

**Impact of Riverbank Erosion on the Elderly: A Study on a
Coastal District of Bangladesh**

Submitted by

Examination Roll: 3415

4th Batch, Registration No: Ha-3611

M.S.S. (2nd Semester)

Session: 2013-2014



**Institute of Social Welfare & Research
University of Dhaka**

March, 2015

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This thesis has been conducted to fulfill the partial requirement of M.S.S degree.

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This study entitled “*Impact of Riverbank Erosion on the Elderly: A Study on a Coastal District of Bangladesh*” has been conducted to fulfill the partial requirement of my MSS degree (Course: 1004) at the Institute of Social Welfare and Research, University of Dhaka. At the very outset, I would like to express my greatest appreciation to Almighty Allah who has given me the opportunity to do my higher study at a very recognized institute like the Institute of Social Welfare and Research, University of Dhaka. I am very much grateful to my loving mother and sisters for their continuous support and co-operation. For the successful completion of my thesis, I am indebted to many persons and agencies.

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Mahmdul Hassan

EXECUTIVE SUMMARY

The rivers have historically played an important role on the lives and livelihood of the people in Bangladesh. The annual flooding over the plains caused by these rivers is considered to be the blessing because it makes the land fertile and the curse if the magnitude of floodwaters regularly causes bank slumping and erosion. As the consequences, every year thousands of people are affected by flood and erosion hazards especially those who live not away from the river banks. Sufferings of riverbank erosion is very terrible on the elderly as they are considered the most vulnerable and dependent group during every disaster period.

Riverbank erosion has long been a dominant environmental problem affecting many people of Bangladesh especially the elderly. It has so many adverse effects on the lives and livelihood of the people of this disaster prone country. In this study, it is tried to explore the impact of riverbank erosion on the elderly living in a coastal area of Bangladesh. This study is both quantitative and qualitative in nature. Here, the basic method is sample survey. Apart from these a few case studies were conducted to supplement the total findings of the study. Char Alexander at Ramgoti upazila in the Lakshmipur district is the study area. Purposive sampling method is used for determining the sample where 100 elderly people are selected as sample. The data for this study is collected both from primary and secondary sources. The study is relied on interviews, observation and case study methods. The main objective of the study is to find out the impact of riverbank erosion such as socio-economic, physical (physical illness, sanitation and water source) and psychological status (anxiety, MDD and PTSD) on the livelihood of the affected elderly. Besides, this study has emphasized some recommendations given by the affected elderly for improving their condition.

This study reveals a mixed and some new findings regarding the impact of riverbank erosion on the elderly. In this study, the number of male respondents is more than the female respondents. In this study, it is seen that male respondents are 60% whereas female respondents are 40% (Table: 1) and this disaster (riverbank erosion) attacked about 10-15years ago. In regard to the types of house, it is found that before the bank erosion about 30% respondents had kacha (mud and bamboo) house, 60% respondents had tin & wood house and 10% respondents had semi-pacca house. But now 25% respondents live in hut, 60% have respondents have kacha (mud and bamboo) house and 15% respondents have tin & wood house. Here, though the number of kacha house have increased but at the same time, a

large amount of people are living in hut and the number of tin & wood houses have decreased remarkably (Table: 2). On the other hand, Before the bank erosion, about 50% respondents had their own house to live, 30% female respondents answered about the ownership of house of her husband and about 20% respondents informed about their son's ownership of house. But now the amount of son's ownership of house have raised up to 60% and only 30% respondents have their own house after the bank erosion of Meghna River (Table: 3). This study reflects that about 80% respondents had living land and about 20% had no living land before riverbank erosion. Since that erosion, 25% respondents have been living in government land, only 21% have her husband land to live and 37% respondents have their own land to live. Besides, due to this disaster attack a lot of people live in son's house (17%) (Table: 4). Here, most remarkable fact is that a significant number of people became landless and they have started to live in road-side government areas which are commonly known as "Berī".

A lot of respondents have lost their cultivating land as a result of riverbank erosion. Among 100 respondents about 80% respondents had cultivating land before that bank erosion whereas only 30% respondents have cultivating land now (Table: 5). Besides, many of them have to change his occupation after losing their cultivating land. Here, agriculture was the main occupation of most of the respondents (45%) before the riverbank erosion, about 15% respondents were fisherman and about 30% of female respondents were housewife. Besides, only 5% respondents were dependent on family members. But this scenario has totally changed after the erosion. Now, a major part of the respondents are dependent (50%) and only 20% respondents are engaged in agriculture. This riverbank erosion has made people dependent on others (Table: 6). Monetary loss is a great loss for elderly. About 25% respondents have lost in total 80000-1.2 lac taka and only 5% respondents have lost in total 2.4 lac taka and above taka due the devastation of riverbank erosion. Maximum respondents (40%) have lost 1.2 lac tk-1.6 lac taka. Besides, 20% and 10% respondents have lost 1.6 lac tk-2.0 lac taka and 2.0 lac tk-2.4 lac taka respectively. They are passing a very miserable life in the Char. But, most noticeable fact is none of them have got services from government and non-governmental organizations. No one comes to help them during the post-disaster period (Table: 7).

This study reveals that during the period of riverbank erosion, respondents have faced many health problems such as unstable angina, fatal arrhythmias, asthma etc. Among the

respondents about 64% respondents were suffered from unstable angina, 31% became victim of fatal arrhythmias and about 5% respondents had faced asthma problem (Table: 8). Elderly become worried about their belonging during the erosion period which causes many health problems. Besides, many respondents become victim of various diseases after the erosion period. Many of the affected elderly believe that erosion is the cause of the illnesses. Among the respondents, about 87% respondents have been suffering from various physical illnesses after the erosion and they think that riverbank is the cause of their physical illnesses. On the other hand, 13% respondents do not feel that they are not suffering from any diseases due to riverbank erosion (Table: 9). Among 87 respondents, many respondents are suffering from more than one disease. About 55 respondents (63.21%) have been suffering from whooping cough and 25 respondents (28.73%) have said about their tuberculosis problem. After the erosion, the most common disease is scabies and other skin diseases whereas 75 respondents (86.20%) have been suffering from this health problem (Table: 10). Collected data shows that about 87% of respondents have been suffering from various diseases after the riverbank erosion. About 73 respondents have taken medical services but 14 respondents have not taken any medical services. Besides, only 10 respondents have taken government services whereas 63 respondents have taken medical services by themselves. A significant number of people did not get any government medical services (Table: 11). Here in this study, about 45% respondents have their own tube-well and 55% respondents drink water from neighbour's tube-well. But no one drinks water from pond or river water (Table: 12). In addition, among 100 respondents, sanitary latrine is used by only about 4% respondents and most of the respondents (90%) use kancha latrine (Table: 13).

In regard to psychological condition, respondents have expressed their feelings when they remember that disaster. Maximum number of respondents (40%) replied that they experience insomnia when they remember that incident, which is very common among the riverbank erosion-affected people. Besides, about 10% and 5% respondents replied that they usually experience dizziness and unsteady gait respectively when they remember that disaster attack. Also, 20% elder people replied that they have become the victim of flash back and panic attack respectively when they remember that incident (Table: 14). Though they are not conscious about their psychological problems but they agree with the symptoms of various psychological disorders. About 60 respondents have replied that they are experiencing some symptoms of psychological disorders. On the other hand, 40 respondents have replied that they do not experience any symptoms of psychological disorders (Table: 15). About 60

respondents have symptoms of psychological problems after the riverbank erosion whereas 25 respondents (41.67%) have post traumatic stress disorder and 5 respondents have expressed the symptoms of major depressive disorder (8.33%). Besides, about 15 respondents (25%) have been suffering from somatoform and mixed anxiety depressive disorder respectively (Table: 16). Here, most noticeable fact is that none of them have taken any psychological treatment yet. They are not aware about their psychological status.

It is matter of irony that none of the respondents have got any post-disaster services. They have not got any services from government and non-governmental organizations. No one comes to help them after the erosion period (Table: 17).

To conclude, elderly suggest some recommendations to protect themselves from riverbank erosion and also to support their life, family and belongings etc. In most cases, elderly recommended that government and N.G.O's should come forward to help them through providing monetary help, employment opportunities, advices, ideas and training etc. Also, elderly respondents want rehabilitation facilities from the government to start their life journey with new hope and aspiration.

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Chapter - One

Introduction



1.1 Background

In recent years, riverbank erosion has become a common natural disaster in Bangladesh. Bangladesh is one of the large deltas of the world. The whole of Bangladesh is formed with generic hilly region, limited high land and a vast area of plain land washed by river water. More than 310 rivers and tributaries have made this country a land of rivers (RIC, 2008). The geographical location, land characteristics, multiplicity of rivers and the monsoon climate render Bangladesh highly vulnerable to natural hazards. The coastal morphology of Bangladesh influences the impact of natural hazards on the area. Especially in the south western area, natural hazards increase the vulnerability of the coastal dwellers and slow down the process of socio-economic and psychological development especially for the elderly.

Deltaic sediments of Quaternary formation characterize most of the lands of Bangladesh. The natural setting of Bangladesh is between the Himalayas and the Bay of Bengal together with the prevalence of tropical monsoon climate. The catchment area of the major rivers is about 1.65 million square km of which only 7.5 percent lies within the border of Bangladesh (Sarker *et al.*, 2003) that generates 1200 km³ of run-off annually, only 10 percent of which is generated within Bangladesh. In addition to vast quantities of water, these rivers carry about 1.1 billion tons of sediment every year (EGIS, 2000; Sarker *et al.*, 2003) and are responsible for the prevalence of flooding and riverbank erosion in Bangladesh (Elahi, 1991). The combination of the large discharges and heavy sediment loads with high water content from the annual wet monsoon, a low degree of compaction, and a large amount of runoff materials result in highly variable and dynamic channel morphologies (Coleman, 1969) to adjust their bed configurations. The river channel may shift laterally by more than 300 meters (Haque and Hossain, 1988) in any season.

Table-1.1: Catchment Area of Major Trans-Boundary Rivers

Rivers	Total catchment Area (sq. km.)	Country-wise catchment area (Sq. km.)			
		India	Nepal	Bhutan	Bangladesh
Brahmaputra	552,000	1,95,000	-	47,000	39,100
Ganges	10,87,300	8,60,000	147,480	-	46,300
Meghna	82,000	47,000	-	-	35,000
Total	17, 21,300 (100%)	11,02,000 (64.02%)	147,480 (8.57%)	47,000 (2.73%)	120,400 (7%)

(Source: Baki, 2014)

Over 92 percent of the annual runoff generated in the GBM area flows through Bangladesh (Ahmad, 2000). Thus, a vast amount of water flows through Bangladesh. It is estimated that every year an average of 870 Million Acre Feet (MAF) of water flows into the country from India.

About 700 rivers (including tributaries and distributaries) of Bangladesh have almost 2,400 kilometers of bank line in our country. Along with the bank line there are 283 locations, 85 towns and growth centers are vulnerable to erosion (Islam et al, 2011).

Natural disasters may, at first glance, seem to strike all victims without regard to the common characteristics by which people are classified, such as age, culture, nationality, health status, or economic status. Older adults and the poor are distinctly disadvantaged with regard to being prepared for and recovering from natural disasters (Torgusen & Kosberg, 2006). Besides, they are the eye-witness of the incident, so it creates a great negative impact in their psycho-social condition.

Elderly are the most vulnerable group in our society. Due to their physical weakness and diseases, there are generally dependent on others. During the disaster period, after Hurricane Katrina in 2005, many elders and their families were amazed by reports that elderly persons had not been allowed to board a bus that would have take them out of the low-lying area. Incidents like this were not isolated; empirical research shows that elderly persons and their families suffered from stress, exposure to dangerous conditions caused by the disaster, lack of economic and social resources, and inadequate government response, many of which were linked directly or indirectly to the deaths of many elderly people after Hurricane Katrina (Bourque, Siegel, Kano, & Wood, 2007).

Historically, much of the literature giving attention to poor and older victims of natural disasters has focused on displacement and relocation as a consequence of a natural disaster. For example, statistics show that, after the Haiti earthquake in January 2010, about 7% (about 84,000) of the estimated 1.2 million Haitians who were displaced by the earthquake were over 60 years old (Urbina, 2010). In December 2004, after the tsunami ravaged India, Indonesia, Sri Lanka, and Thailand, 92,000 people over the age of 60 were displaced (Alzaga et al., 2005; Mudur, 2005).

During disasters, elderly as the most vulnerable group experience the worst condition due to negligence and abuse towards them. The present study intends to explore the impact of riverbank erosion, both physically and psychologically, on the elderly persons. Taking into these considerations and as an attempt to explore their present situation, *“Impact of Riverbank Erosion on the Elderly: A Study on a Coastal District of Bangladesh”*- titled research has been conducted.

1.2 Rationale of the Study

By nature’s law all human beings grow old one day. And in old age, people face many problems along with physical weakness and diseases in family and society. These problems are familial, economic, cultural and psychological. Due to their inability to earn, often the importance of elderly people reduces in family. They fall victim to many neglect and deprivation. Due to lack of income, it becomes difficult for them to maintain their life, to provide shelter and treatment for themselves. For this, they have to depend on others or seek help of others. This creates one kind of inferiority complex in them.

Bangladesh has a long cultural and religious tradition of looking after the elderly and it is expected that families and communities will care for their own elderly members. But rapid socio-economic and demographic transitions, mass poverty, changing social and religious values, influence of western culture, and other factors have broken down the traditional extended family and community care system. Most of the elderly people in Bangladesh suffer from some basic problems, such as poor financial support, senile diseases, and absence of proper health and medicine facilities, exclusion and negligence, deprivation, and socio-economic insecurity.

Disasters of all kinds affect older adults disproportionately, especially those with chronic diseases, disabilities or conditions that require extra assistance to leave an unsafe area and recover from an event. During emergencies, the elderly and disabled have many of the same needs as the general population. People with age-related or physical disabilities have different needs at different points in the disaster cycle. Besides, riverbank erosion creates a significant change in the life-style of elderly. Elder people have to migrate to a new place, may have to change his occupational status and sometimes they become victim of many physical and

psychological diseases. They have to adapt with new environment and wait for donation from both government and NGO's.

It has been found that the elderly become more vulnerable in disasters as they are more liable to chronic illness and incapacity, resulting both from the natural decline in their functional capacity and from greater exposure to accidents. Besides, there is scarcity of research in the impact of riverbank erosion on elderly to find out their condition. So, I think that this study will help us to explore the vulnerability, needs and also understanding physical, economic and psychological state of the elderly as a result of riverbank erosion.

1.3 Objectives of the Study

Riverbank erosion has now become a common phenomena and one of the major natural calamities of Bangladesh that took place in almost every day, every year. The effect of this disaster is widespread. The main aim of the study is to find out the impact of riverbank erosion on the livelihood of the affected elderly. On the basis of this general objective, the research is directed in the light of the following specific objectives:

1. To know the demographic information of the elderly.
2. To gather information about socio-economic condition of the elderly after riverbank erosion.
3. To explore health condition (physical illness, sanitation and water source) of the elderly after the riverbank erosion.
4. To explore the psychological state (anxiety, MDD and PTSD) of the elderly during and after that disaster.
5. To find out available government and NGO's services in post-disaster period and recommendations given by elderly for ensuring their whole community development.

1.4 Definitions of the Key Concepts Used

Riverbank Erosion: Riverbank erosion is a “geo-morphological process of alluvial floodplain rivers”. Simply it is defined as the process of wearing of the banks of a stream river. It is because of bank adjustment, bank trampling, and changes in bed elevation and topography in reaction to modified flow conditions or bank resistance.

Elderly: In developed countries, 65 or more year persons are regarded as elderly. Usually people over 60 are considered the elderly in Bangladesh (National policy on older person, 2013). In this study, people who are 60 years old or above will be considered as elderly persons.

Coastal District: Coastal areas are commonly defined as the interface or transition areas between land and sea, including large inland lakes. Among different coastal district of Bangladesh, Lakshmipur is one of them. In this study, Char Alexander at Ramgoti Upazila in Lakshmipur district is chosen as the study area.

1.5 Limitation of the Study

This research is an academic one with limited time, money constraint and small study area. Besides, it is a lengthy, complex, systematic and skilled based process. So, it is probable to have some error. During field survey some obstacles had to face in collecting data and documents. They are-

Time and Money constraint: Time provided for the research is very limited. Time for collecting data is not enough. Also qualitative study requires more time to analyze data collected. At the same time extra time is required to design the research in the light of new developments and insights. Besides, there is no allocation of money for the research.

Non-availability of data and documents: For collecting reliable data a good understanding between the interviewer and respondents is required. If the respondents cannot take the interviewer with confidence they may be conservative in providing proper information. For that interviewer has to give enough time to make good rapport with key informants. With limited time it is difficult to ensure it. Another challenge is the difficulty in having documented information. Sometimes documents may not be found readily available and considered confidential.

Selective study area: The study area was small and selective. There may be some variation as sample was taken from a particular geographical location for time and budget constraint.

Determination of various losses: Losses for homesteads, cultivable lands and kitchen garden/home yard land are calculated on the basis of the value (approximately) given by the respondents. Remarkable variation may be observed. But it does not influence the findings broadly.

Determination of Sample size: Due to unavailability of the number of affected households the perception of local elderly people has been used in determining the sample size. According to them the half of the total households has been affected.

Chapter – Two

Review of Relevant Literature

For any of research, review of literature is very necessary. It is an important, essential and integrated part to find out the knowledge gap. To endorse the rationality of the proposed study, the researcher tried to find out knowledge gap in this regard through study of relevant literatures, which includes the books, journals, reports and internet resources. Some relevant literatures of the proposed study are discussed below:

2.1 Bank Erosion of the River Meghna: Population displacement and socio-economic impacts (Islam, M. Zahurul et al: 2007)

The present study was conducted with the objective to review into the river bank erosion: population displacement and socio-economic impacts due to river bank erosion in Bangladesh and to conduct a case study to observe the Meghna river bank erosion, population displacement and socioeconomic impacts.

Data and information used for the study were based on the field measurement of the river cross sections and eroded banks. Questionnaire survey was made and interviews were held with the local people to collect data and information on the river bank erosion; population displacement and socio-economic impacts due to bank erosion of the Meghna River. Besides, necessary data and information were collected from different sources like Bangladesh Water Development Board (BWDB), Local Government Engineering Department (LGED), Water Resource Planning Organization (WARPO) and local consulting firms.

The result of the analyses of data and information showed that the river bank erosion affects the people to such an extent that the people lose all of their belongings affecting severely the socio-economic conditions of the people of the country. The result of the questionnaire survey showed that after the displacement of almost 94% of the displaced person became fully landless. About 27% of the displaced person adopted rickshaw-driving as their main source of livelihood, 44% became day-labourers, 9% started to work in the garment factories with very low salaries, 1% were engaged in fishing and less than 1% started to work in the engine boats in the rivers, 3% started petty business, less than 1% started significant business, 8% remained in their (previous) paternal occupation, agricultural activities and 6% were engaged in other occupations.

Analyses of the data of the questionnaire survey showed that as a result of this disaster, socio-economic displacement significantly affected the condition of the household size, educational attainment, labour force participation and occupational status, land holding and income at both individual and households levels.

2.2 Riverbank Erosion Induced Stress and Coping of Displaced Women in Bangladesh (Keya and Harun: 2007)

The purpose of the present study was to examine the psychological impact of riverbank erosion on women in Bangladesh. This study attempted to assess the perceived stress level and coping mechanisms of river erosion affected women who had lost their shelter and property and were compelled to migrate to government land. The findings of this study clearly show that displacement has profound psychological impact.

The major finding of this study is that displaced women differed significantly from non-displaced participants in their perceived stress. Displaced women had high level of perceived stress than their non-displaced counterparts. In the present study stress was assessed immediately after the respondents had the experience of riverbank erosion. The present study also attempted to identify ways by which river erosion induced displaced women cope with daily demands of living.

As expected, the results showed that these women use significantly different coping mechanisms compared to the non-displaced ones. Displaced women used more positive reappraisal and seeking social support. That means the victims had efforts to create positive meaning by focusing on personal growth and actively sought social support. It was found that they used less confrontive coping which means that they were less aggressive in altering their situation which is a sign of constructive adaptation strategy. The displaced women were also found to use less self-control, accepting responsibility, escape-avoidance and planned problem solving strategies of coping compared to their non-displaced counterparts. These findings are also not unexpected.

2.3 Mental health and the psychosocial consequences of natural disasters in Asia

(Udomratn, Pichet: 2008)

This article presents an overview of natural disasters in Asia, as well as mental disorders and psychosocial interventions related to disasters. This study reveals that the prevalence rate of PTSD and PTSD symptoms vary from 8.6% to 57.3% among Asian survivors in the aftermath of natural disaster.

The prevalence of major depressive disorder (MDD) related to disasters is less frequent when compared with PTSD. Data from Thailand showing that the prevalence rate of tsunami-related PTSD in children (diagnosed by child psychiatrists) and PTSD symptoms in adults (using a questionnaire) decreased over time while MDD in children did not, but depressive symptoms in adults showed a modest decrease at nine months of follow up.

In the developing countries of Asia the limitations of mental health professionals and inadequate knowledge and practices concerning the mental health of disaster victims among the medical and paramedic staff may lead to delays in the psychosocial interventions and rehabilitation of the survivors.

2.4 Impact of Riverbank Erosion Hazard in the Jamuna Floodplain Areas in Bangladesh (Rahman, M.R: 2010)

The paper provides an overview of Bangladesh populations displaced by river erosion. It focuses the socio-demographic profile of the victims of the study area. Caused riverbank erosion a considerable proportion of the victims are compelled to leave the original homestead plot and take shelter by the road side embankment, neighbors land and relative land. The health condition of the victims is very low.

Primary and secondary data are being used in the present study. The principal tools for collecting the primary data are questionnaires and interviewing two techniques of the survey method. The major sources of data used in this study are collections and analysis of local level office report, evaluation of government and semi-government projects, programs and census reports, published reports and articles etc. The present study includes some case

histories and case studies of the victims and notable issues to constitute another part of data collection.

The degree of economic loss and vulnerability of population due to bank erosion has dramatically increased in recent years. The impact of land loss involves primarily the loss of homestead land, housing structures, crops, cattle, trees and household utensils. Loss of homesteads forces people to move to new places without any option and puts them in disastrous situations. About one million people are directly affected each year by bank erosion in the country. Most households earned their income through daily wages in surrounding, more stable communities. A very few ran small businesses; for instance the village had 6 shops selling tea and sundries. Very few people living on the bank line depended directly on farming as a source of income, as virtually all villagers had been rendered landless by river erosion. Over 70% of households had an income below the official poverty line in Bangladesh and over 50% were living below the extreme poverty line, with on average households earning less than US\$ 1 dollar per day.

2.5 Effects of Riverbank Erosion on Livelihood (Uddin, A.F.M Azim et al: 2011)

The report entitled 'Effects of Riverbank Erosion on Livelihood' provides the overall impacts of riverbank erosion on the livelihood status of the people who resides on the bank of rivers. This study also reveals how people cope up with this salient disaster. This report is an output of Climate Change, Biodiversity and DRR unit of Unnayan Onneshan, a multidisciplinary Policy Research Centre.

The study was conducted in the most vulnerable regions of Bangladesh (i.e., Kapasia Union of Gaibandha District, and Kazipur and Khasrajbari Union of Sirajganj District) due to riverbank erosion. The study tried to find out the effects of riverbank erosion on livelihood and its associated displacement. The study employed both primary and secondary data sources to find out the effects. Primary data were collected through semi-structured questionnaire from households of the study areas using purposive random sampling techniques to understand the adverse effects of bank erosion. On the other hand, tracking through Global Positioning System (GPS) gives the current bank line and image analysis from Google Earth gives the amount of area eroded in this year.

The study findings revealed that on an average, 256.1 hectare and 622.2 hectare of total land area of Gaibandha and Sirajganj respectively were eroded per year during the period of 1973-2009. In 2011, the erosion was found 60.8 hectare, 178.76 hectare and 203.36 hectare of land respectively that is an indication of increased erosion rate. From the study, it has been observed that the total economic loss arising from such erosion were 4448736 and 41939962 BDT in Gaibandha and Sirajganj respectively.

Respondents of poor income level have less opportunity in expending money on food consumption, educational expense and getting health care facilities. A vast majority of them (45.3 and 40.8 percent in Gaibandha and Sirajganj respectively) are in the income group of 3001- 4000 BDT. Among them, 45.4 and 49.9 percent in Gaibandha and Sirajganj respectively spend 1501- 2000 BDT for food consumption, which is inadequate for most of the time because of large family size.

Poor income also lessens the opportunity to invest in educational sector. However, bank erosion also evacuated schools and impedes the children in going to school that eventually increase the dropout rate. From the study, it is evident that almost one-fourth (22.7 percent) and more than that (27.3 percent) of the respondents do not spend a single amount of money for education in Gaibandha and Sirajganj respectively. An overwhelming majority of respondents (36.4 and 27.3 percent of the respondents in Gaibandha and Sirajganj respectively) argued that they are unsatisfied with their family health status. Empirical data shows that a vast majority of respondents (40.9 percent in both areas) pay only 301-500 BDT for seeking health care facilities. Moreover, during the period when bank erosion strikes, they face enormous health burden.

The major agricultural production of a calendar year in Gaibandha is Boro-Pulse-Jute. In addition to this, they produce homestead vegetation to fulfil their daily demand. It was revealed from the study that in Gaibandha, loss of one-hectare of agricultural land produce a total profit loss of 17795 BDT. On the other hand, in Sirajganj, agricultural production in a calendar year is Boro-*Gainja* (local variety of paddy)-Jute-Pepper. Loss of one- hectare agricultural land gives a total profit loss of 23165 BDT. People of those areas are generally poor and such loss makes them ultra-poor.

Such situation, in turn, makes them more vulnerable to migration and search for a hazardous job. Empirical data showed that bank erosion displaced a total number of 486 and 4028 inhabitants in Gaibandha and Sirajganj respectively during the study period. People aged between 20-35 moves to different districts of Bangladesh like Bogra, Chittagong, Dhaka, Dinajpur, Gaibandha, Sirajganj etc. while age groups of 31-35 and 26-30 years of age were found as the highest long distant migrants in Gaibandha and Sirajganj respectively. Those who were more than 35 years of age tried to maintain their livelihood by migrating in own district. Step migration pattern was observed during the study where people first relocated their homestead in nearby areas and tried to find out employment. After that, they migrated in a distant place to live a better standard of living but failed most often.

The marginalized and poor people not only lost property but also experienced socioeconomic deprivation through displacement. Because of the dynamic character of the braided channelled river and the failure of structural measures, the sufferings of the people continue. Long-term policies and strategies should be taken to cope up with bank erosion taking into account the social and institutional adjustment measures. Land relocation assurance is one of the appropriate strategies to cope up with such disaster. In addition, a flood plain zoning is essential to lessen the vulnerability of riverbank erosion.

2.6 Disaster Preparedness for the Elderly: An Analysis of International Literature Using Symbolic Inter-actionist Perspective (Marshall and Mathews, 2011)

From a symbolic inter-actionist perspective, this review examines literature pertaining to elderly persons who have been victims of natural disasters in North America, as well as around the world. The literature review addresses (a) emergency preparedness, (b) specific risk factors associated with the elderly, and (c) practice and policy implications. The review illustrates how negative perceptions of the elderly contribute to insufficiency of disaster services and a consequent increase in elder casualties. The literature shows clearly that to be able to save lives during disaster situations requires adequate preparations well in advance of the disaster. The key focus in the literature is that disaster emergency management programs must be tailored to address the needs of the elderly, because their needs are clearly different from those of the majority population.

It is seen that normal aging processes can result in cognitive, biological, physiological, and sensory changes with advanced age; these declines become more severe with the existence of chronic conditions. These include chronic conditions such as arthritis, cancer, heart disease, and diabetes. From a health standpoint, old elders are vulnerable in disasters due to impaired physical mobility, declines in sensory function, pre-existing chronic illness, dependence on medication, and need for routine personal care.

Events such as natural disasters appear to have a greater impact on the elderly than on the general population, due to their already diminished financial state. Older adults no longer have means to generate income; many (particularly members of minorities) have had a life history of limited access to income to sustain daily living.

Also, older cohorts may have experienced social stigma as result of dependency in other areas and may be reluctant to apply for aid during a disaster. Many people in this age cohort lived through the Great Depression and may be more likely to presume that others have needs greater than theirs.

Literature indicates that several housing-related issues have been explored in considering the needs of older adults during and after a natural disaster. These areas include relocation, shelter, institutionalization, and recovery. Considering the economic and health related vulnerability of older adults, it is not surprising that they are less likely to maintain a home during and after a natural disaster.

This study reveals that with aging come psychosocial adjustments in cognition. Changes occur in intellect, memory, learning, and creative process of elders. One of the most common mental reactions after disasters is posttraumatic stress disorder (PTSD), defined as chronic anxiety resulting from experience with danger. Typical symptoms include re-experiencing the traumatic event in recurrent thoughts or desires; “psychic numbing” or “emotional anesthesia,” characterized by detachment from others and loss of ability to feel happiness or intimacy; and/or extreme alertness, difficulty in concentrating, or sleep disturbances.

2.7 Socio-Economic Impacts of Gorai Riverbank Erosion on People: A Case Study of Kumarkhali, Kushtia (Baki, A.T.M. Abdullahel: 2014)

This is a both qualitative and quantitative research. The purpose of this research was to identify socio-economic impacts of riverbank erosion on people of Kumarkhali. It was hypothesized that the socio-economic impacts of riverbank erosion on affected people are quite significant and enormous. The findings of the study reveal that affected people have experienced substantial socio-economic impoverishment.

Data have been processed through coding and tabulation with the help of SPSS software before analysis. Primary and secondary data were analyzed both quantitatively and qualitatively according to the character of data. Following important findings of riverbank erosion at Kumarkhali has been identified:

Change of livelihood pattern: Their livelihood pattern has been changed as almost all of them have lost remarkable amount of homestead lands (83%), cultivable lands (90%) and kitchen garden/home yard lands (20%).

Social destruction: Many of them have got separated from their society as a result still they miss the social ties. Social destruction has taken place among the families. A number of joint families have been splinted into small families.

Income Erosion: 71% affected people has said that financial ability of the displaces has decreased i.e. they have faced income erosion badly, as a result most of them (84%) have become either hardcore poor, very poor or poor.

Change of Profession: Maximum of the respondents is from agri-based family. But now only 12% people are engaged in agriculture. That is, large number of people has compelled to change profession.

Degradation of life quality: Their quality of life has decreased. 93% people have gone through negative change of social status in term of financial ability of the family.

About 71% people have admitted that they missed the financial ability they had before. Getting compelled to change profession, getting separated from the society are also become headache for them. 60% erosion victims are low income generating (monthly income up to 10,000 taka).

About 83% people have lost their homesteads. Among them 53.01% has lost their homesteads at least one time. 46.9% has lost their homesteads twice or more. 18.1% displacees have no lands of their own for making their homesteads; they live in VP/Khasland. 90% victims have lost their cultivable lands. 20% has lost remarkable amount of kitchen garden land or home-yard land.

About 95% erosion victims admitted that their family status has changed. Among them 93% are negatively and 2% are positively impacted.

The socio-economic impacts of Gorai riverbank erosion on the people of Kumarkhali were crucial and still it is a nightmare for their successors.

Chapter - Three

Methodology of the Study

3.1 Research Methods

Two methods are available for conducting social research such as qualitative method and quantitative method. This study is both quantitative and qualitative in nature. Here, the basic method is sample survey. Apart from this, a few case studies were conducted to supplement the total findings of the study.

Qualitative research is collecting, analyzing and interpreting data by observing what people do and say. Whereas, quantitative research refers to counts and measures of things, qualitative research refers to the meanings, concepts, definitions, characteristics, metaphors, symbols and descriptions of things.

Qualitative research is much more subjective than quantitative research and uses very different methods of collecting information mainly individual, in-depth interviews and focus groups. The nature of this type of research is exploratory and open-ended. Small numbers of people are interviewed in-depth and/or a relatively small number of focus groups are conducted. On the other hand, quantitative research options have been predetermined and a large number of respondents are involved. By definition, measurement must be objective, quantitative and statistically valid. Simply put, it's about numbers, objectives hard data. The sample size for a survey is calculated by statisticians using formulas to determine how large a sample size will be needed from a given population in order to achieve findings with an acceptable degree of accuracy. Generally, researchers seek sample sizes which yield findings with at least a 95% confidence interval (which means that if we repeat the survey 100 times, 95 times out of a hundred, we would get the same response), plus/minus a margin error of 5 percentage points.

The key features of qualitative research are as follows:

- It uses words as the unit of analysis and often takes an in-depth, holistic and rounded approach to events/issues/case studies.
- It tends to be associated with description and small-scale studies and holistic perspective.
- It does not investigate causal hypotheses, instead developing and testing theories as part of an ongoing process.
- It tends to be associated with researcher involvement with the researcher acting as a measurement tool.

3.2 Selection of the Study Area

For the present research work on “impact of riverbank erosion on the elderly”, Char Alexander at Ramgoti Upazila in the Lakshmipur district has been selected purposively. This area is a coastal area. Mighty river Meghna has been continuing its devastation there for last 15 years.



Figure 1: Riverbank line of the Study Area

3.3 Population and Unit of Analysis

In the study area, the *Elderly* who are able to give information are considered as population and every older person is considered as unit of analysis.

3.4 Sample and Sampling

In this study, purposive sampling method is used for determining the sample where 100 elderly is selected as sample. Respondents are selected on a random basis.

In statistics and quantitative research methodology, a data sample is a set of data collected and/or selected from a statistical population by a defined procedure. On the other hand, sample is a subset of a population selected for measurement, observation or questioning, to provide statistical information about the population. Also, a sample is a finite part of a statistical population whose properties are studied to gain information about the whole (Webster, 1985). When dealing with people, it can be defined as a set of respondents (people) selected from a larger population for the purpose of a survey.

On the other hand, sampling is the act, process, or technique of selecting a suitable sample, or a representative part of a population for the purpose of determining parameters or characteristics of the whole population. Besides, sampling is concerned with the selection of a subset of individuals from within a statistical population to estimate characteristics of the whole population. Each observation measures one or more properties (such as weight, location, color) of observable bodies distinguished as independent objects or individuals. In addition, the purposive sampling technique, also called judgment sampling, is the deliberate choice of an informant due to the qualities the informant possesses. It is a non-random technique that does not need underlying theories or a set number of informants. Simply put, the researcher decides what needs to be known and sets out to find people who can and are willing to provide the information by virtue of knowledge or experience (Bernard, 2002, Lewis & Sheppard, 2006).

Moreover, purposive sampling technique is a form of non-probability sampling in which decisions concerning the individuals to be included in the sample are taken by the researcher, based upon a variety of criteria which may include specialist knowledge of the research issue, or capacity and willingness to participate in the research.

3.5 Data Collection Method

The data for this study is collected both from primary and secondary sources. A pre-test is conducted in the study area. An ideal standard interview schedule is prepared. Questions are both open and close ended. The study is relied on interviews, observation and case study method. Secondary data is drawn from the existing literatures like official documents, books, newspaper reports, previous research works, seminar papers, reports etc.

3.5.1 Primary Data

Primary data has been collected from the local people (Elderly) – both victims and people who have witnessed Riverbank erosion- using both methods of formal and informal interviews with the interview schedule. Informal discussions with various classes of people and direct field visits have also been done.

3.5.1.1 Present Value Calculation of Losses

Respondents have lost their homesteads, cultivable and garden lands in various years of the past. They have given approximate value of the land lost in particular year. The given value has been converted in term of present value according to the formula given below;

$$FV = PV (1+i)^n$$

Where, i = rate of inflation = 10% (assumed)

n = no. of years from 2014

PV = Value at that time (approximate)

FV = Value at 2014

3.5.1.2 Informal Group Discussion

While conducting the survey in the study area informal group discussion was carried out with different kinds of people. This informal meeting has been conducted in the gathering places of the locality. The issues related to riverbank erosion and its impacts were discussed and problems of the victims were identified.

Besides, interview with the key informants have been carried out with various walks of people in order to gather information about the problems of riverbank erosion, its impacts, perception and causes about erosion.

3.5.2 Secondary Data

Secondary data for this study has been gathered in two steps. In first step, before going to the study area, literatures were studied at Dhaka University Central library and Dr. Ahmadullah Memorial Seminar at Institute of Social Welfare, University of Dhaka. Secondary data includes book chapters, journals, reports, important articles, theses, related news/articles published in newspapers, related articles available in the websites.

3.6 Processing, Analysis and Interpretation of Data

Data collected from field visit is edited properly. After editing the collected data, information are classified on the basis of their characteristics. After that, data have been processed through tabulation with the help of SPSS software before analysis. Data processing refers to the process of converting data from one format to another. On the other hand, data analysis consists of examining, categorizing, tabulating or otherwise recombining the evidence, to address the initial propositions of a study. Primary and secondary data were analyzed both quantitatively and qualitatively according to the character of data. Later this data have been presented with tables and graphs. In some cases, data is interpreted with single and multivariate table to show the relationship among the different variable.

3.7 Validity, Reliability and Generalization

Validity is a technical term with scientific meanings; here, the focus is on measurement validity, a term whose meaning is a matter of discussion in the measurement literature. In this view, measurement validity means the extent to which an instrument measures what is claimed to measure; an indicator is valid to the extent that it empirically represents the concept it purports to measure. Validity is important because it can help determine what types of tests to use, and help to make sure researchers are using methods that are not only ethical, and cost-effective, but also a method that truly measures the idea or construct in question.

On the other hand, a reliable measure is one that has a small error component and, therefore, does not fluctuate randomly from one moment to the next. Reliability is an indication of the extent to which a measure contains variable errors, that is, errors that differed from observation to observation during any one measuring instance and that varied from time to time for a given unit of analysis measured twice or more by the same instrument.

Generally, researchers seek sample sizes which yield findings with at least a 95% confidence interval (which means that if we repeat the survey 100 times, 95 times out of a hundred, we would get the same response), plus/minus a margin error of 5 percentage points.

In this study, sample size is very small with diversity of data which does not represent the whole population of the country. But here, proper sampling method, data collection technique and analysis, and interpretation method is followed for ensuring the accuracy of data. Validity, reliability and generalization are ensured in this study. If any further research is conducted following same techniques and method, the result will be unchanged.

3.8 Ethical Consideration

In each step of research, certain ethical concerns guide the researcher. This ethical guidance could be generated from the kinds of questions studied by the researcher and the methods used to obtain the answers, the procedures used when the respondents were chosen, and the methods used in analyzing data etc. Ethical guidance is strongly followed during collecting data, taking interviews and analyzing collected data in this present study.

Ethical consideration is essential to conduct a research properly. An ethical consideration refers to the ethical principles that are used when tackling a particular issue. Ethics are codes or rules which govern those practices of a profession. It dictates how information and client's relationships should be managed. In this study, information is given by respondents spontaneously and without any insistency. Also, it is strongly maintained that researcher's feelings should not influence the respondent's response. Besides, most importantly, objectivity is maintained in this study. Therefore, ethical guidance is followed in every step of this present study.

Chapter - Four

Contextual Analysis on Riverbank Erosion and its Impact on the Elderly



4.1 Concept of Riverbank Erosion

The word erosion has come from the Latin term “erodere”. It means ‘gradually reduce’, the same origin that gives us the word ‘rodent’. Simply erosion means soil removal from the earth’s surface. According to Dictionary.com, it is process by which the surface of the earth is worn away by various agents like water, winds, waves etc. Though erosion is a natural process, excessive erosion causes desertification, decreases in agricultural productivity due to land degradation, sedimentation of waterways, and ecological collapse.

Riverbank erosion is a “geo-morphological process of alluvial floodplain rivers”. Simply it is defined as the process of wearing of the banks of a stream river. It is because of bank adjustment, bank trampling, and changes in bed elevation and topography in reaction to modified flow conditions or bank resistance. Bank erosion is a natural process; without it rivers would not meander and change occurs. Severe riverbank erosion causes heavy displacements along the bank line of the rivers and impacts result in the socio-economic change.

i) Causes of Riverbank Erosion

Riverbank erosion occurs primarily through a combination of three mechanisms: sub-aerial weakening and weathering, fluvial erosion, and mass failure. Sub-aerial processes are often viewed as ‘preparatory’ processes, weakening the bank prior to fluvial erosion (Mengoni and Mosselman, 2006). Sub-aerial processes dominate in the upper reaches, fluvial erosion in the middle, and mass failure in the lower reaches of a river. Fluvial erosion is the detachment of particles from the bank surface by the direct action of the flowing water; mass failure is the collapse of bank material under the action of gravity; weakening processes are modifications of soil characteristics that increase bank eradication, and thus induce bank erosion.

Generally, the process of declination of bank line in the major river channels can be attributed to both the liquefaction and flowage of bank line, or to the shearing away of bank material. Such erosion process takes place both during the flood and the low flow season. In the low flow season, the damaged edges or materials of riverbank expose to further erosion due to collapsing by wave action and internal water pressure. During the downturn of floodwaters, pressure against the channel walls decreases and water moves from the formation back into the channel run-off, resulting in consequent erosion (Thorne, 1982).

4.2 Riverbank Erosion in Bangladesh

Riverbank Erosion is an endemic and recurrent natural hazard in Bangladesh. When rivers enter the mature stage (as in the case with the three mighty rivers-Ganges, Brahmaputra and Meghna) they become sluggish and meander or braid. These oscillations cause massive riverbank erosion. Every year, millions of people are affected by erosion that destroys standing crops, farmland and homestead land. It is estimated that about 5% of the total flood plain of Bangladesh is directly affected by erosion. Some researchers have reported that bank erosion is taking place in about 94 out of 489 Upazilas of the country. A few other researchers have identified 56 Upazilas with incidence of erosion. At present, bank erosion and flood hazards in nearly 100 Upazilas have become almost a regular feature. Of these, 35 are severely affected.

Some rivers cause erosion in large scale and high frequency due to their unstable character. These rivers assume a braided pattern consisting of several channel's separated by small islands in their courses. During the last 200 years or so, the channels have been swinging between the main valley walls. During the monsoon, extensive overbank spills, bank erosion and bank line shifts are typical. In a typical year, about 2,400 km of the bank line experiences major erosion. The unpredictable shifting behaviour of the rivers and their encroachments not only affect the rural floodplain population but also urban growth centers and infrastructures.

No systemic pattern has yet been observed of the erosion hazards because of the involvement of a large number of variables in the process. The intensity of bank erosion varies widely from river to river as it depends on such characteristics as bank material, water level variations, near bank flow velocities, plan form of the river and the supply of water and sediment into the river. For example, loosely packed, recently deposited bank materials, consisting of silt and fine sand, and are highly susceptible to erosion.

Virtually all of Bangladesh lies within the delta of three major rivers: the Ganges, the Brahmaputra-Jamuna and the Meghna. It is estimated that some 1.1 million acre feet of run of crosses Bangladesh annually (Abbas, 1987), resulting widespread flooding, extensive riverbank erosion and displacements of households. The short and long term impacts of these hazards are multidimensional. Population displacement due to flood and bank erosion is

being considered as one of the major contributors to landlessness and impoverishment of rural population.

Displacement is the immediate impact of riverbank erosion. The displaced usually move to nearby areas but migrations to distant places are not uncommon. In erosion-prone areas, most families have witnessed a displacement in their lifetime. This involuntary movement can go up to 10 times or even more. A survey conducted in two Dhaka slums has revealed that they consist of migrants who mostly originated from the districts of Faridpur (34%), Barisal (25.6%), Comilla (24.3%) and Dhaka (14.3%). A closer examination of this distribution further revealed that most of the migrants came from an area consisting of only a few upazilas mostly located around the Ganges-Padma and the Meghna and their combined estuaries. The displacement caused by erosion, mostly involve displacement of whole families. On an average, a household experienced riverbank erosion 2.33 times in the life of its members. Some of them experienced displacement 4-5 times or more. Most of the environment-induced refugees turn mainly into labourers or rickshaw pullers. A large proportion of the victims remain unemployed due to lack of work opportunities. Moreover, women head many of these families. The female-headed households displaced by riverbank erosion and residing on embankments are the most deprived group. Fortunately, nowadays, social workers are focusing on these problems and also suggesting strategies of survival to these people. (Rahman, 2010)

About 18 percent of Bangladesh's total landmass gets submerged by floodwaters during flood years, while it may be nearly half in severe years (Chowdhury, 2000). Because of the braided nature and immense size of Bangladesh's river system, floods cause a distinct type of hazard' namely riverbank slumping or erosion produced by shifting of the river channels that carry away valuable agricultural land and settlements (Haque, 1988). River bank-line erosion is a severe problem for the people of Bangladesh. Each year'10s of thousands of people are made homeless through riverbank erosion'.

The Riverbank Erosion Impact Study (Elahi, Ahmed and Mafizuddin, 1991) shows that bank erosion is taking place in about 94 Upazilas (total 462) in about 50 districts (out of 64). In 35 Upazilas bank erosion is severe and most recurrent'. According to Currey (1979) 66 thanas, i.e. about 14% the main rural administrative units in Bangladesh (average population of

200,000) are liable to regular flooding and riverbank erosion. Over 50 percent of the landless rural households in Bangladesh are victims of riverbank erosion (Januzzi and Peach, 1980). Rogge and Hoque (1987) estimated that approximately 1/10th of the total population in Bangladesh (130 million) are at risk of riverbank erosion'.

4.3 Elderly in Bangladesh: Status and Vulnerability

Old age is neither a disease nor an individual problem; rather, it has become a worldwide challenge that must be addressed globally. "Later life" is unavoidable, inevitable, universal and excessively troublesome. No one can stop the process of ageing. The quality of life and the rate of ageing both vary considerably depending on a number of factors such as education, occupation, purchasing capacity, lifestyle, food habit, residential location, belief and culture etc.

Surprisingly, ageing takes place within the context of family members, kin, neighbours, friends, work associates and the state. Lifelong preparations, making intergenerational linkages, using appropriate technology, developing right-based societal relationships, upholding religious values at the personal level, political commitment and governmental undertaking at the macro-level can help ensure a healthy ageing and active later life. Policy responses to ageing until now have tended to focus only on the provision of medical care and income security for older persons, which remain important but have been inadequate compared to the rate of ageing occurring now and projected to intensify in the coming decades.

Population ageing is a by-product of scientific development in human societies bound to remain a dominant social problem throughout the 21st century. It is also gaining increasing recognition as one of the most influential forces of change in societies; becoming one of the defining global issues to shape the future of the world's societies.

Ageing has an influence on development and interacts with global patterns in labour and capital markets, governmental pension services and traditional support systems, all of which are further shaped by technological change and cultural transformations. Population ageing has a direct impact on socio-economic development, particularly in the case of countries going through economic transition such as Bangladesh.

Bangladesh, with its 10 million out of 160 million in the older age group, is not out of the current global ageing stream and is facing a daunting challenge in providing social security, health care and other safety net programmes to the seniors. At present, around 7 percent of Bangladesh's population constitutes the elderly population, but their absolute number (about 10 million) is quite significant, their rate of increase is also very alarming.

About 8 million of them live in rural areas. Due to a fall in mortality rate, accompanied with fertility decline over the last few decades, the elderly population of Bangladesh is continuously increasing. According to 1911, 1951, 1974, 1981, 1991 and 2001 decennial censuses, the elderly populations in Bangladesh were 1.38 million, 1.86 million, 4.06 million, 4.90 million, 6.04 million and 7.98 million respectively. Side by side, the projected number of older persons in 2025 and 2050 are 18 million and 44 million accordingly. About 85,000 new older people are added to the over 60-year age group each year, making Bangladesh one of the 20 countries with the largest number of elderly population and by 2025 Bangladesh, along with four other Asian countries, will account for about half of the world's total elderly population. (Rahman, 2010)



With dramatic changes in climate and demography in recent years, Bangladesh is confronting unprecedented intimidation from disaster and population ageing. Both occurrences are increasing alarmingly and have become a threat to its development. Considering its geography, climate, population, governance, politics and culture, Bangladesh is one of the

most severely disaster-prone and elderly-threatened least-developed countries in the world. The cumulative effects of the aforesaid environment affect older persons the most, leading them to distress, vulnerability and helplessness and requiring logical and right-based societal intervention. So, in order to ensure sustainable development, Bangladesh needs to meet the challenges of both frequent disasters and rapidly growing older persons.

The older section of the population is increasing much faster than the total population, their vulnerability multiplying the dimension of the problem. Most of them are seriously suffering from some basic human needs related challenges, viz. lack of minimum income and employment opportunities, extreme poverty, senile diseases accompanied by absence of proper health, medical care, food, nutrition and comfortable living arrangements, isolation, exclusion, loneliness, negligence, psychosocial and cultural complexities etc.

Their capacity for doing creative and socially useful work is underestimated. Feeling of proximity of loss of status in the family and society, spectre of reduced income, insecurity and deprivation in the later life often cause depression, calling for proper action programmes to reduce their vulnerabilities and bring them into mainstream social life as active, productive, healthy and dignified members of society. (Rahman, 2010)

In Bangladesh, the situation of older women is much worse than older men because of their longer life expectancy and extreme vulnerability due to social and economic marginalisation. Other reasons behind the feminisation of poverty in old age include gender discrimination, pattern of economic dependency, reproductive and family responsibilities, widowhood, rural and religious tradition etc.

Older women also own fewer assets and have less control over family income, and are more willing to endure more chronic disease and disability than their male counterparts. Antagonistic relationship between daughters-in-law is a very common feature in this society, which affects care of the older persons especially in the case of older women.

Moreover, widowed, divorced, single or even uprooted older women and men live in severe destitution. This humiliated life sometimes encourages them to commit suicide or, more frequently, to depend on begging. The majority (68 percent) of older women in Bangladesh

are widowed. Husbands' death is the start of their descent into almost complete dependency and gradually they lose their rank, prestige and authority along with livelihood security.

Usually they begin to live with the families of their married sons and spend their final years completely dependent on the good wishes and pity of their sons and daughters-in-law. But they take on more responsibilities in caring for their grandchildren and other household work. There is also a mistaken presumption that older persons are physically inactive, not open to new ideas and unable to participate effectively in economic activities. When considered and seen as welfare issues, older persons are regarded as a burden on society and passive recipients of care. Lack of public awareness and information about older persons' contributions, circumstances, and issues or needs create negative images of ageing.

Major political parties and the Bangladesh government have shown some interest in and taken initiatives for the benefit and welfare of older persons in recent years, an encouraging trend for future age-care initiatives. Unfortunately, despite Bangladesh being a country of thousands of NGOs, the role of the major NGOs is not yet satisfactory in this regard. Only a handful of NGOs are involved in ageing-related activities as one of their side programmes. Also unfortunate is the fact that national and international donor agencies and personal donors are not at all interested to extend their hand towards age-care activities.

There are hardly any physicians, dentists, psychologists, psychiatrists, nurses, architects, journalists, social workers or any other professionals offering their specialized services exclusively for older persons. Naturally, family, kin, community, neighbours and religious guides and organizations still remain the main sources of care, service and security to the huge number of older people in Bangladesh.

4.4 Riverbank Erosion and its Impact on the Elderly

Natural hazards have caused extensive loss of life, as well as damages to physical facilities such as buildings and infrastructure, and have as a result had a detrimental impact upon the socio-economic conditions, physical and psychological state of affected communities. They have had manifest and latent implications economically, socially, and culturally. The long-term financial costs of these natural disasters have contributed to the budget deficits in many already-cash strapped countries. Although financial costs can be quantified, the psychological

effects of lives lost, serious injuries suffered, and major displacement of people due to these disasters cannot be measured in a meaningful way.



Natural disasters may, at first glance, seem to strike all victims without regard to the common characteristics by which people are classified, such as age, culture, nationality, health status, or economic status. However, the literature suggests that natural disasters have had a disproportionately negative effect on the poor and the elderly versus other groups.

Impacts of Riverbank Erosion

Elderly are found more vulnerable to natural disaster as well as riverbank erosion displacement. Multistage troubles arose in the process of transferring these members. Sometimes they suffered from various types' of hardship or created problems to others. Impacts of riverbank erosion on people, society, culture, environment and ecology are very high.

a) Socio-Economic Impacts on the Elderly

Socio-economic factors include income, education, occupation, and involvement in the community. Riverbank erosion has terrible socio-economic impacts on people mostly elderly in our country.

i. Extent of Bank-Erosion and Displacement

At the time of leaving home for a new place, an emotional situation took place. All the family members were crying for their unfortunate displacement. Older people were widely accepted as being a vulnerable or potentially vulnerable group. Older members created more complex situation for the young, who were engaged in shifting process. They had no time to waste for resettling family members. A large number of respondents replied that their older members were not willing to go another place leaving their forefathers homestead land. But lack of public awareness and information about older people's contributions, circumstances, issues or

needs created negative images of aged members. Other family members were about to forget older peoples' affliction to family in their early age. Older members were so emotional that they wanted to die than to leave. They had spent their childhood in that place. Mementos were touching in every corners of their house. Most of the respondents realized that they had shown anger with their older family members in that situation. Interestingly, they did not feel guilty for misbehaving with their older members.

Elders, who were incapable to walk or too weak to walk or sometimes unable to climb into a truck or van or on a country boats, they were taken up on the lap. In that vulnerable situation, they needed special care and attention from other members. On the transport, they occupied more space to lie-down. It was embarrassing for them, when they shared a transport with others or owned by others. Sometimes, respondents had to manage a separate transport for them. Problems concerned to elders did not end by shifting but in the new place, they found more troubles with the environment.

Riverbank erosion displacees' losses are unbound. Besides the loss of land, they also lose other things, and being homeless, they become asset-less too. Erosion victims lose their agricultural and homestead lands in one hand and on the other hand they become rootless, ousted from their community, breaks down their family ties and social bondage. The effect is enormous and the loss is quite impossible to regain.

ii. Housing

Several housing-related issues have been explored in considering the needs of older adults during and after a natural disaster. These areas include relocation, shelter, institutionalization, and recovery. Considering the economic and health related vulnerability of older adults, it is not surprising that they are less likely to maintain a home during and after a natural disaster.

Older adults plan to stay in their homes for as long as possible (Novak, 2009), followed by a familiar arrangement for care in group facilities. Theoretically, homes for elders symbolize life capes or places defined more by memories and experiences than structure (Hillier & Barrow, 2008). Related to these values, elders are less likely to heed disaster-related warnings for special precautions or evacuation, in part because of psychological reasons that can be exacerbated by prior disaster-related experiences (Fernandez et al., 2006). This knowledge of older adults' ties to home has generally not been recognized in emergency management

strategies, but could prove effective in public service announcements regarding risks and the need for evacuation.

Relevant to a symbolic interaction perspective, the significance of social interaction and meaning has been implicated by researchers linking neighborhood relations as a potentially underutilized asset in emergency management. According to Wu, Preece, Shneiderman, Jaeger, and Qu (2007), the neighborhood where an elderly lives can be an indication of an elder's social capital or resources associated with interactions rooted in geographic proximity. Thus, neighbors of older adults can prove to be a fruitful resource during and after disasters, beginning with encouraging elder neighbors to heed warnings, take appropriate cautions, seek assistance as needed, and cooperate with emergency service personnel when requested or directed to do so.

Emergency services personnel may be more successful in reaching older adults and providing services during and after a natural disaster by channeling their efforts through neighborhood groups.

iii. Economics

Even in times of prosperity, most elderly persons face special financial consequences. Events such as natural disasters appear to have a greater impact on the elderly than on the general population, due to their already diminished financial state. Due to riverbank erosion, elderly losses their property, living and cultivating lands etc. Even sometimes they may have to change their occupation. In addition, they may have to lend money in a high interest rate. This is a clear and strong example of how poverty can have a negative effect on the elderly in a disaster.

Any kind of displacement has direct impact on regular sources of income and income generating activities of the displacee households. This change may be positive or negative but some sort of change is found in every situation faced by the affected people. But displacement due to natural disaster did not make any room for the affected population rather they were victimized by several ill-motivated stakeholders. They faced difficulties to find new sources of income in new settlement area. Riverbank erosion displacees took shelter in distant places or migrated to urban areas. The landless and jobless heads of the households under financial duress⁸ often deserted their families.

It has been shown clearly that the elderly, as a whole, receive less aid than their younger counterparts after disasters (Bolin & Klenow, 1982; Kaniasty & Norris, 1995; Kilijanek & Drabek, 1979). Older persons do not qualify for small loans for home repairs or replacement of possessions after a disaster because extra assets may place them in categories in which they are not eligible to receive benefits such as Medicare/Medicaid. Fernandez et al. (2002) asserted that voluntary charitable organizations may play the key role in bridging this gap. Older adults no longer have means to generate income; many (particularly members of minorities) have had a life history of limited access to income to sustain daily living.

Basically, the elderly need “wrap around” services housed in a one-stop shop system that would address all of their needs. As Fernandez et al. (2002) suggested, emergency management services should be incorporated into the overall emergency management system, especially related to aid distribution and recovery funds.

iv. Social Stigma

An issue that is often overlooked when considering elders' receipt of aid or lack thereof is the social stigma that may be associated by many elders to what it means to apply for “welfare programs” and even disaster recovery assistance services. Older cohorts may have experienced social stigma as result of dependency in other areas and may be reluctant to apply for aid during a disaster. Many people in this age cohort lived through the Great Depression and may be more likely to presume that others have needs greater than theirs (Hooyman & Kiyak, 2005).

Related on a macro level are systematic barriers, such as complex and tedious application procedures, which may deter elders and thus block access. Socially, emergency management service teams must make processes and procedures elder friendly and accessible. Otherwise, elders who are economically disadvantaged may not receive the help they need to recover from natural disasters.

v. Loss of Land and Changes in Land Holding Capacity

Riverbank erosion aggravates land of the coastal inhabitants. Elderly were displaced from their original homestead, which was an unwilling displacement. Impact of unwilling displacement is always negative, either economically or socially.

Land is fundamental for civilization, to build home and establish family followed by a society. From various studies it was found that loss of land, as well as displacement, was the only reason for present sufferings and other problems of elderly. They expressed that they followed their own strategy and system to mitigate needs and problems. But due to displacement and settling in a new area, things were out of their reach. Searching for homestead land turned into priority and a few of them managed to become landowner.

vi. Loss of Crop

With the loss of land, a significant number of the coastal inhabitant elderly lost their standing crops also. Crop was their main source of income and when they failed to harvest their crop in time, they suffered from shortage of money following unavoidable misery. They had to wait for next harvest, which was far away from present time. In the mean time, to meet daily expenditure they had nothing to do but to borrow money, in most of the cases, by lending their land to money-owners, locally known as *mahajon*. At the time of river bank erosion, if there were standing crop in the field, sometimes farmers harvest those knowing that they will not get food grain but may be used for fuel or animal food. Loss of crop had direct impact on local as well as national production of crop.

vii. Loss of Security

Security was another hazard faced by the elderly in the new settlement area. In the new settled area, some of them managed only a room for living but other homestead materials remained open under the sky. There are five sectors of insecurity in the early days in new area. Those were: valuable goods might be stolen, household goods might be lost, women and girls might be harassed, and attack of animal or bite by snake, and infants or children, elderly might be missed. Dependent elderly cannot move easily in a new area. They need the help of others.

b) Impacts on the Physical and Mental Health of the Elderly

It is invariably true that everyone will experience physical or emotional and psychological distress during or in the immediate aftermath of a disaster or other large-scale traumatic event. Acts of terrorism, natural disasters and other large-scale traumatic events typically result in tremendous loss of life, physical injuries and property damage to the elderly. Survivors of such tragedies invariably experience significant physical, emotional and

psychological distress in the immediate days and weeks that follow. Just after the disaster, respondents reported symptoms ranging from physical injury, intense fear, anxiety and despair to shock and disbelief, which are compounded by legitimate concerns about safety, shelter and significant financial consequences of the event. Every disaster left few signs over the affected locality.

i. Physical Health

As older adults age, they become more susceptible to health related-declines, chronic illness and disability. According to Novak (2009), “Nearly every major chronic disease (except certain cancers) increases in frequency and severity with age”. Normal aging processes can result in cognitive, biological, physiological, and sensory changes with advanced age; these declines become more severe with the existence of chronic conditions. These include chronic conditions such as arthritis, cancer, heart disease, and diabetes.

From a health standpoint, old elders are vulnerable in disasters due to impaired physical mobility, declines in sensory function, pre-existing chronic illness, dependence on medication, and need for routine personal care (Alzaga et al., 2005; Fernandez et al., 2002). In general, such physical health conditions limit independence and increase reliance on others, which directly puts these older adults at great risk when a disaster strikes.

Aldrich and Benson (2008) suggested that, due to chronic illness and other age-related health declines, as described above, older adults characteristically are more vulnerable than other groups during the period of a disaster. These researchers identified certain characteristics that can be especially important in providing disaster assistance to older adults: For example, declining vision or hearing can make it difficult for an older adult to communicate. Physical accidents are as follows:

Injury: Thirty six percent respondents were injured at the time of shifting of their household goods and family members. Physical injury covers, bleeding or loss or damage of a limb. It was quite natural and unavoidable to be injured in any form of the hazardous shifting process. Others experienced swelling or negligible hurts.

Disability: Bone crack due to accident at the time of shifting was found in the 01 percent households of both the study areas.

Death: Death due to riverbank erosion was not common like tornado, cyclone, earthquake or other natural disasters.

Older adults with cognitive problems may become agitated during a crisis or feel overwhelmed by crowding, noise, and lack of privacy in a shelter. They may need assistance to ensure that they have their medications, adequate nutrition and water, and assistive devices.

Elders may experience Heart Attack, Unstable Angina, Asthma and Fatal Arrhythmias during the period of riverbank erosion. Besides, they may be the victim of Influenza, Measles, Whooping cough, Tuberculosis, Dengue fever and Scabies and other skin infections just after the period of riverbank erosion.

An inability to plan for or provide assistance with medications, access to routine care, medical supplies, transportation, and assistive devices can only increase the devastation brought on by natural disasters.

ii. Mental Health

With aging come psychosocial adjustments in cognition. Changes occur in intellect, memory, learning, and creative process of elders (McInnis-Dittrich, 2005). The literature regarding mental health and the elderly clearly suggests that the elderly are at times mentally quite resilient in dealing with traumatic situations/disasters and can adjust well despite the circumstances (Huerta & Horton, 1978; Phifer, 1990).

Bell (1978) and Phifer (1990) stated that most elderly have lived through traumatic situations in the past and many have built personal resistance that enables them to bounce back faster than younger counterparts, who have not lived through or even witnessed tragedy. One of the most common mental reactions after disasters is post traumatic stress disorder (PTSD), defined as chronic anxiety resulting from experience with danger. Typical symptoms include re-experiencing the traumatic event in recurrent thoughts or desires; “emotional anesthesia,” characterized by detachment from others and losses of ability to feel happiness or intimacy; and/or extreme alertness, sleep disturbances (Wade & Tavis, 1987).

Unfortunately, elderly persons are less likely to seek mental health treatment after a disaster because they tend to associate mental disorders with personal failure, spiritual deficiency, or some other stereotypic view (Lebowitz, Light, & Bailey, 1987). Although the fundamental reactions to a disaster may be quite similar between older and younger adults, each group requires specific services according to their developmental needs.

Every natural disaster left few psychological events for the affected population. For most of them, the adage “time heals all wounds” was an apt characterization of post-traumatic adjustment. Some common forms of psychological events of riverbank erosion for the elderly are mentioned below briefly:

Fear: Many of them feared that the river might grab their present homestead on day. They did not forget the fearful events-when they lived with threat of erosion.

Flashbacks: This type of emotional shock made people more vulnerable to be sick. They wanted to look forward but could not build new idea. All the time they thought about their past life, which they believed as a golden time. They remembered their childhood, joyful events, family-life etc. Flashbacks made them emotional and consequently they became psychologically sick.

Feeling of pain: Elderly felt mental pain, when they thought about their fate and present situation. Though it was reported as being impossible to describe in words, it was characterized by very painful emotions.

Feel helpless: Elderly felt very helpless in the present place of living. In their earlier living area, they had a very strong association; neighbors were helpful to one another in every situation, especially in the emergency time. But in the new settlement area, they felt themselves helpless in every situation, as they could not express their needs to the local people.

Loneliness: This was another symptom of distressed population. Losing homestead, family members, friends and neighbors they became psychologically weak, and could not make relation with new neighbors. Due to continuous emotional pressure, they became introvert

and as a consequence of these matters, they preferred to stay alone and thought about their losses.

Disappointment: Disaster victims always look disappointed due to various reasons. And riverbank erosion displacees were victimized at the maximum that river can do. They looked just like a boat in a sea without sail. They found no light of hope to bear the needs. It was found that due to this displacement, total workhour of the displacees had reduced remarkably by 20-30 percent in both the areas, which varied from male to female also.

Low self-esteem: As a disappointed and hopeless man, elderly lost self-esteem to do something for the betterment of the family members. Actually they had lost their inner energy and power to do something. In this connection, social workers had more space to gear up these people to start normal life.

Sleep disturbance: Respondents reported on their changes in duration of sleep before and after displacement. It was found from their report that they were suffering from sleep disturbance due to migration in a new place and displacement from their original homestead. This may be clarified from the following table.

Crying: It was observed from various research that most of the displaced persons, especially the women and children cried for their present miserable condition. They could not forget their earlier happiness and way of living. ‘Loss of land, loss of everything’ – this thinking made them emotional to cry out.

Feeling guilty: Sometimes failure to manage situation professionally brought guilty perception to the head of the family (elderly). The riverbank erosion displacees faced a crucial problem during and after displacement in connection with disposing or shifting household goods and family members. Some of them expressed their concern over their land and other on movable assets, which they could sell out or bring with them. Some of them felt guilty to compel family members to participate in the process of shifting who had been injured and disabled.

Suicidal tendency: Disaster affected and psychologically distressed people may commit suicide any time after disaster. There are two final stages of psychological distresses, one is

schizophrenia and the other is suicide. But it does not always happen to every affected person.

Relationship problems: Relation with the local people sometimes might cause psychological distress to the elderly. The researchers came to know that though most of the local people accepted them cordially but some of them expressed negligence and criticized their sufferings as it was a punishment from *Allah* for their unbound sins. Sometimes they quote the Qur'anic verses and try to relate with that. Most of the local people identified elderly collectively as 'refugee'. In this context, elderly suffer from relationship problem with local people.

4.5 Present Policy and Institutional Setup

Due to the geographical location, the country frequently suffers from devastating natural hazards of which, floods, cyclones, tornadoes, riverbank erosion, drought and earthquakes are the most disastrous to mention. Flood, cyclone, tornado and drought are seasonal disasters in Bangladesh. Earthquakes happen rarely in this country. But only the riverbank erosion is recurrent and it happens throughout the year.

Riverbank erosion is a unique type of environmental disaster due to its destructive nature. In other disasters, resources may loss or people may displace for a short period of time but land exists. On the other hand, land, the primary component of civilization, is washed out, displacement occurs forever. So, no other disaster is as disastrous as riverbank erosion. Unfortunately, it was not considered a specific disaster in Bangladesh before 1993, rather thought to be a consequence of flood. But flood is not turns always a disaster. After continuous campaign and demand from concerned agencies and stockholders, in 1993, government of Bangladesh declared riverbank erosion as a disaster. Though riverbank erosion is a unique type of disaster but it is amalgamated with other disasters and affected people are entertained on the basis of the existing policies and programs of disaster management.

Ministry of Water Resources (MWR) and Ministry of Food and Disaster Management (MFDM) are two key ministries to work in this area. MWR is responsible for riverbank protection and management and MFDM has responsibility for coordinating the government

disaster management efforts with two line agencies as the Directorate of Relief and Rehabilitation (DRR) and the Disaster Management Bureau (DMB).

The government of Bangladesh has promulgated The National Water Policy in 1999 providing policy direction for water sector. Planning and Management of Water Resources under the policy (article- 4.2 q) provides directive to ‘undertake survey and investigation of the problem of riverbank erosion and develop and implement master plans for river training and erosion control works for preservation of scarce land and prevention of landlessness and pauperization.’

The National Policy on Disaster Management has emphasized a group of broad based strategies, i.e. risk management, community involvement and non-structural mitigation measures. In Bangladesh there are three bodies for multi-sectoral coordination and collaboration at the national level. a) The National Disaster Management Council (NDMC) is headed by the Prime Minister, b) Inter Ministerial Disaster Management Coordination Committee (IMDMCC), headed by the cabinet Minister in charge of the Ministry of Food and Disaster Management (MFDM) and c) National Disaster Management Advisory Committee (NDMAC) with memberships from both the public and private sectors. There are committees also in district, upazila and union level followed by the directives of national committees.

The Ministry of Food and Disaster Management is responsible for building awareness in pre-disaster phase and distributing relief goods in post-disaster phase as well as rehabilitations in some extent. Certain sections of the displacees are accommodated in allocation of *Khas* land, *Adarshaya Gram* and *Abashon* projects. NGOs like CARE-Bangladesh, OXFAM, BDPC and RDRS are working with elderly in certain areas of Bangladesh.

4.6 Conceptual Frame work

Due to riverbank erosion, affected elderly have to go through heavy loses of wealth. As a result they become asset less and subsequently, poorer than before. This loses lead to income erosion of the victims. Besides, they become victim of physical and psychological disorders. They are compelled to lead a painful and measurable life. Their standard of life falls and vulnerability of life increases.

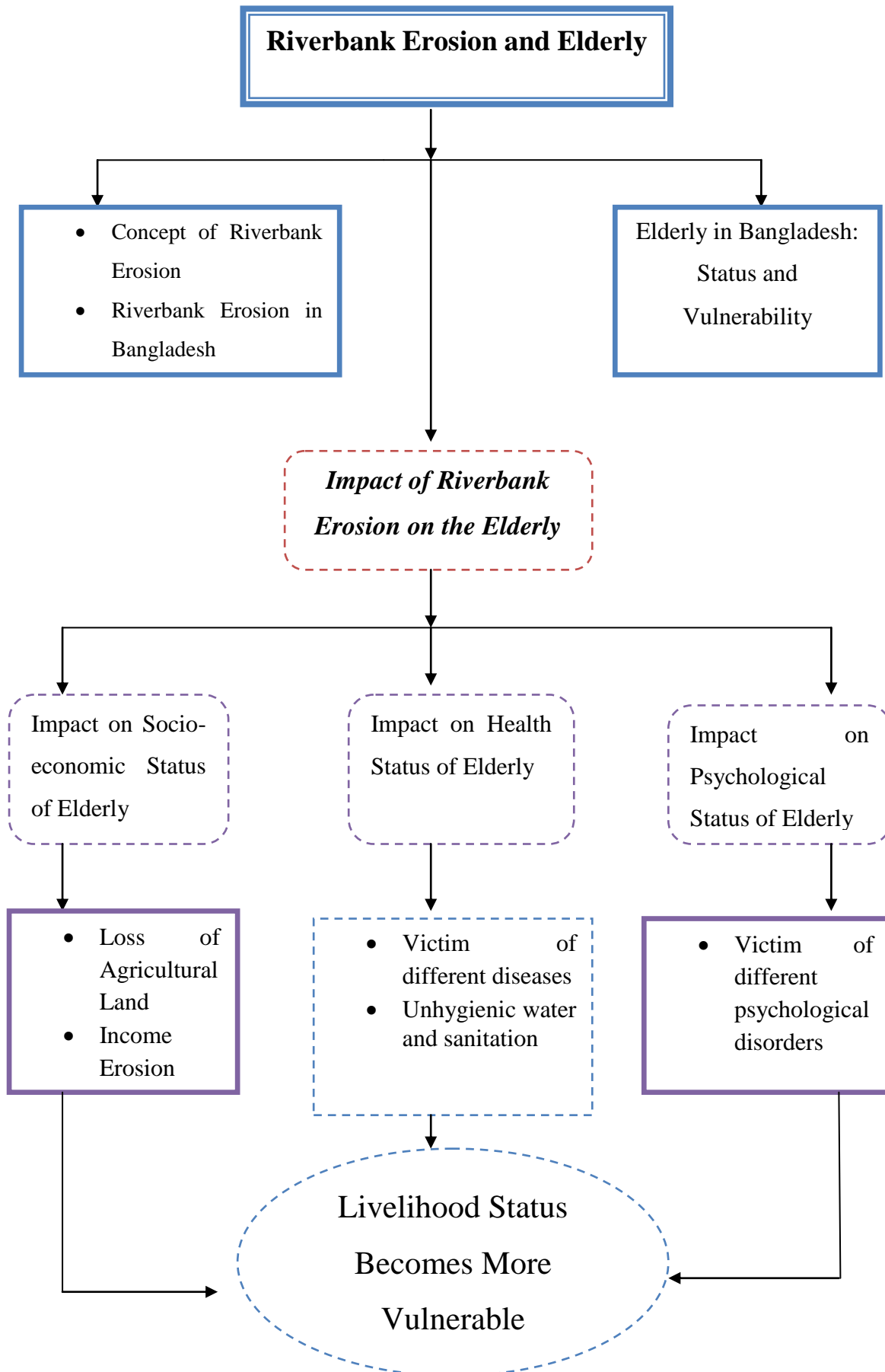


Figure 2: Conceptual Frame work of the Study

Chapter- Five

Presentation of the Findings of the Study

5.1 Personal, Demographic and Economic Information of the Respondents

5.2 Health (Illnesses, Water and Sanitation) Related Information of the Respondents

5.3 Psychological Status Related Information of the Respondents

5.4 Post-disaster Services and Recommendations of the Respondents

Results of the Study

The study has been conducted for the purpose of revealing the total impact (socio-economic, physical and psychological) of riverbank erosion on elderly in a coastal area of Bangladesh. Here, the specific objectives are to know about the personal and demographic information of the elderly, to find out socio-economic condition (type of house, nature of work, income and losses) of elderly due to riverbank erosion, to enquire into their physical and psychological health (PTSD, Anxiety and Somatoform Disorder), to know the prevailing governmental and non-governmental services for elderly after that disaster attack and to emphasize the recommendations given by elderly for ensuring their whole community development.

5.1 Personal, Demographic and Economic Information of the Respondents

In this study, primary data have been collected from a coastal area (Char Alexander at Ramgoti upazila under the Lakshmipur district). All of the respondents are above 60 years old and they are randomly chosen. Most of them are illiterate, some of them are married, some are widow and some are widower also.

Table: 01 Distributions of Respondents according to Gender (N=100)

Sex	Frequency	Percentage (%)
Male	60	60
Female	40	40
Total	100	100

In the above table, it is seen that most of the respondents are male that consists of 60% and about 40% respondents are female among total 100 respondents. Here, the distribution of respondents is on the basis of the gender.

Table: 02 Distributions of Respondents Regarding their Types of House (Before and After Riverbank Erosion) (N=100)

	Type of House Before Riverbank Erosion			Total/Percentage
	Kacha (Mud & Bamboo)	Tin & Wood	Semi-pacca	
Type of House After the Riverbank Erosion				
Hut	25	0	0	25
Kacha (Mud & Bamboo)	5	45	10	60
Tin & Wood	0	15	0	15
Total/ Percentage	30	60	10	100

The above cross tabulation shows the types of house (before and after riverbank erosion) of the elderly. It is clear that before bank erosion about 30% respondents had kacha (mud and bamboo) house, 60% respondents had tin & wood house and 10% respondents had semi-pacca house. But now 25% respondents live in hut, 60% have respondents have kacha (mud and bamboo) house and 15% respondents have tin & wood house. Here, though the number of kacha house have increased but at the same time, a large amount of people are living in hut and the number of tin & wood houses have decreased remarkably.

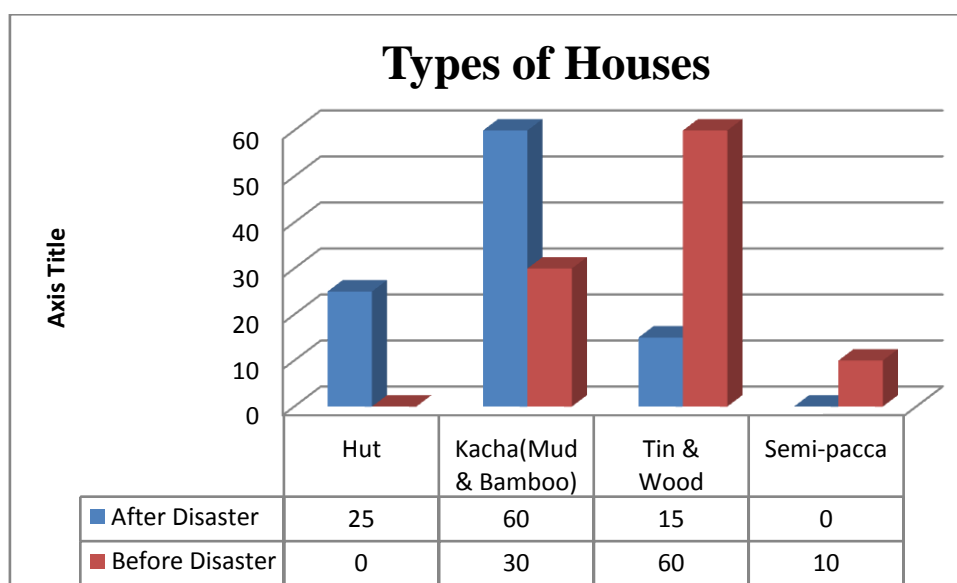


Figure 3: Respondents types of houses (Before and After Disaster)

Table: 03 Distributions of Respondents regarding their Ownership of the House (Before and After Riverbank Erosion) (N=100)

	Ownership of House Before Riverbank Erosion			Total/Percentage
	Self	Husband	Son	
Ownership of House After Riverbank Erosion				
Self	0	19	11	30
Husband	0	10	0	10
Son	50	1	9	60
Total/Percentage	50	30	20	100

This cross tabulation shows the ownership of house (before and after riverbank erosion) of the elderly. Here in this study, most of the respondents are male (60%) and this disaster (riverbank erosion) attacked them about 10-15years ago. Before the bank erosion, about 50% respondents had their own house to live, 30% female respondents answered about the ownership of house of her husband and about 20% respondents informed about their son's ownership of house. But now the amount of son's ownership of house have raised up to 60% and only 30% respondents have their own house after the bank erosion of Meghna River.

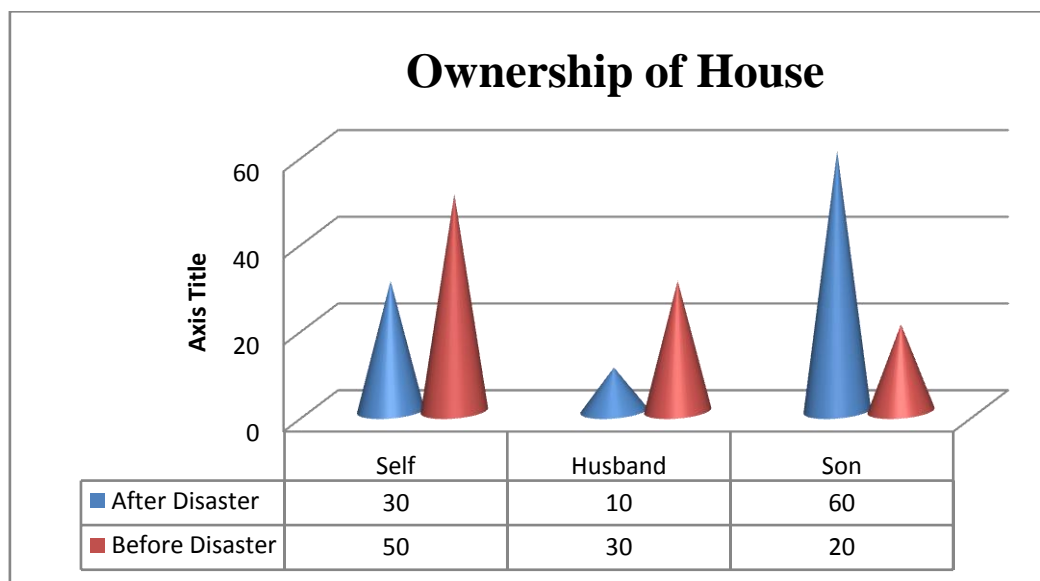


Figure 4: Respondents Ownership of House (Before and After Riverbank Erosion)

Table: 04 Distributions of Respondents regarding their Ownership of Living Land (Before and After Riverbank Erosion) (N=100)

	Ownership of Living Land Before Riverbank Erosion		Total/Percentage
	YES	NO	
Ownership of Living Land After Riverbank Erosion			
Self	36	1	37
Husband	21	0	21
Son or Daughter	4	13	17
Government	19	6	25
Total/Percentage	80	20	100

Ownership of living land of elderly is clearly focused on the above cross tabulation. It reflects that about 80% respondents had living land and about 20% had no living land before riverbank erosion. Since that erosion, 25% respondents have been living in government land, only 21% female have her husband land to live and 37% respondents have their own land to live. Besides, due to this erosion, a lot of people have been living in son’s house (17%). Here, most remarkable fact is that a significant number of people became landless and they have started to live in road-side government areas which are commonly known as “Beri”.

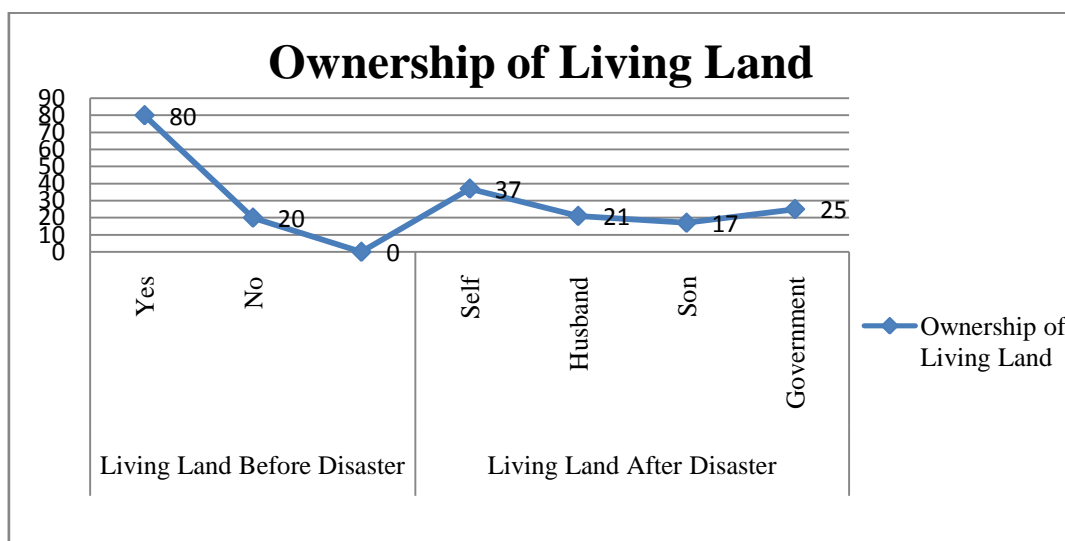


Figure 5: Respondents Ownership of Living Land (Before and After Erosion)

Table: 05 Distributions of Respondents regarding their Ownership of Cultivating Land (Before and After Riverbank Erosion) (N=100)

	Ownership of cultivating land before Riverbank Erosion		Total/Percentage
	Yes	No	
Having crop production land at present time after erosion			
Yes	30	0	30
No	50	20	70
Total/Percentage	80	20	100

The above cross tabulation shows the ownership of cultivating land of the respondents (before and after riverbank erosion). Among 100 respondents about 80% respondents had cultivating land before that bank erosion whereas only 30% respondents have cultivating land now. A lot of respondents have lost their cultivating land as a result of riverbank erosion. Besides, many of them have to change his occupation after losing their cultivating land.

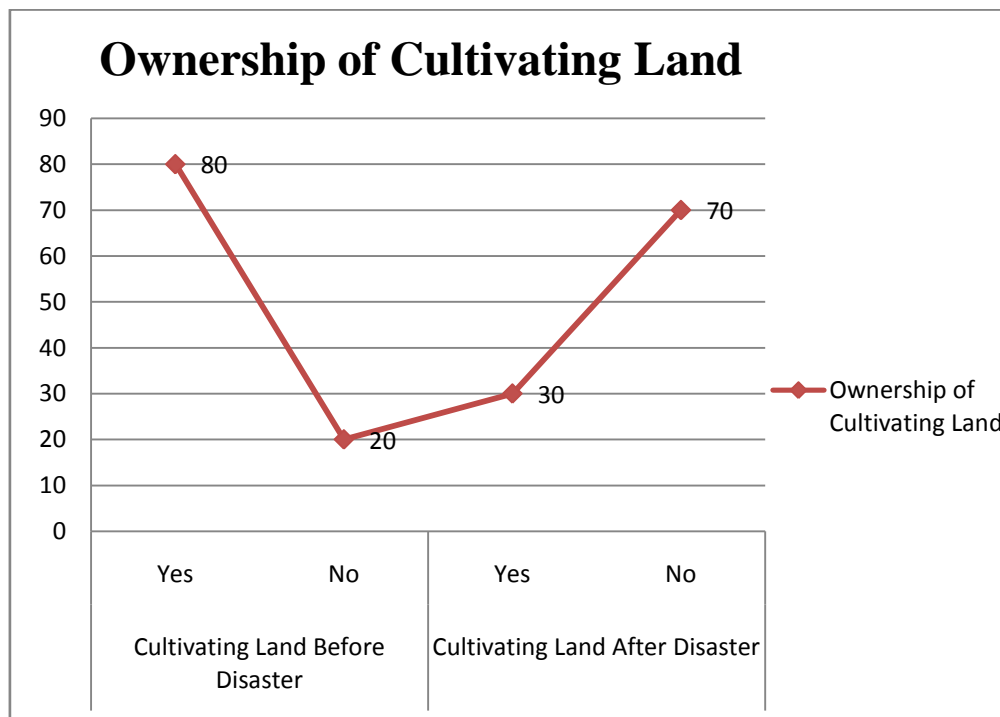


Figure 6: Respondents ownership of Cultivating Land (Before and After Riverbank Erosion)

Table: 06 Distributions of Elderly regarding their Occupational Status (Before and After Riverbank Erosion) (N=100)

	Occupation Before the Riverbank Erosion					Total/ Percentage
	Agriculture	Catching Fish	Business	House wife	Dependent	
Occupation After Riverbank Erosion						
Agriculture	0	15	5	0	0	20
Catching Fish	0	0	0	10	0	10
Business	0	0	0	10	0	10
Housewife	0	0	0	7	3	10
Dependent	45	0	0	3	2	50
Total/ Percentage	45	15	5	30	5	100

Occupational status of the respondents can be found in the above cross tabulation. Here, agriculture was the main occupation of most of the respondents (45%) before the riverbank erosion, about 15% respondents were fisherman and about 30% of female respondents were housewife. Besides, only 5% respondents were dependent on family members. But this scenario has totally changed after the erosion. Now, a major part of the respondents are dependent (50%) and only 20% respondents are engaged in agriculture. This riverbank erosion has made people dependent on others.

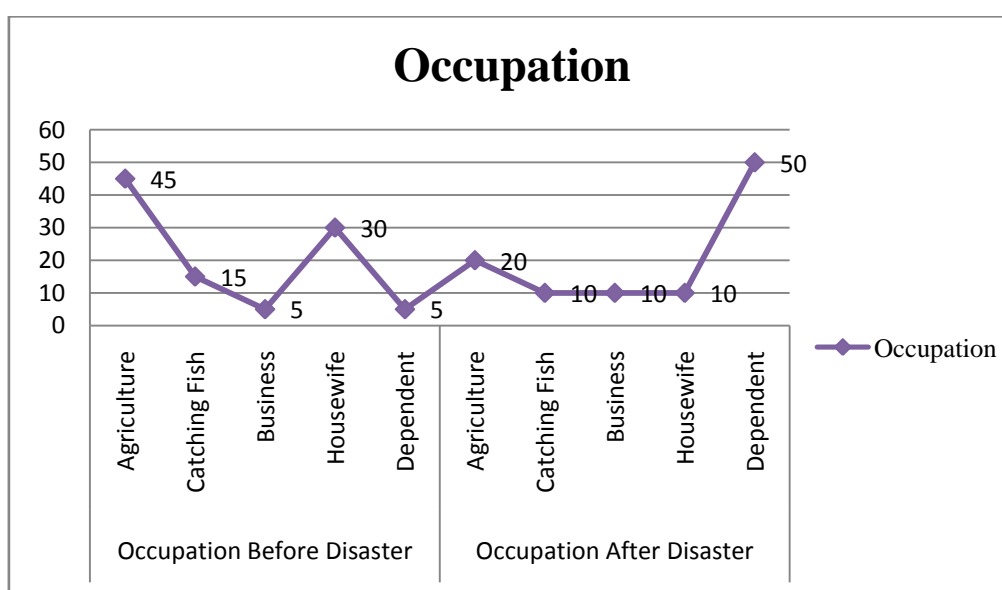


Figure 7: Occupation of the Respondents (Before and After Riverbank Erosion)

Table: 07 Distributions of Respondents regarding Monetary Loss as a result of Riverbank Erosion (N=100)

Monetary Loss due to the Riverbank Erosion	Frequency	Percentage (%)
80000tk-1.2 lac	25	25
1.2 lac-1.6 lac	40	40
1.6 lac-2.0 lac	20	20
2.0 lac-2.4 lac	10	10
2.4 lac and above	5	5
Total	100	100

The above table shows that monetary losses of the elderly due to riverbank erosion. Monetary loss is a great loss for elderly. About 25% respondents have lost in total 80000-1.2 lac taka and only 5% respondents have lost in total 2.4 lac taka and above taka due the devastation of riverbank erosion. Maximum respondents (40%) have lost 1.2 lac tk-1.6 lac taka. Besides, 20% and 10% respondents have lost about 1.6 lac tk-2.0 lac taka and 2.0 lac tk-2.4 lac taka respectively. They are passing a very miserable life in the Char. But, most noticeable fact is none of them have got services from government and non-governmental organizations. No one comes to help them during the post-disaster period.

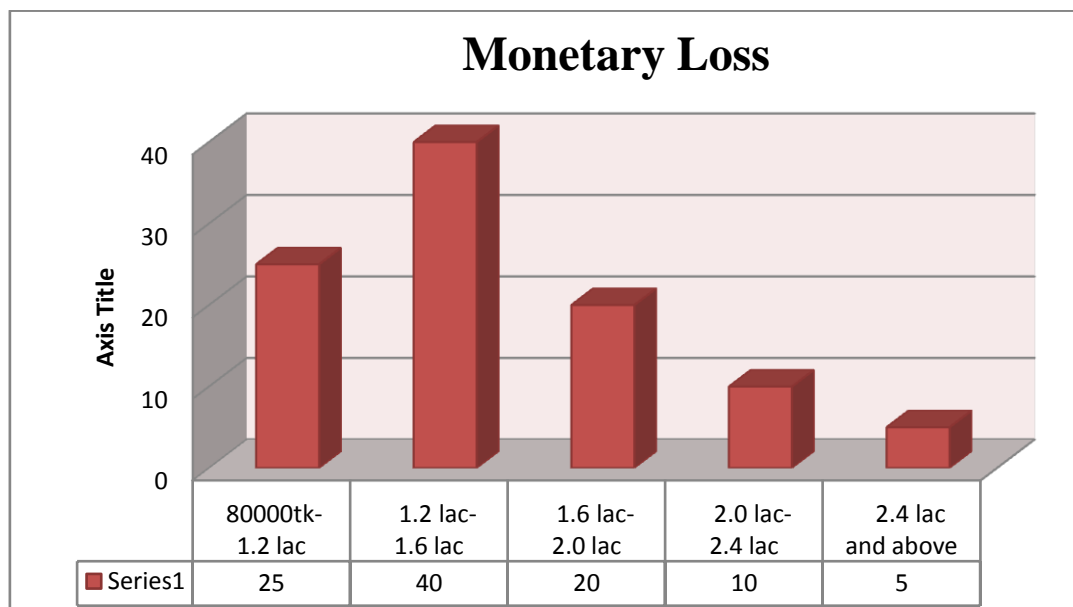


Figure 08: Monetary losses of Respondents

5.2 Health (Illness, Water and Sanitation) Related Information of the Respondents

Table: 08 Distributions of Respondents regarding their Health problems during the Period of Erosion (N=100)

Health problems during the Period of Erosion	Frequency	Percentage (%)
Unstable Angina	64	64
Fatal Arrhythmias	31	31
Asthma	5	5
Total	100	100

The above table shows the health problems of the respondents faced during the period of riverbank erosion such as unstable angina, fatal arrhythmias, asthma etc. Among the respondents about 64% respondents were suffered from unstable angina, 31% became victim of fatal arrhythmias and about 5% respondents had faced asthma problem. Elderly become worried about their belonging during the erosion period which causes many health problems.

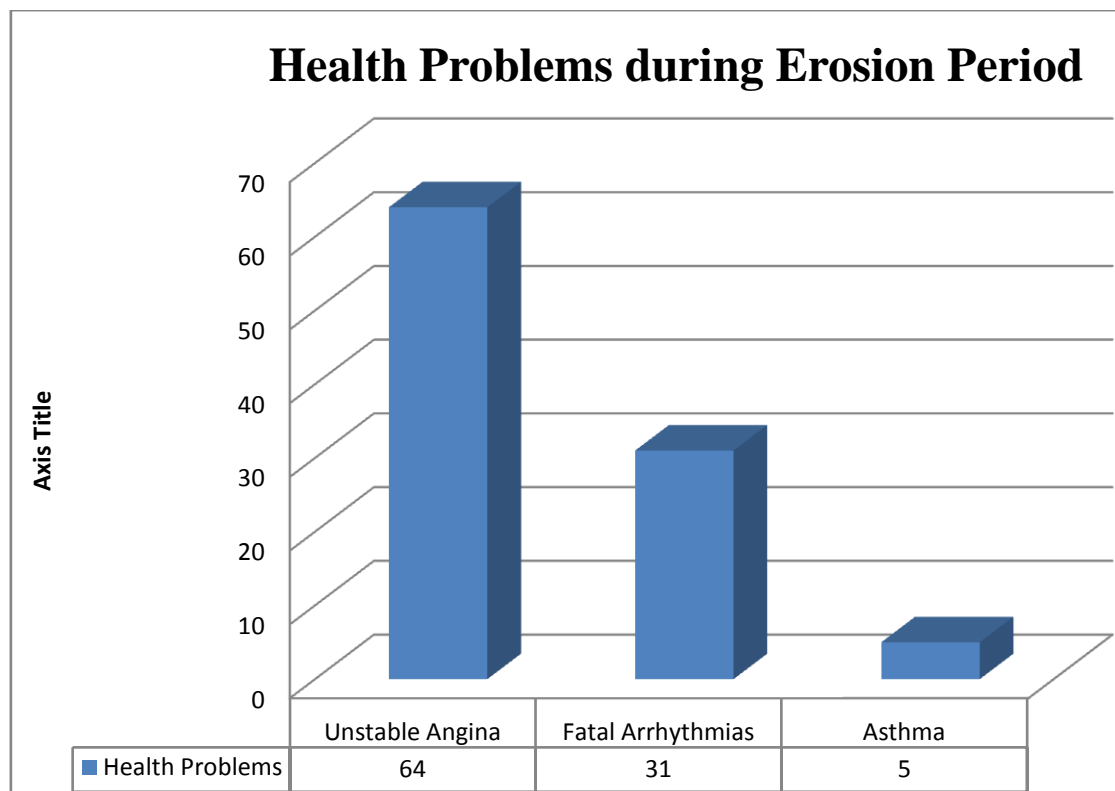


Figure 9: Health Problems of the Respondents during Erosion Period

Table: 09 Distributions of Respondents regarding their having Health problem or not as a result of Riverbank Erosion (N=100)

Health Problem as a result of Riverbank Erosion	Frequency	Percentage (%)
Yes	87	87
No	13	13
Total	100	100

The above table shows the distribution of respondents regarding their having health problem or not. Always, people become sufferer of various diseases in the post-disaster period. Among the respondents, about 87% respondents have been suffering from various physical illnesses after the erosion and they think that riverbank is the cause of their physical illnesses. On the other hand, 13% respondents do not feel that they are not suffering from any diseases due to riverbank erosion.

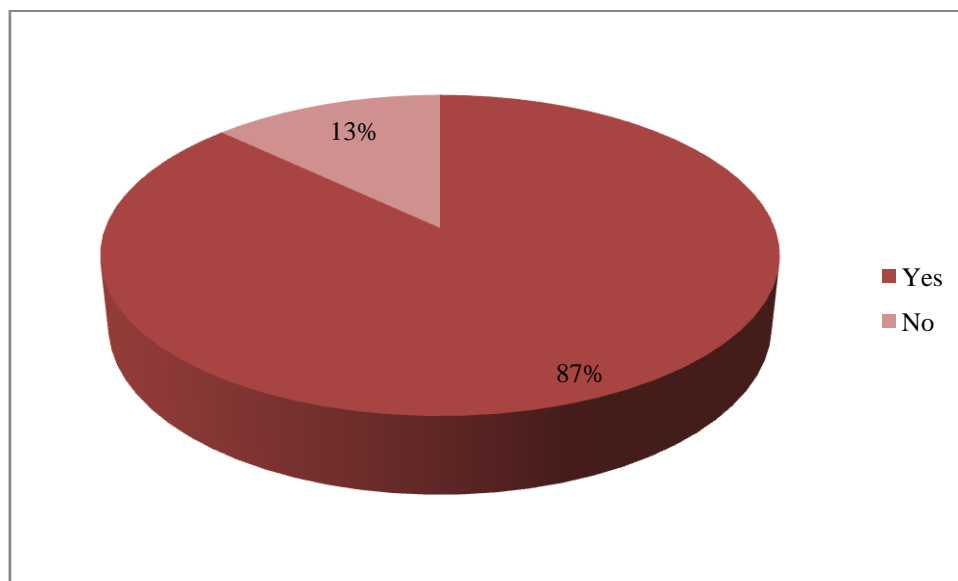


Figure 10: Health Status of the Respondents as a result of Riverbank Erosion

Table: 10 Distributions of Respondents regarding their Types of Physical Illnesses after Riverbank Erosion

Types of Physical Illnesses	Frequency	Percentage (%)
Whooping Cough	55	63.21
Tuberculosis	25	28.73
Scabies and other skin diseases	75	86.20

(More than one response was possible)

In the previous table, it is found that about 87% respondents have been suffering from various physical illnesses due to the riverbank erosion. Among 87 respondents, many respondents are suffering from more than one disease. The above table shows that about 55 respondents (63.21%) have been suffering from whooping cough and 25 respondents (28.73%) have said about their tuberculosis problem. After the disaster, the most common disease is scabies and other skin diseases whereas 75 respondents (86.20%) have been suffering from this health problem.

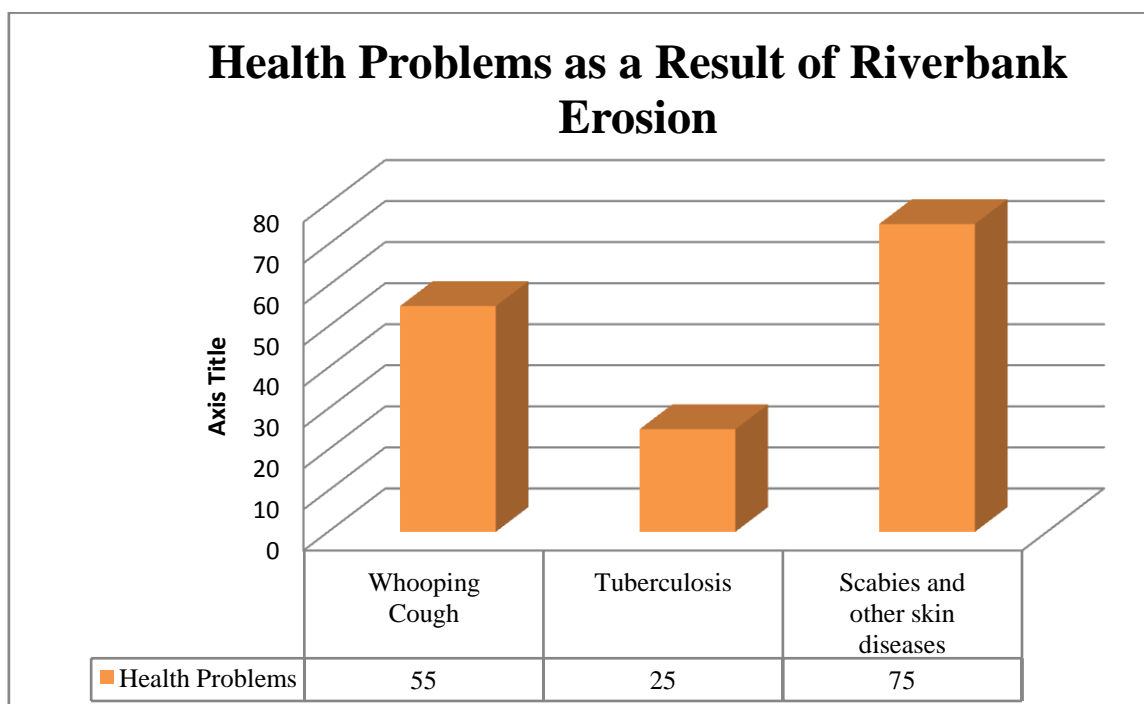


Figure 11: Respondents Types of Health Problems (After Riverbank Erosion)

Table: 11 Distributions of Respondents regarding their Medical Services for Illnesses

	Who gave medical services		Total
	Self	Government	
Got Medical Services			
Yes	63	10	73
No	0	0	14

Collected data shows that about 87% of respondents have been suffering from various diseases after the riverbank erosion. Medical services of the respondents are shown by above cross tabulation. About 73 respondents have taken medical services but 14 respondents have not taken any medical services. Besides, only 10 respondents have taken government services whereas 63 respondents have taken medical services by themselves. A significant number of people did not get any government medical services.

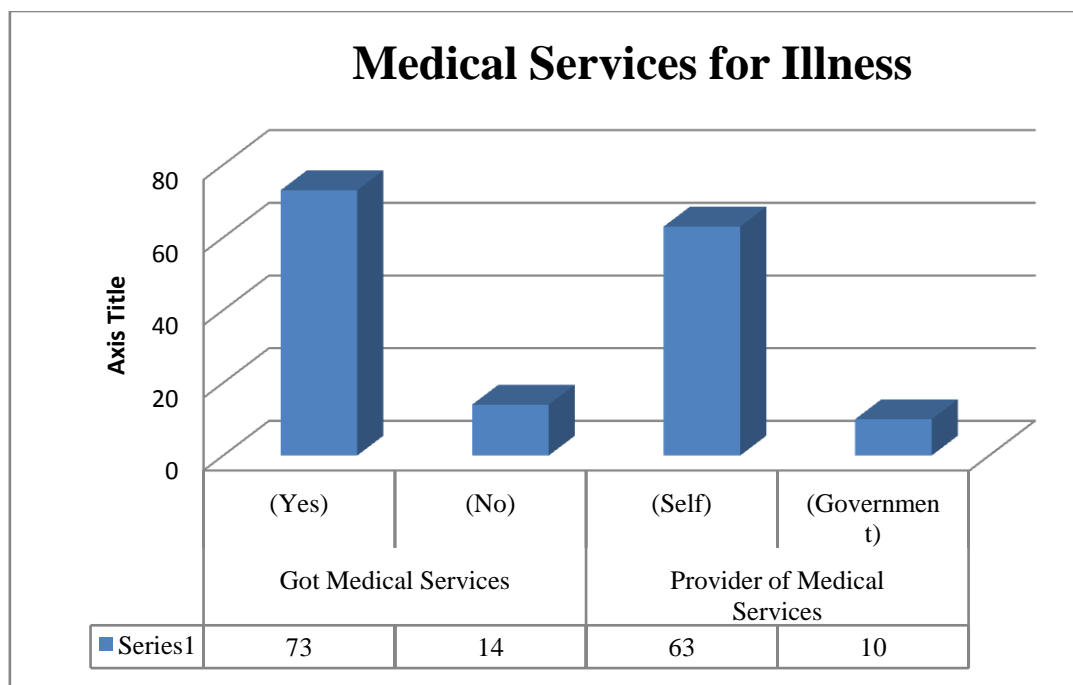
**Figure 12: Respondents Receiving Status of Medical Services**

Table: 12 Distributions of Respondents regarding Source of Drinking Water (N=100)

Source of Drinking Water	Frequency	Percentage (%)
Own Tube-well	45	45
Neighbour's Tube-well	55	55
Total	100	100

This table shows the source of drinking water of the 100 respondents of this study. In this table it is clear that most of the respondents are conscious about clear drinking water. Here, about 45% respondents have their own tube-well and 55% respondents drink water from neighbour's tube-well. But no one drinks water from pond or river water.

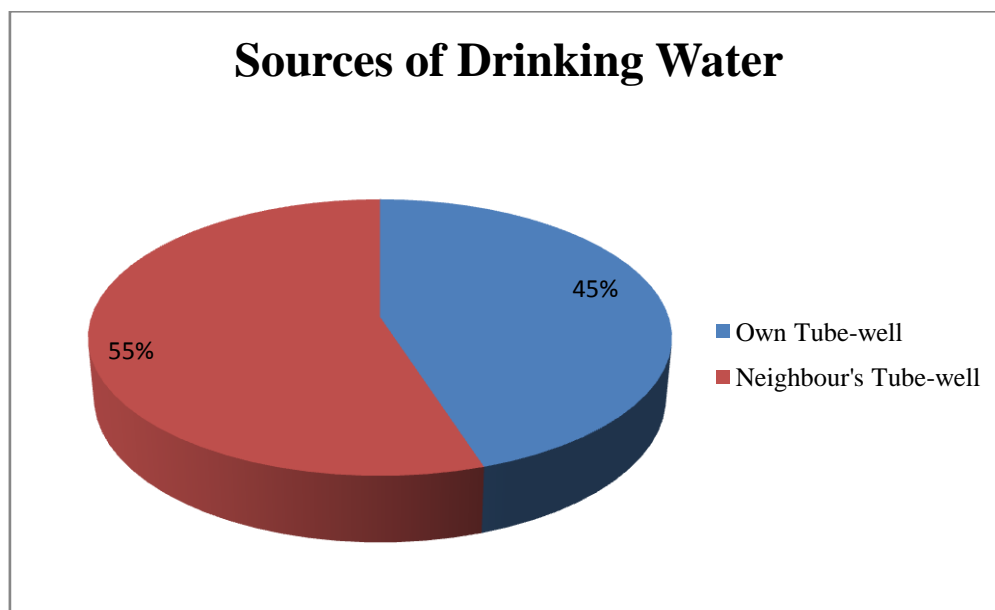


Figure 13: Respondents Sources of Drinking Water

Table: 13 Distributions of Respondents regarding their Types Sanitation System (N=100)

Types of Sanitation System	Frequency	Percentage (%)
Sanitary Latrine	4	4
Kancha Latrine	90	90
Open Space	6	6
Total	100	100

Sanitation system of the respondents is clear from the above table. Among 100 respondents, sanitary latrine is used by only about 4% respondents and most of the respondents (90%) use kancha latrine. Besides, some people (6%) also use open space for sanitation. Here, it is clear that elder people are not much aware their sanitation system. Besides, they can not afford sanitary latrine due to financial crisis.

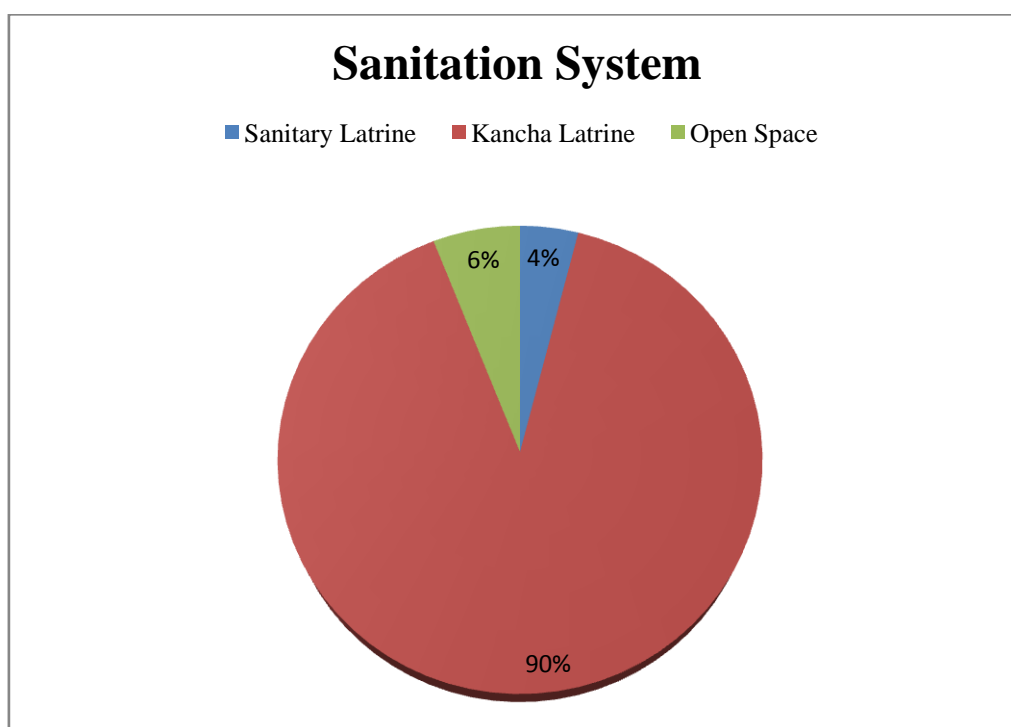


Figure 14: Respondents Types of Sanitation System

5.3 Psychological Status Related Information of the Respondents

Table: 14 Distribution of Respondents regarding their Psychological Status when they remember that incident (N=100)

Feelings When Remember that Disaster	Frequency	Percentage (%)
Dizziness	10	10
Unsteady Gait	5	5
Flash Back	20	20
Insomnia	40	40
Altered Sleep Wake Cycle (ASW)	5	5
Panic Attack	20	20
Total	100	100

The above table is about the psychological status of the respondents when they remember that incident. They have expressed their feelings when they remember that disaster. Maximum number of respondents (40%) replied that they experience insomnia when they remember that incident, which is very common among the riverbank erosion-affected people. Besides, about 10% and 5% respondents replied that they usually experience dizziness and unsteady gait respectively when they remember that disaster attack. Also, 20% elder people replied that they have become the victim of flash back and panic attack respectively when they remember that incident.

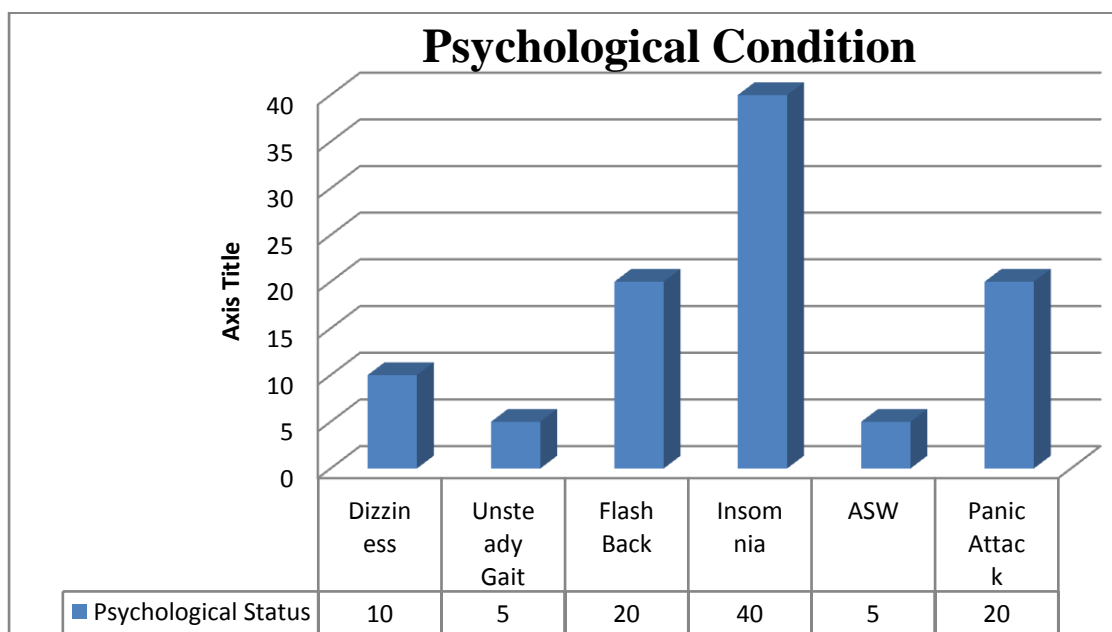


Figure 15: Psychological Condition of the Respondents

Table: 15 Distributions of Respondents regarding having Psychological problems or not as a result of Riverbank Erosion (N=100)

Victim of Psychological Problem	Frequency	Percentage (%)
Yes	60	60
No	40	40
Total	100	100

The above table is about the psychological status of the riverbank erosion-affected respondents. Though they are not conscious about their psychological problems but they agree with the symptoms of various psychological disorders. About 60 respondents have replied that they are experiencing some symptoms of psychological disorders. On the other hand, 40 respondents have replied that they do not experience any symptoms of psychological disorders.

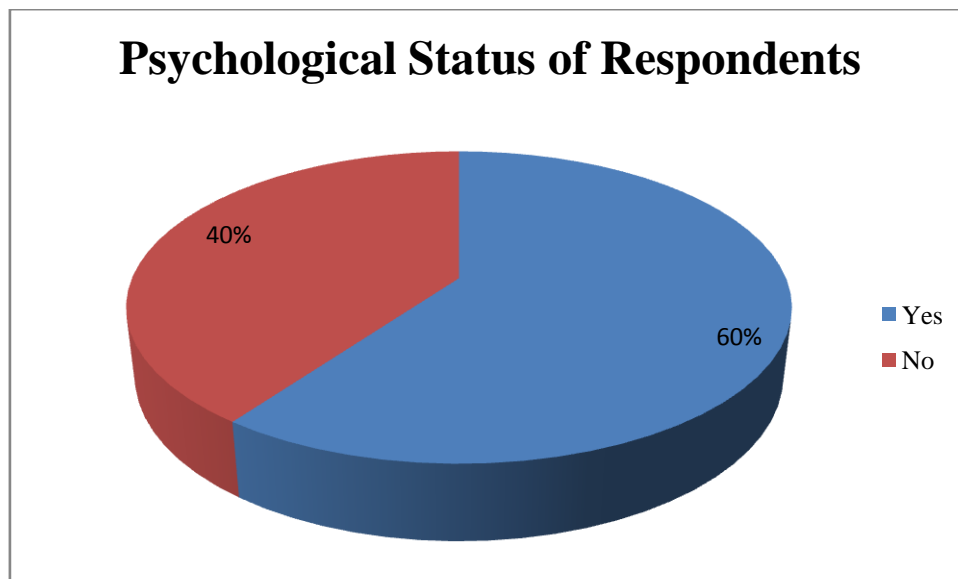


Figure 16: Psychological Status of the Respondents

Table: 16 Distributions of Respondents regarding their Types of Psychological Problems

Types of Psychological Problems	Frequency	Percentage (%)
Post Traumatic Stress Disorder (PTSD)	25	41.67
Major Depressive Disorder (MDD)	5	8.33
Somatoform Disorder	15	25
Mixed Anxiety Depressive Disorder	15	25
Total	60	100

From the above table, it is visible that about 60 respondents have symptoms of psychological problems after the riverbank erosion whereas 25 respondents (41.67%) have been suffering from post traumatic stress disorder and 5 respondents (8.33%) have expressed the symptoms of major depressive disorder. Besides, about 15 respondents (25%) have been suffering from somatoform and mixed anxiety depressive disorder respectively. Here, most noticeable fact is that none of them have taken any psychological treatment yet. They are not aware about their psychological status.

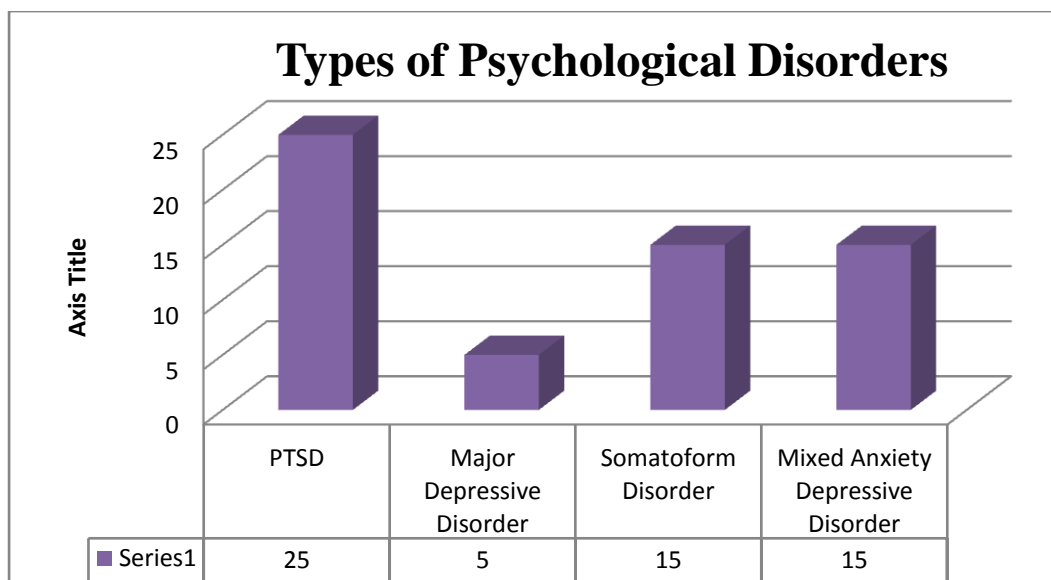


Figure 17: Respondents Types of Psychological Disorders

5.4 Post-disaster Services and Recommendations of the Respondents for their development

Table: 17 Distributions of Respondents regarding their Post-disaster Services (N=100)

Post-disaster Services	Frequency	Percentage (%)
Yes	00	00
No	100	100
Total	100	100

This table is about the post disaster services of the respondents. It is both a matter of irony and surprising that none of the respondents have got any post-disaster services. They have not got any services from government and non-governmental organizations. No one comes to help them after the erosion period.

Table: 18 Respondents Recommendations about the forms of Government and N.G.O. Services during post-disaster period (N=100)

Forms of Post-disaster Services	Frequency	Percentage (%)
Monetary Assistance	82	82
Employment Opportunities	73	73
Nothing	16	16

(More than one response was possible)

This study reveals that elderly are frustrated about the initiatives and co-operative activities of the government and N.G.O. About 16% respondents do not have any hope on the government or N.G.O's. Respondents believe that government or N.G.O's will not take any initiatives for their welfare. On the other hand, maximum number (82%) of bank erosion-affected elderly wants monetary assistance from the government or N.G.O's, 73% respondents believe that government or N.G.O's should arrange employment opportunities for them. They want to earn money and support their family members.

Chapter - Six

Presentation of Selected Case Studies

Case Study - 1

Case Study - 2

Case Study - 3

Case Study - 4

Case Study - 5

Case Study-1

Younus Mia is 62 years old person, living with his son. He can only write his name. His main occupation is agriculture. He lives at Char Alexander of Ramgoti Upazila in Lakshmipur district. Almost 12 years ago, bank erosion of Meghna River got everything from Younus Mia. He is now dependent on his son.

Family Structure

Name	Age	Education	Relationship	Occupation	Income (monthly)
Abdur Rahman	45 years	Class 5	Son	Agriculture	8000tk
Rahima Begum	35 years	Illiterate	Daughter-in-law	Housewife	-
Hossen	18 years	S.S.C	Grandson	Work in shop	2500tk
Sharif	16 years	Class 8	Grandson	Work in shop	1500tk
Amena	13 years	Class 5	Grand daughter	Handicraft	1500tk

Before the erosion of Meghna River, Younus Mia's house was made of mud and bamboo (kacha), but now he lives in a hut on his son's land. He had his own house and own living land. But now he lives in his son's family though he is regarded as the chief of the family.

Younus Mia is a poor old person. He had lost his cultivating land during that disaster attack. Now, he has only a few amount of cultivating land. His main occupation is agriculture. He cultivate in his own land along with his son. His monthly income is almost 10000tk. In this disaster attack, he lost about 1.2 lac tk-1.6 lac taka. Bank erosion of Meghna River has brought significant losses in his life.

Physical health of Younus Mia is not well. Now, he is physically weak. He believes that riverbank erosion is the main cause of his physical illness. Even he became the victim of unstable angina during the disaster period. Now, he has been suffering from whooping cough. After the riverbank erosion, he became the victim of scabies and other skin diseases. At that

time, he got medical service by himself to recover himself from diseases. Besides, his family gets water from neighbour's tube-well and they have kacha latrine of their own.

Younus Mia is very much conscious about his psychological condition. He does believe that now he is psychologically sick. He is not satisfied with his present condition. When he remembers that disaster attack, he feels dizziness and unsteady gait; sometimes he becomes the victim of panic attack. Besides, he has been suffering from post traumatic stress disorder (PTSD) and somatoform disorder since bank erosion of Meghna River. But he did not take psychological treatment as facilities are not available there.

Like other victims of riverbank erosion of that locality, Younus Mia did not get any post-disaster services. Even, he does not have any expectation from government or N.G.O's as he believes that all of them are corrupted.

Younus Mia is an independent old person who passes his days through agriculture. Now he is living with his son. Also, he has lost his land as a result of riverbank erosion though he has a few amount of cultivating land now. And he has been suffering from various physical illnesses due to this disaster attack. Besides, he is the victim of psychological disorders but cannot take any treatment in this regard due to lack of available treatment facilities. When he was asked about his expectation from government and N.G.O's, he replied that they should make employment opportunities and give easy loan to run profitable business. N.G.O.'s should give effective training for reducing unemployment in our country. Besides, he thinks that government should take necessary initiatives to prevent riverbank erosion.

Case Study- 2

Sufia Begum is 62 years old widow who lives in her son's family. She cannot read or write. She lives at Char Alexander of Ramgoti Upazila in Lakshmipur District. Almost 10 years ago, bank erosion of Meghna River devastated her life, her economic, physical and psychological condition. She is now dependent on his son's income.

Family Structure

Name	Age	Education	Relationship	Occupation	Income (monthly)
Shamsul Alamin	48 years	Literate (only signature)	Son	Fisherman	10000tk
Sharifa Khatun	40 years	Illiterate	Daughter-in-law	Housewife	-
Hosne Ara	22 years	Class-10	Grand-daughter	Handicraft	2500tk
Shafikul	20 years	Class 8	Grandson	Work in shop	2500tk
Shahinur	16 years	Class 5	Grand-daughter	Handicraft	2500tk

Before the erosion of Meghna River, Sufia Begum's house was made of tin and wood but now she lives in a kacha (mud and bamboo) house on her son's land. Before bank erosion, Sufia Begum had her own land to live. At that time, she was the chief of her family.

Sufia Begum is a poor dependent person. She had her own living and cultivating land. But bank erosion of Meghna River has got everything from her. Now, she is dependent on her son. She has lost about 80,000tk-1.2 lac taka in this disaster attack.

Physical health of Sufia Begum is quite well. Now, she has been suffering from scabies and other skin infections just after the riverbank erosion. She believes that river erosion is the main cause of his physical illness. Even she became the victim of fatal arrhythmias during the

disaster period. She has got medical services by herself to recover from scabies and other skin infections as she did not get any government medical services. Besides, her family gets water from neighbour's tube-well and they have kacha latrine of their own.

Psychologically Sufia Begum is well though she is not satisfied with her present condition. When she remembers that disaster attack, she feels dizziness; sometimes she becomes the victim of panic attack. Besides, she did not get any post-disaster services, so she is hopeless about government and N.G.O. services.

Like other victims of riverbank erosion of that locality, Sufia Begum did not get any post-disaster services. Even, she does not have any expectation from government or N.G.O's as she believes that all of them are corrupted.

Sufia Begum is a helpless old person who is dependent on others mercy. Now she is leading a miserable life as there is no one to talk with her. Also, she lost his living and cultivating land as a result of riverbank erosion. And she has been suffering from various physical illnesses due to this disaster attack. However, though she is not suffering from any psychological problems but she is not satisfied with her present condition. When she was asked about her expectation from government and N.G.O's, she replied that they should make employment opportunities, provide monetary help and give rehabilitation services. Besides, she thinks that government should take necessary initiatives to prevent bank erosion of Meghna River.

Case Study- 3

Ambia Khatun is 61 years old widow who lives in her son's family. Almost 13 years ago, bank erosion of Meghna River devastated her house, her cultivating land and all her belongings. She cannot read or write. She has to rely on her son for her daily bread.

Family Structure

Name	Age	Education	Relationship	Occupation	Income (monthly)
Keramot Ali	48 years	Literate (only signature)	Son	Agriculture	10000tk
Laiju Begum	40 years	Illiterate	Daughter-in-law	Housewife	-
Taslima	22 years	Class-10	Grand-daughter	Handicraft	2000tk
Honufa	16 years	Class 5	Grand-daughter	Handicraft	1500tk

Before the erosion of Meghna River, Ambia Khatun's house was made of tin and wood but now she lives in a kacha (mud and bamboo) house on her husband's land. Before the bank erosion, her husband was the chief of her family but now both of them live in their son's family.

Ambia Khatun is a poor dependent person. She had her own living and cultivating land. But bank erosion of Meghna River has got everything from her. Now, she is dependent on her son. She has lost about 1.6 lac tk-2.0 lac taka in this disaster attack.

Physical health of Ambia Khatun is not well. Now, she is physically weak. She does believe that river erosion is the main cause of her physical illness. Even she became the victim of unstable angina during the disaster period. Now, she has been suffering from whooping cough. After the riverbank erosion, he became the victim of scabies and other skin diseases. She has got medical services by herself to recover from scabies and other skin infections as she did not get any government medical services. Besides, her family gets water from their own tube-well and they have kacha latrine of their own.

Ambia Khatun is very much conscious about her psychological condition. She does believe that now she is psychologically sick. She is not satisfied with her present condition. When she remembers that disaster attack, she feels unsteady gait; sometimes she becomes the victim of panic attack. Besides, she has been suffering from post traumatic stress disorder (PTSD) since bank erosion of Meghna River. But she did not take psychological treatment as facilities are not available there.

Like other victims of riverbank erosion of that locality, Ambia Khatun did not get any post-disaster services. Even, she does not have any expectation from government or N.G.O's as she believes that all of them are corrupted.

Ambia Khatun is a helpless old person who is dependent on others mercy. Now she is leading a miserable life as there is no one to talk with her. Also, she lost his living and cultivating land as a result of riverbank erosion. And she has been suffering from various physical illnesses due to this disaster attack. Also her psychological condition is not satisfactory. When she was asked about her expectation from government and N.G.O's, she replied that they should make employment opportunities and provide monetary help. Besides, she thinks that government should take necessary initiatives to prevent bank erosion of Meghna River.

Case Study- 4

Moju Bepari, 63 years old, is a widower. He is a fisherman now. He can read and write. He lives at Char Alexander of Ramgoti Upazila in Lakshmipur District. Almost 11 years ago, he lost his everything due to bank erosion of Meghna River.

Family Structure

Name	Age	Education	Relationship	Occupation	Income (monthly)
Selim Ali	45 years	Class 5	Son	Fisherman	8000tk
Nilufa Begum	35 years	Illiterate	Daughter-in-law	Housewife	-
Sohel	18 years	S.S.C	Grandson	Work in shop	2500tk
Juwel	16 years	Class 8	Grandson	Work in shop	1500tk
Halima	13 years	Class 5	Grand-daughter	Handicraft	1500tk

Before the erosion of Meghna River, Moju Bepari's house was made of mud and bamboo (kacha), but now he lives in a hut on government land. He has live from hand to mouth. He cannot take rest for a single day. If he does not go out for fishing, he cannot manage money for food and medicine.

Moju Bepari is an ultra poor person. Though he is an old person but he is the chief of his family. He has no cultivating land. His main occupation is catching fish. His monthly income is almost 8000tk. In this disaster attack, he lost about 80,000tk-1.2 lac taka. Now, he is helpless and does not know how to recover his losses.

Physical health of Moju Bepari is not well. Now, he is physically weak. He does believe that river erosion is the main cause of his physical illness. Even he became the victim of fatal arrhythmias during the disaster period. Now, he has been suffering from whooping cough. After the riverbank erosion, he became the victim of tuberculosis. At that time, he got

government medical service to recover himself from tuberculosis. Besides, his family gets water from neighbour's tube-well and they have kacha latrine of their own.

Psychologically Moju Bepari is well though he is not satisfied with his present condition. When he remembers that disaster attack, he feels dizziness; sometimes he becomes the victim of insomnia. Besides, he did not get any post-disaster services, so he is hopeless about government and N.G.O. services.

Like other victims of riverbank erosion of that locality, Moju Bepari did not get any post-disaster services. Even, he does not have any expectation from government or N.G.O's as he believes that all of them are corrupted.

Moju Bepari is a helpless old person who passes his days through catching fish. Now he is leading a miserable life as there is scarcity of fish in the river. Also, he lost his land as a result of riverbank erosion. And he has been suffering from various physical illnesses due to this disaster attack. However, though he is not suffering from any psychological problems but he is not satisfied with his present condition. When he was asked about his expectation from government and N.G.O's, he replied that they should make employment opportunities and give easy loan to run profitable business. Besides, he thinks that government should take necessary initiatives to prevent riverbank erosion.

Case Study- 5

Md. Kader Ali, 63 years old, is a small businessman (tea stall). His tea-stall is just on the bank of Meghna River. Almost 12 years ago, he lost his everything due to bank erosion of Meghna River. This disaster attack has brought a significant change in his whole life-style.

Family Structure

Name	Age	Education	Relationship	Occupation	Income (monthly)
Jahir Ali	45 years	Illiterate	Son	Fisherman	10000tk
Karimon Begum	35 years	Illiterate	Daughter-in-law	Housewife	-
Habiba	18 years	Class 8	Grand daughter	Handicraft	2000tk
Selim	16 years	Class 5	Grandson	Work in shop	1500tk
Shamsunnaher	14 years	Class 5	Grand daughter	Handicraft	1500tk

Before the erosion of Meghna River, Md. Kader Ali's house was made of tin and wood, but now he lives in a hut on government land. Md. Kader Ali lives with his son where his son is the chief of the family.

Md. Kader Ali is a poor old person, living with his son. Before the bank erosion of Meghna River, he had his own living and cultivating land. At that time, he used to do farming in his cultivating land. But this disaster attack has taken everything from him. Now, he has no cultivating land. His house is on the government land. He is now a small businessman, running a tea stall in the village market. His monthly income is almost 8000tk. In this disaster attack, he lost about 1.2 lac tk-1.6 lac taka. Now, he is helpless and does not know how to recover his losses.

Physical health of Md. Kader Ali is not well. Now, he is physically weak. He does believe that river erosion is the main cause of his physical illness. Even he became the victim of

unstable angina during the disaster period. After the riverbank erosion, he became the victim of scabies and other skin infections. At that time, he got medical service by himself to recover himself from diseases. Besides, his family gets water from their own tube-well and they have kacha latrine of their own.

Md. Kader Ali is very much conscious about his psychological condition. He does believe that now he is psychologically sick. He is not satisfied with his present condition. When he remembers that disaster attack, he feels unsteady gait and flash back; sometimes he becomes the victim of panic attack. Besides, he has been suffering from post traumatic stress disorder (PTSD) and major depressive disorder (MDD) since bank erosion of Meghna river. But he did not take psychological treatment as facilities are not available there.

Like other victims of riverbank erosion of that locality, Md. Kader Ali did not get any post-disaster services. Even, he does not have any expectation from government or N.G.O's as he believes that all of them are corrupted.

Md. Kader Ali is a dependent old person who passes his days through running a tea stall. Now he is leading a miserable life due to physical weakness. Also, he lost his living and cultivating land as a result of riverbank erosion. And he has been suffering from various physical illnesses due to this disaster attack. Besides, he is the victim of psychological disorders but cannot take any treatment in this regard due to lack of available treatment facilities. When he was asked about his expectation from government and N.G.O's, he replied that they should make employment opportunities and give easy loan to run profitable business. Besides, he thinks that government should take necessary initiatives to prevent riverbank erosion.

Chapter - Seven

Discussion and Recommendations

Discussion

Riverbank erosion has become a common and devastating natural disaster in Bangladesh mostly for coastal areas. This research is on the overall impact of riverbank erosion titled “Impact of Riverbank Erosion on the Elderly: A Study on a Coastal District of Bangladesh”, is both quantitative and qualitative in nature. Here, the basic method is sample survey. Apart from this, a few case studies were conducted to supplement the total findings of the study. Char Alexander at Ramgoti Upazila in the Lakshmipur district is the study area. Purposive sampling method is used for determining the sample where 100 elderly people are selected as sample. The data for this study is collected both from primary and secondary sources. The study is relied on interviews, observation and case study methods. The main objective of the study is to find out the impact of riverbank erosion such as socio-economic, physical (physical illness, sanitation and water source) and psychological status (anxiety, MDD and PTSD) on the livelihood of the affected elderly. Besides, this study has emphasized some recommendations given by the affected elderly for improving their condition. With all the limitations, following are some important findings of riverbank erosion at Char Alexander has been identified:

In this study, primary data have been collected from a coastal area (Char Alexander at Ramgoti upazila under the Lakshmipur district). All of the respondents are above 60 years old and they are randomly chosen. In this study, that most of the respondents are male that consists of 60% and about 40% respondents are female among total 100 respondents. Here, the distribution of respondents is on the basis of the gender. Most of them are illiterate, some of them are married, some are widow and some are widower also.

This study reveals that livelihood pattern of almost all of the elderly has been changed. This disaster has brought a change in their ownership of land, property, occupation, physical and mental setup. About 25% elderly respondents now have hut, 15% have tin and wood house and 60% have kacha (mud and bamboo) house after the erosion. But earlier 60% respondents had tin and wood house, 30% respondents' house was made of kacha (mud and bamboo) and 10% respondents had semi-pacca house. But this destructive erosion has got everything from them. These findings of this study are similar to the research titled “Impact of Riverbank Erosion Hazard in the Jamuna Floodplain Areas in Bangladesh” (Rahman, M.R., 2010)

Only about 30% respondents have the ownership of their house and 10% respondents answered about the husband as the ownership of their house. Remarkably 60% elderly respondents has given answer that their son is the owner of the house now. But about 50% respondents had the ownership of their house and 30% respondents have answered that their husband was the owner of their house before the bank erosion of Meghna River. These findings of this study are similar to the research titled “Bank Erosion of the river Meghna: Population Displacement and socio-economic impacts” (Islam, M. Zahurul et al, 2007).

Riverbank erosion of Meghna has brought changes in the ownership of living and cultivating land as they have lost remarkable amount of homestead lands and cultivable lands due to riverbank erosion. In this study, about 37% respondents have their own living lands, 21% elderly female respondents have answered that their husband is the owner of their living land. About 25% respondents have no land to live so they live in government lands (locally called “Beri”). About 70% respondents have lost their cultivating lands. Loss of cultivating land has brought changes in their occupation. Before the erosion, about 45% elderly respondents was engaged with agriculture, 15% was involved with catching fish, 30% was housewife and only 5% was dependent. Now, about 50% respondents have become dependent on their son, only 10% respondents are engaged in business and catching fish respectively. This erosion has remarkably decreased the number of farmer (only 20%) in the study area.

This study has revealed significant changes in the health status of the elderly due to bank erosion of Meghna River. Some health problems are common among the elderly during the disaster period. About 64% respondents felt unstable angina, 31% elderly respondents felt fatal arrhythmias and 5% respondents became victim of asthma during the period the riverbank erosion. Besides, about 87% respondents have been suffering from various diseases after the bank erosion. About 63.21% respondents have become victim of whooping cough, about 28.73% respondents have tuberculosis and 86.20% elderly have scabies and other skin infections. Only 73 respondents have taken medical services among 87 sick respondents. But it is an irony of fate that only 10 respondents have got government medical services and about 63 respondents have taken medical services by themselves. These findings of this study are similar to the research titled “Disaster Preparedness for the Elderly: An Analysis of International Literature Using Symbolic Inter-actionist Perspective (Marshall and Mathews, 2011).

In addition, elderly in the study area are not conscious about their sanitation system and drinking water. Though no one drinks river or canal water but only 45% respondents have their own tube-well. About 55% elderly respondents take water from neighbour's tube-well. On the other hand, only 4% respondents use sanitary latrine and 6% respondents use open space whereas about 90% respondents use kacha latrine.

Moreover, with aging come psychosocial adjustments in cognition. Changes occur in intellect, memory, learning, and creative process of elders (McInnis-Dittrich, 2005). In addition, the effects of intense situations are often compounded by the accumulative effects of losses during later life (Oriol, 2001). The literature regarding mental health and the elderly clearly suggests that the elderly are at times mentally quite resilient in dealing with traumatic situations/disasters and can adjust well despite the circumstances (Huerta & Horton, 1978; Phifer, 1990). Bell (1978) and Phifer (1990) stated that most elderly have lived through traumatic situations in the past and many have built personal resistance that enables them to bounce back faster than younger counterparts, who have not lived through or even witnessed tragedy.

Elderly in the study area are not aware about his mental/psychological condition. Only 60% elderly believe that they became victim of psychological disorder after that bank erosion of Meghna River. Also, about 10% and 5% respondents replied that they suffer from dizziness and unsteady gait respectively when they remember that disaster attack. Also, 20% elderly people replied that they have become the victim of flash back and panic attack respectively when they remember that incident. Moreover, majority number of respondents (40%) replied about insomnia which is very common among the riverbank erosion affected people.

Psychological disorders are very common among the disaster affected people. Since the riverbank erosion, about 41.66% respondents have been suffering from Post Traumatic Stress Disorder (PTSD), 8.33% in Major Depressive Disorder (MDD), 25% in Somatoform Disorder and Mixed Anxiety Depressive Disorder respectively. But it is a noticeable fact that none of them have taken any psychological treatment which are similar to the study titled "Mental Health and the Psychosocial Consequences of Natural Disasters in Asia", it is found that the prevalence of PTSD and PTSD symptoms vary from 8.6% to 57.3% among Asian survivors. The prevalence of major depressive disorder (MDD) related to disasters is less frequent when compared with PTSD. Data from Thailand showing that the prevalence rate of

tsunami-related PTSD in children (diagnosed by child psychiatrists) and PTSD symptoms in adults (using a questionnaire) decreased over time while MDD in children did not, but depressive symptoms in adults showed a modest decrease at nine months of follow up. (Piyasil et al., 2007; Piyasil et al., 2008; Udomratn, 2006; Udomratn & Panyayong, 2006; van Griensven et al., 2006).

Monetary loss is a great loss for elderly. They have mentioned that about 25% of them have lost 80,000tk- 1.2 lac and 20% respondents have lost 1.6 lac-2.0 lac taka respectively. Besides, majority of my respondents (40%) have lost property of about 1.2 lac-1.6 lac taka due to riverbank erosion. These findings of this study are similar to the research titled “Effects of Riverbank Erosion on Livelihood” (Uddin, A.F.M Azim et al: 2011). But, most noticeable fact is none of them have got services from government and non-governmental organizations. No one come to help them after the disaster period. As a result most of them have become either hardcore poor, very poor or poor.

Every erosion-affected elderly fell that both government and N.G.O’s services are necessary for overcoming the losses and preventing riverbank erosion in the study area. Most of the affected elderly prefer monetary help, employment opportunities, and training and easy loan facility for improving their socio-economic conditions.

The impacts of Meghna riverbank erosion on the people of Char Alexander are very crucial and still it is a nightmare for the elderly.

Recommendations

Riverbank erosion is a threatening problem for the people of Bangladesh especially for elderly and for the economy of the country as well. It also breaks the environmental and ecological equilibrium. The loss of erosion is irreparable. As our country is densely packed with people and maximum of them are directly or indirectly dependent on agriculture, proper measures for erosion control are badly needed. The National Disaster Management Council (NDMC) should enact the Comprehensive Riverbank Erosion Management Policy:

- To ensure the rights and protection of the displacees;
- Formation of ‘Coordination Council’ to coordinate bank-protection works and displacees’ livelihood development programs.

These programs should include the following phases of erosion risk management at the national as well as local level:

Phase 1 – Pre-displacement Period

1. Identifying, assessing and monitoring of the potential hazards, risks and vulnerabilities of elderly.
2. Organization of effective early warning and information management systems. This guarantees timely and effective dissemination of early warning information to the community level.
3. Building storage systems at district levels in order to effectively dispatch material resources for relief and rehabilitation of elderly.
4. “Regional Disaster Management Center of South Asia” for multilateral cooperation.

Phase 2- Emergency Response

1. Conducting rescue, evacuation and recovery operations as necessary.
2. Determining temporary shelter and facilitate with transport may help the elderly to come to the shelter area.
3. Activating evacuation points/areas and distributing relief and medical supplies to disaster victims especially elderly, women and children.
4. Developing recovery plans based on community needs and priorities for the elderly.

Phase 3- Post Displacement Phase

1. Providing “developmental relief” and recovery services as necessary.
2. Enacting Banking policy to provide loan without interest and write off agricultural loan to the elderly.
3. Ensuring boundary conditions (river depth, flow velocities, water levels) for different design options (spurs, revetments) based on specific characteristics of major rivers.
4. Introducing two- and three-layer bank protection systems for the elderly.

Besides, following stringent measures can be taken to help and rehabilitate the erosion affected elderly:

i. Stakeholders’ Awareness Rising and Advocacy

More national and international organizations should be involved for old people’s disaster risk reduction at national and local levels through different risk reduction initiatives

including preparation of risk reduction planning, especially for elderly. Advocacy program should be introduced by the NGO's and civil societies to incorporate old people's issues at different levels from national to grass root levels.

ii. Increase of Social Networking

The lower level of visibility among elderly of the society should be increased through formation of old people's organization at ward, union, upazila, district and national levels. This organization will play a vital role to raise issues of their vulnerability in the forum of different levels.

iii. Enhancing Economic Condition

Due to change in the power structure of society, the elderly are in the most vulnerable condition. So, different household base income generating activities should be introduced focusing the vulnerability of the elderly only. As a part of income generating activity, various skill development training should be incorporated with national to local level skill development programs.

iv. Shelter Center and Capacity Building

The shelter center should be designed friendly for the elderly, because most of the elderly are not physically capable like other groups of people. It is essential to incorporate ramp along with stairs to ensure elderly accessibility in the shelters and separate rooms should be reserved for elderly during disaster period. Different capacity building initiatives for the elderly should be introduced at the local level through conducting introductory courses on disaster risk reduction. The elderly should be able to response by themselves during disaster so that community people may help in the reduction of vulnerability for old people at a significant level.

v. Reformation of Disaster Management Committee

Existing local level disaster management committee should be reformed in order to create scope for old people to enter in the committees, because existing structure of disaster management committee does not consider old people as the most vulnerable group. So, to reduce the vulnerability of elderly at a significant level, it is essential to reform existing disaster management committee and create a scope to get their opinion and experience at the same time.

Conclusion

A natural disaster affects the lives of survivors socially, economically and psychologically, and can influence their behaviour regarding the hazards. In the last 30 years total eroded area on the left bank of the Meghna was 14851 sq meters and total deposition was 10940 sq meters. The river course shows an overall migration of the left bank is northwestward and south-eastward direction. The tidal effects, combined flow of Padma and Meghna and regular channel shifting are mainly responsible for erosion in that area. Higher rate of deposition may help to form submerged land or char land which may divert the water flow to the mainland resulting severe erosion. Past protections or embankments which were given to reduce erosion, failed in most of the areas and also increased erosion rate in the unprotected areas.

Besides different bank protection works, riverbank erosion remains as a continuous threat to the riparian inhabitants and the land-scarce country. Every year, a large number of its population is displaced due to riverbank erosion. They lose their land and migrate to another place to make new settlement. These environmental refugees become vulnerable as a whole in every sense. Before deteriorating situation to beyond control, it is high time to take necessary actions to stop forceful displacement and livelihood management of the victims.

The marginalized and poor elderly people not only lose property but also experience socioeconomic deprivation through displacement. Because of the dynamic character of the braided channelled river and the failure of structural measures, the sufferings of the elderly are assumed to continue. Long-term policies and strategies should be taken to cope up with the bank erosion taking into account the social and institutional adjustment measures. Land relocation assurance is one of the appropriate strategies to cope up with such disaster for the elderly. In addition, a floodplain zoning is essential to lessen the vulnerability of riverbank erosion. Furthermore, measures should be taken in different level to minimize the loss:

- a) Sustainable embankment construction and its maintenance
- b) Training on disaster preparedness involving local institution/ local government
- c) Massive afforestation with the experience of local knowledge and its maintenance
- d) Action against deforestation
- e) Form an alliance among SAARC countries in order to ensure water distribution within the subcontinent.

The victims especially elderly makes efforts both physically and socially to survive with the precarious conditions by riverbank erosion. It is found that the influences of the ecological and the socio-economic conditions and the formulated and undertaken strategies by the victims are effective to survive with the changing environment. The existing conditions influence them to formulate this kind of strategies.

In this decade of environment, the policymakers and development researchers at the national need to be aware of the nature of socio-economic and environmental conditions of riverbank erosion victims in Bangladesh. Due to every year caused riverbank erosion unemployment landlessness and poverty is increasing which is responsible for the unstable condition in whole the country.

However, further research should be focused on future channel shifting pattern, erosion rate and vulnerability of different locations as well as determining effective measures to decrease erosion severity and its consequences on the victims especially elderly as they are considered the most vulnerable group.

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Appendix 1

Interview Guidelines/Checklist

Institute of Social Welfare and Research

University of Dhaka

Session: 2013-14

Research Title: Impact of Riverbank Erosion on the Elderly: A Study on a Coastal District of Bangladesh

(This thesis has been conducting to fulfill the partial requirement of M.S.S degree, Course:1004 Information collected for the study would be used only for the research purpose and strict confidentiality will be maintained)

Interview Guideline No:

Date:

A. Demographic Information

- 1) Name :
- 2) Age :
- 3) Gender : Male Female
- 4) Education : Illiterate Literate (Only Signature)
 Primary Education Class 6-10 SSC & Above
- 5) Marital Status : Single Married Divorce Widow
 Widower Others (specify)...
- 6) Permanent Address :
- 7) Who is your family head?
 Self Husband Son Daughter Others (specify)...
- 8) How many years ago this disaster attacked you and your belongings?

B. Information regarding Impact on Socio-economic condition of Elderly

9) What is the type of this house?

- Hut Kacha (Mud & Bamboo) Tin and Wood
 Semi-pacca (Brick and Tin) Others (specify)...

10) Before the erosion, what was the type of your house?

- Hut Kacha (Mud & Bamboo) Tin and Wood
 Semi-pacca (Brick and Tin) Others (specify)...

11) Who is the owner of this house?

- Self Husband Son Daughter
 Government Others (specify)...

12) Before the riverbank erosion, who was the owner of this house?

- Self Husband Son Daughter
 Government Others (specify)...

13) Who is the owner of this land?

- Self Husband Son or Daughter Government
 Others (specify)...

14) Did you have your own land to live?

- Yes No

15) Do you have any land now for crop production?

- Yes No

If yes, mention the amount-...

16) Have you lost your cultivating land due to that disaster?

- Yes No

If yes, mention the amount-...

17) What is your occupation now?

- Agriculture Catching Fish Business Housewife Dependent
 Others (specify)...

18) Before the erosion, what was your occupation?

- Agriculture Catching Fish Business Housewife Dependent
 Others (specify)...

19) What is the amount of your monetary loss due to this bank erosion of Meghna?

- 80000-1.2 lac 1.2 lac-1.6 lac 1.6 lac-2.0 lac
 2.0 lac-2.4 lac More than 2.4 lac

C. Information regarding Health Condition of the Elderly after the Erosion

20) Did you face any health problem during the erosion period?

- Heart Attack Unstable Angina Fatal Arrhythmias Asthma
 Others (specify)...

21) Are you suffering from any physical problem as a result of riverbank erosion?

- Yes No

22) What type of physical illness do you have?

- Influenza Measles whooping cough Tuberculosis
 Scabies and other skin infections Dengue fever others (specify)...

23) What is the source of your drinking water?

- Own tube-well Pond Water River Water Neighbour's tube-well
 Others (specify)...

24) What type of sanitation system do you have?

- Sanitary Latrine Kancha Latrine Open Place Others (specify)...

25) Have you got any medical service?

- Yes No

26) Who gave you that service?

- Self Government NGO Others (specify)...

D. Information regarding Psychological Issues of Elderly

27) Are you suffering from any psychological problem?

- Yes No

28) How do you feel when you remember that incident?

- Dizziness Unsteady Gait Flash Back Insomnia
 Altered sleep wake cycle Panic Attack Others (specify)...

29) Have you lost anyone from your family during that disaster?

- Yes No

30) How many members have you lost?

31) What type of psychological problem do you have?

- Post Traumatic Stress Disorder (PTSD) Major Depressive Disorder (MDD)
 Somatoform Disorder Mixed Anxiety Depressive Disorder

(Interviewer will ask about the symptoms and determine the type)

32) Have you got any psychological treatment/therapy/counseling?

- Yes No

33) Who gave you that service?

- Self Government NGO Others (specify)...

34) Do you think you are dependent on others due to this disaster?

- Yes No

E. Government and NGO Services in post-disaster period

35) Have you got any services in post-disaster period?

- Yes No

36) If Yes, What gave you that service?

- Government NGO

37) What type of services have you got?

- Food Water Money Medicine Treatment
 Others (specify)...

F. Recommendations given by Elderly

38) Do you think Government services are necessary for you?

- Yes No

39) Do you think NGO services are necessary for you?

- Yes No

40) What should govt. do for your welfare?

- i.
- ii.
- iii.
- iv.

41) What should NGOs do for your welfare?

- i.
- ii.
- iii.
- iv.

(Thank you for giving your Time)

Date: .10.2014

Signature of the interviewer

Appendix 2

Definition of Some Used Terms

- i. **Unstable Angina** - It is a condition in which our heart doesn't get enough blood flow and oxygen. It may lead to a heart attack. Angina is a type of chest discomfort caused by poor blood flow through the blood vessels (coronary vessels) of the heart muscle.
- ii. **Fatal Arrhythmias** - Abnormal heart rhythms called arrhythmias.
- iii. **Asthma** - It is a common long-term condition that can cause coughing, wheezing, chest tightness and breathlessness.
- iv. **Influenza** - A highly contagious viral infection of the respiratory passages causing fever, severe aching, and catarrh, and often occurring in epidemics.
- v. **Measles** - An infectious viral disease causing fever and a red rash on the skin, typically occurring in childhood.
- vi. **Whooping Cough** - Whooping cough, also known as pertussis, is a serious infection that spreads easily from person to person. The infection causes coughing spells so severe that it can be hard to breathe, eat, or sleep.
- vii. **Tuberculosis** - It is caused by bacteria that spread from person to person through microscopic droplets released into the air. This can happen when someone with the untreated, active form of tuberculosis coughs, speaks, sneezes, spits, laughs or sings.
- viii. **Scabies** - Scabies is a contagious skin condition caused by tiny mites that burrow into the skin. The main symptom of scabies is intense itching that's worse at night. It also causes a skin rash on areas where the mites have burrowed.
- ix. **Dizziness** - Dizziness is the feeling of being lightheaded, woozy, or unbalanced. It affects the sensory organs, specifically eyes and ears. It can cause fainting. Dizziness is not a disease but a symptom of other disorders.

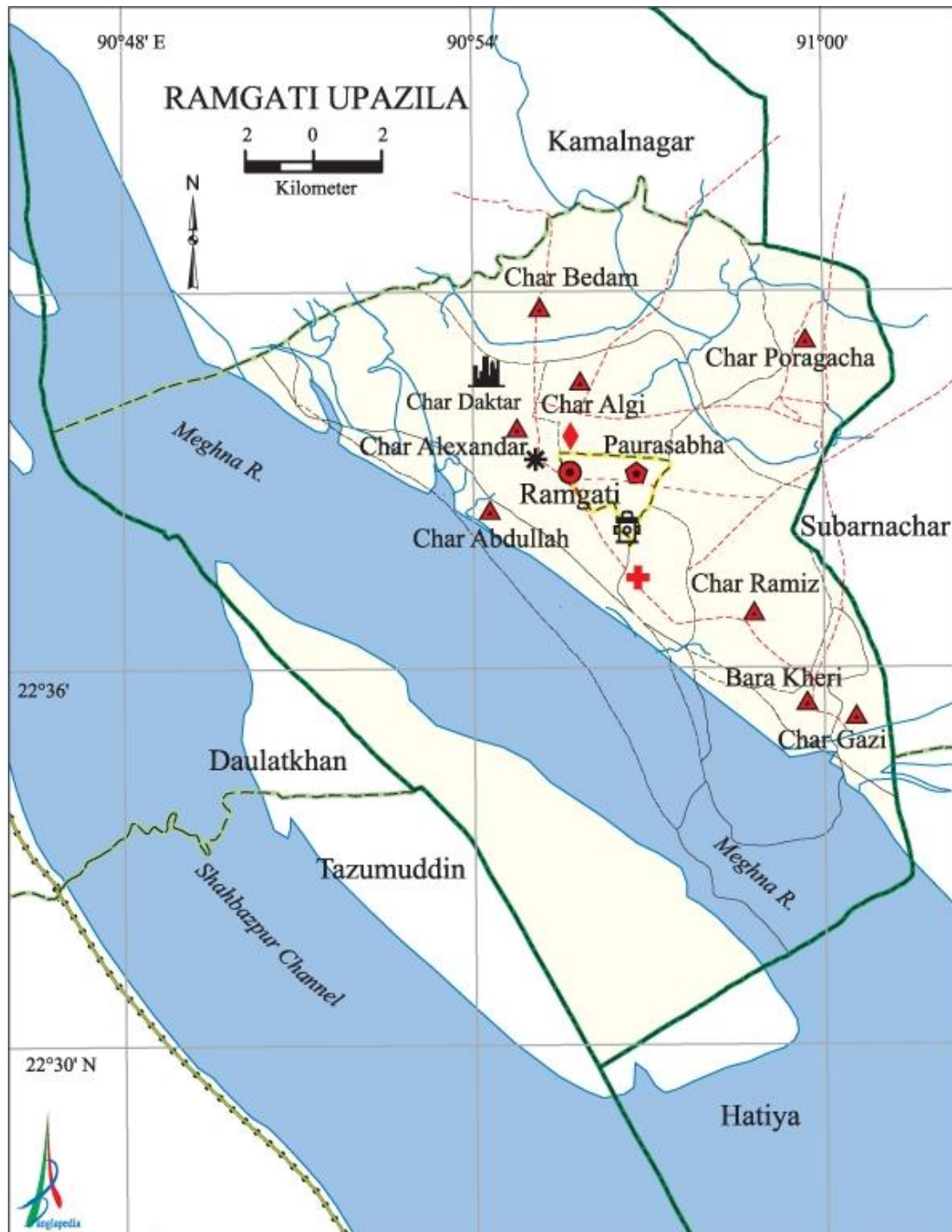
- x. **Unsteady Gait** – An unsteady gait is an abnormality in walking that can be caused by diseases of, previous unexpected event or damage to the legs and feet or to the nervous system that controls the movements necessary for walking.
- xi. **Flash Back** - A sudden and disturbing vivid memory of an event in the past, typically as the result of psychological trauma.
- xii. **Panic Attack** - Panic attacks, also known as anxiety attacks, are periods of intense fear or apprehension of sudden onset accompanied by at least four or more bodily or cognitive symptoms (i.e. heart palpitations, dizziness, shortness of breath, or feelings of unreality) and of variable duration from minutes to hours.
- xiii. **Insomnia** - It is a sleep disorder that is characterized by difficulty falling and/or staying asleep.
- xiv. **Altered Sleep Wake Cycle** – Excessive sleepiness
- xv. **Post-traumatic Stress Disorder (PTSD)** - It is a mental health condition that's triggered by a terrifying event — either experiencing it or witnessing it. Symptoms may include flashbacks, nightmares and severe anxiety, as well as uncontrollable thoughts about the event.
- xvi. **Major Depressive Disorder (MDD)** - It is also known as unipolar depression or simply major depression—is a serious clinical mood disorder in which feelings of sadness, frustration, loss, or anger interferes with a person's everyday life for weeks or months at a time. Major symptoms are irritability, difficulty with concentration, fatigue or lack of energy, feelings of hopelessness and/or helplessness, feelings of worthlessness, guilt, or self-hate, social isolation, sleep problems (insomnia or excessive sleeping), dramatic changes in appetite along with corresponding weight loss or gain etc.
- xvii. **Somatoform Disorder** - A somatic symptom disorder, formerly known as a somatoform disorder, is a mental disorder characterized by physical symptoms that suggest physical illness or injury – symptoms that cannot be explained fully by a

general medical condition or by the direct effect of a substance, and are not attributable to another mental disorder. In people who have a somatic symptom disorder, medical test results are either normal or do not explain the person's symptoms, and history and physical examination do not indicate the presence of a medical condition that could cause them. Patients with this disorder often become worried about their health because doctors are unable to find a cause for their symptoms. This may cause severe distress. Preoccupation with the symptoms may portray a patient's exaggerated belief in the severity of their ill-health. Common symptoms include anxiety and depression.

xviii. Mixed Anxiety-Depressive Disorder - Mixed anxiety-depressive disorder is a diagnostic category defining patients who suffer from both anxiety and depressive symptoms of limited and equal intensity accompanied by at least some autonomic features. This disorder is caused by a combination of biological, psychological, and environmental factors. These factors include imbalances to neurotransmitters in the brain, traumas, stresses, and an unstable home environment. Since the possible causes of anxiety disorders and depressive disorders are so similar, it is not surprising that these disorders occur so frequently together: approximately 58% of patients with major depression also have an anxiety disorder, and approximately 17.2% of patients with generalized anxiety disorder also have depression. Mixed Anxiety-Depressive Disorder, however, occurs when someone experiences symptoms that are not sufficient for a diagnosis of either an anxiety disorder or mood disorder, even though the symptoms cause the person emotional distress or interfere with academic, occupational and or social functioning. Common symptoms include having difficulty on concentrating or having the experience of one's mind going blank, sleep problems, including difficulty in falling sleep. Staying asleep and restless or unsatisfying sleep, and daytime fatigue or lack of energy. The person may feel irritable and worry excessively.

Appendix 3

Map of the Study Area



Map of the Study Area

