



Exploring the status of disaster risk reduction focusing coping strategies in Rangpur division of Bangladesh

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Abstract

Bangladesh is a low laying country where disaster events are common phenomena almost every year. Same as coastal areas of Bangladesh, the northern areas are now suffering huge events of floods, droughts and riverbank erosion. The main purpose of this study is to determine the practice of disaster coping strategies by the people in the study areas. The study was carried out at Rajibpur sub-district under Kurigram district, Saghatta sub-district under Gaibandha district, Gangachara sub-district under Rangpur district, Aditmari sub-district under Lalmonirhat district and Dimla sub-district under Nilphamari district. Data were collected from a sample of 300 respondents from 5 sub-districts by using interview schedules 12 January 2017 to 19 March 2018. About 80% respondents are dependent on the TV or Radio news for pre-disaster warning and forecasting as well as more than this population loses their property above BDT 50000 in every year due to disaster damage. During flood, the respondents maintain some scoping materials like raising plinth, making scaffold, using moveable cooking materials, taking loan from the Mahajan and sold their non-productive assets. Most of the respondents from various study area follow these kinds of measures and about 63.33% respondents use bamboo or wood for their cooking purpose during flood. About 40% respondents from these study areas are suffered of shelter due to riverbank erosion and they migrate here and there for better life. More than two third of the respondents have no opportunity to get any kind of help or relief from the GOs and NGOs. They are now depending on their own coping strategies. They badly need a new coping strategy for reducing the damage of flood or riverbank erosion. Disaster forecasting, early warning system and community-based flood management can save many lives and properties. For effective disaster management strategies, it could be applied early warning systems and adequate training as pre-disaster strategy and availability of relief and other inputs at acceptable price and loan with flexible conditions as post-disaster strategy.

Key words: Disaster, damage, DRR, coping strategies, Rangpur, Bangladesh

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Introduction

Disaster is a sudden, calamitous event bringing great damage, loss, and destruction and devastation to life and property (Kale and Kutemate, 2011). The damage caused by disasters is immeasurable and varies with the geographical location, climate and the type of earth surface or degree of vulnerability. This influences the

mental, socio-economic, political and cultural state of the affected area (Biswas *et al.*, 2013).

Bangladesh is currently ranked as one of the world's most disaster-prone countries and its geo-physical location makes the country prone to various hazards e.g. floods, river erosions, droughts, arsenic, cyclones,

storms, earthquakes, etc. which cause immense losses of lives and damage to properties, livelihoods and economic infrastructure (Dilley, 2005, UNDP, 2004). About 97.1 percent of its total area and 97.7 percent of the total population at risk of multiple hazards, including floods, riverbank and drought (Dilley, 2005). The country faces at least one major disaster in per year (Chakraborty *et al.*, 2016). In the last 10 years it has lost on average 3.02 % of its GDP every year and holds the highest disaster mortality rate in the world (UNDP, 2004). The economy of Bangladesh is highly dependent on agriculture and, at large, a major constraint for the sustainable and stable growth of food production in Bangladesh is the fact that natural calamities of different types have made the people vulnerable to crop failures and food scarcities which accelerating poverty intensification in the country (Rasul and Thapa, 2003). The high vulnerability to flood, drought, fire, earthquake, landslides, river bank erosion and some other hazards have evolved a unique condition of existence in Bangladesh, especially in the North-western regions (Rahman *et al.*, 2007). This region has additional risk features particularly because the region is bounded by hilly areas of India and become seasonally prone to flash flood from the upstream of Indian rivers. In recent years from 2011 to 2015 abnormal floods have increased significantly, causing serious damage to lives and property which is most exposed to Northwest Rangpur Division of Bangladesh (Sarker and Rashid, 2013). Given this backdrop, the ability to respond, cope, adapt or recover from the overexposure of natural hazards have emerged as the central question of survival – the core challenge for people in everyday life especially in the Northwest regions of Bangladesh (Anik and Khan, 2012). People of this country have a long history of coping with such critical fragile conditions, which by virtue is the basic strength of the disaster management of Bangladesh. This good community practices need to be accounted in a scientific manner for the benefit of larger community through effective dissemination. The focus of the study is on how traditional coping mechanisms

of the rural poor in Northwest Bangladesh, function in response to eternal vulnerabilities to the livelihood systems brought about by natural hazards (Mallick and Vogt, 2011).

Flood makes people resource less and many often in flood time, it is seen that thousands of hungry people are waiting for relief in flood affected areas. Consecutive floods at that time drastically reduced the percentage of growth rate of Gross Domestic Product (GDP). The growth rate of GDP dropped down from 4.4 percent in fiscal year 1985-1986 to 3.9, 2.9 and 2.5 percent during FYs 1986-1987, 1987-1988 and 1988-1989, respectively (Lucky and Hossain, 2001). There is significant evidence of frequent and rapid erosion and fast rates of bank line retreat along the river Brahmaputra-Jamuna within Bangladesh. Analysis showed that the erosion rates in the Brahmaputra-Jamuna River were 160m/year between 1973 and 1992, indicating the severity of erosion hazard along the river. The river has migrated westward at an average movement rate of 50m/year during the period of 1830-1992. In 1830, the river had an average width of 6.2 km, but by 1992 the average width had increased to 10.6 km. The channel has widened at an average rate of 27 m/year during 1830-1914. After that, it has widened at an average rate of 65 m/year. The average width of the river has increased about 130 m/year since 1973. Analysis of land sat images showed that, over the whole river, riverine islands most often persist from 1 to 7 years, but 30% have lasted for 14 years or more. Accretion has taken place in the middle and lower reaches north of the east bank and in the extreme north of the west bank between 1973 and 1992. The rate of accretion is not comparable with the rate of bank erosion of the Brahmaputra-Jamuna River (Khan and Islam, 2003). Due to disaster, farmer cannot prepare land and sow seeds in time, often flood wash away the standing crops before harvesting which cause a huge economic loss of the farmer (Brammer, 1987). Moreover, most of the farmers in our country are poor, they have no savings. During flood, their life become miserable, often they have to leave their house and take

shelter on high roads, embankments where they depend on relief. Most of the time they have to cope with hunger. In this period, they have no work and also loss their stock of food grains. Under these circumstances stated above, it is necessary to find out the way how do people cope themselves to minimize the disaster loss.

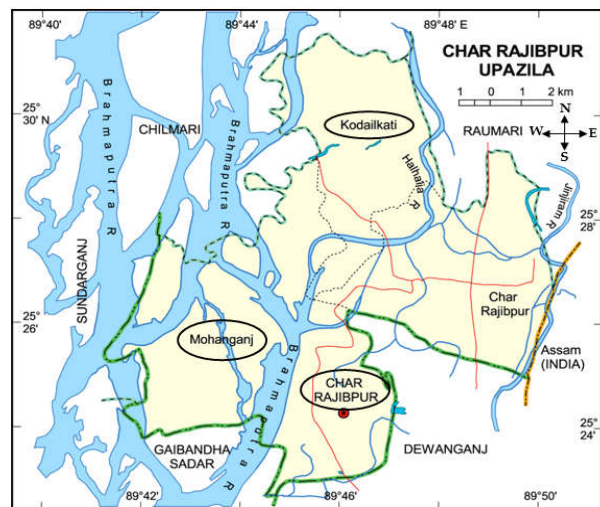
Coping implies much less control over a situation than to what has usually been denoted by the term ‘to manage’. Coping strategies are closely related to resources and assets, and thus the ability to generate coping responses is being subjected to the availability of livelihood resources that individuals and households have access to and control over (Kapferer, 2012). The scope of the study empirically explores, in some details, the strategies they employ over time as they strive to cope and eventually adopted by poor communities as disasters impact on their highly complex livelihood systems. This will also provide insights into the impacts of long-term trends of repeated hazards exposure on the resilience and traditional coping strategies of the local communities resulting increased vulnerabilities for the poor people. The research also however, shed light on assessing the response mechanisms of the communities utilizing traditional knowledge and skills to counteract the aftermath of recurrent disasters.

Materials and Methods

Study Area: Keeping in view the main objectives of the present study five Sub-district namely Rajibpur of Kurigram, Saghata of Gaibandha, Gangachara of Rangpur, Aditmari of Lalmonirhat and Dimla of Nilphamari district were selected for related survey and data collection, which are represented in Figure 1. The locality covers a large area, which is previously and presently affected by several disasters like flood, river bank erosion and drought (BBS, 2011).

Survey and Data Processing: An up to date data of the study area were collected from District Statistics Office, District Agriculture Office and some NGO offices. A total of 300 disaster affected families were

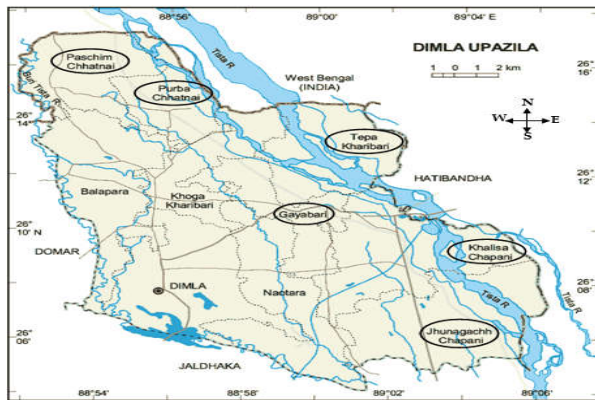
selected for the study, 60 from each Sub-district. A simple, direct, easily understandable and well-structured interview schedule was prepared for the respondents for a focus group discussion and questionnaire survey from 12 January 2017 to 19 March 2018. Secondary data were collected from different Government Organization (GO), Non-government Organization (NGO), UNO office and Agriculture Extension Office. The collected data were tabulated for necessary analysis with Statistical Package for the Social Sciences (SPSS) and Microsoft Excel.



A



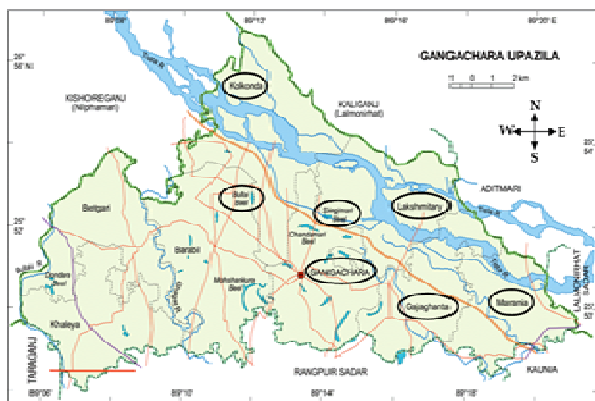
B



C



D



E

Figure 1. Selected study areas (A, B, C, D and E) from different districts. Encircled areas are the survey sites of the study (Source: Official website of Local Government Engineering Department, Bangladesh).

Results and Discussion

Socio-economic scenario: About 300 disaster affected households were surveyed and almost of the families were living under the poverty line and their yearly income US\$ 600 to US\$ 800 per household. The major professions of the respondents were varied from the lower to higher class level such as, day labor, small business, farmer, fisherman, public servant, NGO worker, social worker and also freelancer. The age of the respondents was ranged from 27 to 67 years old all of the study region where middle aged (30-40 years) respondents were considered maximum amount. Educational qualification of the study region was unsatisfactory because maximum respondents (51.31%) stayed under the illiteracy level, even they could not sign.

Disasters related scenario in Rangpur division: From the secondary data and some literature, selected sub-districts of this study had been facing huge amounts of disasters such as, floods, drought and river bank erosion. Since last five years a huge population of these regions had experienced the worst suffering of disaster impact. Disaster affected families of the selected areas are represented in Figure 2, where the people of Rajibpur sub-district in Kurigram district, suffered more than the others.

Disasters faced by different study areas in last 5 years (2011-2015): Floods and Riverbank erosions were the common phenomena in whole sub-districts. In every year, almost the areas had experienced such kind of disasters (Figure 3). Drought occurrence frequency was lower than the other disaster considering the last five years data. Rajibpur, Gangachara and Aditmari faced the most impact of floods even every year. Besides, others also trapped by the Riverbank erosion. Shaikh *et al.* (2015) stated that the coastal areas of Bangladesh faced flood almost every year in last five years. He also stated that coastal area of Bangladesh faced cyclones 5 times last 5 years which was totally absent in Rangpur division.

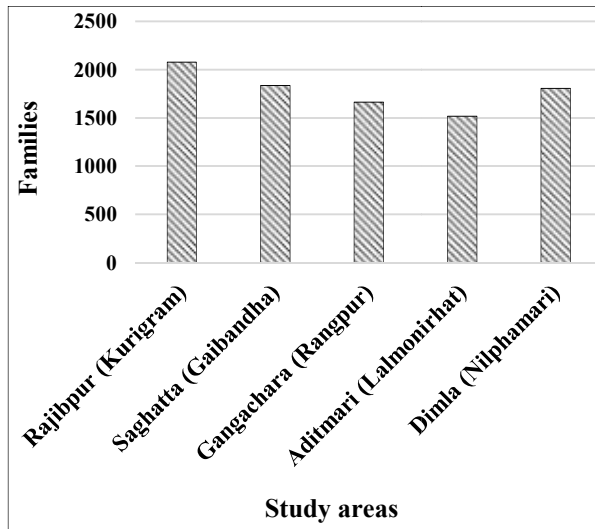


Figure 2. Distribution of the number of affected families in study areas (Source: U.N.O office of respective Sub-districts).

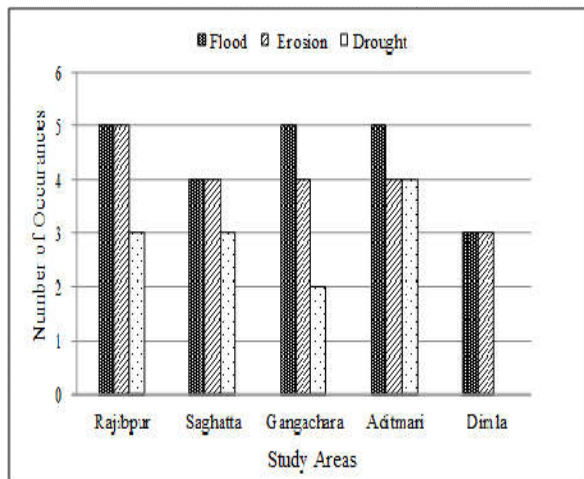


Figure 3. Frequencies of disasters faced last 5 years in different Sub-districts.

Source of information: Pre-disaster information contributed significantly to reduce disaster effects in the affected area. The sources of information are: Radio and TV bulletin, local leaders, NGOs, community meetings etc.

Among the respondents from all the selected regions, 80% respondents' dependent on the electric media (TV

and Radio) for disaster forecasting, bulletin and news as well as the other hand about 20% respondents' dependent on their local leader or other sources (Figure 4). Shaikh *et al.* (2015) and Ahmad (2003) investigated about the information sources in disaster prone areas in Bangladesh, where they estimated that the use of electric media was the major source (44.2% and 60% respondents used in both studies respectively) of disaster bulletin than the other sources. Actually, in disaster prone areas in Bangladesh, mass media is the one and only source of disaster forecast or bulletin.

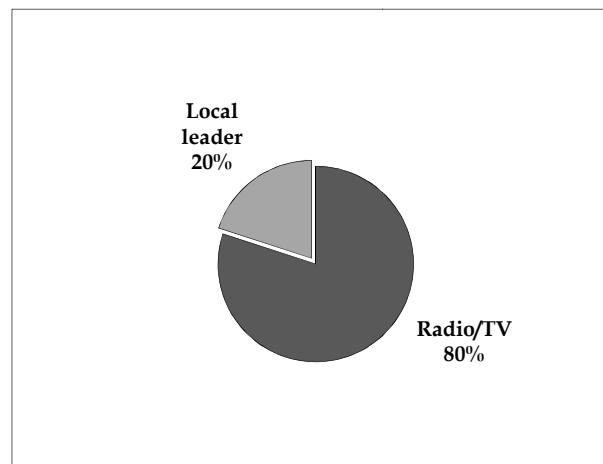


Figure 4. Sources of information getting by the affected people of the study areas.

Floods

Losses due to flood: Considering the last five years disaster occurrence and depending on the secondary information most of the families suffered huge amount loss of property, cattle, households, infrastructure and also their deposits. Almost of the respondents (80%) from the disaster affected areas, lost about 50000 BDT worth of property. Besides, some respondents (16.67%) also lost their partial property which estimated loss amount ranges from 50000-100000 BDT and some of the respondents (3.33%) also lost everything and the amount estimated above 100000 BDT (Figure 5).

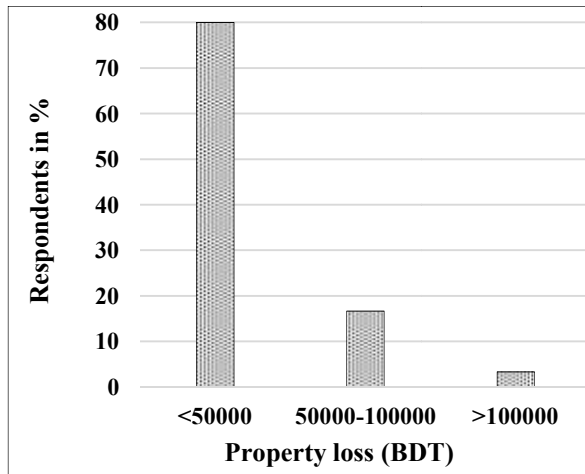


Figure 5. Distribution of frequencies of respondents according to their economic loss due to flood.

Shaikh *et al.* (2015) investigated and planned that the flood affected people lost about 50000 BDT worth of property which decision was agreed to the GoB (2007) report on 2004 and 2007 floods. My findings are jointly agreed to the previous did work. Besides, considering Southwick and Charney (2018), floods is world’s number one weather related killer and causes a huge amount (\$40 million) of property loss annually.

Coping strategies related to floods

Preparation to flood in the study area: The goal of emergency preparedness programs is to achieve a satisfactory level of readiness to respond to any emergency situation through programs that strengthen the technical and managerial capacity of governments, organizations and communities. These measures can be described as logistical readiness to deal with disasters and can be enhanced by having response mechanisms and procedures, rehearsals, developing long-term and short-term strategies, public education and building early warning systems. Pre-flood activities contributed significantly to reduce flood disaster such as miking around the flood disaster areas, radio and TV bulletin, enclosure tube well by polythene bag, shift livestock and other valuable assets to a safer place.

Actually, in the selected areas, a mass population was unaware about the pre-flood preparedness (Figure 6). Education, training and other community-based awareness program were not available among this community and that’s why they are not familiar to the pre-disaster activities. A study was conducted by Sinclair and Pegram (2003) and they stated that floods cannot be prevented but their devastating effects can be minimized if advance preparation is available.

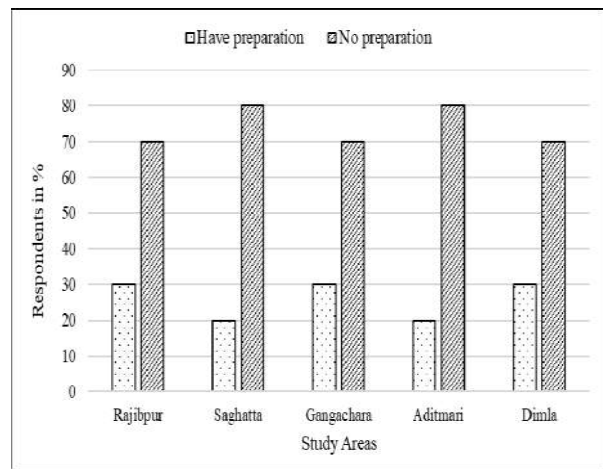


Figure 6. Distribution of the respondents in respect with pre-disaster preparation.

Activities during flood: About 80% respondents of Rajibpur, Gangachara and Aditmari were not still capable of raising the plinth of their house and Saghatta and Dimla both were 70% incapable of raising their plinth during house construction. During flood 90% of affected respondents of Rajibpur sub-district made scaffold for living and 70% of Saghatta, Gangachara and Dimla sub-district using scaffold when 60% family of Aditmari sub-district used it. In the period of flood, the majority of the family used moveable Chula for cooking because normal Chula goes under water during flood. About 50% respondents of Rajibpur, Saghatta, Aditmari and Dimla and 60% respondents of Gangachara sub-district taking loan from Mahajan at high rate of interest. During flood 60% of respondents of Rajibpur, Saghatta and Gangachara were sold their

non-productive assets like jewelry, livestock etc. (Figure 7).

Discussion some related previous studies, Khondker (2010), Ahmad (2003), Abrar and Azad (2004) find out the similar kind of coping strategies in context with Bangladesh. All of them estimated that, the coping strategies or disaster risk reduction strategies are same all over the disaster-prone areas in Bangladesh. Therefore, coping strategies should be modified and developed for the highest efficiency.

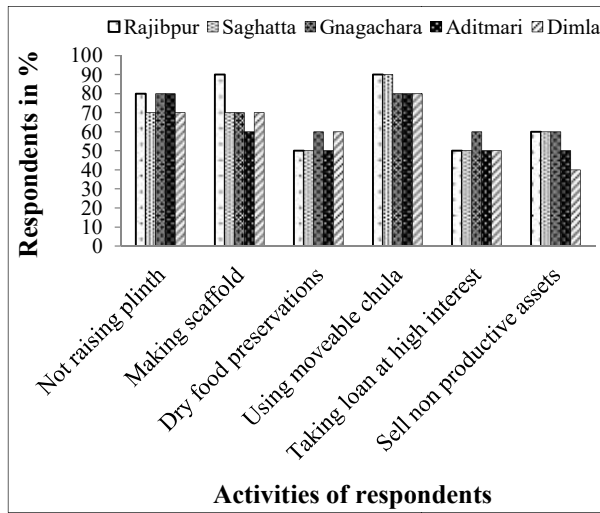


Figure 7. Different coping strategies of flood affected people of the study area.

Source of fuel for cooking during floods: Table 1 revealed that majority (63.33%) of the respondent used wood or bamboo as fuel for cooking purpose during flood. No respondents used kerosene due to their poverty and low income but nationally 2.32% rural people used kerosene (BBS, 2011). About 13.33% of the respondents used leaves as their source of fuel for cooking and 23.33% of the respondents used cow dung as their fuel source.

Shaikh et al. (2015) stated that majority of the respondents used leaves and woods as fuel for their cooking purpose and also cow dung and kerosene used for cooking in the affected areas. From the discussion it

was clear that most of the affected people used wood or bamboo as fuel for cooking during flood periods.

Table 1. Distribution of the respondents according to their source of fuel for cooking.

Source of Fuel	Frequency of Respondent	Percentage (%)
Wood or Bamboo	190	63.33
Leaves	40	13.33
Cow dung	70	23.34
Kerosene	00	00
Total	300	100

Riverbank erosion

Damaged of households in the study area: About 40% respondents of Rajibpur sub-district faced full damaged of their households, Saghatta, Gangachara and Aditmari at the same time 30% respondents faced full damage and 20% respondents of Dimla sub-district were victims due to river erosion. Full damaged 100% people migrated to other place for searching of shelter and rest is waiting until they have one piece of land remain (Figure 8).

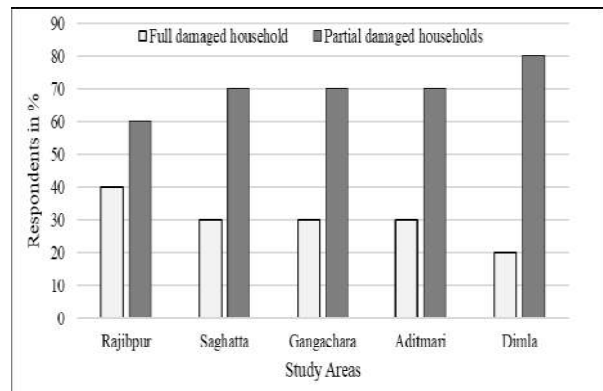


Figure 8. Households damaged due to river bank erosion in the study areas.

Greenberg (2006) investigated the dynamics of the adjustment processes of the involuntary migrants in their new living environment. He surveyed of 707 displaces households who migrated to Sirajganj district

town due to displacement caused by riverbank erosion. It was pointed out that displaces who resided in the squatter settlement were not adapting to their current living environment. They lacked adequate housing and health care facilities, which were considered basic amenities of life. The paper concluded that since displaces had become a permanent component of Sirajganj town life.

Origin of migration: Displacement mainly confined within the village of same union. Intra union displacement was frequent. On the basis of origin of migration, the respondents were classified into four categories as shown Figure 9. Majority (43%) of the respondents were migrated to another village of same union while 22% of the migrant were migrate to another part of the same village due to riverbank erosion. No respondents were migrated to another sub-district but 35% of the total respondents were migrated to another union. From some similar study such as, Khondker (2010) and Sarker et al. (2003), the migration of people was focused importantly in Bangladesh. The people of the river bank eroded areas have been migrating from the very beginning of climate change and disaster.

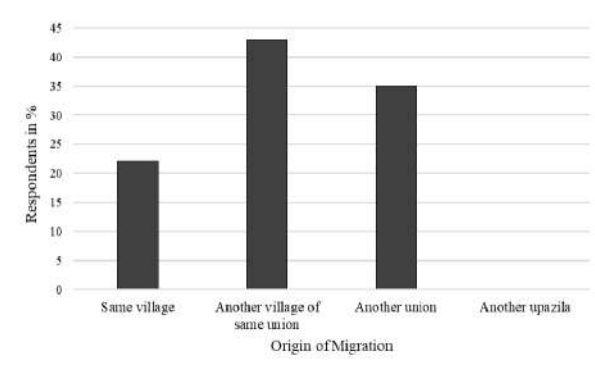


Figure 9. Origin of migration of the respondents in the study areas.

Pattern of migration: According to their pattern of migration the respondents were categorized into two categories as shown in Table 2.

Data in the Table 2 indicated that majority (63.33%) of the respondents migrated temporarily in the study area while 36.67% of the respondents migrated permanently in the study area due to river bank erosion. The temporarily displaced respondents live a more vulnerable life than that of the permanently displaced respondents. In a similar study Khondker (2010) and CARE (2000) found that maximum peoples migrated temporarily than permanent intension due to river bank erosion.

Table 2. Distribution of the respondents according to their pattern of migration.

Pattern of migration	Frequency of respondents	Percent
Permanently	110	36.67
Temporarily	190	63.33
Total	300	100

Financial help or facilities

Relief received by the respondents: Data presented in the Table 3 stated that 50% respondents of Rajibpur sub-district, 70% of Saghatta, 60% respondents of both Gangachara and Aditmari and 70% of Dimla sub-district were received relief from Government, non-government and volunteer organization.

Table 3. Distribution of respondents according to their relief availability in the study area.

Name of sub-district	Yes (%)	No (%)
Rajibpur (Kurigram)	50	50
Saghatta (Gaibandha)	70	30
Gangachara (Rangpur)	60	40
Aditmari (Lalmonirhat)	60	40
Dimla (Nilphamari)	70	30

In all sub-district, 100% said relief was not sufficient for them. The most alarming thing found that almost same percent said relief materials reached to them after 2-3 days of disasters occurred. Those 2-3 days they led a miserable life with hunger especially the children and women of the study area.

Credit availability of the respondents: Table 4 indicated that majority (46.67%) of the respondents were related with different types of NGOs in case of their credit transition 23.33% of the total respondents depend on their relatives in case of money for emergency need. 30% of the respondents took money from Mahajan (Local borrower) at a high interest rate of 12-15%.

Table 4. Distribution of the respondents according to their credit availability in the study area.

Source of Credit	Frequency of Respondents	Percent
Mahajan	90	30
NGOs	140	46.67
Relatives	70	23.33
Total	300	100

Khondker (2010) and Del Ninno *et al.* (2003) reported that about most of the respondents got credit from local NGOs while a few of respondents depended upon on their relatives and government bank.

Conclusions

Finally, it could be concluded that the impact of disasters on the socio-economic condition of the affected people was multilateral. In one side it was eliminating the homesteads and infrastructure, damage of crops of the people, on the whole increasing poverty. On the other hand, frequent disasters causing “*Manga*” silently because it deprived the disaster affected families from doing the normal job to survive at least for a certain period of time. There is no doubt that flood and riverbank erosion have devastating impact on the displaced population. Majority of the people have been moving from one place to another. They tend to

have experienced changes in their life style with intensity and number of incidences of disaster events. From the study, it was clear that households cope differently when affected by such disasters. The communities should be encouraged to build houses using durable materials and away from the disaster-prone area as a way of coping with the disasters. Furthermore, the Ministry of Agriculture and Cooperatives should through the Extension Services, encourage the communities to increase the area cultivated on the upland to enhance the food security at household level. Clearly, there is need to develop better and appropriate measures to prepare and mitigate the effects of the disasters. Above all, the aim must be to involve all the stakeholders to enhance communities’ resilience to disasters.

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