are literate and 87% of female are illiterate (Field Survey, June 2010). For higher education (up to SSC) students have to travel to Nayarhat, Chilmari and Rowmari. For this reason, female participation up to class-V is nil.

Migration Status

Char population is very mobile. In and out migration is a continuous process. In a lifetime char dwellers may experience of moving to several chars. People migrated in char Manushmara different phases of time. Migrants in this char are two types; primer settlers and new settlers. Primer settlers are those, who are living here since the formation of char and have second generation. New settlers are those, who settled here for less than 5 years. The study it is found that major migration took place in the following year, presented in table 3.9;

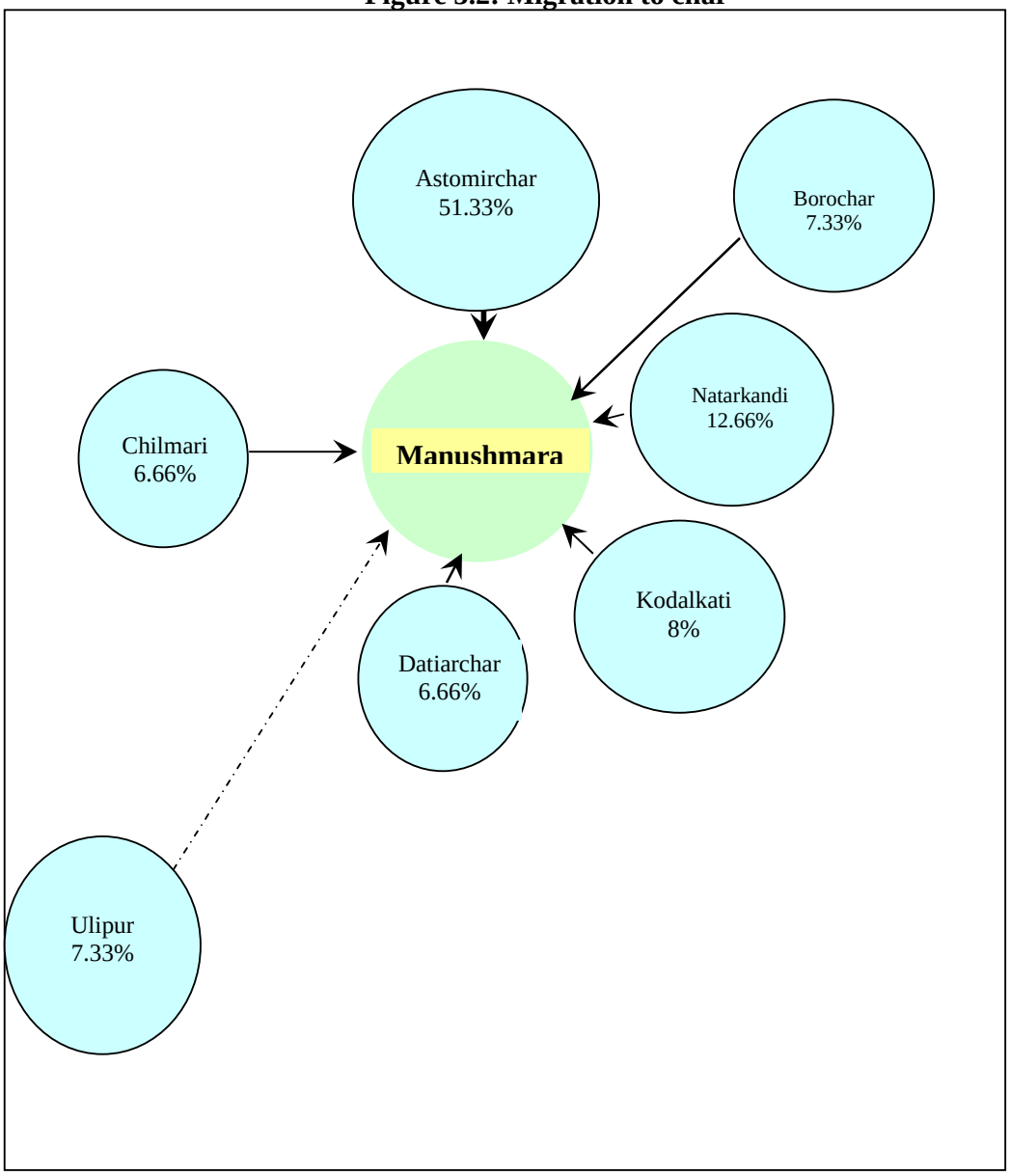
Table 3.2: Year of migration in char

Year of Migration	Percentage of migration
2009	9
2007	20
2004	23
1998	40
1988	6
1978	2

Source: Field survey, 2010

Major migration occurred in those year affected by severe floods. 51% people migrated due to environmental reason, 37% for poverty and 12% for marital relationship (Field survey, 2010). Among the migrated people 14% are from main land. Rest 86% has migrated from surrounding chars.

Figure 3.2: Migration to char



Size of the shape is proportionate to perceived importance
Intensity of the arrow from the site is proportionate to accessibility

Source: FGD, 2010

3.2 Land Use of char Manushmara

Char Manushmara land use is dominated by agricultural, household and commercial land use (Map 3.2). Figure 3.2 shows transect walk to depict land use to the char. Land use is dominated by elevation. Highest elevated land is used for housing. Limited access, remoteness and hazard events restrict land use.

Agricultural Land Use

The mainstay of households in Char Manushmara is agriculture (Map 3.3). Lands are cultivated through share cropping. A quarter of land is sandy and cropping is not possible. Boro is the only cash crop. Jute, Pulse, Peanut, Water melon, Sesame, Chili, Corn, Kaon are produced but at small scale. Seasonal distribution of crop is detailed in table 3.4. Pumpkin, corn and leaf vegetables are planted in unproductive land. Robi crop season corn, garlic and onion are produced in the village (Map 3.4). Agricultural activities and their agricultural land use are three types elaborated in table 3.2.

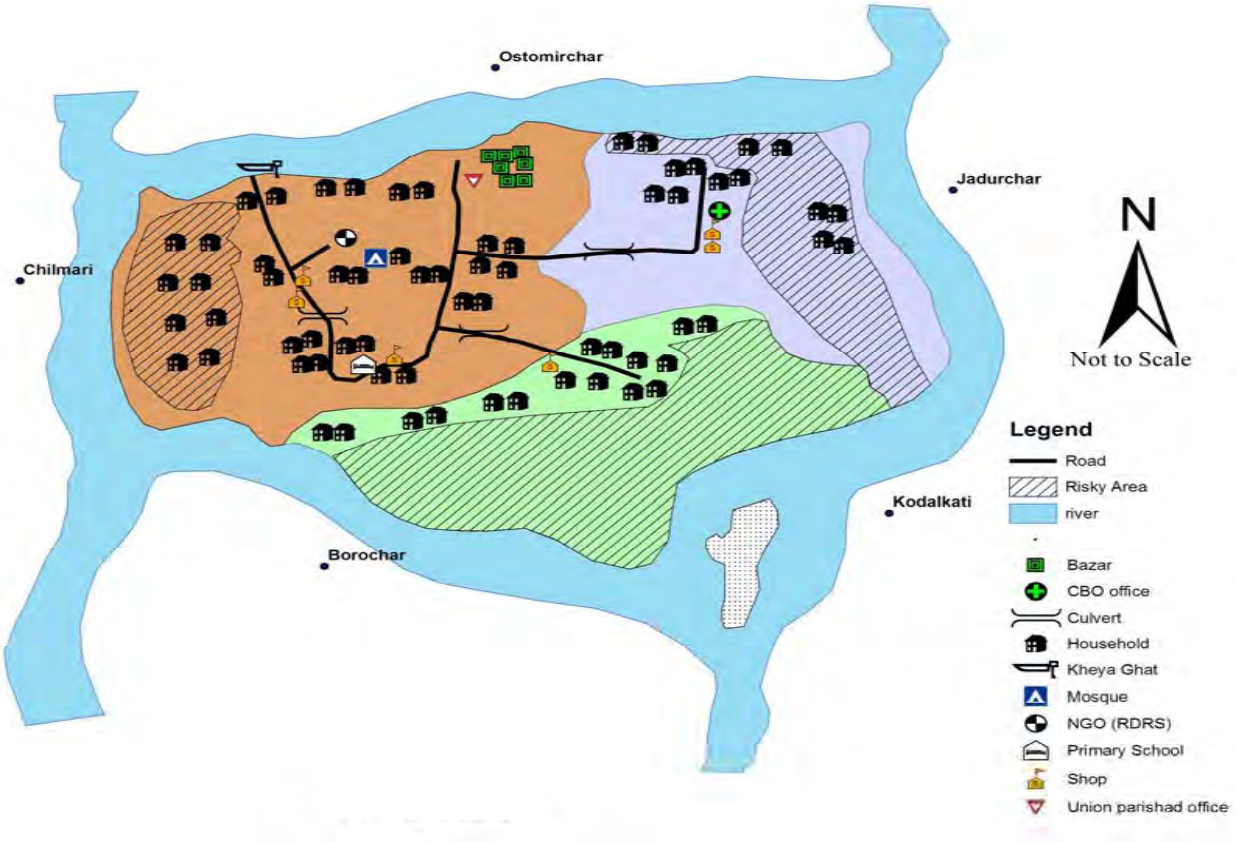
Table 3.3: Agricultural Land Use

Agriculture activities	Land use (Acre)	Agriculture Use
Major agricultural land use	20.21	Rice and jute is principle crop. Apart form that pulse, sesame; kaon is produced along with jute and rice.
Secondary crop	11.62	Cucumber, Chili, Water melon, Peanut and corn are the secondary seasonal crop. They are produced in summer and winter.
Homestead agriculture	10.11	Abundant homestead lands are used for the production of pumpkin, cucumber, leaf vegetable, banana and guava. Production of these crops has added a new dimension in livelihood in agriculture.

Source: RDRS, 2008

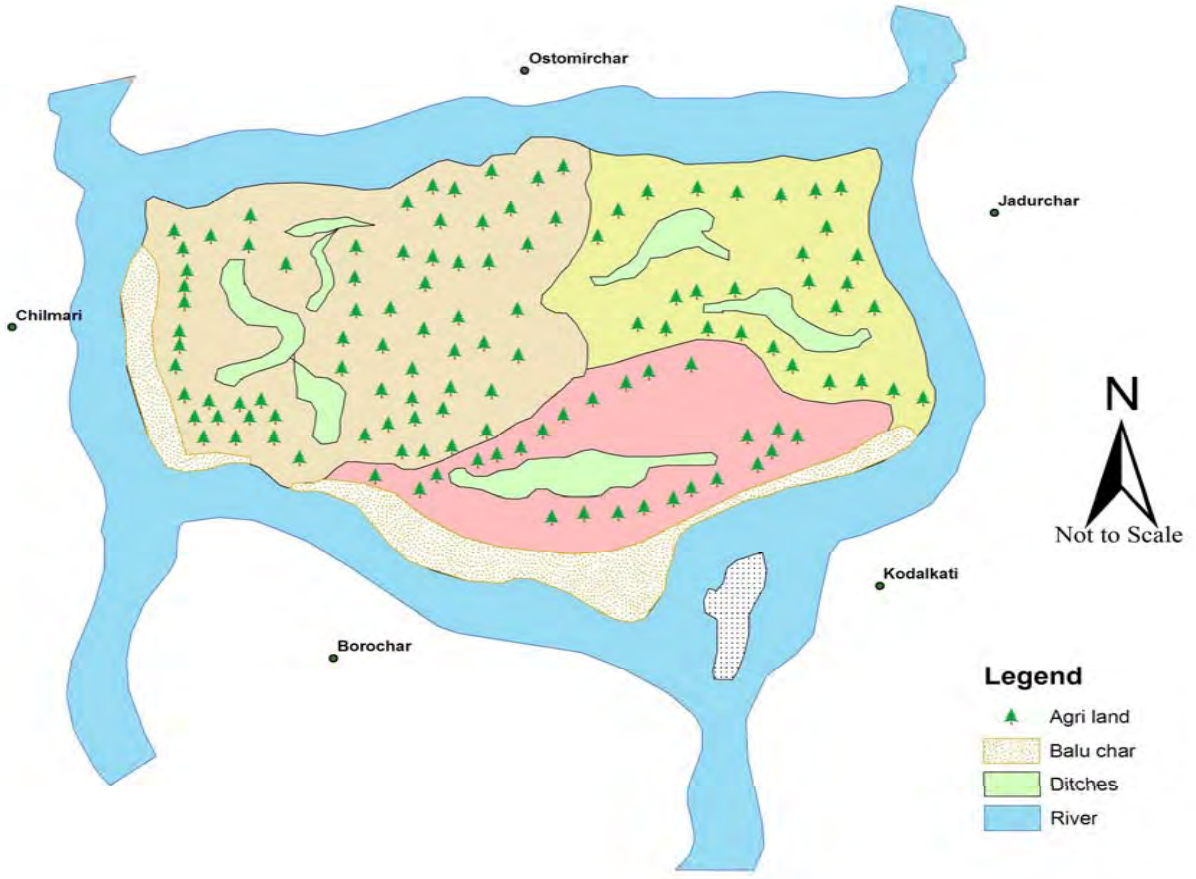
Secondary crops are produced seasonally, in 65% of the land. Cropping pattern (Table 3.3) express that cash crop is rice (Map 3.4), is prone to annual flood and erosion due to seasonality. Other crops like pulse, jute the second and third cash crop they also are grown during monsoon. Although there is high risk of crop demolition char land people cultivate these crops.

Map 3.2: Land Use of Char Manushmara



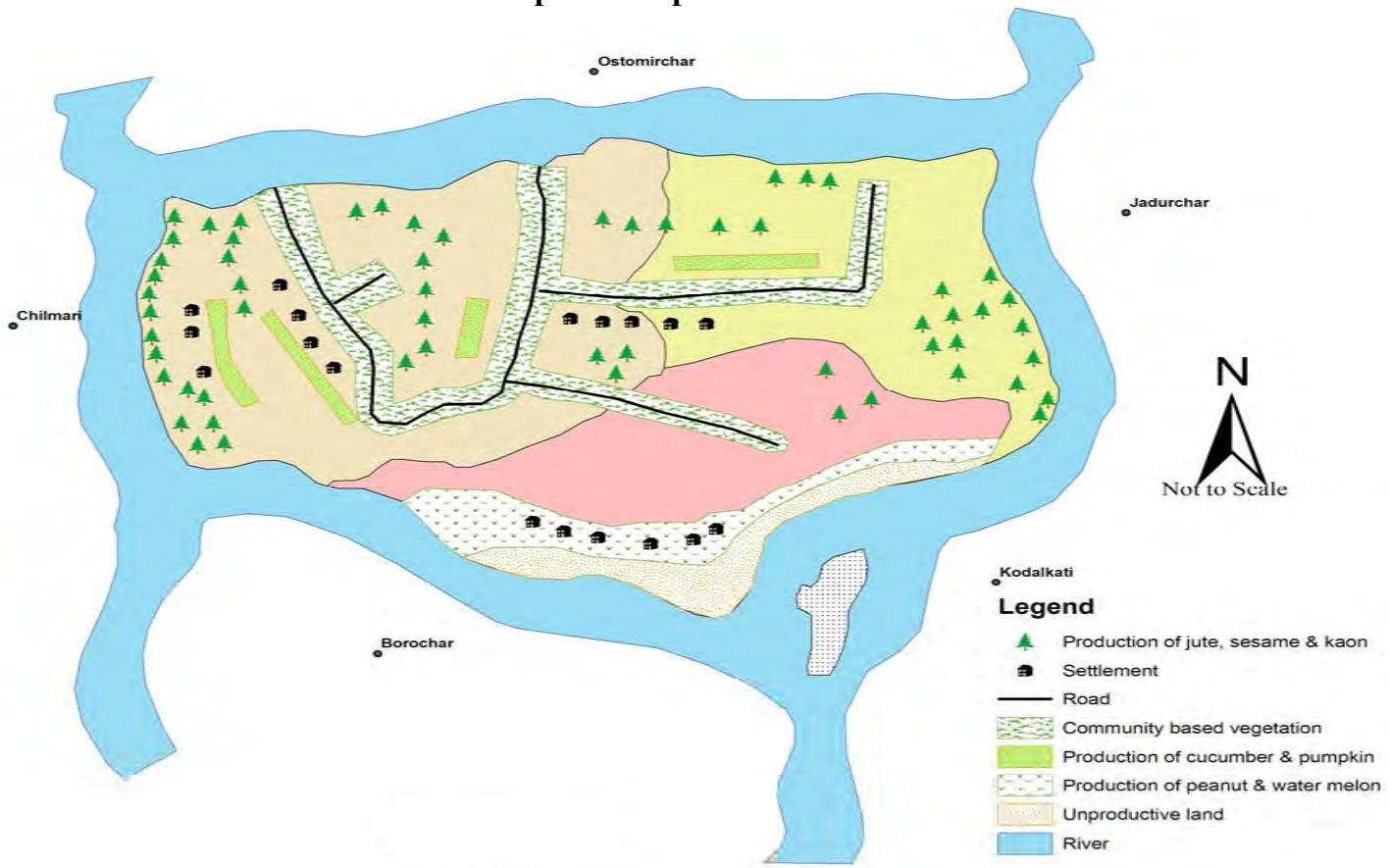
Source: RDRS, Modified by Author, 2011

Map 3.3: Agricultural Land Use



Source: RDRS, Modified by Author, 2011

Map 3.4: Crop Distribution



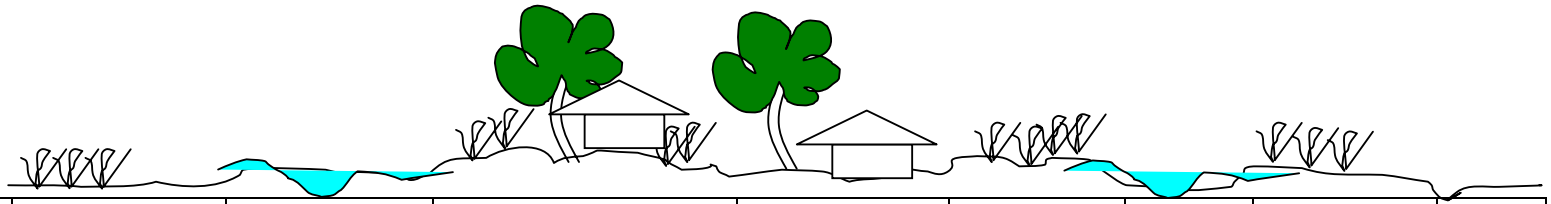
Source: RDRS, Modified by Author, 2011

Table 3.4: Seasonal distribution of crop

Seasonal Crop Calendar												
Crop	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**
Rice												
Jute												
Sesame												
Kaon												
Pulse												
Chili												
Corn												
Watermelon												
Peanut												

Source: Agriculture intervention file,UnionParishad-Manushmara 2010

Figure 3.3: Transect Walk



1.Topography	Low	Medium	High	Medium	High	Low	Medium	Low
2. Land Use	Agriculture	Water body	Settlement/Agriculture	Settlement	Agriculture	Water body	Agriculture	Barren land
3. Density		Moderate	Very high	High	High			
4. Housing		Thatched	Tin shed	Thatched/Tin shed	Tin shed			
5. Vegetation								
6. Crop	Peanut, Watermelon.	Rice/Paddy /Jute	Paddy	Jute/Paddy	Paddy		Rice/Jute	
7.Accessibility	Low	Moderate	Moderate	Moderate	Moderate	Low	Low	Low

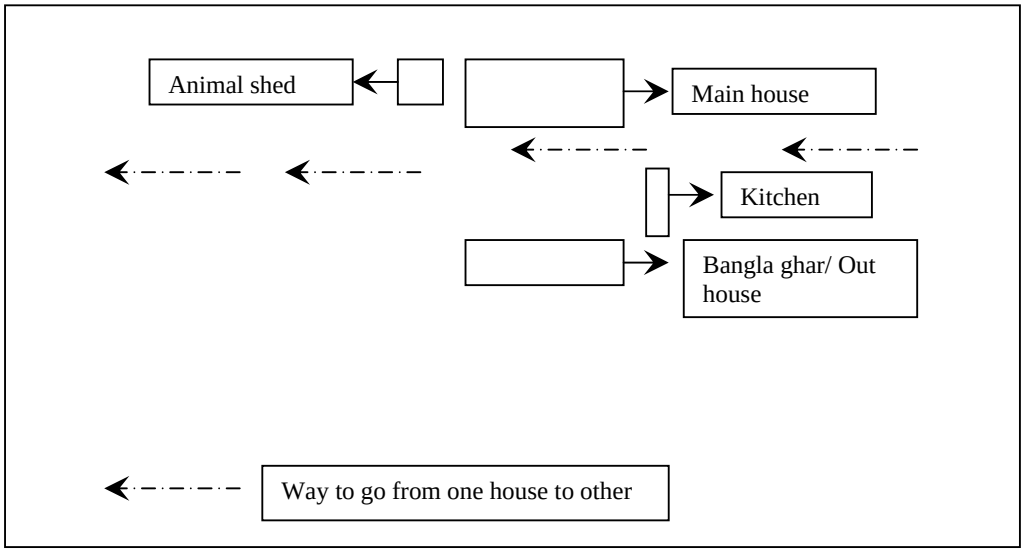
Source: Field survey, 2010

Photograph 3.1: Crop Produced in Manushmara

Residential Land Use

Residential settlements are located on relatively high land. The settlements are developed on linear pattern. The char loses territory settlements tend to be more closely located due to the scarcity of suitable space where dwelling structures can be erected. Char settlements are unique. House is composed of; main house, a kitchen, an animal shed and a bangla ghar (out house). 15-20 houses of similar composition form a para. Houses close to another house creates a shield of production from robbery, stealing when male members migrate to cities in search of job. People usually use uthan to move from one house to another.

Figure 3.4: Household pattern of char Manushmara

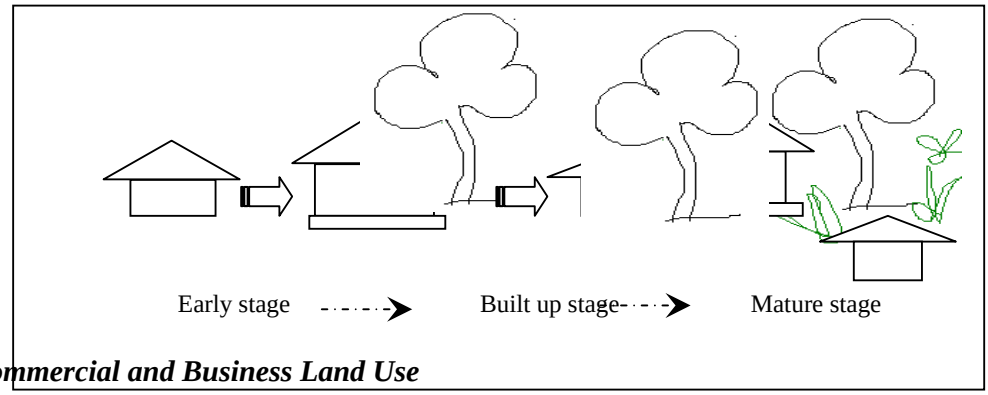


Homestead land use consists of living unit house, cow shed and kitchen and kitchen garden (Figure 3.3). The houses are thatched and semi tin shed. The house walls are framed and can be moved within very short period. Char houses are small and built from locally available products to adapted to floods and erosion since they can be dismantled and moved. In char Manushmara 36% thatched , 41% semi tin shed and 23% tin shed houses are found (Field survey, 2010). Photograph 3.2 depicts homestead of char Manushmara.

Photograph 3.2: Homestead in char Manushmara

Settlement procedure has three stages. Early stage, where new settlers encroaches land built a thatched house for temporary living. In built up, people upgrade foundation, built house and do some vegetation. In mature stage, they built an entire house (Figure 3.2) above flood level with vegetation.

Figure 3.5: Stages of settlement



Commercial and Business Land Use

Mudafat Bazar is only market place. It contains 16 shops; 01 jewelry shop, 01 tailor shop, 03 cloths hop and 11 grocery shop. Temporary shops set during hat. There *Bazar* is relocated in 2008 after erosion at south-west part. This market place also works as the weekly Haat (Friday hat) for the village. There is no road between the bazar and char settlements. In dry season the settlers come here through crop field. In monsoon the settlers depend on small country boat for going to the bazar.

Photograph 3.3: Mudafat Bazar at Manushmara

3.3 Institutional and Infrastructural scenario

Primary School

Mudafat Primary School is the only educational institution in the char. It was established in 1998 and it is at a poor state (Photograpg 3.4). Char has poor road communication between villages. Earthen road and connecting culverts was constructed in 2007-2008. Mud slide in several places discontinued the road; especially, at the connecting sites of culvert.

Photograph 3.4: Mudafat Primary School

Union Parishad office

Union Parishad office was established in 2004. Previously it was located at Astomirchar. After flood 2004 flood it was relocated to Manushmara, near Mudafat kheya ghat. It eroded in 2007. At present the office shifted 1.5 km south west from present location (Photograph 3.5).

Photograph 3.5: Union Parishad office

RDRS

RDRS is the only NGO working on livelihood restoraltion and education program. It is located at Mudafat Kalikapur. A is Branch of RDRS is located at Adarsha gram.

In the char infrastructure is always under threat. People of this char are not at all interested in building permanent structures. They form a cluster and/or contiguous settlement in the villages. Infrastructures and their situation given in table 3.12

Table 3.5: Infrastructure and their scenario

Infrastructure	Unit	Construction material	Existing Condition
Housing	237	Thatched, Tin-shed, Jute stick, Semi tin shed	Houses are mostly founded at the highest elevation of the char land area. House walls are portable and can be easily parted. A house use to have four windows at least. The windows are located exact opposite to another window to allow easy flow of strong air. Every house in this char has false roof to store, take shelter temporary shelter during disaster.
Office	UP Office-1	Tin shed structure-Concrete framed	Union parishad office resolve land issue, do regular assigned job, and provide relief and rehabilitation service during disaster.
	NGO office-2	Thin shed	Under CLP program support people to restore sustainable livelihood, education and awareness program.
Road	Length-10.5km	Earthen road	Between Mudafat Kalikapur and West Kalikapur. Present condition is very poor. Slide in several places has caused discontinuation of the road. Constructed under FFW program. In dry season accessible. In wet season road is completely unused.
Culvert	3	Concrete slab	Culverts are constructed to connect road. Strong water current in monsoon caused slide on both side of culvert. They cannot be used. They are used to dry crops.
Bazar	23 shops	Tin-shed	Near the UP office. There are temporary and permanent structures in the bazar and weekly hat. People from surrounding char come to hat days.
Mosque	2	Tin and bamboo made	One in Adarsha gram, another in is Mudafat Kalikapur.

Source: Field Survey, June 2010

3.4 Livelihood in char Manushmara

Land

Land is primary resource in char Manushmara. Cyclical erosion and accretion made the land resource in chars. Fertility of the chars attracts many to exploit their agricultural productivity. Since erosion is endemic most household have insufficent land for subsistence (Photograph 3.5).

Photograph 3.6: Homestead and household land in Manushmara

Land is broadly is used for; Homestead and Agricultural purpose. Only 24.81% people are found to have owned homestead land. Productive land is currently being used for regular agriculture (rice and jute) and unproductive agricultural land is the potential to use in future on regular basis and currently being used to produce seasonal crop.

Table 3.6: Land Status of the study area

Village/Para	Homestead land-Acre	Agricultural land-Acre
Mudafat Kalikapur	5.61	10.80
West Kalikapur	6	8.27
Adarsha gram	3.13	8.57

Source: Field Survey, June 2010

In 2010, char Manushmara has 42.373 acres of agriculture and homestead land (Table 3.6). 8.63% land is owned and 26.15% others, 40.07% is productive and 25.15% is unproductive. Agricultural land is cultivated through sharecropping. Landlords (*jotdars*) gain control of a large accreted char and then recruit tenants (sharecroppers) to cultivate it and to recruit people. 46% of the households have less than 0 to 0.49 acres of land and 26% have only 0.50 acres to 2.49 acres of lands where another 26% have 2.50 acres to 7.49 acres of land and rest 2% have 7.50 + acres of land ownership.

Vegetation

Char have very few deep rooted trees (Map 3.4). Quick growing plants, banana, papya and ivy plants are abounded. Deep rooted plants; Mango, Jackfruit, Neem are found at small scale. Banana plant is commonly found in and around the homestead. It is important because

it is a fruit and trunk is sometimes used for making rafts during flood. Community based programs were introduced in 1997 (Photograph 3.6). Under community based program Bamboo, Papaya, Mango, Guava, Jackfruit, Neem are grown at large sclae. In char 10% vegetation is natural and 90% vegetation is under community based program (Field Survey, June, 2010; Photograph 3.8).

Photograph 3.7: Natural and community Vegetation

Livestock

Livestock are key asset for the char people. Selling livestock is a major source of income and also used for cultivation. Cow dung is used for manure and fuel. Char Manushmara has ample grazing field. Every homestead raises cow, goat, sheep, chicken etc. or their livelihood support. In char land 42% of the household owned cattle and average 3.9 livestock per household. They are presented in terms of village in table 3.7;

Table 3.7: Livestock in Char Manushmara

Village	**Cow**		**Goat**		**Duck**		**Chicken**		**Sheep**	
	2004	**2010**	**2004**	**2010**	**2004**	**2010**	**2004**	**2010**	**2004**	**2010**
Mudafat Kalikapur	54	111	40	31	13	50	181	135		44
West Kalikapur	42	66	51	25	11	24	150	164	7	64
Adarsha Gram	24	37	29	20	14	51	133	62	5	48
Total	**120**	**214**	**120**	**76**	**38**	**125**	**464**	**361**	**12**	**156**

Source: Field survey, 2010

From, 2004-2010 there is significant shift in sheep and duck rearing, because they easily adapt to flood hazard. 7% animals are reared on tenancy. Theft and robbery of animal is a common problem.

Photograph 3.8: Livestock in Char

Water source

River Brahmaputra is the principle water source. Other than that, tubewell, pond and ditches in monsoon are used as waster source. People use this river for drinking, cooking water source. River water is used for drinking, bathing and cultivation of crops.

Table 3.8: Distance from river

Radius	No of household	Percentage
¼ k.m	9	3.797%
½ km	19	8.016%
1km	36	15.189%
1.5 km	110	46.413%
2 km	63	26.582%
Total	237	100

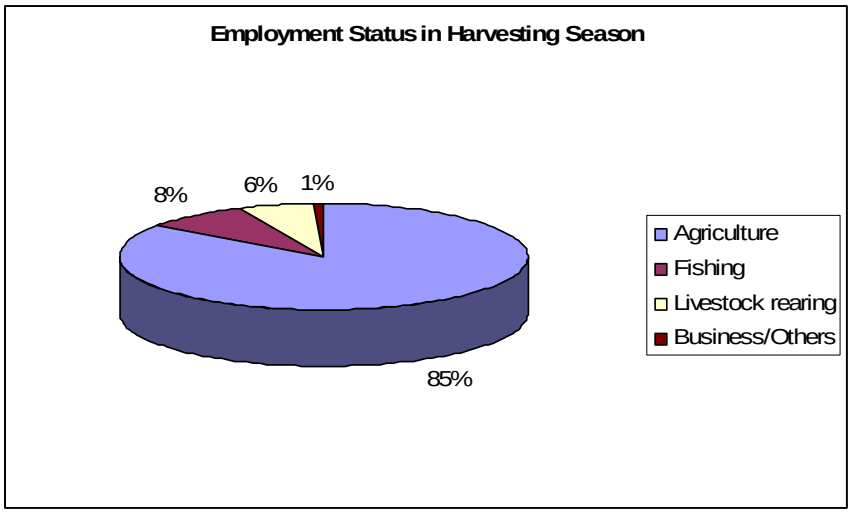
Source: Field Survey, June 2010

Table 3.7 illustrates maximum houses in Manushmara are within 1.5 kilometers radius. The second highest distance is 2 kilometers. People try to settle as far away from the river as possible to avoid erosion for as long time as possible.

Occupation status

Main occupation is agriculture in the char. Occupation in the char Manushmara varies with the season. Farming occupation includes owner cultivation as well as sharecropping. Livestock rearing, manual labour forces and farming are major sources of income. Other than that people are engaged in fishing and some little business, cattle rearing shown in figure 3.8.

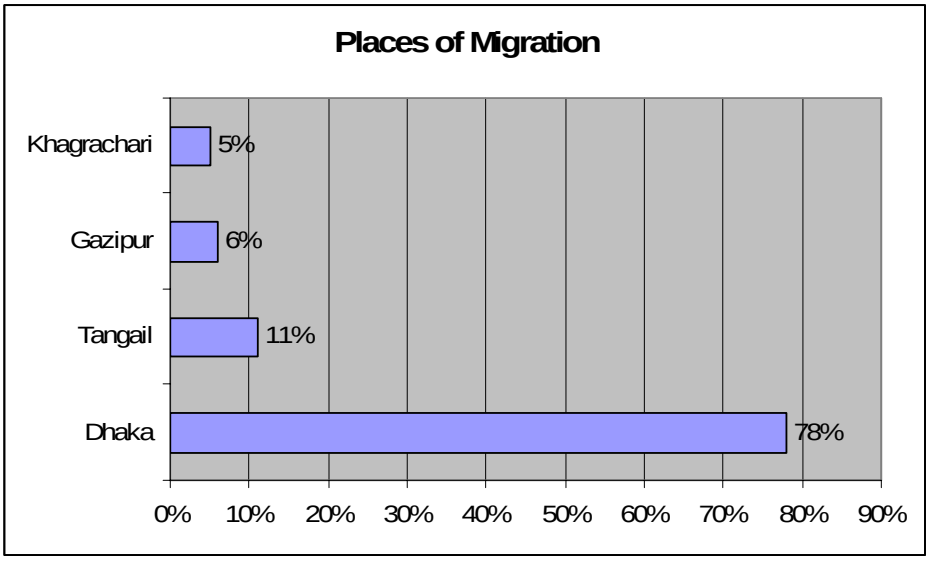
Figure 3.6: Employment Status in Harvesting Season



Source: Field Survey, June 2010

During harvesting season women and child (inactive labour force) comes foreword to support family. At least 6% of women at the harvesting season took care of their husbands business and 41% of children of 6-12 age groups took part in the rearing domestic animal. But occupation is influenced by nature and primary occupation in one season becomes secondary occupation in another season. People migrate seasonally to cities to earn extra livelihood (Figure 3.7). 80% of the migrants are day labourers. 13% of people are rickshaw puller and 6% are in agriculture. Migrants work at brick field, agriculture labor, rickshawpuller etc. 6% of the labor force went to Khagrachari as agriculture labour (Field Survey, 2010). They migrate for 3 to 4 months.

Figure 3.7: Places of Migration



Source: Field Survey, June 2010

Labour Capacity

Wage labour is the principle source of income. In char, active labor force constitutes 66% (52%-male and 14%-female). Occupation is seasonal, mostly in harvesting season (August-September). During harvesting season, on an average a labour works 12-14 hours/day. Migrants work long hours to save money to fight monga, flood and erosion (Table 3.13). Since there is limited agricultural acitivity 49% of the active labour force to migrate to Dhaka (19%), Khagrachari (16%),Gazipur (5%), Tangail (5%), Savar (4%). Since their educational status is low.

Table 3.9: Working Hour during Migration

Job	Working hour
Agriculture	8-14
Day labor	10-15
Rickshaw	12-14
Others	7-10

Source: Field Survey, June 2010

Income

Income source is limited in char Manushmara, people work both in char and outside (migrate to cities) the char for earning their livelihood. In the char wage in the normal times is 60-80 taka. During harvesting time the wage is 150 taka without meal and 100 taka with one meal. During monga they migrate to larger cities for seasonalearning. 31% has income of average 6000 taka. 28% are found having income 4000 taka and 0.3% having income above 7000 taka.

Table 3.10: Income group

Income (taka)	Population (%)
<3000	8.7
4000	28
5000	23
6000	31
7000	9
7000 +	0.3

Source: Field survey, June 2010

Savings

Inconstant income, seasonal job, frequent migration and hazard event cause irregular income .For this reason no savings is found by char land dwellers.

Credit

Maximum credit is taken form RDRS. RDRS launched CBO programs are the major source of credit. Credit is taken from following sources (Table 3.8);

Table 3.11: Source of credit

Credit source	Percentage
NGO-box collection	78
CBO	21
Mohajan	1

Source: Field Survey, June, 2010

At least three persons receive credit every month. Following amount is taken by the dweller on regular basis.

Table 3.12: Credit taken by char land dwellers

Amount of credit	Percentage-%
2500-3000	11
3000-4000	19
4000-5000	57
5000+	13

Source: Field Survey, June, 2010

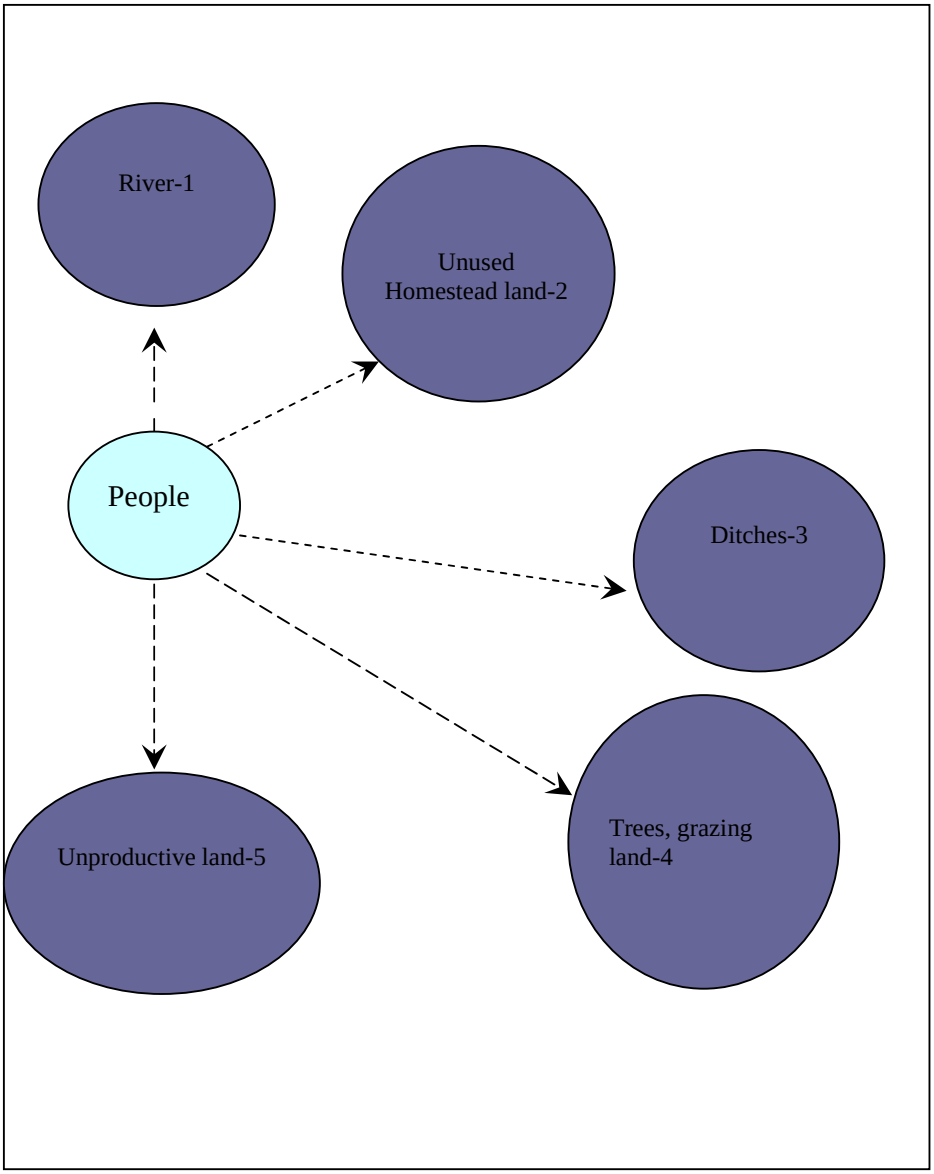
Because income is irregular, savings is not possible. Credit is taken in different times, to return this credit they have to migrate and use the earned money from harvesting time (Table 3.9). For this cycle, the people's financial capital represents a poor feature.

3.5 Accessibility Issues in Char

Access to common property resources

Access to common property here includes access to pond, unproductive land, ditches, trees, vegetation, grazing land and river. In this char in terms of using common properties every char land dwellers enjoy common freedom can use them. They can use any unused property on a temporary basis. River is the common property having access to all common people. In order to that unused homestead land, ditch, trees and grazing land and unproductive land is ranked 2,3,4,5 respectively explained in figure 3.5.

Figure 3.8: Access to common property resources



Accessibility to common properties, data collected using PRA

Access to institution outside char

The char land people have very weak relationship with the mainland institutions. Apart form educational purpose access to institutions is based on extremely emergency situation base. They went to Rowmari, Nayarhat and Chilmari for land related objection or encroachment and only the land owner and members are frequent to mainland. Socially economically solvent family and families with larger land and domestic animals has highest accessibility outside char.

Access to institutions

In dry season settlements are accessible. But during monsoon, it is tough. Houses are compact linear structure. In terms of UP and RDRS office distance are stated in table 3.13.

Table 3.13: Distance to Union Parishad and RDRS office

Distance	No. of Household-%	
	UP office	RDRS
0.25 km	23	39
½ km	46	36
1 km	18	14
2 km	13	11

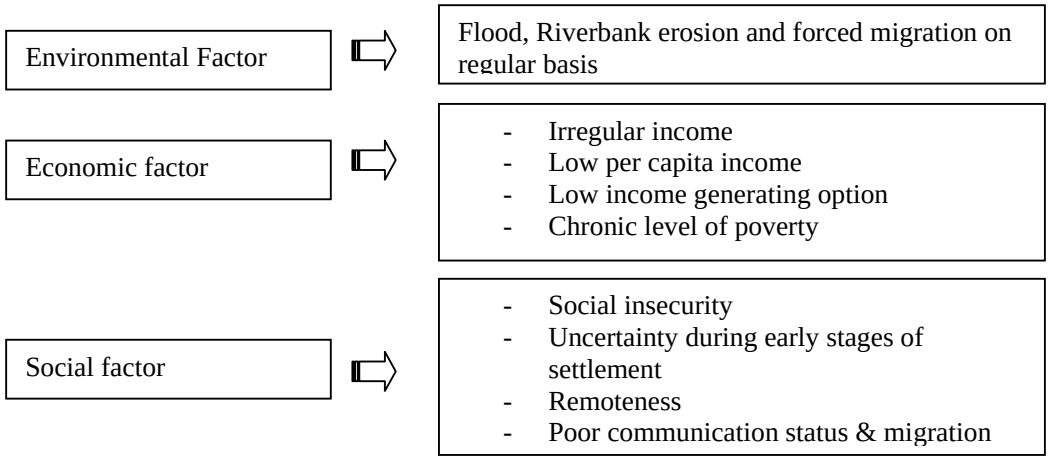
Source: Field Survey, June 2010

During monsoon people have to cross extra 4 kilometers to go to bazar and UP office, even they are in same village.

3.6 Relationship Status

Frequent migration form one place to another creates a complex relationship status with relative is complex and weak. Once a family is shifted to the char, their aim is to acquire land for household and agriculture for sustenance of livelihood. All factors reflect in maintaining relationship with relatives and kin become impossible. Factors are presented in figure 3.8;

Figure 3.9: Factors affecting relationship status



Relationship with relatives in mainland

Isolation from main land, livelihood options and poor communication network creates poor relationship status with the mainland. Char area revealed three stages in relationship status.

Relationship	***No contact with relatives***	***At initial state to contact relatives***	***Weak but frequent contact.***
Status	- Busy in coping with new situation, acquiring new land, settle homestead. - Remain under trauma because of the previous displacement. - Absence of regular job	- No homestead land - Own some livestock - Irregular job	- Known as settlers of char Manushmara
Year come to char	0 4	7	

Among 237 households only 30 families has regular contact with their mainland relatives. Other families has very weak or almost no contact with their kin. For this reason, first generation children (born in char) have very poor and weak relationship. New settlers let them stay on their grand parent's house in mainland. These families are comparatively solvent and want to educate their child. These groups rarely knows their parents. Ultra poor, landless and marginal, who moves from char to char very frequently, has less likely feeling for their kin.

Relationship with char dweller

Remoteness, physical isolation, migration, land tenure and constant threat of disaster and associated are the most important factors in considering relationship for the village dweller. People try to keep friendly relationship especially women, maintain cordial and cooperative relation within char, because during migration they are left alone in char. Social security and uncertainty due to displacement and past experience edify them to maintain god relationship. Relationship among the inhabitants of char land is comparatively flexible. As the villagers here have not strong economic tie in the sense of ownership of land, insufficient production, insufficient marketing facilities, the socio-economic relationship is much informal and flexible. Factor and causes of relationship is stated below;

Factors	**Relationship**	**Causes of having relationship**

	status	
Agriculture	Positive	- Support is crop plantation and harvesting - Support seed and crop storing and selling - Share information on agriculture - Harvest crop during emergencies
Primer New settler	Moderate	- New settlers in the char dictate new readjustment of land. It creates a negative and conflicting relation between primer and new char land dweller - Accretion of new land raises encroachment issue. It creates conflict.
	Positive	Primer settlers support them by providing labour and sometimes temporary shelter.
UP Members VS. Primer settlers	Positive	To acquire land and for social security they maintain good terms.
UP Members VS. New settlers	Moderate	To maintain good terms they even gift those chicken, vegetables or even free labour to establish their presence and further sustainance
Migration and relation between women	Positive	When active labour force migrate to larger cities for seasonal migration leaving female and children alone, security issue force people to keep good terms
Conflict with other char	Positive	There is always a chance of conflict between two chars and regarding char ownership. For this reason people maintain good terms with each other.
Disaster	Positive	People in the char always under constant threat of disaster. They maintain good relationship to support during disaster and emergency situation

Internal conflicts are visible, people in the char tries to keep strong relation with each other for economic purpose and to protect from hazard. Conflicts are prominent, but they try to maintain cooperative relations that help to sustain further. Chars highlight the role of samaj as an institution in the lives of char people. With the absence or low importance of more formal institutions and the vulnerability and mobility of people in response to erosion and accretion, these local societies appear to be more important than in mainland villages. Services provided through the samaj and its matbar(s) include settling of disputes among members, decision making on relocation during erosion and accretion events. Along with kinship it determines which households help one another when homesteads are eroded.

Relationship with Government and Non-Government institutions

GO

Performance of the Union Parishad office in terms of service provision is very poor. Constrains in access and lack of flexibility in development approaches are common problem in UP performance. Traditionally, UPs distributed (as a government resource distributor) Vulnerable Group Development (VGD) cards and constructed infrastructure under Food-

For-Work (FFW) but these were often misallocated. Institutional framework that would respond to the needs for preparing, coping and rehabilitating disaster is not in place.

NGO

Relationship with NGOs is better rather than GO. Action and time oriented activities has increased NGO credibility. Livelihood restoration, Disaster preparedness, hazard coping program and financial support has increased their credibiltiy. The CLP program has changed their life, livelihood, social status and addressed their social problem at a large scale. Through the program now the know about Pre, During and Post disaster activities. For this reason, they are very much close to the NGO people. They took their advice to the NGOs rather than GOs in solving social, political and economic problem.

Tradition and reciprocal change

Char land is organized into society. Members of society hold control on char land issue. Day to day life, marriage, settlement of disputes, settlement are controled by shamaj. Tradition is more dependent on them. Isolation in char also creates unique sub-culture. Common people rely on them and try to follow their decision. Traditionally char land follow customs strongly than others. But with time their response to change is faster than past.

Use of information technology

People in the char seem to have information about technologies. But due to location they may not frequently use all technologies. A series of technologies were enlisted they ranked according to their information and extent of level of knowledge.

Technology	User level
Television	On an average 5 household has a television. They are completely informed about its use and utility. Ran on battery and solar power.
Mobile	People are familiar with mobile. At least 45% people can only make calls. Other utilization is not known.
Computer	Only 0.5% people know about computer. Utility is not known.

3.7 Adaptation Capacity in Char

Adapting capacity

Char land dwellers migrate so frequent that they can easily adapt to any situation. Once they move to new area, they adapt to the place as well as try to restore their livelihood. Within 6-

8 month they can easily adapt to current place. To adapt in this char their movement is very frequent *(Annexure)*. More the move, the soon they adapt to situation.

Unit	Movement frequency	Scenario
Household	1	Try to stay close to their local or community people. Live in thatched houses, after acquiring land they immediately dug the back side of the house and use the soil to uplift foundation and plant vegetable. Their settlement in a cluster and contiguous pattern is a corrective type of strategy for adapting to a new social environment. One's homestead neighbors on others and it helps them to maintain their *samaj* ties. As the *samaj* members they provide help with each other in any emergencies. This is an incidental measure of reducing loss due to riverbank erosion. The clustered settlement pattern builds a bridge between the migrants settled in char.
Agriculture	2	After the new migrants come to this char, for first few years they work as day labourer. In these year, they migrate very frequently to cities earn money. They use the money to acquire land on lease. They participate to secondary agriculture and earn livelihood.
Education	4	Migrants are so busy with restoring livelihood and their economic condition remains unstable. The children in such situation face break study. They remain in one class for 1-2 years to adapt to situation. 23% children in the char have break study. 17% left school to support their family.
Occupation	1	Immediately after migration people try to receive job in the char, if not possible they move to Nayarhat, Chilmari and Rowmari for temporary occupation. After a year they join the group who migrate to larger cities for migration.

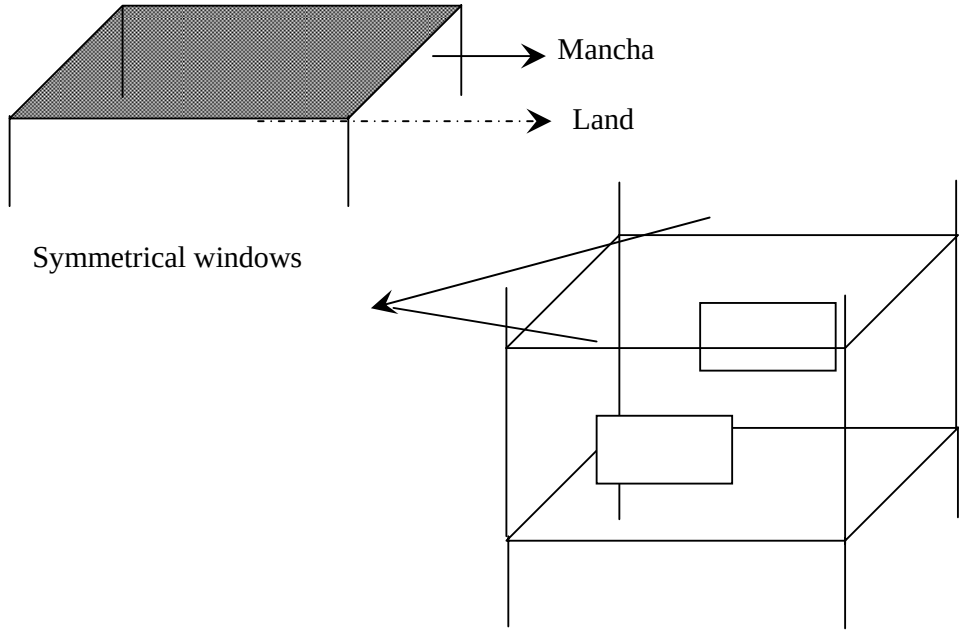
Development of Indigenous technology

In Manushmara people are staying for more than three decades. Living away from the mainland and fighting to uncertainties they have developed some indigenous technologies to fight the uncertainties and sustain livelihood. In char indigenous technologies revealed are;

Homestead

The char land people not only uplift their foundation but also built on floor mancha system. They found that if they use false floor flow the flood water without less damage to their household. Windows of their houses are symmetrical to opposite. In this char wind blows strongly. It helps to blow the wind without damaging the house.

Figure 3.10: Lifted platform to protect flood water current (Use of indigenous method)



The threat of riverbank erosion attack impelled them to use movable housing materials. In addition to this fact, many of the displacees built movable framed housing structure because they were not adequate economic standing for building RCC house. Housing structure prior to displacement was usually traditional. This housing structure was constructed of indigenous roof materials, *e.g.*, thatch, burnt tile, etc. and indigenous wall materials, *e.g.*, mud-dough, thatch, bamboo, wooden plank, etc. These materials are easily movable and less susceptible to the damage caused by riverbank erosion.

Photograph 3.9: Household material

The people in the char have a high elevated kitchen garden. Here they produce chili, papaya, leaf vegetable etc. and some vegetable. During flood and water rise people use kitchen garden to sustain livelihood.

Food and other storage

They store dry chilly, pulse, rice and chira, muri, important documents and books use it during monsoon in earthen floating pot or haari (large pan).

Infrastructure

Houses are settled close to one after another. If people move one place to another, they have to move crossing other's housing. It secures their household. Male members migrate once or twice a year. For this reason this type of linear housing settlement provides security to peoples living in the houses.Roads are of no use as lands erode. That is why they built baazar, temporary hat, near the kheya ghat. It helps them to identify the locality.

3.8 Sustainability in the char

Hydro-morphological characteristics

The Brahmaputra-Jamuna originates in the on the northern slope of the Himalaya and drains snowmelt and rainfall from China, Bhutan, India and Bangladesh. Total catchments area is 570,000 km^2, of which only 7% is within Bangladesh. Annual precipitation of which more than 80% occurs during monsoon. The discharge and sediment load caused Brahmaputra becoming braided river causing a typical process of erosion and char formation.

Land tenure

Local control of land is achieved through violence. 46% of household in the char have insufficient land 0-0.49 acre for survival. Insecurity and dispositional distribution of land creates conflicts and disputes. Control by muscleman control and exploit land impacts livelihood decision. Livelihood adjustment thus; largely depends on land tenure.

Char formation and dynamics remoteness isolation

Manushmara is a braided island char, consist of coarser materials. After accretion land is ready to sustain livelihood not within two years. This formation process of char reduces immediate livelihood actions to support people. Isolation, land control, economy and exlpoitationby land lords created peripheral, culturally distinct society.

Population displacement

Erosion is the principle cause of displacement in the char. Population and land are two major resources in Bangladesh. Loss of land at the char at 2% per year creates an extra pressure to arranging the population considering drop of land.

Cultivation

Opportunity for agriculture is limited to soil quality. Coarse sand is less sutiable. Land in the char produce Boro ricc, jute, pulse etc.Rice is the cash crop grown at around 27.64 acres of land. Seasonally rice production is prone to monsoon and seasonal flooding. Instability of char land offer less variation in crop production. In terms of minor crops production largely depend on economic return of Boro.

Economic Resource

98% people relates to crop agriculture. Farming occupations include owner cultivation (2%), share cropping (98%). Wage labour is also used 66% labour work on wage labour of about 135 taka on an average. Absentee ownership of 2% land is done to held control over land. Raising livestock is another important source of income. Duck and sheep is currently found to be an important source of income. Cow milk and lease of cows is found to be source of income. On an average 5% domestic an. imal lost is being reported from flood, water rise and robbery with loss of 7500 taka. Seasonal occupation in char has increased use of credit frequently.

Occupational Pattern

Occupational pattern is influenced by labour market. Seasonal production of crop caused migration to distant places. During peak harvesting period of Boro paddy temporary migration occurs. Female in migration is prominent for storage and post harvesting work. Occupation is affected by cycles of immigration and emigration triggered by events of erosion. Seasonal unemployment of about has developed a quick occupational shift for income generating activities. Remoteness from the mainland caused heavily dependent on local market. Small markets are not substitute for mainland market. But they have to rely on them. Inaccessibility in dry season creates problem in the transportation of heavy goods. But in monsoon it is easy, but flood cause journeys to market hazardous.

Socio-economic strata

Female population constitutes larger population than male. Thus abundant women, in the char face acute problem contributing char livelihood. The study sample consisted of 45 women-headed households. 16 % of the households were headed by widows, 10 %were divorced, another 10 %were women who were abandoned by their husbands, 7% were women whose husbands worked elsewhere and lived away from home and the rest about 9%

were women with invalid husbands. Majority of the female heads had to work outside the home and had to make day to day decision regarding running of their households. Problems faced by these households are a consequence of poverty. This is reflected in their economic and social deprivation and their vulnerability to different types of crisis events (Table 3.11).

Table 3.14: Problems Faced by the Female Headed Households

Nature of problem	Total number reporting to problem	Rank
Socio economic deprivation		
1. Non-availability of job	71	4
2. Difficulty in getting job	83	1
3. Low wage	82	2
Vulnerability		
4. Natural hazard	82	2
5. No relatives present	13	8
6. Illness and inadequate access to medical treatment	72 31	3 6
7. Difficulty faced in repairing dwelling units	36	5
8. Insecurity of life and property	26	7
9. Educating children	1	8
10. Others		

Source: Field Survey, June 2010

Multifarious problems are faced by the female heads of households and each cited more than one problem, which are ranked according to the frequency of the answers.

Stages of settlement

Settlement process passes three stages. Completion of each stage largely depends on successful completion of earlier stage. Land is cultivated before homestead settlement. This is an economic rupture- gaining economic stability is the key to establish a sustainable livelihood.

Resource availability and utilization

Land is the primary and largest resource in the char. It is used for production of rice, jute, pulse and robi crops. Land is fertile and vegetation is abundant. But deep rooted plantation is not possible for erosion propensity. Erosion and loss of land is regular. Land is used from Boro cropping during April-October. During prolonged flood production of crop is impossible. Wide open grazing land encourages livestock rearing in the char in another

major resource. Livestock faced significant shift due to increased propensity of flood. Char are surrounded by rivers, people enjoy fisheries there in.

Institutional Setting and arrangement

Special nature of Institution is required for development of char resources. It requires different policy procedures that apply to stable landmass. Educational institution and Union Parishad are only two government institutions. Weak setting and poor structure inadequate manpower has made those government institutions ineffective. They are not able serve population within their jurisdiction.

Accessibility

Isolation and remoteness are the major reasons that people to stay in the char. Inaccessibility to mainland lacks in provision of basic service, institutional support and goods, health care and other services.

Accessibility to mainland is poor, time consuming and hazardous during increased flood event. Accessibility within the char is more frequent. People can moves and frequently use and share common property. River is the highest accessed property used for agriculture and household use. Accessibility to common property during dry season is more frequent support their daily livelihood. Grazing of cattle and searching vegetable for daily livelihood is done most. Highest percentage of woman, 41% access to common property. In monsoon, accessibility trims down to a considerable rate.

Char land people access NGO more than GO. Performance of the UP office towards people is not satisfactory. Bureaucracy, poor finance, manpower, instability, poor peoples participation and above outdated direction makes reluctant to use UP office. On the contrary NGO support is regular and updated and people oriented. People weighted 1 (most accessed) to NGO. Current performance of NGO has stabilized livelihood than before.

Relationship status

Livelihood in the char is interplay of relationship. People who have settled here develop close cordial relationship. Living in an enclosed proximity helps to develop relationship, worm, dependent, understanding relation. Limited livelihood states them
to develop brotherhood to support each other. Hazard events also tie the relationship. Migration of the male member, social security force people to live a close cordial

relationship. Owner-settler relationship is another dimension in char. Owner forcefully use labour for share cropping, day labouring. Also, new settlers try to maintain relationship to receive land.

Adaptation to char

Over the year displacers settle in the char and move to new location. People living here have a very good capacity. With limited access, livelihood option and intensity to hazard they adapt to present char. On an average they settle and restore livelihood within 8 months. Skilful capacity to develop indigenous methods helps restore livelihood within short time and sustain within short period.

Char Manushmara in river Brahmhaputra is very much limited to its livelihood options. The area is located is a remote place. The area is isolated from mainland. Manushmara is extremely prone to disaster. Although the char land has quite a diverse livelihood, that is the result of their years of experience and hard work. There is always chance of eviction. People live in the others land. Temporary living, unsettled land issues, migration causes serious impact on livelihood. Because of remoteness institutional facilities are inadequate. People are devoid of using technological options. For this reason livelihood in char is fragmented and based on seasonal activity.

Chapter Four

Disaster Vulnerability of Char Manushmara

4.0 Introduction

Char land people have to be brave to natural calamities of land erosion and flooding in making living there. People fight flood, erosion and monga on regular basis. Because of location dynamics, normal flood and erosion in mainland may appear as severe disaster in Manushmara. For this reason livelihood is significantly impacted by disaster. This chapter therefore, explores disaster, seasonal variability and their intensity, frequency and damage on char Manushmara.

4.1 Disaster profile

Char Manushmara like any other char land is affected by Floods, Riverbank Erosion, seasonal Monga, Nor'wester, Cold wave are common disaster in char (Figure 4.1; Photograph 4.1). Although the char land is affected by multiple disasters, the study only focuses on flood and river bank erosion (Figure 4.2).

Photograph 4.1: Disaster Scenario of char Manushara

Flood and Riverbank erosion are two major disasters of char Manushmara (Map 4.1). Annual monsoon causes 55% low lying area submerged by increased river water. Erosion is also regular in monsoon causing considerable amount of loss of land. The land elevation is

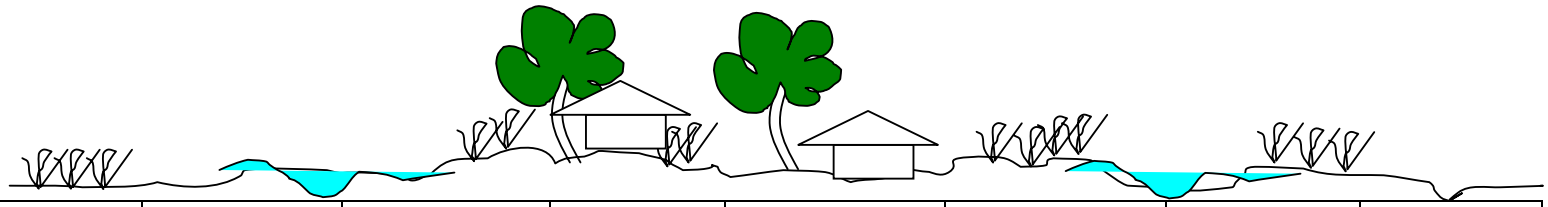
lower comparing to mainland. For this reason, normal flooding in the mainland appears as severe flood in Manushmara. The scenario get worsen because flood is associated with severe erosion. From Baishakh to Ashwin (April-October) both hazards havoc char Manushmara causing numerous damages to the livelihood.

Figure 4.1: Seasonal Hazard Calendar

Seasonal Hazard Calendar												
Disaster	**Baishakh**	**Jyistha**	**Ashar**	**Sraban**	**Bhadro**	**Ashwin**	**Kartik**	**Agrahayon**	**Poush**	**Magh**	**Falgun**	**Chaitra**
Flood												
Flash Flood												
River Bank Erosion												
Cold wave												
Nor'westers												
Monga												

High	**Medium**	**Low**

Figure 4.2: Transect Walk (Disaster Period)



1. Topography	Low	Medium	High	Medium	High	Low	Medium	Low
2. Land Use	Agriculture	Water body	Settlement	Settlement	Agriculture	Water body	Agriculture	Barren land
1. Flood Damage	----------	----------	----------	High	----------	----------	----------	----------
2. Vulnerability	Very high	Very high	High	High	High	Very high	Very high	Very high
3. Water level								
5. Erosion	High	High				Moderate	Moderate	
6. Accretion								Moderate

Water level

Very high	High	Moderate high

4.1.2 Flood

Flooding in char Manushmara occurs from prolonged seasonal rainfall, rainstorms, monsoon water rise. Flooding is influenced by factors such as undulated geography, vegetation and soils, river alteration; land use of this char. highest land elevation in Char Manushmara is 7 feet and lowest elevation 2.5 feet. Lowest mainland elevation at Rowmari is 8.5 feet *(Union Parishad Manushmara, 2004)*. A normal flooding (upto 6 feet) submerges entire char.

Table 4.1: Flood in Char Manushmara

Flood category/Intensity	Year of appearance/Frequency
Severe	1988, 1998, 2004, 2007,
Moderate	1985, 1991, 1994, 2001, 2008, 2009
Normal	1989, 1992, 1995, 1997, 1999, 2003, 2005, 2006

Source: CDMP, Union Office-Char Mudafat, 2010

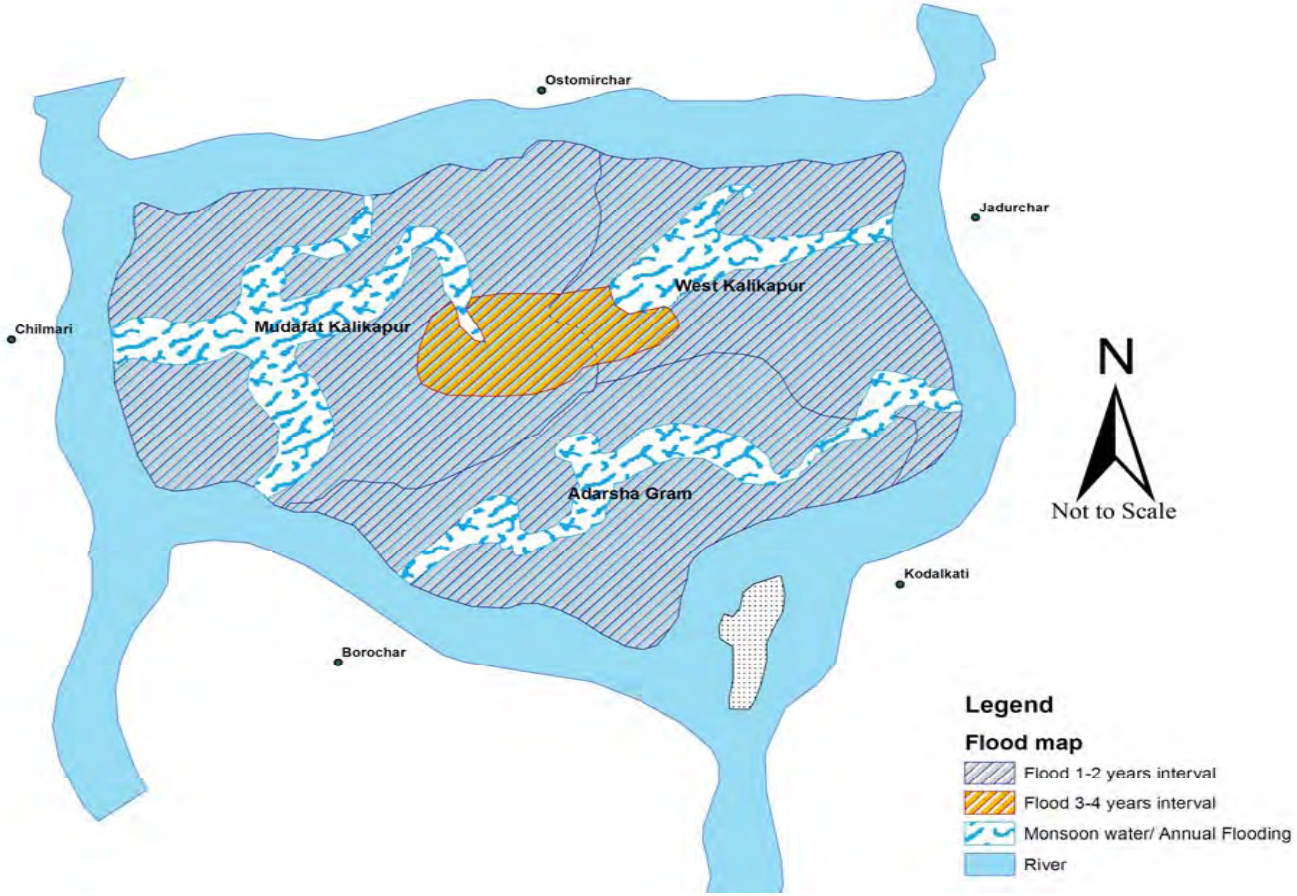
Component at risk

Land elevation is lower than main land. Homestead land, Agricultural land, Educational and Institutional elements are at risk. 237 households and 27.64 acre agricultural land, school, market, UP office, NGO office and all other components are at risk. Major cash crop Boro and Jute are also under risk. Agricultural product submerged and destroyed by flood, the principle means of substance washes away intensifying vulnerability. Considering the monsoon and flood water level increase found in char Manushmara from focus group discussion shown in figure 4.3.

Damage

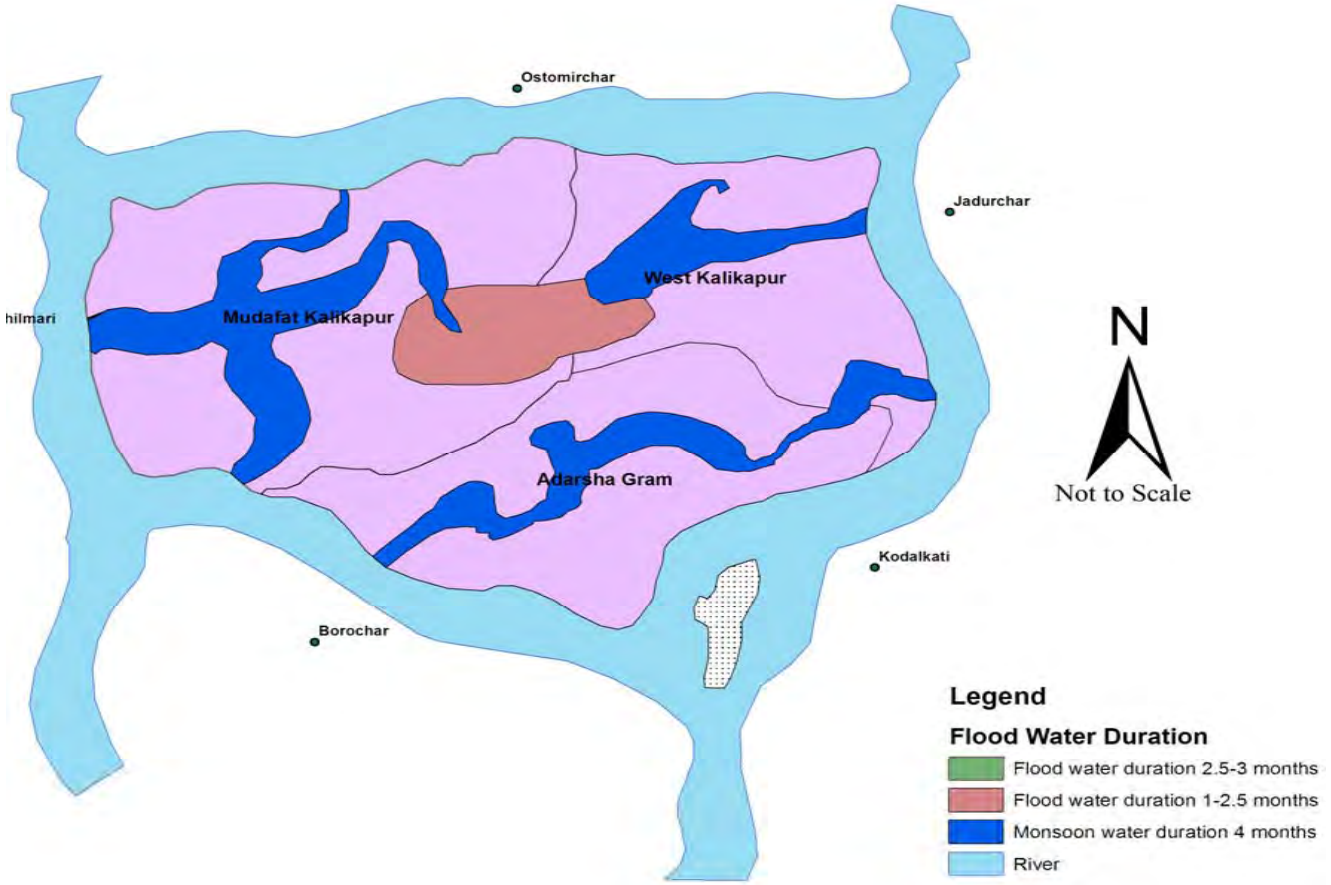
During flood entire char land inundates. Some of the most significant flood risks in char are physical threat from increased water current, infections and water borne disease. Flood reduces people's access to necessary treatment and medicine. Flood impact includes damage to most household physical assets in the chars with average financial losses to homesteads of around Tk. 6,000 (NSPB, 2003). However, floods in the range of 1.64 ft- 3.28 ft. above plinth level tend to result in the total loss of *kutcha* house walls. Shelter, as a basic capital asset is a critical issue for char people during floods. Flood causes both temporary and permanent damages to homestead, agricultural land and other existing infrastructures. Damage scenarios of flood, from year 2004 -2009 are represented in table 4.3 and Map 4.2.

Map 4.1: Flood Affected Area



Source: RDRS, Modified by Author. 2011

Map 4.2: Flood Water Duration



Source: RDRS, Modified by Author. 2011

Table 4.2: Impact of Flood on Manushmara

Flood scenario	Land Submerged	Water level	Impact on char land
Water rise during rainy season	55%--65%	2-4 ft.	- Low lying agricultural and homestead land went under water. - Char land area adjacent to River bank area submerged to river water. - Increased monsoon water associates with increased water current. - Erosion increases with increased river water current.
Normal Flood water rise	65%-85%	4-5ft	-Low lying lands, agricultural land, unproductive low lying land goes under water. - Homestead situated below 5 feet elevation goes under water. - Plants and gardens impacted by heavy current of water. -Soil of char land washed away by heavy current. -River bank erosion takes severe form. -People have to take shelter on mancha - Daily activities of the char land become shattered. -Increased threat of robbery and theft. - Chances of eviction due to land erosion.
Moderate and severe flooding	85%-100%	5-7.5ft.	- Entire char land submerged under water. - Increased river water current. - Washes away plans and household. - Heavy damage of infrastructure. - Force the survivors to abandon their homes. - Chances in loss of domestic animal and stored food associated with building collapse. - Severe erosion of river bank. - Low lying areas with in the char may breach and cause damage to household - Current associated with silt and sand that destroys the land fertility and stability. Flooding cause mudslides and violent winds that compound the short-term and long-term devastation. - The more frequent flood events of a medium magnitude can still bring serious damage and disruption by ruining crops and causing food scarcities, - disrupting infrastructure and access to services, - suspending business activities, - and exacerbating health risks in the home and local environment

Source: FGD, Char Manushmara, June, 2010

Table 4.3: Flood Damage Scenario 2004-2009

Year	Intensity	Damage												
		People			Household (Number)		Homestead land (Decimal)		Agricultural land (Decimal)		Infrastructure nos.		Land Eroded	Accreted
		Injured	Life loss	Displaced Population	Permanent	Temporary	Permanent	Temporary	Permanent	Temporary damage	Permanent	Temporary	decimal	
2004	Severe	435	14	378	86	94	---	780	1800	--	--	3	115	65
2005	Normal	71	--	25	--	57	-----	114	1500	459	--	--	80-85	--
2006	Normal	122	2	231	--	60	15	45	1200	250	--	1	150	--
2007	Severe	850	5	650	51	112	45	450	1200	2800		4	110	
2008	Moderate	15	4	120	16	43	--	80	2500		--	2	--	--
2009	Moderate	20-25	--	85	20	35	--	90	800		--	--	115	--

Source: RDRS, FFWC, CDMP and Union Paarishad Office-Char Manushmara, 2010

4.1.3 Erosion

Due to active fluvial action and braided river bed char land is severely prone to erosion *(Baqee, 1998)*. Soil contraction of the char and intense up stream water flow in monsoon causes regular erosion at 2% per year of Char Manushmara.c(RDRS, 2007 and Map 4.3). Every year from April-September land is eroded to river Brahmaputra. Mudafat Kalikapur and West Kalikapur are two worst erosion affected villages in the char.

Photograph 4.2: Erosion in Brahmaputra

Table 4.4: Nature of Erosion-attack

Nature of erosion attack	Mudafat Kalikapur Household No: 60		West Kalikapur Household No: 87		Adarsha Gram Household No: 90	
	No	%	No	%	No	%
Very Quick	11	18.333	11	9.57	05	4.5
Quick	32	53.333	15	13.05	35	31.5
Slow	14	23.333	50	43.50	30	27
Very Slow	3	5	11	9.57	20	18

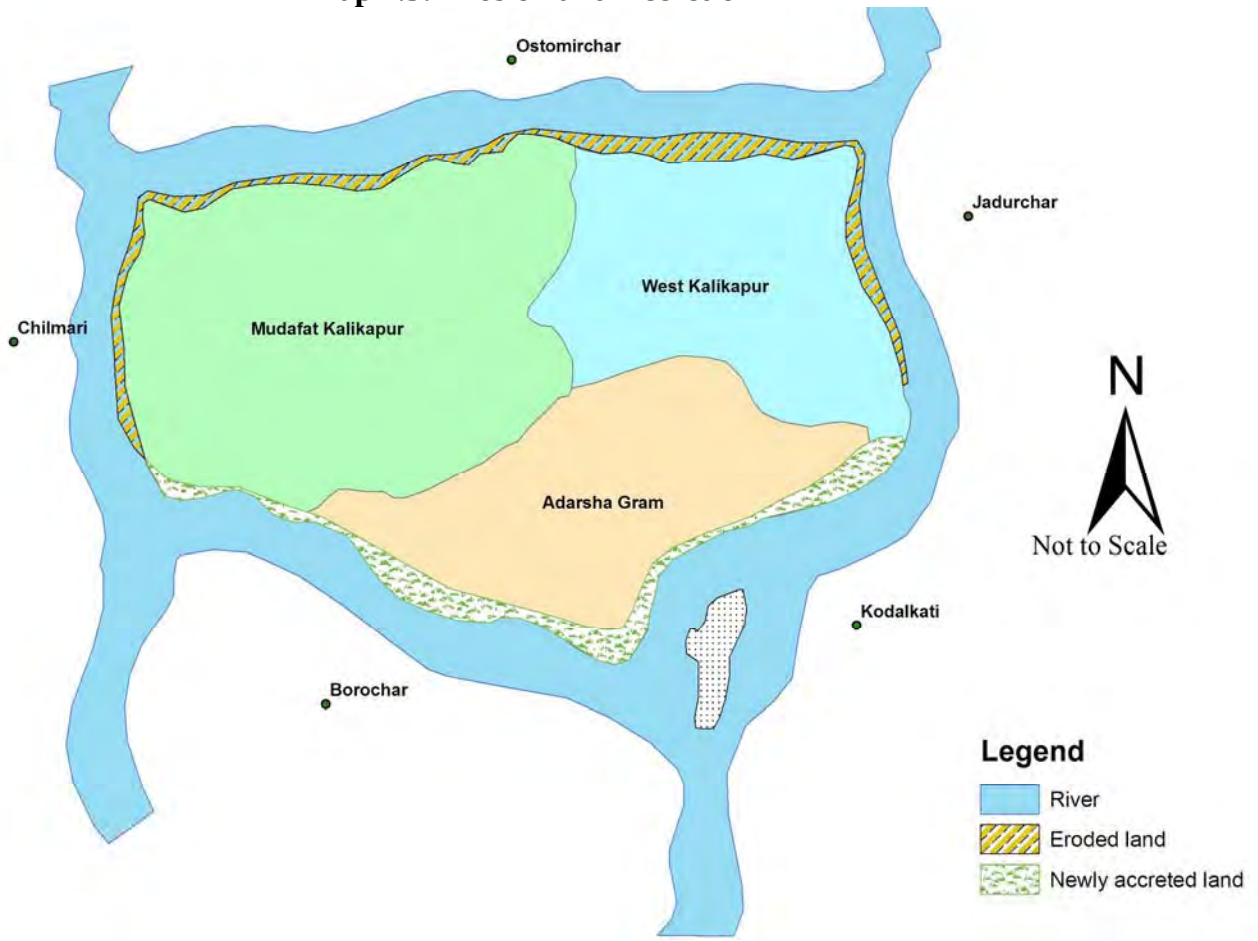
Source: Field Study June 2010 and Char Livelihood Programme Annual Report, 2007

The table 4.4 illustrates erosion propensity in char. Very quick includes land to be eroded within 6-8 month. Quick includes 1-1.5 years. Slow and very slow includes erosion of land between 2-3 years and 3.5 years respectively.The study reveals that 31% land of village Mudafat Kalikapur and 17% land of West Kalikapur of the category quick-very quick eroded in River Brahmaputra from 2007-2010.

Component at Risk

Mudafat Kalikapur is the worst affected village. Kheya ghat, Union Parishad office; Bazar, Homestead and agricultural land are under risk. At West Kalikapur agricultural lands and Homestead land are under serious threat. North and North-east part of the char is prone to river bank erosion.

Map 4.3: Erosion and Accretion



Source: RDRS, Modified by Author, 2011

Damage

With their land loss due to riverbank erosion as they failed in protecting their cultivable land, homestead plot, and other valuable properties from the cataclysm of riverbank erosion, they fall into vulnerable situation (Table 4.5). In char Manushmara 63% of his respondents actually abandoned their original homestead after 2000. People living in chars must move home at least once every 6 - 7 years. Additionally up to 20% of char land people were displaced by bank erosion during an approximate 11-year period. During this period about 2% were estimated to have permanently left the char land. Damage is acute when agricultural land with standing crop erodes in the river. River erosion and loss of land is given in table 4.5.

Table 4.5: Land erosion and accretion from 2007-2010

Land Category / Village	Homestead land-Decimal		Agricultural land-Decimal	
	Erosion	**Accretion**	**Erosion**	**Accretion**
Mudafat Kalikapue	175		300	
West Kalikapue	110		354	45
Adarsha gram	--	70	41	200

Source: RDRS, October, 2010

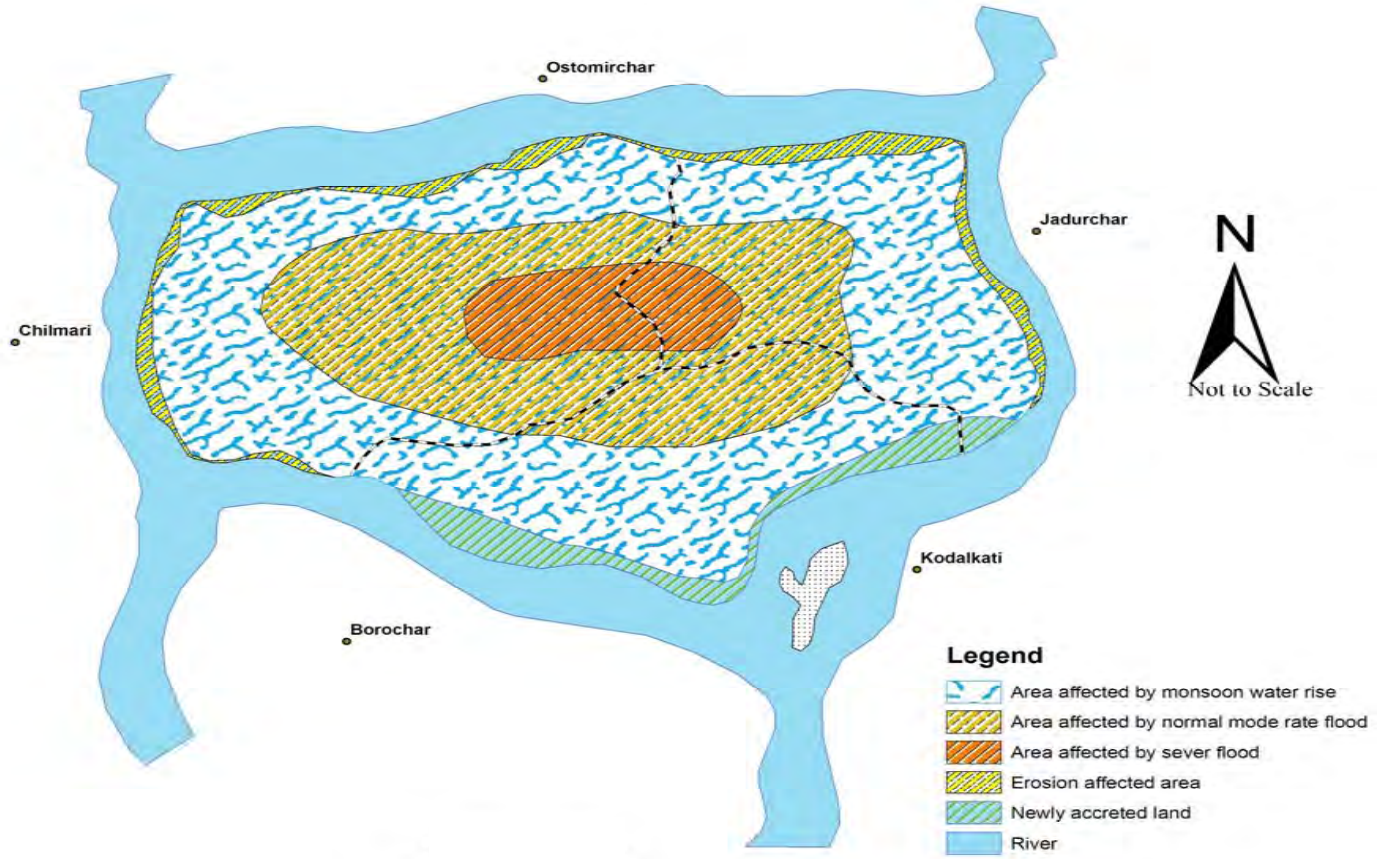
In terms of damage char Manushmara has lost more than 23.36% or 980 decimal of total land due to erosion. But the char land has accreted more than 315 decimal land within 2007-2010.

4.2 Impact from flood and erosion

Flood and Erosion in char Manushmara cause damage to the life and livelihood. Geographical location makes char Manushmara exposed to flood and erosion. For this reason impact is intense (Map-4.4). During moderate and severe flood and associated erosion, char Manushmara impacted form following;

	Impact
People	- During ***flood*** people cannot move from their houses. They are forced to use their savings (money, rice, pulse, chilly etc) to continue their livelihood. - Immediately after disaster they take some credit and get busy to harvesting winter vegetable. - In case of prolonged flood they take credit to sustain their livelihood. - Even they sale their properties cow, goat, hen, stored grain, even their house hold. In 2004 about 6 household were forced to sell their belongings. In 2007, 07 of the village people sold domestic animals.
	- Impact in ***erosion*** is rapid on set. - People loose agricultural and homestead land - People are forced to move to new place; within char and out side char. - If erosion is not that severe people move within char. But if erosion is severe with acute land loss people is forced to move to another char. In char Manushmara in 2007, 12 families left Mudafat Kalikapur because of severe erosion, to Jadur char.
Household	- Household materials in char Manushmara is not durable. - After flood all the household face damages. Earthen foundation wipes away, walls get stretched, and bends or the structures get damaged. In 2007 all 249 households were damaged. 153 damaged severely, 51 houses collapsed and 45 houses damaged moderately. - For this reason people store some construction material bamboo, but in case of severe flooding. Immediate after flooding there is risk of land sliding. Sliding sometimes partially damage of household.
	- Erosion if occurs people usually shifts their houses and properties as early as possible. - If it is associated with flood, properties cannot be removed. Household facing erosion has to be relocated. In char Manushmara erosion affected people are forced to relocate them at Adarsha gram.
Homestead land	- Household lands are fragile, because land is filled for uplifting the elevation. - In Manushamra homestead land is uplifted for kitchen garden and protection against flood. Severe flooding damage land and immediately after flood homestead land slide is common. - With severe flood associated with current and erosion soil washes away through mud slide and soil contraction tree, vegetation, kitchen garden, and fodder spot for animal's damages. 2007 flood reported 115 homestead land slide. Homestead land slide damage kitchen garden and domestic animal shed. It makes livelihood restoration options more rigid.
Agricultural Land	- Flood and Erosion damages and destroys agricultural land and crops. Impact is severe because they occur from April-October. - Rice, Jute remain in tender stage, they cannot be harvested. Cost of agricultural production is therefore doubled. 2007 flood washed away entire paddy, jute and sesame.
Infrastructure	- Brick built primary school and UP office eroded in 2007 flood. - Flood caused only earthen road breached in 13 spots. Even road connecting to culvert face mud slide. Therefore both road and culverts are of no use.

Map 4.4: Vulnerable Area



Source: RDRS, Modified by Author, 2011

4.3 Vulnerability from disaster

The char is formed as a result of river erosion and silt deposition and surrounded by water. Near-annual flooding of the Bramhaputra region regularly forms and re-forms the char, making them highly prone to acute erosion (EGIS, 2000). Flood force thousands of families to move their households each year. People move five to seven times in a lifetime, with poorer char households invariably moving many more times due to the inferior quality and location of the land they move to and from. For char Manushmara every single component household, agricultural land, infrastructures are at risk. Remoteness, limited livelihood options, frequent migration, multifaceted hazard and chronic levels of poverty intensify the level of risk manifold. In Manushmara, flood and river bank erosion force people to live here with limited livelihood options. All the factors create risk associated with increased vulnerability. The vulnerability context is presented in following figure 4.3 and table 4.6;

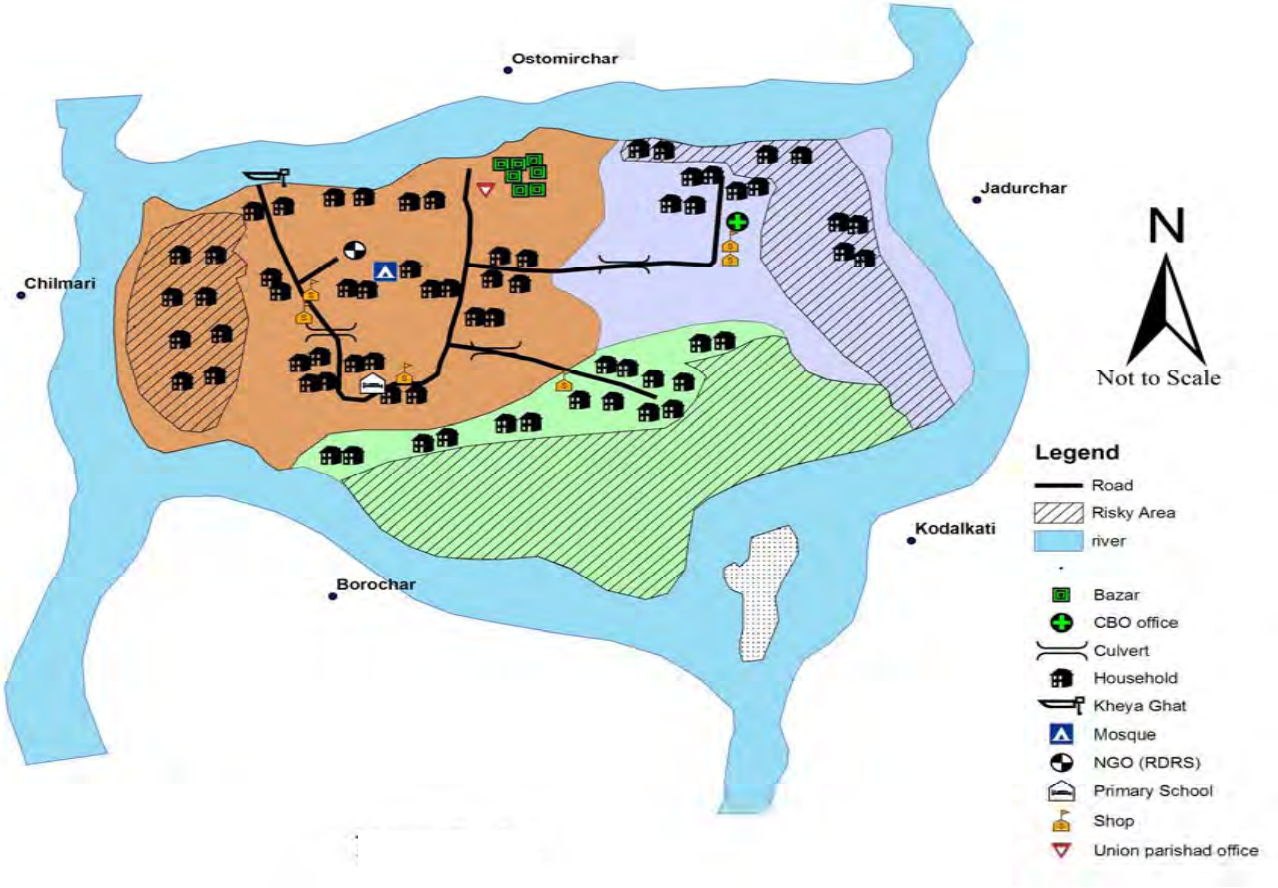
Social Vulnerability

Char land offer different societal structure. Flood and erosion is the major reason for the vulnerability, controlling the life and livelihood of people in char land area. Social status, class, gender, disability and migration status and the nature and extent of social networks in the char land area is not well enough and some groups are more prone to disaster. Placing the genesis of disaster in a longer time frame causes extreme impact in their future life and livelihood. The social attributes of disaster vulnerability indicates that disaster events differentially harm the poor. For reasons of economic disadvantage, lower human capital, limited access to social and political resources, residential choices, and evacuation dynamics are the social factors that contribute to observed differences in disaster vulnerability by race/ethnicity and economic class.

Physical Vulnerability

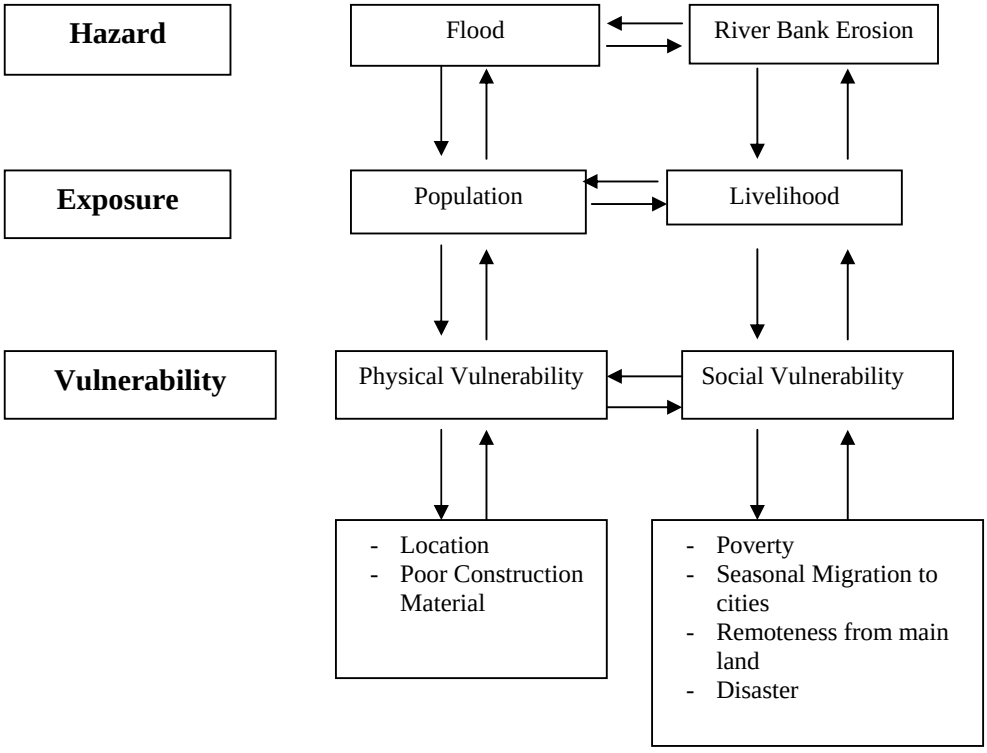
Physical Vulnerability in char land area appears from geography, poverty and structure.

Map 4.4: Vulnerable Area



Source: RDRS, Modified by Author, 2011

Figure 4.3: Vulnerability context of char Manushmara



Flood and erosion frequently attacking to char make entire char population and livelihood expose to risk. Their vulnerability can broadly be categorized to physical and social vulnerability. Vulnerability rises from location construction, poverty, migration and such other social and physical vulnerability. Some significant factors considering vulnerability are;

Progression of Social Vulnerability

Restoration of livelihood and vulnerability

Livelihood in char takes average 4 to 5 years to settle. After migration char land restoration of household takes 1.5 years. Restoration of irregular income takes 2 years, regular income after 3 years. A settled life starts after 4th year of settling, but within the time the gets prone to disaster. For this reason their life is always unstable. Soon after they restore life, they are prone to disaster.

Poverty and vulnerability

The poor tend to occupy the more flood-prone environments. In char Manushmara 59.7% of people live below 5000 taka income per month. They did not have a regular source of

income. Poverty drives them toward settling and working in precarious locations such as unstable riverbanks in farming areas. In turn the unsustainable settlement of such areas can accentuate flooding levels, causing a cyclical increase in hazard exposure. It is not just that the poor may be more exposed to flooding: crucially they are also more likely than the wealthy to suffer when flooding strikes. At the household level they have fewer resources upon which to draw to counteract the impacts of flooding regard to flood hazards, because disruption to assets and livelihoods by one event often make households yet more vulnerable to future flood hazards. That downward spiral, which confirms how, after each flood, the same families tend to lose their homes, possessions and livelihoods, increasing their vulnerability to the next disaster event.

Labour Capacity and Vulnerability

Existing labour force in the char depend on seasonal labour (harvesting) activities.Lack of education and immobility of char force people to depend on manual labour and thus their income opportunity is also limited.In case of prolonged disaster event they lose their major income source-harvesting within char.

Education and Vulnerability

Poor road and distant location from West Kalikapur and Adarsha Gram discourage many students (specially female) to continue school. During monsoon the school is inaccessible to 89% school going children. Erosion and major disaster cause break study that impact education status. 13% student of class-V and 6% student of class-IV are continuing break study.

Displacement and Vulnerability

Displacement is forced rather voluntary. Causes and consequences of flood and erosion in surrounding and adjacent area (char land and main land) cause migration to a group. But the chain of poverty and disaster cause migration seven to eight times in their lifetime. They migrate because flood and erosion has taken their possessions and asset on them they were dependent. Each time they move to a newer place their asset and properties get smaller in quantity. Because, each time they move to newer place they have to begin their livelihood from beginning also the earlier hazard event took some of their valuable possessions. By the time they are about to settle down in 5-7 years, they become exposed to disaster and have to migrate again.

Disaster and Vulnerability

Flood and Erosion and other disasters in Char Manushmara are regular. Although other disasters like cold wave and nor'wester are not frequent but they threatens livelihood, especially agricultural production pushing people expose to disaster.

Remoteness and Vulnerability

In monsoon it takes about 2 hours to reach to main land. But in winter when the water level is low, it takes 3 hours to reach the mainland. Every day on an average 1.5 people move to nearby char. Remoteness of this char makes the society vulnerable many folds. Because of remoteness these households were especially vulnerable to disease and sickness. Limited movement cause inadequate income meant their families were malnourished. Low quality living environment and poor housing condition meant they were more exposed to the elements of nature.

Physical Vulnerability

Physical vulnerability of a disaster event clearly indicates that socially vulnerable populations suffer disproportionately in terms of property damage, injury, and death. Especially lower income households experience significantly higher rates of injury, particularly with regard to flood and erosion events.

Infrastructure and their physical vulnerability are following;

Union Parishad Office

Union Parishad office located within ½ kilometer from river Barhmhaputra. For easy communication of other char land dwellers UP member usually locates this within the eye visibility from river. Building Structure tin shed building with shallow foundation. It is vulnerable to both flood and erosion

Bazar

Bazar is located at the same position near UP office ½ kilometer from river. Shops are semi tin structure, with bamboo shed.

Road and Culvert

Earthen road is linear in nature and prone to mud slide with water and current increase. Culverts are constructed without preventive structural measures (i.e sand bags) make the structure vulnerable.

Household

Bamboo structured tin shed, semi tin shed and thatched houses and prone to erosion, mudslide and flood.

Progression of Physical Vulnerability

Location

Homestead, school, mosque, market, UP office all the structure are located closest proximity of the river. Maximum infrastructure is at easy reach. With normal water rise associated with current, wind or river bank erosion they are at risk of destruction.

Poverty

Limited livelihood options and seasonal uncertainty in the char land **is** strongly associated with seasonal appearance of disaster. All the factors are intensified by frequent migration of people or constant movement. Landlessness, continuous movement of the people and the livelihood factor throws them to poverty. A poor people are more focused in earning their livelihood. Their homestead and recurrent structures are poor.

Remoteness and Availability of construction material

In char land far away from main land is though to bring RCC, brick, or heavy material are not available and easy to carry.

Theoretically it is claimed that disaster risk is associated with hazard, exposure and vulnerability. In char Maushmara the char and its location is risk for itself. Population, poverty, social structure, economy, limited livelihood options intensifies risk. At the time they are associated with flood and river bank erosion the *"Risk factor"* attacks livelihood the entire population and livelihood component are exposed to disaster. Therefore, it increases vulnerability of the people living in char Manushmara.

Chapter Five

Linkage between Livelihood-Disaster Vulnerability

5.0 Introduction

The present study is conducted to understand the nature of Disaster vulnerability and Char livelihood and their linkage revealed from cause effect relationship. The study has conducted on Manushmara Char located in the Brahmaputra River. The study indicates that the Char people are enjoying a rudimentary life mostly depending on internal resources. Most people have lost their settlement at least three times in their life. They are informed of fact that life is uncertain and disasters such as, flood and river bank erosion is frequent.

This research has aimed to question some common claims about vulnerability and livelihoods. These are not open frontier zones capable of absorbing large groups of poor or marginalized people from more densely populated areas: someone always owns or will claim ownership of emerging land. Migration is circular and local people move and settle according to the erosion and accretion of land produced by the river. The livelihoods analysis based on findings char Manushmara painted a bleak picture of the life of poor households in the chars and suggests that the combination of physical and social characteristics make the chars one of the poorest parts of Bangladesh, with the people being amongst the most vulnerable to the disaster appears to them. Some of the major issues facing the poor in the chars were;

a) Inability to resist physical hazards;
b) Poor access to essential services;
c) Inadequate saving and credit options;
d) Poor access to income enhancing opportunities and services;
e) Greater vulnerability of women and children;
f) The importance of local informal organizations and institutions;
g) Adequate cooperation, quality and coverage by government and non-government organizations.

5.1 Livelihood and Root Causes to Vulnerability

Modeling population vulnerability and risk in natural disasters and post-disaster assessments of surviving populations enable governments and humanitarian organizations to make rapid, informed decisions under conditions of great uncertainty (Sarkar and Huque, 2003). Sustainable Livelihood Approach used revealed, access and capability is limited and that they are dependent and shaped by disaster and location factor. Access model is applied here,

where the simplified model allows information about community to be presented in terms of vulnerability and capacity to withstand disaster. The diagram below shows the progression of vulnerability form the way that information is gathered and analyzed and presented in figure 5.1.

Clearly, *char* life is not without insecurity. The uncertainties posed by Perennial River Erosion and flood make it difficult to develop good permanent houses and homesteads or invest in basic social infrastructure such as roads, schools, latrines and tubewells. Their scope for enhancing capabilities and assets, for improving livelihoods and infrastructure seems limited. Apart from the risk of severe and regular hazards, people are forced to live in this char. Rate of erosion is higher than the rate of land accretion in this char. Livelihood options are extremely limited in this char. Agricultural land in this char produces rice once a year. Every year the agricultural field is under threat of loss of both land and crop. From the time of cultivation to the time of harvesting, planted crop is under constant threat that they might be taken away by river Brahmaputra or being washed away by flood.

The major production of crop is also uncertain causing livelihood in this char is adding extra pressure leading to vulnerability. Migrants from river eroded areas settled here for search of new life. The study reveals that, migrants are the marginalized poor are forced to live in such vulnerable areas. Their economic status is below poverty level. Living in this char and fighting to harsh condition is yet another fight for them. The char land is unstable, remoteness in this char made the life for the new settlers harder. Within two or three years when the life seems settled, they face eviction due to erosion or severe flood. For the char land people life is never settled. For this reason in this char people's risk is intensified manifold in their day to day life.

Remoteness and isolation of people in the chars create their own societal structure and fight for their minimum sustenance within a small proximity. Land ownership is controversial in this char. Land is distributed on leasehold to the current char land people. Fragile economy with small seasonal variation associated with disaster event enhances poverty. It can be said that, migration, erosion, land ownership and poverty are the root causes to vulnerability in the char land Manushmara. They all together create cycle that impact the livelihood and enhanced vulnerability of the char land manifold.

Table 5.1: Root Causes of Vulnerability

Hazard	Unsafe Condition	Dynamic Pressure	Root causes
Flood	*Physical Environment* Dangerous locations Unprotected building and structure *Local Economy* Low income Unstable Livelihood *Livelihood diversity* Lack of seasonal variation Location factor *Social Structure* Special group at risk Seasonal migration *Public actions and institutions* Lack of disaster preparedness Occurrence of subsequent disaster event	Human Capital - Less occupational variation within char proximity - Frequent migration for jobs - Illiteracy/ Low educational status Natural Capital - Unclaimed ownership - Land erosion - Uncertainty in raring livestock. Financial Capital - Low wage - Regular credit intake Social Capital - Weak relationship status with mainland relatives - Frequent migration - Uncertain access to land - Their own social structure - Poor access to institution - Traditional views and use of indigenous technology - Unstable income generating activities - High adaptation capacity - Constant threat of eviction from erosion and land fight. - Inadequate educational institution - Inadequate health care facilities - Inadequate GO, NGO and CBO organization.	*Land erosion and Displacement.* *Flooding* *Limited Livelihood* *Poor Economy* *Remoteness*
Riverbank erosion	*Physical Environment* Dangerous location Frequent shifting of building within and outside char *Local Economy* Low income due to land loss Destruction of livelihood Livelihood diversity Threat to erode land during harvesting time Social Structure Migration within and outside char Public actions and institutions No preparedness measures Institutions are under threat		

5.2 Livelihood and disaster vulnerability in char land area

Access model interprets vulnerability and capacity by looking at differential access to resources-skills, land, information, etc. In essence it aims to describe the situation of vulnerable groups according to differences between the groups in a society rather than the quantitative characteristics of individual households or groups of households. To assess the livelihood in char Manushmara 'households' were considered as production units. Livelihood and their associated vulnerability can broadly be defined in three stages; *Life in Pre-disaster, During disaster and Post disaster*. Life in pre-disaster stage or in normal time they are engaged in their regular activities. They are engage in preparation agricultural activities, livestock rearing, and maintenance of household. Just before monsoon they also repair homestead to protect their houses from disaster. Some people migrate to cities for job.

Household budget in the char land always a deficit. People know that there is constant threat of flood, riverbank erosion and some minor disaster. They took credit, repair house, and uplifts the Vita and store crop early. Apart from that they adapt strategies for coping threats. It involves elements of physical, homestead preparation. Disaster in char Manushmara is a common phenomenon. Regular monsoon water inundates 65% low-lying areas. Erosion associated with increased water and current. Hazard in this char has attacked at significant magnitude causing massive disruption to the livelihood and economy. People cannot move from houses. They have to stay and protect household. Their livelihood activities stand still. Hazard increases risk. It is associated with increased propensity of robbery and theft. Also, severe erosion increases the risk of displacement. Soon after disaster, people engaged in resorting livelihood. Livelihood destructs very badly. Rice production; their principle source of income destroys completely. They immediately restore their household, try to overcome sock. Soon after disaster they heavily depend on credits. Because, they even cannot move to cities for jobs. Livelihoods in the char during these three stages are closely related to each other. People in the char have a very poor economic base. There is diminutive seasonal variation, with the appearance of disaster; their economy falls to vulnerability many fold.

5.2.1 Livelihood in the char

Livelihood in the char broadly categorized in three groups. Pre-post and During disaster. Land is the only resource and agriculture in the principle means of livelihood. Before disaster only 18% land is used for production of chili and pulse. Production is for homestead

use only. From April-October major cash crop Rice and Jute is produced. This phase of production is under severe risk of flood and erosion. During post disaster phase people immediately engage in restoring livelihood. They sold their stored grain, valuable possessions. Corn and peanut is produced during this phase but only at 8% land. Livelihood here is extremely fragile and depends on mercy of nature.

People are day labour both in the char and outside the char. Instable life results in illiteracy and inaccessibility to school (primary and secondary) and vise-versa. This is the major reason people force to select agriculture and day labour as occupation. Livestock are also under threat since during disaster, 9% livestock lost (death, theft) is found.

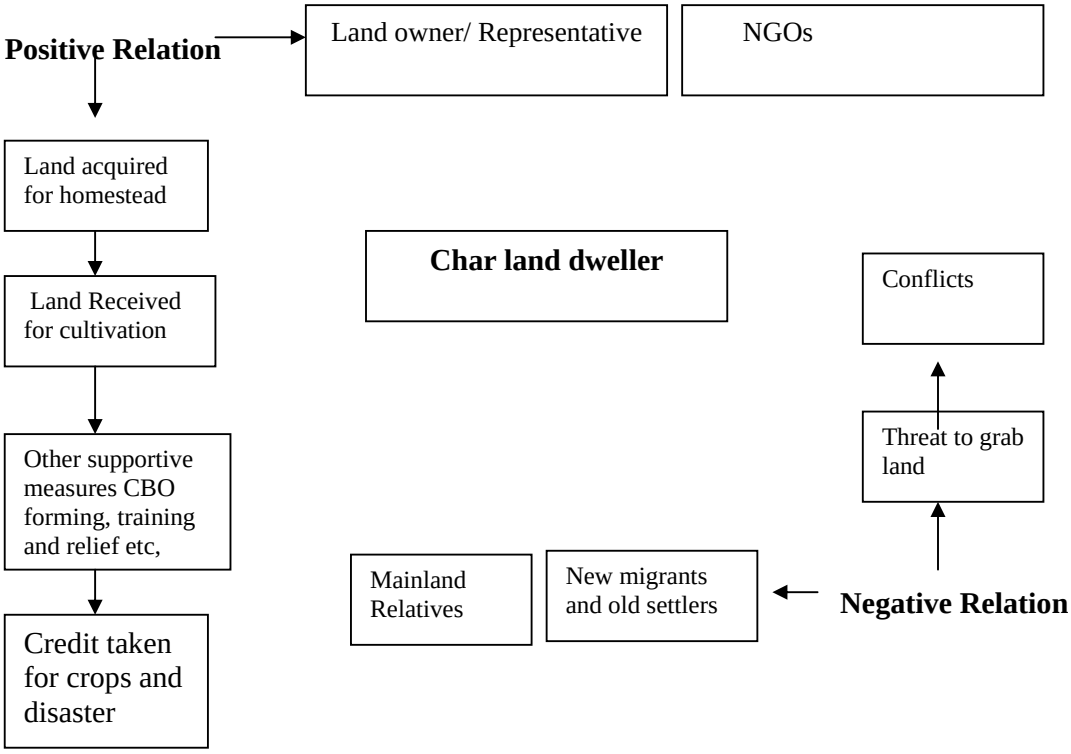
5.2.2 Social protection

Social protection is defined by economy, physical condition and location. In terms of income 90.7% people are below 6000 taka per month that is below national average. Income is irregular, seasonal harvesting season and migration. During prolonged flood major income source destroys, also during post disaster phase, they cannot migrate for seasonal job. Due to location, their physical assets are also under threat affecting shield.

5.2.3 Social Relation and Structure of domination

Domination arises from unresolved land issue and control. People in the char are oppressed by owner .Also, social system is unique, but it cannot be said that they ensure equity. GO and NGO support relies on the relationship they is to be built up with existing organization, char land owner and people they living around.

Social relation in the key strength, on which people survive and sustain in the char. People in the char develop their own social structure. They depend on each other, develop relation that is more than brotherhood. Relationship is useful because, being a group of people they can acquire land easily, settle easily and restore livelihood. Relationship status especially works in post disaster scenario in restoring livelihood. It also works when male members migrate for job outside char.



People try to keep positive relation with land owners and NGO. But the relationship with land owners is complex. Therefore, their structure of domination is also poor. They are oppressed by inactive government and the owner. Apart from disaster, char land dwellers are dominated by social structure.Each and every char dweller, especially the new migrants, poor and marginalized people face domination conflict. Within the small proximity char land dwellers know each other. They help and support each other for their sustenance. It is their need. They are not clear enough about the role of government. They only keep good term because they are the powerful group.

5.2.4 Unsafe condition

Flood inundates entire char land. Water current destructs homestead, infrastructure and standing crop. Riverbank erosion wipes away house and land. Prolonged disaster destructs house, cause mudslide and destroys economy. All factor leads to destruction of major source of economy, leading to poor homestead and other infrastructure. They give dynamic pressure by ownership, inefficient economy and loss of land. Entire social and physical structure is under risk. Flood is the major hazard. Erosion associates flood. It is almost regular in the

char every year char looses 2% land. Flood destroys principle crop and erosion takes away land and displace population.

5.2.5 Disaster (the trigger event)

At the time hazard appears it is triggered or intensified by char's remoteness, poor economy, limited livelihood option, and existing soil condition are the composite event triggering the disaster effect and increasing vulnerability. Social relations and domination visibly found to be cut off, playing no role and increasing vulnerability. People and family stay together. Life is paused, people seat idle because they have no work. They use their stored resource. Income is seasonal in case of prolonged disasters, their vulnerability increases. Because, in post disaster phase engagement is in any income generating activities are impossible,

5.2.6 Reaction, coping, adaptation and intervention

During sever flood dwellers to take cannot move or take shelter to safer place. Immediately after disaster char land people tries to restore livelihood by taking credit to move life on. In case of erosion they have to migrate to new place. Loss of major production increases vulnerability. It is intensified as they have to sell their household property and livestock etc.

Char land dwellers are displaces, are well aware of the river and its behavior. People in the char have an natural adaptation tendency and great strength to cope with it. People can settle and settle life very quickly. They can be the part of this char because they have year of experience to understand present and past scenario. To cope with disaster they built their houses high, store food and necessaries. Also, they take credit/ loan if there is chance of hazard. The socially vulnerable or disadvantaged households have lower levels of disaster preparedness. The *physical impacts* of a disaster in Manushmara clearly indicate that socially vulnerable populations suffer disproportionately in terms of property damage, injury, and death. Lower income households experience significantly higher rates of injury, particularly with regard to flood and riverbank erosion. The study indicates that socially vulnerable populations suffer greater property loss in disaster events. Overall, research on the social attributes of disaster vulnerability indicates that disaster events differentially harm the poor.

5.2.7 To the next disaster

Disaster destroys major crop, household and sometimes erodes in river. Soon after the restore, they are already exposed to next disaster. Because, from a disaster to next monsoon there is only six months remains to restore life and livelihood. Poverty drives people toward

settling and working in precarious locations such as unstable char. In turn the unsustainable settlement of such areas can accentuate flooding levels, increasing cyclical exposure to hazard. At the household level they have fewer resources upon which to draw to counteract the impacts of flooding. Immediately after disaster they do not have money to restore livelihood. Even they have no option to restore livelihood. The risk incurred by the migrants lead to downward poverty cycles because the household cannot overcome these risks. That downward spiral effect after each flood, the same families tend to lose their homes, possessions and livelihoods, increasing their vulnerability to the next disaster event.

Livelihood in this char found to be vulnerable, fragile and inconsistent. Settlers are displaced population from Astomir char, Natorkandi, Borocar, Ulipar, Chilmari. Previously they are landless marginalized population. In the char land is the major resource, for which they have migrated. Char land Dwellers are physically and socially vulnerable. Their accessibility to services are minimal. Income is below standard. Their vulnerability intensified in such oppressive situation. But their capacity to adapt, knowledge to judge scenario and social relation plays a positive role in settling and sustaining livelihood in char.

Vulnerability and livelihood in char are coin a side. They have some factors interrelated to each other. Their linkage in perennial at a stage, but their coping capacity and strenth address vulnerability to a new stage. Char Manushmara the product of River Brahmaputra is exposed to risk by unfolding the social stability and protection. Geography of the char makes the char vulnerable. Limited livelihood opportunity make the char exposed to disaster more then expected. The study reveals that people's regular livelihood is limited. Socially poverty of the people forces people to live below standard. Also, flood and erosion in the char weakens the social protections. Char land in the char soon after disaster people cannot immediately restore livelihood. Also, in case of major disasters people cannot migrate to cities, because life requires more restoration and household and social belts remains broken by the time. Also, they are always under threat of eviction from erosion. All, the scenario reveals that disaster and their vulnerability intensified by livelihood and vise-versa. In short, it can be said that, in Manushmara livelihood and vulnerability cannot be separated. They are interrelated causing people to live in a threatening situation.

Chapter Six

Research Finding and Recommendation

6.0 Research Findings

The present study is conducted to understand the nature of Disaster vulnerability and Char livelihood and their cause effect relationship. Char Manushmara in river Brahmhaputra is very much limited to its livelihood options and extremely prone to disaster. Limited livelihood, weak institutional approach, poor service and education and the domination of samaj are some crucial facts. Having all discrepancies people are living here and sustaining there livelihood.

The char came to an existence in 1970's is part of river system of erosion and accretion, at present constitutes 6.5 square kilometer area. It has population of about 1861. Due to polygamy of male population female population is 7% higher; 80% people in the char are

illiterate. Char is populated due to migration of people from nearby Astomirchar (51.33%), Borochar (7.33%), Natarkandi (12.66%), Kodalkati (8%), Datiarchar (6.66%) and from, mainland Ulipur (7.33%) and Chilmari (6.66%). Majority of the people migrated after 1998. Land is used for Agricultural purposes mainly for production of rice, jute, pulse, sesame, peanut, watermelon, cucumber, banana etc. Rice and Jute is the cash crop produced between Aril-October. Households are developed on highest elevated land. Settlement is linear and passes three stages (early, built up and mature) to form a full set of housing. Houses are compact and on easy reach to another house. Muadafat Baazar is the only commercial holding in the land, located just aside of the river. UP office is the only government structure in the char. It is virtually inactive through its performance. RDRS is the only NGO establishment in the char, performing CLP and Shikhon activities for char land people. All physical infrastructures (house, office and market) are built up of Tin, bamboo and Jute stick and straw. Road constructed in the village is disjointed and broken to many part. People usually uses field to move around in dry season and during monsoon they use boat.

Land is the primary and only resource for existing livelihood. Land is cultivated through share cropping. . Char land is instable, for this reason natural vegetation is rare. Banana and ivy and some shallow rooted trees are available. Under community based program. Bamboo, Neem, Jackfruit, Guava, Papaya, Rain tree etc are planted. Cattle, duck, goat, sheep are reared. On an average a household hold 3.9 livestock. 66% of the active labour force engaged in agriculture and related activities. During off-season the majority of male labor force migrates to Dhaka, Tangail, Gazipur and Khagrachari. On an average a labour (during migration and harvesting season in char) works 12-14 hours. Their average income is 5500 taka. But income is inconsistence and they depend on credit. Char land ownership is a conflicting issue. People frequently use the common properties, (River, grazing land accreted land etc.). In terms of Accessibility River is scaled one (1), since it can be used by all at any time Unproductive land ranked lowest (5), because in future they will be used for production and subject to land tenure. Remoteness and fragile disaster trim down chances to have contact with mainland relatives. Constant displacement and frequent movement force people to get reluctant with their kin outside char. People's movement within char is frequent. Char develops a sub-culture based on relation. Land, livelihood, disputing social issues are done through char land people. For this reason people try to have a harmonious relationship within char. GO are least accessed institute and relationship status is very poor. Rather NGO's have set example of establishing good relationship within short period. People in the char have

limited livelihood and limited access to services but their capacity to adapt is very strong. Within eight months, they can settle and establish a new livelihood. Indigenous technologies play an important role in developing adaptation capacity.

Flood and erosion are the major disasters faced by the dwellers. Erosion is regular 2% per year and on an average flood attack char every year. In terms of severe flood, erosion propensity intensified many fold. Also, risk of displacement also increased around 24% lands and household properties are under threat to erode very quickly (within one year period). Every year April-October, flood and erosion risk increased manifold. Flood inundates entire char land causing massive destruction to household and standing crops. Entire char land in under threat. Low elevation and characteristics of river increase threat of hazard in the char.

This study has aimed to question some common claims about vulnerability and livelihoods among people living on the *char Manushmara*. These are not an open frontier zones capable of absorbing large groups of poor or marginalized people from more densely populated areas: someone always owns or will claim ownership of emerging land. Migration movements are mainly circular and local people move and settle according to the erosion and accretion of land produced by the river. The livelihoods analysis based on findings char Manushmara painted a bleak picture of the life of poor households in the chars and suggests that the combination of physical and social characteristics make the chars one of the poorest parts of Bangladesh, with the people being amongst the most vulnerable to the disaster appears to them. Features of the social and physical environment shared by all residents of a locality, such as latitude and climate, public services, and socioeconomic characteristics that shape disaster outcomes and their pattern. If poverty itself impacts on vulnerability, then vulnerability to flood hazard now becomes seen not just as a product of physical location but also as a social product. The recognition and identification of locationally or socially vulnerable sectors of populations is itself only an indicator of the processes that have brought about these conditions.

One key insight from this research is that income-poverty is certainly not the only nonphysical influence on vulnerability, and assumptions that equate the two can lead to blanket solutions without proper analysis of other dimensions. As the preceding arguments suggest, vulnerability to the impacts of hazards has social, political, institutional and cultural

dimensions, too. A community's capacity to absorb the impact of a hazard event and recover from it is determined by its geographical location, the resistance of its physical structures and infra-structures, its economic capacity expressed in terms of asset levels, reserves and access to vulnerability within communities linked with socio-economic status, gender, age, ethnicity and political or religious affiliation.

Vulnerability analysis to these areas should be central to the regional planning and management. Analysis of this fragile environment will help plan to adapt definitive policy options as well as include char land into planning to address risk and associated vulnerability to an exact level. The study reveals that limited livelihood option associated with major disaster event and socio-political structure increases vulnerability many fold. Char Manushmara selected for the study explores the linkage is positive. Also the study reveals that, unique geographical location in the river Brahmaputra, its social, natural and locational character intensifies vulnerability of the people. The scenario is a repeated event and thus their livelihood and disaster is always linked pushing people deeper into poverty.

6.1 Recommendation

Land tenure, poverty, displacement, poor social and physical structures, remoteness and poor information technology are marked as some of the major draw backs in amplifying vulnerabilities. Associating with flood and erosion, char land offer different resource and management aspect. Therefore, it requires developing and executing appropriate plan for management of these services.

Land right

Landless people migrate to char in search of livelihood. Despite of poverty, hazard risk, they settle to char. Land ownership is still an unsettled issue. Although the char is declared khas land, ownership is hold by locally powerful businessman. Ownership conflict discourage people to excavate livelihood within char. Against the backdrop of dynamics erosion and accretion land right require particular significance. The perception of khas land should be redefined.

Explore Livelihood option

Limited and seasonally dependent livelihood intensifies poverty dynamics. Extremely fertile char land can be used to produce short term agricultural product; corn, peanut, watermelon, pumpkin on commercial basis. Homestead gardening should also be encouraged to eradicate poverty.

Increase Agricultural Production

The selection of crops in Chars can be targeted to minimize food insecurity. High species and varietals diversity be introduced. Both flood and drought resistant varieties of crops/vegetables have importance in terms of biodiversity in Char areas. Small scale seasonal crop over the year should be developed. Also homestead agriculture should be in encouraged at larger scale.

Develop Cottage Industry

People within char have ample time during off-harvesting season and during prolonged monsoon or flood. Small cottage industry can use people's skill when they have no job and help. Locally available materials can be used. Cooperative system cottage industry will help sustain such industry. Especially women can be involved to develop such industry.

Increase Market access

Improper and poor market structure (physical and capital); force people to sell their product at lower prices. Market system can be rearranged. Existing market system will be developed along with regular access to mainland market. This will help encourage enhancing livelihood options on commercial basis.

Develop Social Program

Social awareness program will act against backdrop of oppressive social scenario. Information dissemination, group formation, ensures women participation will change social scenario. Also, increase capacity through training, small scale cottage industry can improve the scenario. GO and NGOs who would form women's groups covering all char households. NGOs will provide micro-finance services to these groups (including loans for agriculture), support livelihood development at the homestead level (including homestead agriculture, forestry and non-farm enterprises), legal rights and awareness raising, health and family planning, and disaster management and climate change. This support will be particularly targeted at women.

Institutional arrangement

One of the research findings were almost non-functional government institutional set up. Due to remoteness of the chars it would be difficult to have functional institutes' arrangement in traditional arrangements in char areas. Char development committees made up of people of chars are in better position to accommodate typically changeable char situation. Existing agencies should also be redefined for char. Their role should be clarified to work in char areas. An interdisciplinary approach will upgrade institutional scenario. UP can play an important role keeping updated intervention to chars. Management intervention will help managing resource at lowest level, particularly for physical and social environment. The research also find that there is no rletion between GO and NGO. To overcome this GO and NGO coordination should be redefined for char states to ensure better result.

Extension of services

The char is dependent on two crops. Due to lack of government extension service on crop diversification, seed, storage and irrigation the knowledge of these has not reached here. The availability of the service would not only benefit char dwellers but also reduce male migration. Mobile veterinary service on livestock rearing will also help them to increase sustainability.

Education Service

Poor structure, inaccessibility and displaced population discourage children to continue studies. Also, break studies increase drop out rate. Ensure physical structure, hire local people to stay in the char and adjust to seasonal constrains and communication can encourage continuing school. Adjust to break studies, create volunteer group to help continue study during disaster and resettlement to char. Also satellite program will help develop of higher studies.

Coping with hazard

People cannot avoid hazard, while living in char. Improved warning system is needed so that people could shift their meager belongings to higher elevation or mainland before disaster strike. Also training on local scale disaster management could improve their skills to combat disaster. Encourage people to develop flood proofing through strengthening household, create multipurpose flood shelter for animal and people along with safe transportation to

these shelters. Resettlement program should be in place. Use of updated data base will help restore livelihood with proper assistance.

Cluster Village

Erosion affected displaced people move to a place of river familiar to them. They move in a group. Cluster village program can provide land for household and agriculture. Displacement and shift of program can be recorded and displaced population may receive land at same rate to the new settlement.

Development of information system

Poor information system in the char most of the time discourage policy holders to take further actions. Population, household number, char properties and hazard information should be collected and updated. All people and institution should have access to it including char people. Also, system should be developing to provide satellite images to aware them about erosion and flood propensity. Char land should maintain a database to identify their drawbacks. Also, use of updated technology like, solar energy, television and mobile will increase their information base. Groups may be formed and they may be sent to institutes learn about latest technology regarding agriculture, education and utilize them in char.

Livelihood scenario is depressing, but addressing "Char" as important land mass of the country of the authority and proper planning and management can change the scenario from a vulnerable to strong resilient society. Char land are always under pocket of chronic levels of poverty, because it is settled by poor, landless, displaced population. People always live under constant threat of disaster; displacement people continue living in the char. Also, limited fragile livelihood intensifies their vulnerability along with threat of hazard event. People are under spiraling effect of poverty. Each time they face hazard they lost their possession that put them deeper into poverty. But, their skill of adaptation and their intervention in using indigenous methods affect their vulnerability to a level. Rightful addressing to vulnerability to a level and exploration of livelihood in regional planning and management will help strengthen regional management. Proper planning will intervene burning issue, address to its root causes. Improvement in their root will strengthen their base and will help utilize char land and their resources.

Appendices

Definition

Adaptation

Adaptation is the adjustment in natural or human systems in response to actual or expected climatic situation or their effects, which moderates harm or exploits beneficial opportunities. The broader concept of adaptation also applies to non-climatic factors such as soil erosion or surface subsidence. Adaptation can occur in autonomous fashion, for example through market changes, or as a result of intentional adaptation policies and plans (UNISDR, 2009).

Capacity

Capacity is the combination of all the strengths, attributes and resources available within a community, society or organization that can be used to achieve agreed goals. Capacity may include infrastructure and physical means, institutions, societal coping abilities, as well as human knowledge, skills and collective attributes such as social relationships, leadership and management. Capacity assessment is a term for the process by which the capacity of a group is reviewed against desired goals, and the capacity gaps are identified for further action (UNISDR, 2009).

Char

Char lands are the sandbars that emerge as islands within the river channel or as attached land to the riverbanks as a result of the dynamics of erosion and accretion in the rivers of Bangladesh (Banglapedia).The riverine sand and silt landmasses known as char in Bengali. The chars - some midstream islands and others attached to the mainland - are termed as char. Chars create new areas for settlement. Cultivation is an important resource and livelihood conditions in the chars are scarce country compared with the rest of rural mainland. However, a constant threat of riverbank erosion and flooding along with monga are common threat to disaster (NSPB,2003). An island char is 'defined as that land, which even in the dry season, can only be reached from the mainland by crossing a main channel (CEGIS: 2000). Two types of chars are found: attached chars and island chars. 'Attached chars' are accessible from the mainland without crossing a channel during the dry season and island char is only accessible through crossing main channel entire year.

Coping capacity

The ability of people, organizations and systems, using available skills and resources, to face and manage adverse conditions, emergencies or disasters is termed as coping capacity. The capacity to cope requires continuing awareness, resources and good management, both in normal times as well as during crises or adverse conditions. Coping capacities contribute to the reduction of disaster risks (UNISDR, 2009).

Disaster

A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources. Disasters are often described as a result of the combination of the exposure to a hazard the conditions of vulnerability that are present; and insufficient capacity or measures to reduce or cope with the potential negative consequences. Disaster impacts may include loss of life, injury, disease and other negative effects on human physical, mental and social well-being, together with damage to property, destruction of assets, loss of services, social and economic disruption and environmental degradation (UNISDR, 2009).

Disaster risk

The potential disaster losses, in lives, health status, livelihoods, assets and services, which could occur to a particular community or a society over some specified future time period. Disaster risk comprises different types of potential losses which are often difficult to quantify (UNISDR, 2009).

Disaster risk management

It is the systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster. This term is an extension of the more general term "risk management" to address the specific issue of disaster risks. Disaster risk management aims to avoid, lessen or transfer the adverse effects of hazards through activities and measures for prevention, mitigation and preparedness (UNISDR, 2009).

Disaster risk reduction

The concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events (UNISDR, 2009).

Early warning system

The set of capacities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities and organizations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss (UNISDR, 2009).

Emergency management

Emergency management is organization and management of resources and responsibilities for addressing all aspects of emergencies, in particular preparedness, response and initial recovery steps. Emergency management involves plans and institutional arrangements to engage and guide the efforts of government, non-government, voluntary and private agencies in comprehensive and coordinated ways to respond to the entire spectrum of emergency needs (UNISDR, 2009).

Exposure

People, property, systems, or other elements present in hazard zones that are thereby subject to potential losses. Measures of exposure can include the number of people or types of assets in an area. These can be combined with the specific vulnerability of the exposed elements to any particular hazard to estimate the quantitative risks associated with that hazard in the area of interest (UNISDR, 2009).

Hazard

A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. In technical settings, hazards are described quantitatively by the likely frequency of occurrence of different intensities for different areas, as determined from historical data or scientific analysis (UNISDR, 2009).

Natural hazard

Natural process or phenomenon that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. Natural hazards are a sub-set of all hazards. The term is used to describe actual hazard events as well as the latent hazard conditions that may give rise to future events. Natural hazard events can be characterized by their magnitude or intensity, speed of onset, duration, and area of extent (UNISDR, 2009).

Livelihoods

A livelihood comprises the capabilities, assets, and activities required for a means of living. It is deemed sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities, assets, and activities both now and in the future, while not undermining the natural resource base(UNISDR, 2009).

Mitigation

The adverse impacts of hazards often cannot be prevented fully, but their scale or severity can be substantially lessened by various strategies and actions. Mitigation measures encompass engineering techniques and hazard-resistant construction as well as improved environmental policies and public awareness (UNISDR, 2009).

Preparedness

The knowledge and capacities developed by governments, professional response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from, the impacts of likely, imminent or current hazard events or conditions. Preparedness action is carried out within the context of disaster risk management and aims to build the capacities needed to efficiently manage all types of emergencies and achieve orderly transitions from response through to sustained recovery (UNISDR, 2009).

Prevention

Prevention is outright avoidance of adverse impacts of hazards and related disasters. Prevention (i.e. disaster prevention) expresses the concept and intention to completely avoid potential adverse impacts through action taken in advance (UNISDR, 2009).

Recovery

Recovery is restoration and improvement where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors. The recovery task of rehabilitation and reconstruction begins soon after the emergency phase has ended, and should be based on pre-existing strategies and policies that facilitate clear institutional responsibilities for recovery action and enable public participation (UNISDR, 2009).

Resilience

The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions. Resilience means the ability to "resile from" or "spring back from" a shock (UNISDR, 2009).

Response

The provision of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected is response. Disaster response is predominantly focused on immediate and short-term needs and is sometimes called "disaster relief". The division between this response stage and the subsequent recovery stage is not clear-cut. Some response actions, such as the supply of temporary housing and water supplies, may extend well into the recovery stage (UNISDR, 2009).

Risk

The combination of the probability of an event and its negative consequences is risk. The level of potential losses that a society or community considers is acceptable given existing social, economic, political, cultural, technical and environmental conditions (UNISDR, 2009).

Structural measures

Any physical construction to reduce or avoid possible impacts of hazards, or application of engineering techniques to achieve hazard resistance and resilience in structures or systems is structural measures. Common structural measures for disaster risk reduction include dams, flood levies, ocean wave barriers, earthquake-resistant construction, and evacuation shelters (UNISDR, 2009).

Non-structural measures

Any measure not involving physical construction that uses knowledge, practice or agreement to reduce risks and impacts, in particular through policies and laws, public awareness raising, training and education. Common non-structural measures include building codes, land use planning laws and their enforcement, research and assessment, information resources, and public awareness programmes (UNISDR, 2009).

Vulnerability

Vulnerability is the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard. There are many aspects of vulnerability, arising from various physical, social, economic, and environmental factors (UNISDR, 2009).

Questionnaire

Questionnaire Survey

Livelihood Dynamics and Disaster Vulnerability of Char Chaluhara-Shirajganj

1. **Name:**
2. **i. Age…….. ii. Gender**
3. **Migrant: Yes… No…**
   a. If yes previous/permanent location: ……..
   b. When you come to this char: ……..
4. **<u>Human Capital</u>**
   *a.**Job Status:***
   i. Regular……
   ii.Seasonal ……
   b. ***Place migrate for seasonal job*****.....**
   c. ***Educational Status: ……..***
5. **<u>Natural Capital</u>**
   a. ***Land Status***

i. Land (Cultivable)

ii. Land (Homestead)

b. ***Access to Community Property resource***

i. School Physical Distance Time distance

ii. CBO/NGO

iii. GO

iv. Micro finance organization

v. Health Facilty

c. Raise livestock:

Cow…… Goat ……. Chicken……. Others……..

d. Water Source :

i. Natural…… Tube-well ……..

ii. Distance from the water source ……

e. Vegetation:

i. Natural

ii. Community Based Program ……..

Focus Group Discussion

Checklist

1. Relationship with relatives in mainland
   - How they maintain relationship with mainland relatives
   - How they socialize with them and participate in various occasion
2. Reason of Migration
   - What are the reasons of migration / what factors force them to migrate
   - How they took the decision (a single family member/group of people.)
3. Relationship with village dwellers.
   - How they maintain relationship with the villagers/common people.
   - How they maintain relationship with village head.
   - How they maintain relationship with development/ government
4. Relationship with Government and non-government officials.
5. What types of institutions are there?
   -microfinance
   -livelihood restoration

-health and awareness building

-disaster preparedness.

6. How and why groups are formed based on activity

-they form microfinance group.

-they form livelihood restoration group

-if they have any disaster preparedness group

7. Community based organization

- Why the form community based organization

- How many groups they join

8. Access to those institution

- How many institutions are there?

- How they participated there?

- If they could raise voice and took part in decision making activites

9. Social status to maintain network

10. Strong links with family & friends

11. Traditions of reciprocal exchange

12. What types of infrastructure are there?

13. Access to those infrastructures

14. Are they informed about the latest technology for life and livelihood?

a. Ability of char land dwellers adapts them to the existing condition of that area.

b. Their ability to merge indigenous technology along with scientific technology.

Participatory Rural Appraisal-PRA

Checklist

1. Socio-economic profiling

2. Village profiling

3.Wealth chart

4.Vulnerability chart

Disaster Information Checklist

Union parishad, NGOs and CDMP

1. Disaster

a.Flood

b.Erosion

2. Disaster risk

a. Intensity

b. Frequency

c. Damage

3. How they perform their role during disaster.

Vulnerability Checklist

Assess Vulnerability:

a. Social vulnerability (PRA-Ven diagram, seasonal mobility chart)

-How existing social structures make them vulnerable

b. Physical vulnerability (institution, infrastructure), UP, NGO, CDMP

- How existing physical structure make them vulnerable

Weight for measuring the response to Social capital

1=very good	3=Fair	5=Bad
2=Good	4=Moderate	

Weight to assess accessibility

1- Very frequent movement.

2- Frequent movement

3-Moderate movement

4-Low movement

5- No movement

Access to common property resources

Property	**Rank**	**User**
River	1	Each and every people in the char use the river abundantly.
Unused homestead land	2	Ultra poor, women headed family members or even the household dwellers use this land. In this land there are abundant leaf vegetable (Shak) and small fishes. But not all can use this. People of same para use these for their sustained.

Ponds and Ditches	3	Ponds are used for cooking, bathing and washing. People in the closest proximity use this.
Trees and vegetation on common properties grazing land	4	Trees and vegetation is used by all. In terms of grazing land char land dwellers use it for rearing cattle, goat, and sheep. But as soon the land is ready for crop production not all can use them.
Unproductive land	5	Unproductive land rank highest, because they can be used for production if needed. For this individual dweller try to have these land. Although not used they have control over land.

Source: FGD, June, 2010

Coordination schema

Objectives	Parameter	Complex variable	Simple variable	Measuring unit	Data source	Collection method (how to collect)
1. To identify livelihood dynamics of people living in char land area	Livelihood	Asset	Human capital -Labor capacity -Education	- Work per day - Literate/ illiterate	Primary	Questionnaire survey, FGD
			Natural capital -Land, -Livestock , -Water -Vegetation	-Land/landless -Access to common property resources. - Raise any livestock -Water source -Access to water -Vegetation-natural/program based	Primary	Questionnaire Survey, FGD
			Financial capital -Savings, -Credit	- Wage - Access to credit	Primary	Questionnaire survey
			Social capital (network, group, institution social relation, immigration status)	-Relationship with relatives in mainland -Reason of Migration -Relationship with village dwellers. -Relationship with Got/Ngo -What types of institutions are there? - How and why groups are formed based on activity. -Community based organization - Access to those institution - social status to maintain network -strong links with family & friends -traditions of reciprocal	Primary	FGD, Questionnaire survey, life history

Objectives	Parameter	Complex variable	Simple variable	Measuring unit	Data source	Collection method (how to collect)
				exchange		
			Physical capital (infrastructure, technology,equipment)	-What types of infrastructure are there? -Access to those infrastructures -Are they informed about the latest technology for life and livelihood?	Primary	Questionnaire survey, consultation with organized people.
		Activities	a. Income generating activities.		Primary	Questionnaire survey, FGD
		Capabilities	c. Ability of char land dwellers adapts them to the existing condition of that area. d. Their ability to merge indigenous technology along with scientific technology.		Primary	Questionnaire survey, FGD, PRA
2. To analyze disaster vulnerability of the study area.	Disaster	c. Flood d. Erosion	d. Intensity e. Frequency f. Damage		Union parishad, NGOs and CDMP	Literature review
	Disaster Risk	Vulnerability	a. Social vulnerability b. Physical vulnerability (institution, infrastructure)	-How existing social structures make them vulnerable - How existing physical structure make them vulnerable,	Primary	PRA (Ven diagram, Seasonality mobility chart,), FGD, Life history.
					Union parishad, NGOs and CDMP	Literature review , field visit

Objectives	Parameter	Complex variable	Simple variable	Measuring unit	Data source	Collection method (how to collect)
3. To explore linkage between livelihood and disaster vulnerability in char land area						

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