



## Patterns and factors of out-migration in the Meghna Estuarine Islands of Bangladesh

Md Rezwan Siddiqui<sup>1</sup>

<sup>1</sup>Department of Geography and Environment, University of Dhaka, Dhaka, Bangladesh

Correspondence: Md Rezwan Siddiqui (email: rezsidd@gmail.com)

### Abstract

Although migration may be regarded as fundamentally social and economic in nature natural hazards are found to be increasingly responsible for human migration. Given this context this paper explores the trends and factors of out-migration in Meghna Estuarine Islands. In this empirical research, primary data were collected through a three-stage socio-economic survey. The findings indicate that natural hazards such as river bank erosion, saline tide, flood, cyclone, and storms caused extreme havoc to the life and livelihood of Meghna inhabitants rapidly forcing some of them to migrate temporarily or permanently. To others the impacts have been in the form of slow migration decision in tandem with the steady disturbance of the existing regular economic, social and environmental systems. A simplistic model was thus generated to depict the relationship between natural hazards and outmigration in the study area.

**Keywords:** circular migration, livelihood disturbance, natural hazards, out-migration, permanent migration, temporary migration

### Introduction

Migration on a temporary and permanent basis has always been one of the most important survival strategies adopted by people in the face of natural or man-made disasters (IOM, 2008). But with the intensification of natural hazards due to climate change factors, a great change has been observed in the pattern of migration in Bangladesh especially in the off-shore islands of coastal areas. These research aims to understand elaborately this issue of out-migration from these highly vulnerable islands.

Two-thirds of the world's coastal disasters recorded annually are associated with extreme weather events, which are likely to increase in intensity as a result of climate change (Adger et al. 2005). For example, Dasgupta et al. estimated that, in Bangladesh, 27 centimeter SLR and 10 percent intensification of wind speed from global warming suggests the vulnerable zone in coastal Bangladesh could increase in size by 69 percent. Given poverty related vulnerability and resilience, Bangladesh is in the first place of any climate change risk index (Newland, 2011). In Bangladesh the most critical impact of climate change will result in the migration of the people from coastal areas to all over the country (Barman et al., 2012). Environmental hazards and sudden onset disasters will alter the migration patterns of different communities living in this region. Two-thirds of the world's coastal disasters recorded annually are associated with extreme weather events, which are likely to increase in intensity as a result of climate change (Adger et al., 2005, Morss et al., 2011).

Mayer (2011) identifies and analyses permanent, temporary and circular migration as both adaptation and failures to adaptation to climate change – depending on status of communities and environment they are living in. Hussein and Nelson (1999) argue that migration forms a central component of risk mitigation strategies in the life of rural people. In the context of Bangladesh, natural disasters play a significant role in forcing people to migrate as a coping strategy (Rayhan & Grote, 2007).

In general, population mobility or movement includes all kind of spatial relocation from routine daily commuting to permanent migration that occur over various distances, and in which the duration of moves varies from a few hours to many years (Mahbub, 1997). According to Zelinsky (1971), population mobility can be divided into migration and circulation. The distinction is on the basis of the degree permanent change of residence (Mahbub, 1997). IOM (2003) defines migration as "A process of moving, either across an international border, or within a State. It is a population movement, encompassing any kind of movement of people, whatever its length, composition and causes; it includes migration of refugees, displaced persons, uprooted people, and economic migrants." Oliver and Smith (2010) considered migration as a failure to adapt in the context of climate change. This is encapsulated in the notion of "climate refugees" - an adaption of "environmental refugees" that refers to those who flee environmental crises in their homelands (Black, 2001). These terms have been found both politically and analytically lacking as they do not offer protection under the Geneva Refugee Convention of 1951

A. K. M. Nurun Nabi (1992) suggests that high density of population works as a push factor and better opportunity for income works as pull factor. He has also opined the general trend of migration is from village to town areas in Bangladesh. In 2008, in EACH-FOR project report – they have identified several interconnected factors of migration in case of Bangladesh; emphasizing on economic condition as the major factor of migration. Environmental and climate change factors are complicatedly linked with economic factors and also between them. In this preject a country wide sampling method was used with two different types of questionnaires for migrant and non-migrants. In 2012, Barmen et al. undertook a research to understand the migration patterns of disaster affected Subaarna char Upazilla, which is a charland in northern Bay of Bengal. They followed a single questionnaire method within a sample size of 49. They found that erosion and cyclone strongly influential upon migration behaviour of this region.

## **Objective and methodological approach**

The objective of this research is to find out the types, characteristics and factors of out- migration for the Meghna Estuarine islands of Bangladesh. A good attempt has been made in developing a model of factors of migration. An understanding of this migration scenarios and factors will help the policy makers to develop policy to tackle this migration issue properly in future.

This research follows the inductive approach of geographical research. This is a descriptive type of research, analysing all the causal relationship of the observed population with the research problem. Both qualitative and quantitative approaches have been used in the study as a source of data. Emphasizes is given on the quantitative sources of information, mostly primary and some also from secondary. Qualitative informations have entirely gathered from the primary sources.

In designing field survey, this research follows the methodology implemented by Mahbub (1997) incase of identifying mobility behaviour of working people in rural Bangladesh. A ten stage field survey was done in that research – which has been modified to fit into current research.

### *Selection of the study area*

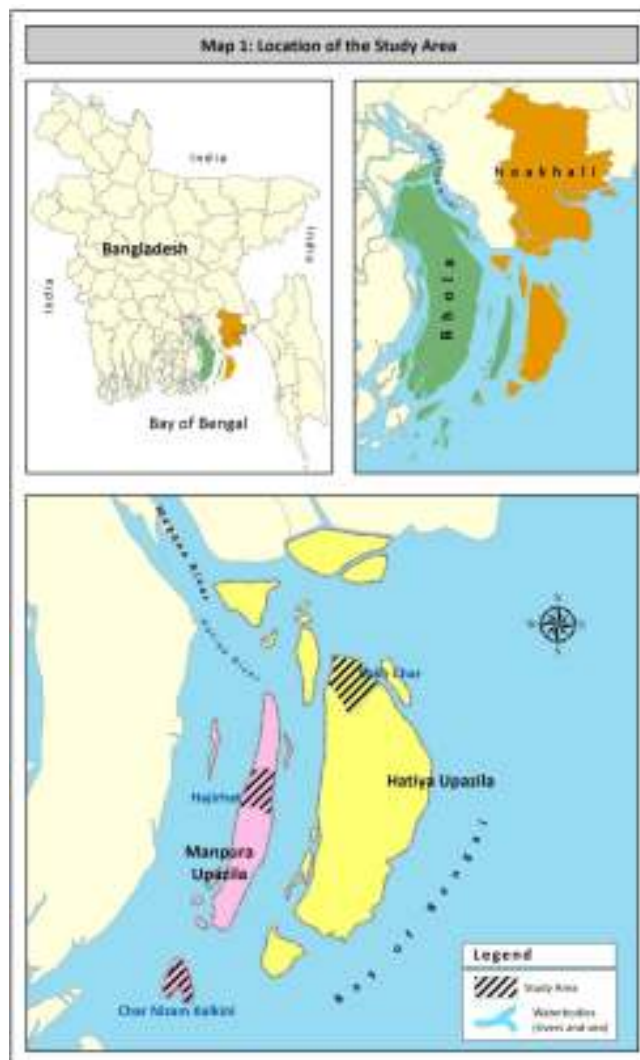
In order to select the study area, secondary data from population census for the major Meghna Estuarine islands area have been collected and analysed (Annex1). From the analysed data, it has been seen that, Manpura and Hatiya Upazila have very different growth rate of population comparing to the other estuarine islands. In 1981 and 1991, Manpura had a population growth greater than country's rate. But at present, it is slightly lower than the country's population growth rate. On the other hand, Hatiya always have a steady rate of growth. But, different union of these two upazilas shows huge difference in their growth rate, somewhere low at an alarming rate (e.g. in Sukh Char Union -6.56 in 2011 and -5.12 in 2001), whereas somewhere with steady higher rate (Hajirhat; 1.72 in 2011 and 2.83 in 2001). In the process of final selection of study area, following criterion have been taken into consideration:

- Off-shore islands in Meghna Estuary region
- Areas with different population growth rate

- Different social and physical settings
- Convenience for surveying

Taking into consideration all these criteria, Sukh Char Union from Hatiya and Hajirhat and Sakuchia Union from Manpura were selected for the field research. For the convenience of primary data collection, two mouzas – Char Geyan and Daser Hat from Hajirhat Union and Char Nizam Kalkini from Uttar Sakuchia Union was taken into consideration. Sukh Char is one of the oldest habitats in off-shore char areas, once was highly populated, but now has rapid drop-off in population. Char Geyan and Daser Hat are situated within and surrounding Manpura Paurshava, which gives them much more facilities than any other area of these islands and even better than any other off-shore islands. And Char Nizam Kalkini is a far remote island, with almost no social facilities for people living there. This char is habituated in very recent times comparing to the other two areas. So the selected study areas are:

- Sukh Char Union of Hatiya
- Char Geyan and Daser Hat Mouzas of Hajirhat Union of Manpura
- Char Nizam Kalkini of Sakuchia Union of Manpura.



### *Sample and sampling design*

In this research, three different methods of data collection of field survey have been carried out. So, three different types of sample system and sampling design have been implemented.

**Field Census Survey:** In Bangladesh, there is a “household list” that belongs to local government. This list consists of the name of the household heads by whom the households are recognized and also the number of family members. The targeted sample size was 10 percent of the population of the study area. For the convenience of survey, more than 10 percent of household were selected from the household list of Union parishad, using random number table. On an average 10 percent of the targeted population was surveyed in this field census survey (Table 1).

**Table 1. Targeted households for field census survey and migrated/missing households**

Study area			Number of households (N)	Targeted households (approx. 10 percent)	Number of households missing	Households found in field census survey	Percentage of households missing/migrated
Upazila	Union	Mouza					
Hatiya	Sukh Char		2630	290	67	223	<b>23.103</b>
Manpura	Hajirhat	Char Geyan Daser Hat	677	85	15	70	<b>15.310</b>
	Sakuchia	Char Nizam Kalkini	296	26	2	24	
<b>Total</b>			<b>3603</b>	<b>401</b>		<b>317</b>	

Advantage of this method is the researcher doesn't have any control over the respondent selection process, so this method easily avoids biasness. Respondents from all economic and social status are randomly selected and respondents are also spatially well distributed all over the study area. Thus, the survey opinion reflects the actual facts and opinion more wisely. In this survey, informations were mostly gathered from the household head, in absence of him/ her from the second adult person in charge of the family.

Problem of this method is in this method randomly selected households are unevenly distributed over the targeted study area, and so it takes much more time and labour to collect data in this method.

**In-depth Sample Survey:** The defined size of the sample for this survey was approximately 50. This has been done using two different criteria. First of all, all the families with migrant sny family members were included in this survey and the rest of survey was done using the ‘Area Sampling’ method. In this survey an in depth and detail questionnaire was used to identify the cause of migration and impact of natural hazards upon this migration.

**Focus Group Discussion (FGD):** FGDs have been conducted using the “Convenience and Purposive Method of Sampling”. The predetermined size of this sample was 20 and the methodology was non-probabilistic. There was a prepared questionnaire for this FGD, which was flexible depending on the situation. Discussion about and around the topic was encouraged to gather actual information as much possible.

## Results and discussion

### *Types and routes of migration*

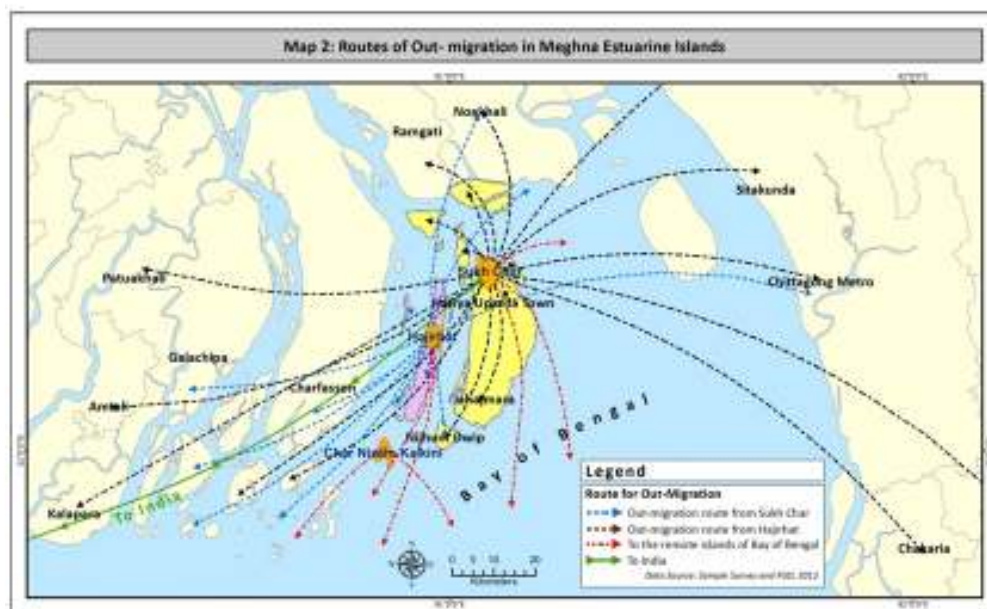
In this research, two major types of mobility behaviors have been found in this Meghna Estuarine islands:

1. Permanent household out-migration
2. Seasonal circular migration.

## 1. Permanent household out-migration

For the field census survey of this research, households were targeted using household list of respective union parishad. These lists are being continuously updated, as being told by local government authorities. Though a good number of households were found missing, most of them have reported to left the village recently. In the field census survey, among all the households chosen by the random number tables from the household list, around eighty two (82) families were found permanently migrated from selected study areas. These families are enlisted in the household lists, but were not present there. 25% percent families in Sukh Char of Hatiya and 15% from Hajirhat and Sakuchia of Manpura have found to be migrated permanently, mostly within last 2-4 years, so that they are still in the household list of the respective unions (Table 1).

It is tough to determine absolute number of migrants from any area in Bangladesh, as there are no records for this variable kept in any national record. More than 96 percent of respondents have reported that, in last 10-15 years, on an average eight families of their close relatives and neighbours have been migrated from villages. Majority (82 %) of the individuals expressed their opinion that peoples and families are migrating from their villages and also from surrounding areas. It has also been found out that in last 20 years more than 500 families have migrated from Sukh Char Union and around 200 families from Hajirhat Union. Finding out destinations of the permanent migrants of these study areas is a part of the objectives of this research. This information was collected through field census survey and was cross checked with sampling survey. Most of the participants have strongly expressed their opinion to the fact that peoples and families migrated from this areas are never willing to go to city areas, rather they like village areas as their destination for migration. This reason behind are cheap lands, well-known environment and social settings. New born nearby islands of Meghna Estuarine are the majorities' choice as a destination of migration. Newly accreted lands of present islands are the second best choice of the migrants. These intra-island migrations are very much prominent in this region. Migrations towards nearby mainland, mainly small towns and cities have also been noticed but are less prominent than intra-island types. People with economic solvency mainly do this kind of migration (Map 2).



## 2. Seasonal circular migration

People from Meghan Estuarine Islands have found to move outside of their villages to earn money. This type of mobility behavior is very common within the landless poor community of this area. Most of these people are day laborer, small farmers and fishermen, who can't make enough money in their

native villages during off season. Table 2 gives us an idea about the seasonal migrants and their movement characteristics. These people don't have any occupational training or expertise to work in any specialized industry. As a result, most of them move on to other villages or small towns and cities of mainland and work mainly as a day laborer. Route for seasonal circular migration have been shown in Map 3.

**Table 2. Pattern of seasonal circular migration in Meghna Estuarine Region**

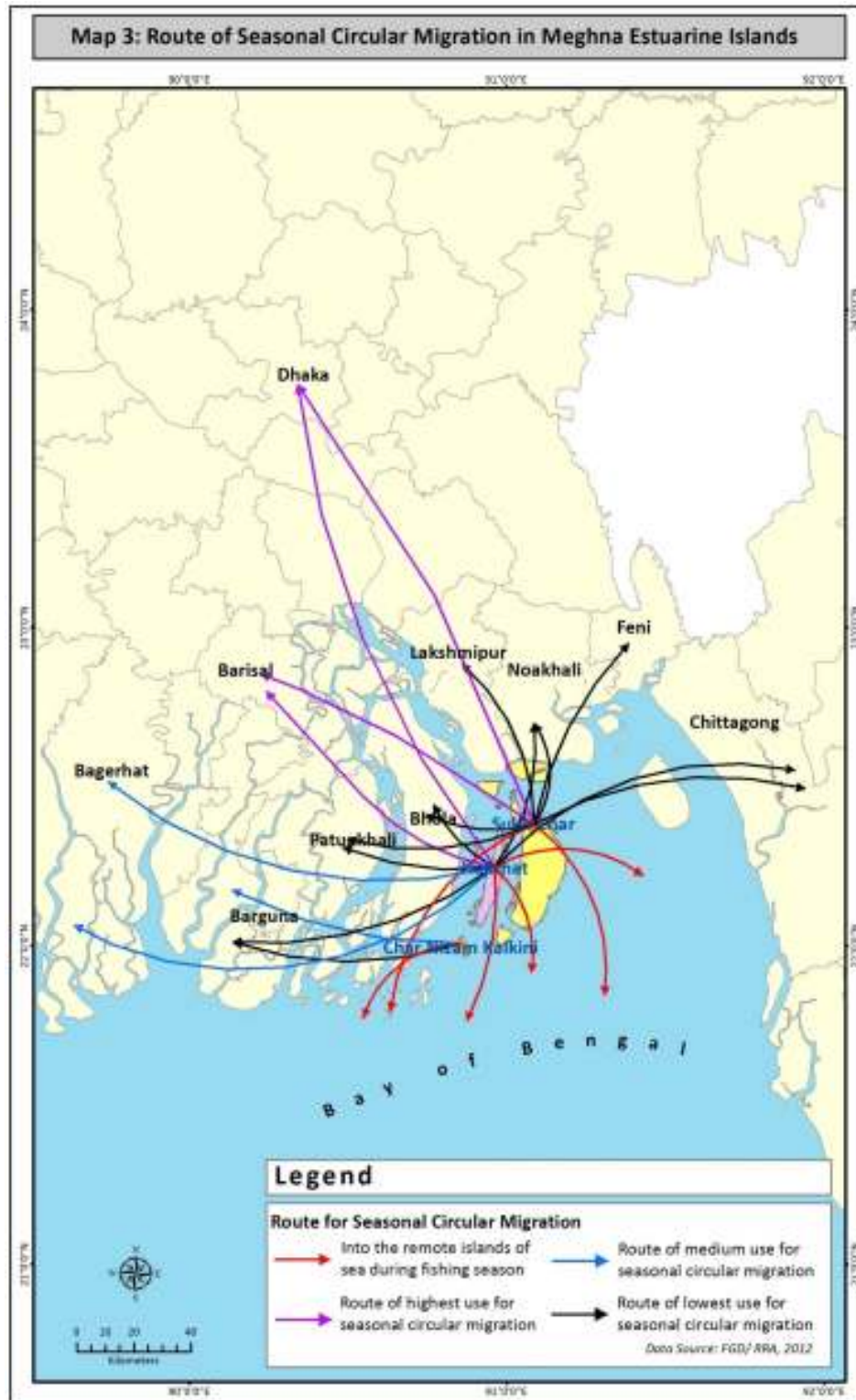
	Mid April-Mid June	Mid June- October	October – Mid December	Mid December- Mid April
		Fishing and Cultivation Season		
<b>Live in</b>	Outside the village for work, mostly in other villages of mainland	Within their village	Mostly in their village, some starts to move outside.	Outside the village for work, mostly in other villages of mainland
<b>Work as</b>	Rickshaw puller, brick field worker, farm labor, and any sorts of day labor	Fishing, Agriculture, day labor in fishing industry.	Fishing, Agriculture, day labor in fishing industry.	Rickshaw puller, brick field worker, farm labor, and any sorts of day labor

Source: Focus Group Discussion, 2012.

Fishermen from these areas sometimes temporarily moved to further remote islands inside sea, to catch fish for duration of 7-30 days. When they live there, sometimes they make temporary shelter on those remote islands. Most of the time, they used this temporary shelter for several times in a fishing season. During fishing season, fishermen, boatmen, and day laborers from nearby villages and islands, temporarily settle in Sukh Char. They stay as long as the fishing season continues. In Sukh Char, every year around more than 2000 people come and stay from outside. These people, don't live on the land, or rented house. They stay on their fishing boat and fish around Sukh Char. Most of the people involved in agriculture have lost most of their lands in riverbank erosion and the remaining lands are sometimes not cultivable for water logging. As they can't make enough to earn their bread, they also seem to move outside of their villages in search of work.

*Factors of out- migration*

In Meghna Estuarine Islands, people are living as a part of nature, extracting enormous amount of resources from nature. On the contrary, their life is extremely affected by the destructive behaviors of nature every year. In this research, people in this region prioritize river bank erosion as the main pushing factor for migration. Severe riverbank erosion and frequent floods and cyclones led to the permanent destruction of households and agricultural land in this area. In recent years, water logging and increase in salinity has added a new dimension of problem – destructing cultivable land and led to food shortage and migration. It has been seen that, river bank erosion is most prominent of all along with increasing salinity intrusion and more frequent saline tide affecting normal way of life of inhabitants of this area. Water logging, is another problem caused severe damage to the life of the island's people. Natural hazard of cyclone and flood is still prevailing but according to the respondent those are far less significant as factor of migration than the other natural phenomena mentioned.



### *Increasing intensity of natural hazards and disaster damages*

Ninety two (92) percent of the respondents have opined that the intensity and frequency of natural hazards have increased. Around eighty (80) percent have stated that, the destructions created by these natural hazards are far more devastating than past. Again in the focus group discussions, more than eighty five (85) percent of the respondent indicated that, the effects of natural calamities are far more aggravated at present, than any time before. And all these effects are working as a pushing factor for migration of people and families from the study areas. Ninety five (95) percent of respondents in FGD mentioned the name of any natural disasters as a cause for migration. Most of them mentioned riverbank erosion, water logging, salinity and saline water tide as a reason for migration.

According to Nironjon Kumar Das, headmaster of Maksudia Govt. Primary School of Shuk Char;

*“Inhabitants of these regions are very much adaptive with the cyclones and storm surge. They had learnt to cope up with this natural hazards from generation to generation. But, they can't fight with riverbank erosion, salinity intrusion or saline water tide and the water logging – these are creating more problems than past and destroys the crops, habitat, lands and pushes to people migrate to somewhere else.”*

Another respondent of focus group discussion Ashraf Majhi said;

*“Water of Meghna River is more saline now. When this water moves into inland, it destroys the productivity of agricultural land and fresh water ponds for a long time. In past there were many fresh water pond in Suk char, but saline water have made them unusable. So, agricultural productivity is declining and people are now pushed to flee away”*

Riverbank erosion is the major cause for influencing out-migration. People lost their valuable houses and agricultural land due to riverbank erosion, and as these people do not have economic comfort or any insurance to support them, they have no other way without migration. There are also many indirect consequence of riverbank erosion; like the many important economic organization (e.g. market, schools, industry) have vanished in the bank of Meghna and this weakens the economy of this area. Riverbank erosion has often cause damage or complete demolition of the embankments that protects the area from high tide and saline water. As now, the area is more affected by the flood, water logging and saline tide. Cyclone and associated storm surge is always a great threat to the life and property of the people of these island areas. But, peoples are more use to this natural calamity as a generational adaptation process. The last great cyclone ‘SIDR’ caused a huge loss in economy, life and property. Thus cyclones usually do not work as a major pushing factor for out-migration as other natural factors.

For the massive fresh water flow of Meghna River and associated estuary, salinity was never treated as a problem here. But now, majority of the respondent have mentioned this as *“lona joar”* (local name for saline tide or salinity intrusion) as a major problem to their livelihood. They have also opined that the salinity of the water have increased now. This saline water when flooded the area, cause long term damage to the productivity of agricultural land and fresh water reservoirs. Many fresh water reservoirs have become unusable due to this salinity intrusion. Due to the salinity intrusion and water logging, fertility and productivity of agricultural land have been decreased in an alarming rate for the last few years. Again, these also create several types of diseases. Water logging is another very new dimension of problem in the study areas. According to the respondents, this problem is very common now in these island areas. Thus creating problem to agriculture, communication and people's living. All these issues related to natural hazards, intensified the poor condition of living the inhabitants living in this area, an influence them to take decision to migrate.

### *Impacts of natural hazards on human inhabitation and livelihood*

In general, men have two priority sector of his/ her social life, one is his inhabitation and the other is his occupation. In Meghna Estuary region, both of these primary elements of human's social life are disturbed and damaged by natural hazards. Fishermen and peoples dependent on fishing have face most problem by natural hazards, following by the day labourers. And farmers and people related with



farming face most problems in their dwelling and living. From the survey, it has also been seen that, businessmen and service holders are much free from these problems of effect of natural hazards on their livelihood or inhabitation, because of their better economic condition.

It has seen that, extreme effects of natural hazards upon the life of people are more prominent on inhabitation, comparing to the sectors of livelihood. People can live and try to earn their bread if only they have roof on their heads, but when they lost their dwelling, they have no other options than migration. In field census survey of this research more people have reported extreme level of environmental problems at their present home. This will help us to understand the answer of the question, “*why people migrate?*” The answer is “*as they face problems in their living*”. It is obvious that, when people or community faces any problem in their life, they want to mitigate it or get rid of it – and migration, chiefly the out-migration works as a favorite option for them.

*Impacts of natural hazards on income and income sources*

Natural hazards in many cases are responsible for decreasing the income of the people affected. The respondents of sample surveys were asked about their present status of income and trend of income growth. The information is summarized Table 3. Except in animal husbandry, production rate has been declined in all sectors in last 10 years. Respondents also mentioned the reasons behind these decrease of production rate and income, and all these reasons are very closely related to the natural hazards (flood, water logging, cyclone, riverbank erosion salinity intrusion etc.). This declination in income sometimes led to take out- migration decision in search of better livelihood.

**Table 3. Status of income and income sources in last 10 years**

Percentage		Reasons
<b>Changes in Income in last 10 Years</b>		
Decreased	73 %	<ul style="list-style-type: none"> <li>• Loss of land due to riverbank erosion</li> <li>• Decrease in fertility of land due to salinity</li> <li>• Population increased but not the opportunity for work</li> <li>• Destruction of institution, like market, shops, educational institutions etc.</li> </ul>
Increased	06 %	
Remain same	21 %	
<b>Changes in Agricultural Production in Last 10 Years</b>		
Decreased	87 %	<ul style="list-style-type: none"> <li>• Loss of agricultural land</li> <li>• Decrease in fertility of land due to salinity or saline tide</li> <li>• Damage of crops from surge, cyclone, flood</li> </ul>
Increased	13 %	
Remain same	0 %	
<b>Changes in Animal Husbandry Production in Last 10 Years</b>		
Decreased	20 %	<ul style="list-style-type: none"> <li>• Cattles washed away in surge, flood or storm</li> <li>• Decline of grassland due to salinity</li> </ul>
Increased	64 %	
Remain same	16 %	
<b>Changes in Fisheries Production in Last 10 Years</b>		
Decreased	96 %	<ul style="list-style-type: none"> <li>• Don't know</li> <li>• Overexploitation</li> <li>• Destruction of the breeding ground of fish</li> <li>• Unauthorized catching of fry fish</li> </ul>
Remain same	04 %	

Source: In-depth Sample Survey, 2012

*Extent of natural hazards*

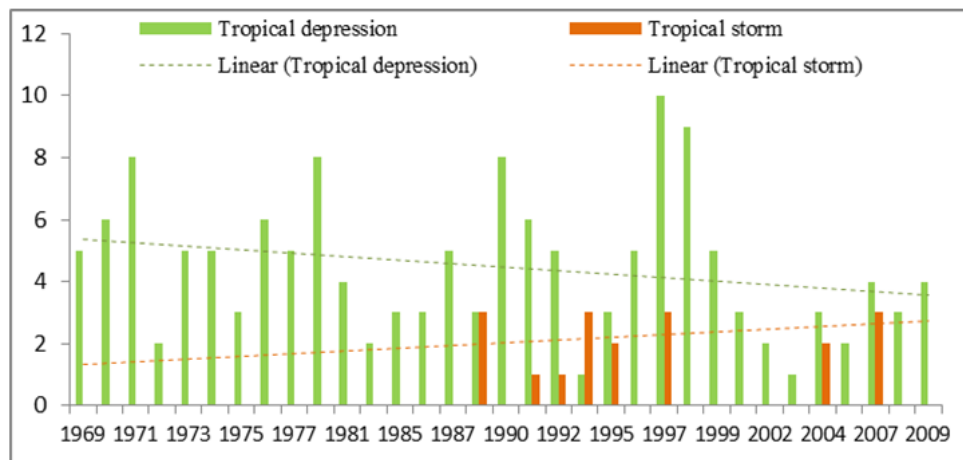
Extent of different natural hazards have been analysed in the following section.

a. Riverbank erosion

Main physical processes in the Meghna Estuary region are related to the dynamics of water and sediment. Strong water flow cause erosion of riverbanks and contributes to the flooding of unpoldered lands. During dry season, the sediment are re-arranged and mainly deposited near the coast and new land is thus formed. A net accretion rate of about 19 km<sup>2</sup>/ year has been observed for the last 50 years, which is nearly 2.5 times higher than the long-term (150-200 years) accretion rate. This land, however, is not a replacement of the fertile land lost to erosion. They are muddy, salty, and lack nutrients. It takes many years before they can be used for the cultivation of crops. (Sarker et al., 2003). Soils of the study islands are predominantly clay loam with some loam texture and these characteristics of the soil of this study area, makes them vulnerable to erosion more. In order to identify the riverbank erosion and its extent and measurement, remote sensing tool and GIS technique are used. Satellite images from 1977 to 2009 have collected processed and analysed to identify the changes in landforms of the studied area due to riverbank erosion. From the analysis of LANDSAT images it has seen that in last 40 years around 170 Sq Km of and has been eroded. From Map 4 it can be seen that the major erosion have taken place in Northern and North-western part of the Hatiya and Manpura. These places are far more populated than any other part of this Upazila; as a consequence, this riverbank erosion affects greater number of people. In the current research it has been found out the every family has a record of some kind of migration or shifting in their household in last two generations. Some families have moved 6-7 times due to this erosion. On an average every family have moved on 5.3 times in their lifespan.

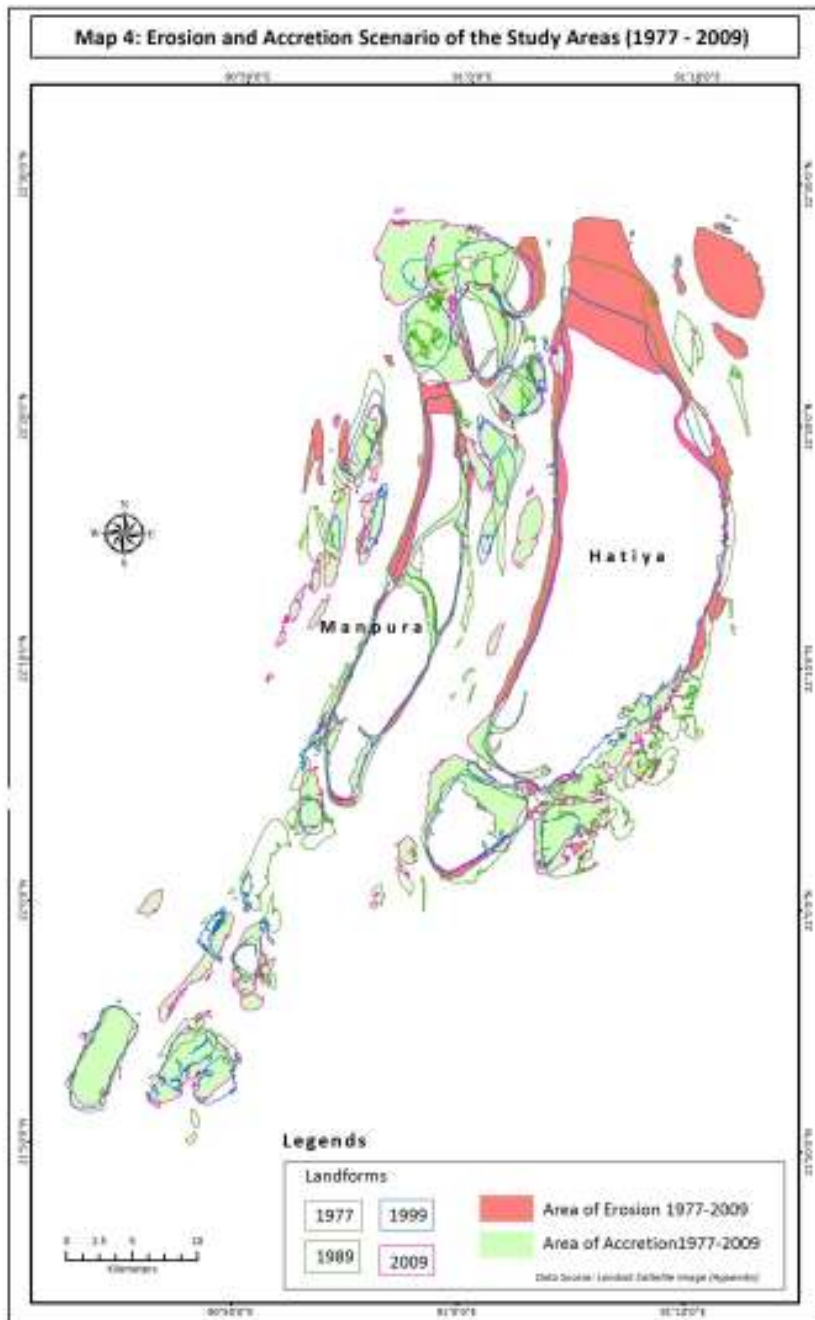
b. Tropical cyclones

In recent years more cyclones with higher wind speed and associate water surge have visited the coast of Bangladesh, and it is obvious that, these remote islands of Meghna Estuary are vulnerable to each and every one of those cyclones. Fall of cyclones with greater intensity has been increasing (Figure 1). Most adverse impacts of any cyclone in Bangladesh are resulted from the inundation due to cyclone surge and Meghna Estuary is the area of the surge amplifications mostly (WB, 2010). And it is obvious that, the people of remote islands of Meghna Estuary, like Char Nizam, Hatiya and Manpura is now more vulnerable for cyclone and associated hazards than any time before.



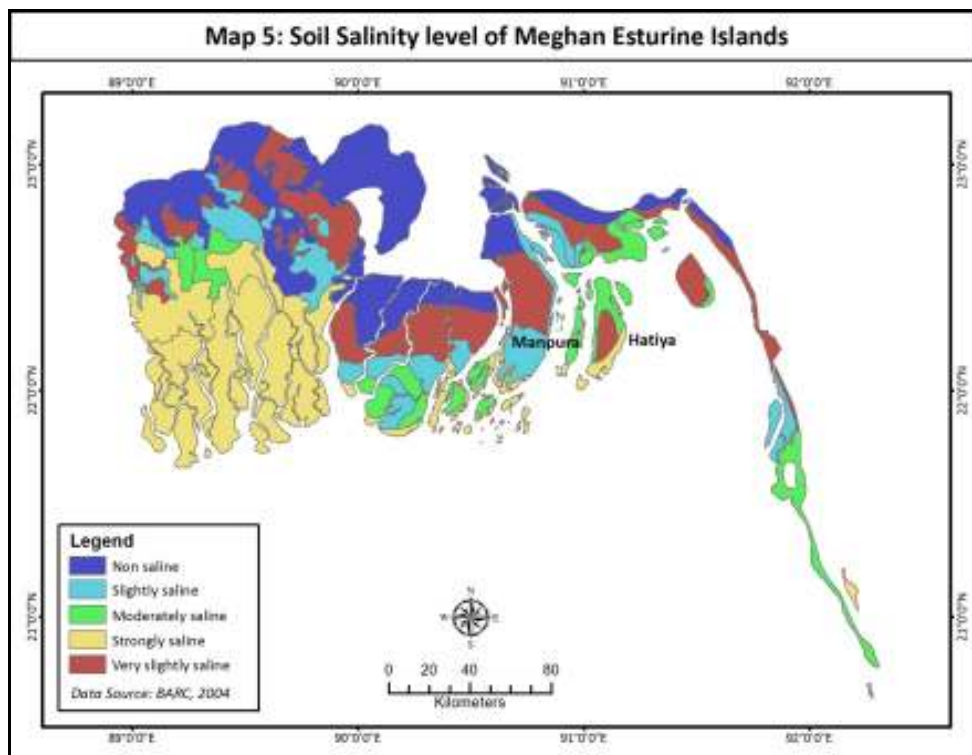
Source: UNEP/NISDR (2011)

**Figure 1.** Tropical depressions and tropical storms of Bangladesh



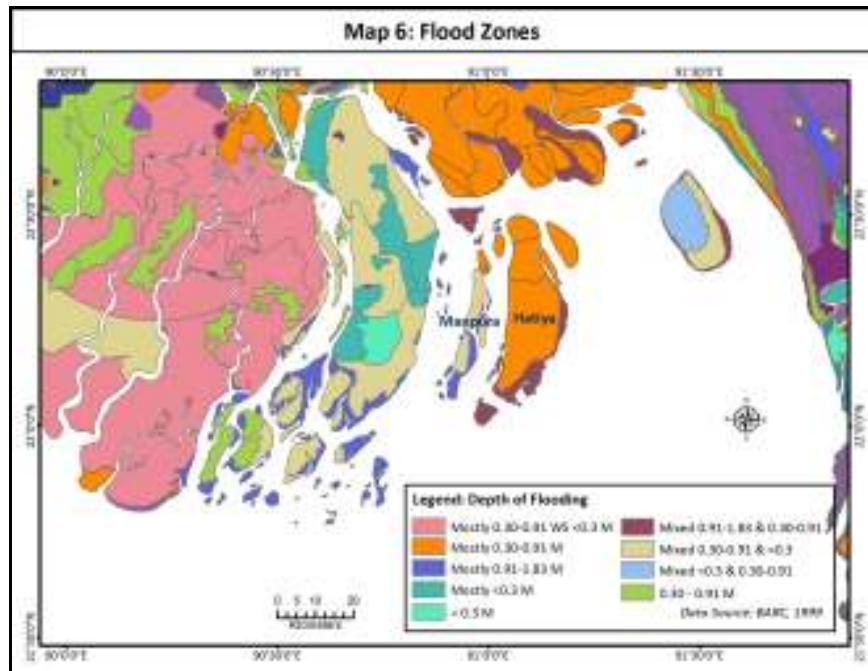
c. Saline tide or salinity intrusion

Both human interventions and climate changes are likely to change the prevailing processes of fresh water flow in the Meghna estuary especially during the dry season. Upstream water withdrawal may contribute to further landward salinity intrusion. Higher sea levels will change the tidal motion in the estuary, especially during the dry season. This will have an impact on the sedimentation and erosion processes. Landward salinity intrusion during dry periods may increase (Sarker & Choudhury, 2003). For four different station around Meghna Estuary, it has been seen that except for the years from 1982 to 1986, there are quite similarity in the salinity level. But after 2004 it seems to be increasing again. From Map 5, different soil salinity level of Meghna Estuary areas has been delineated. It has shown that the Southern parts of study islands are more saline in nature. From the field survey to these islands areas, it was clearly understood that, areas with lower in elevation and prone to tidal seasonal flood are much prone to salinity. Moreover, salt crusts over agricultural land have made them unusable for longer periods.



d. Flood and water logging

Map 6 is an expression from the SRTM DEM analysis. It shows that, almost 25 percent of area lies under the height of 3 meter, as a result these vast areas are in threat of daily tidal flood, as the average height of high tide in the study area is around 3 meter also. Because of the very low topography this area is subjected to severe water logging – water drains in during storm surge or tidal flood, but cannot drain out. During the field survey, it has observed that, many inland parts were flooded during the tidal flood and became unusable for agricultural practices. Majority percentage of the study areas are prone to 0.3 to 0.9 meter flooding with some areas prone to up to 1.83 meter of flooded depth.



## Conclusion

Following the findings of the research a simplistic model for factors influencing migration is generated (Figure 2). It accounts for how natural hazards may exert both active and passive influence on out-migration from Meghna Estuarine Islands. As prioritized by most respondents riverbank erosion, water logging or flood and saline tide were the prime factors for out migration there. Further, historical and trend analyses of different natural hazards revealed how the area was vulnerable to several hazards at a time which in turn impacted upon its natural resources and consequently the people's income sources and forced them to migrate. Intra-island migrations were far more prominent than towards mainland or towns. Most migrants preferred areas with similar environment, near shore or river as their destination.

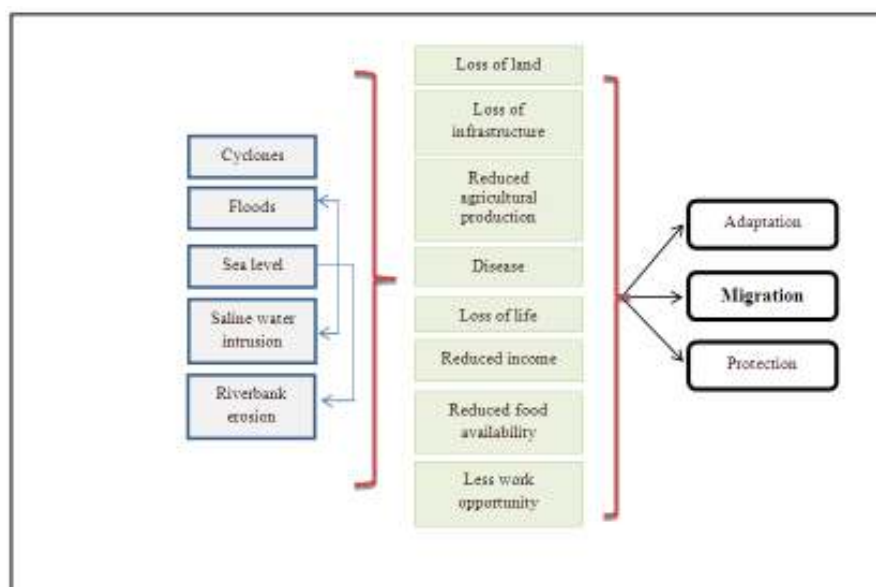


Figure 2. A simplistic model depicting the relationship between natural hazards and human migration

## References

- Adger WN, Hughes TP, Folke C, Carpenter SR, Rockstrom J (2005) Social - ecological resilience to coastal disasters. *Science* **309**, 1036–1039.
- Alam Md.R (2012) Climate change and its impact on health and livelihood within Hatiya Island of Bangladesh. *J. Agro for. Environ.* **6** (2), 13-16.
- Barman DS, Majumder CS, Rahaman MZ, Sarker S (2012) Foundations of migration from the disaster consequences coastal area of Bangladesh. *Developing Country Studies* **2** (4).
- Black R (2001) Environmental refugees: Myth or reality? UNHCR Working Paper 34.
- Hussein K, Nelson J (1999) Sustainable livelihoods and livelihood diversification. IDS Working Paper 69. Institute of Development Studies, Brighton.
- IOM (2004) Labour migration in Asia: Trends, challenges and policy responses in countries of origin. IOM, Geneva.
- IOM (2008) World migration 2008: Managing labour mobility in the evolving global economy. IOM, Geneva.
- Mahbub AQM (1997) Mobility behaviour of working people in Bangladesh. Urban Studies Forum (USF), Department of Geography and Environment, University of Dhaka.
- Mayer B (2011) Migration as a sustainable adaptation strategy. Presentation at the second conference of the Initiative on Climate Adaptation Research and Understanding through the Social Sciences. Climate Vulnerability and Adaptation: Marginal Peoples and Environments, May 5-8, 2011, at Ann Arbor, MI.
- Nabi NAKM (1992) Dynamics of internal migration in Bangladesh. *Canadian Studies in Population* **19** (1), 81-98.
- Newland K (2011) Climate change and migration dynamics. Migration Policy Institute, Washington, DC.
- Oliver, Smith A (2010) Defying displacement: Grassroots resistance and the critique of development. Univ. Texas Press., Austin.
- Rayhan I, Grote U (2007) Coping with floods: Does rural-urban migration play any role for survival in rural Bangladesh? *J. Ident. Migrat. Stud.* **1** (2), 82-98.
- Sarker M, Choudhury E (2003) Knowledge Portal on Estuary Development (KPED). Working Paper. Water Resources Planning Organization (WARPO) CEGIS, Dhaka.
- UNEP/UNISDR (2011) Global Risk Data Platform [cited 27/9/2012]. Available from: <http://preview.grid.unep.ch/index.php?preview=home&lang=eng>.
- Zelinsky W (1971) The hypothesis of the mobility transition. *Geographical Review* **2** (41), p.225.