River erosion induced migration in the Indian Sundarban: A study of involuntary residential mobility

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ABSTRACT

Rapid river erosion in the Sundarban islands directly affects the embankment and increases the frequency of flooding. Earthen embankments have been constructed parallel to the damaged embankments to prevent flooding in river-side villages. Encroachment of the river forces the settlers to move away from the affected village. However, such movement does not occur immediately after a disaster. Rather, it is influenced by the socio-economic condition of the people and the extent of government intervention. Other factors that influence the movement of the affected people include individual beliefs and dreams as well as the need to make a collective decision for the family or community. This inter-disciplinary paper seeks to explain the impact of river erosion and associated displacement, particularly in relation to the impoverishment and marginalisation of settlers living along the riverbank. This paper analyses the trends of residential mobility of the affected households to cope with river erosion, and explores alternative strategies to support the potential increase in future displacements due to encroachment of river in the Sundarban islands.

Keywords: River erosion; residential mobility, migration, Sundarban

1 INTRODUCTION

People of the Sundarban islands have been experiencing hydro-climatic disasters such as tropical cyclones and tidal surges. Floods due to tidal surges are common natural hazards in the Sundarban that cause the river bank erosion. During the monsoon erosion is excessive. It damages agricultural land as well as public and private properties (Haque and Hossain, 1988). Erosion and river encroachment render the settlers landless and homeless forcing them to migrate. Global warming and the consequent rise in sea level is likely to displace more people living in low-lying coastal areas (Myers, 1993; 1993; 1995; 1997). The flood-prevention measures adopted by the government mainly include the construction of embankments that encroaches on farming land. Although there are debates over the use of physical structures in preventing floods (Iyer, 2008; Mishra, 2008; Somanathan, 2012), the construction of embankments is an important governmental strategy in reducing saline water floods in the Sundarban islands (GoWB, 2009: 296). The breaching of embankments and the construction of new embankments parallel to damaged ones (Mukhopadhyay, 2016) are factors that influence the nature of residential mobility of local residents. This paper investigates the trends in residential mobility of the households to cope with river erosion; imparts understanding of the determinants of displacement, particularly in relation to the impoverishment of settlers living at the river bank; and also explores alternative strategies to support the displaced people.

2 CONCEPTUALISATION

The synonymous terms “environmental refugee”, “environmental migrant”, “ecological migrant”, “ecological refugee”, “displaced people” and “eco-migrant” have been used to refer to the residential mobility of people displaced due to environmental causes (Piguet, 2008; Stojanov et al., 2014: 510; Biermann and Boas, 2007; Salauddin and Ashikuzzaman, 2011: 620). Although environmental causes are important factors governing the displacement of people, they are insufficient to explain the complex processes associated with residential mobility. Burton et al. (1993) have mentioned four behavioural characteristics of people inhabiting hazard-prone areas: ignoring the hazards, tolerating the hazards, preventing the hazards, and taking significant action against the hazards. Such action often involves the abandonment of disaster-affected areas and movement to safer locations.

River bank erosion in the context of climate change is the removal of land by waves and currents (Perch-Nielsen et al., 2008: 385; Klein and Nicholls, 1998). The rate of erosion increases with storms and rising currents. Hutton and Haque (2003) have distinguished between river erosion and other natural hazards by emphasising how river erosion becomes an inextricable part of life. Rapid erosion of riverbanks reduces the coping ability of the

people living there and forces them to move to safer locations (Haque and Zaman, 1994). River encroachment through avulsion affects the socio-economic condition of the inhabitants. They lose their valuable agricultural land, and there are many who become landless and homeless every year.

Erosion becomes a disaster when its impact is beyond the coping ability of the affected population. People who are displaced by a disaster are socio-economically and politically disadvantaged. Hutton and Haque (2003:411) found that displaced people in Bangladesh do not perceive erosion as a significant threat to their livelihood because they lose valuable resources due to river erosion. However, those who haven't been displaced are worried about the possibility of their displacement in the future. Households owning agricultural land fear the impending loss of their land due to river encroachment (Haque, 1988: 428).

Hutton and Haque (2003:411) say that migratory behaviour and perception of the risk of river-bank erosion cannot be explained through the environment–human behaviour paradigm. This is because human responses have been understood in relation to disaster characteristics like predictability, duration, intensity, and magnitude. River erosion has become a part of daily life for Bangladeshi settlers living along the riverbank, who have developed distinct disaster coping mechanisms. The coping capacity of the affected people is not particularly determined by the magnitude of riverine hazards. The economic capacity of the affected settlers is an important factor that helps them to take steps against the impact of floods and erosion-induced disasters (Hutton and Haque, 2003: 411).

Compared to other riverine disasters, encroachment and erosion of river bank leave little scope for the affected people to recover their losses. River encroachment forces people to search for safer places to build a house. Displacement has an adverse impact on livelihood activities as well as on the social and psychological condition of displaced people (Haque, 1986). Those who are affected do not leave their place of habitation during the initial stages of displacement. They prefer to accept the risk even as they develop new strategies to minimise their losses (Haque and Zaman, 1989: 307). Researchers have found that displaced people do not move far away from the affected areas. This is mainly because of their incapability to bear the cost of shifting to an entirely new destination (Haque and Zaman, 1989: 307).

The impact of floods and river-bank erosion among affected settlers is an outcome of physical, economic, social, and political conditions (Hutton and Haque, 2004: 46). Landless people and small landowners living near the riverbank are the most vulnerable because of their limited capacity to resist and recover from a disaster (Rogge and Elahi, 1989). People living on the riverbank perceive erosion as a natural facet of life. Continuous avulsion and erosion of the bank has fostered a kind of adjustment that reduces stress associated with the disaster (Hutton and Haque, 2003: 412). But, lack of adequate prevention measures in frequent disaster affected areas leads to lack of self-determination among the people.

Displaced people face serious obstacles when it comes to social adaptation. They are initially not accepted by the local settlers at their new homeland, and this affects the process of assimilation. Strong ties of kinship, social networks, religious links, and interdependence help displaced people to deal with social deprivation and the challenges of socialisation in new place (Hutton and Haque, 2004: 48; Greenberg, 1986; Haque and Zaman, 1994; Zaman, 1989). River-bank erosion negatively affects local livelihood activities, but it does not lead to the loss of community and social support.

Displacement due to erosion and subsidence of river banks has been studied through the theoretical background of environmental degradation and disaster. The major gap in the existing literature is the disconnection between different trends of migration due to river erosion and stages of adaptation. The relationship between the trends of spatial shifting and adaptation to the impacts of river erosion is connected to the socio-economic and political condition of displaced communities. Population growth, crisis of resources, and perception of risk also influence the migration behaviour of displaced people. In addition, migration in search of jobs is strongly connected to displacement or spatial movement from flood-prone areas.

Villagers in the Sundarban islands are directly or indirectly dependent on agricultural activities that do not provide sufficient sustenance. The situation has worsened due to rapid land erosion and saline-water flooding. Sarker et al. (2010) have observed relative rise in sea level by about one mm or less per year. Researchers have established a correlation between the rising sea level and land erosion in the Sundarban islands. Hazra et al. (2002) have claimed that the Indian Sundarban has lost 251.961 sq km of land due to river erosion between 1969 and 2009. This has resulted in a large number of landless and homeless households. Affected people have been resettled in four refugee colonies, namely Bamkimnagar, Chakphuldubi, Jibantala and Sagar Colony of Sagar Block of Indian state West Bengal (Gupta, 2008: 151).

Land erosion leads to the breaching of embankments and the loss of agricultural land. The hamlets close to the embankment are most vulnerable to saline-water inundation and physical loss of agricultural land. Affected villagers are forced to shift to safer locations that are mainly inland. The value of land increases with increasing distance from the embankment. Therefore, a large number of villagers either live close to the embankment or at the embankment. They have been waiting for the government to help them to relocate to safer locations. However, the households benefited by the resettlement programme of the government have not been able to overcome the losses since 1980s. These affected households have experienced multiple displacements in their life. They not only undergo a crisis of livelihood but are also forced to tolerate increasing economic, social, and political marginalisation. Therefore, there is an urgent need for alternative recovery measures for those who have been or could potentially be displaced due to river erosion or slumping in the Sundarban islands.

This research paper seeks to explore why displaced people often do not leave disaster-prone areas permanently. How do they cope with the losses and damages caused by river erosion and shifting embankments? Why are the rehabilitated people unable to cope with displacement over a long period? What are the possible alternatives for the resettlement of increasing number of the affected people at safer places?

3 RESEARCH DESIGN

Research has highlighted that a large number of households have been affected due to rapid river erosion at Ghoramara Gram Panchayat of the Indian Sundarban region. According to an estimate of researchers around one lakh households would be affected in the next two decades if the present rate of river erosion prevails. The neighbouring islands of Ghoramara (i.e., Lohachara and Bedford) submerged between 1975 and 1990. Now, land erosion, embankment failures and storm surges have severely affected Khasimara, Khasimara Char, Lakshmi Narayanpur, Bagpara, Baishnabpara, Hatkhola, Raipara, Mandirtala, and Chunpuri villages of Ghoramara island. The size of the island has decreased from 8.51sq km in 1975 to 4.43 sq km in 2012 (Ghosh et al., 2014) after the submergence of Khasimara Char, Lakshmi Narayanpur, and Baishnabpara. Ghoramara island is selected as a case study. As per the Census of India-2011, while the population growth rate of the Sagar administrative block is 1.4% per annum, the growth rate of Ghoramara island is 0.08% given the widespread migration from the island. Successive census data since 1971 show slow growth rate in Ghoramara in comparison with other stable islands. Displaced people from the submerged island of Lohachara and five affected villages of Ghoramara have been accommodated on Sagar island.

Residents of this island were brought as indentured labourers from Midnapore district of the Indian state of West Bengal by Indian landlords to reclaim the mangrove forest. These settlers belong to different socio-cultural backgrounds, but their identity is based on traditional livelihood activities rather than caste or class (Sen and Pattanaik, 2017). Although the Sundarban islands are close to mainland India, the hybridised caste and religious identities go against the strict caste system and religion of the mainland (Ghosh, 2004). Therefore, caste and religious background have not been considered as the criteria in the selection of respondents for this study. It must, however, be mentioned that most of the villagers (and therefore the respondents) who live in resettlement areas are mostly dalit or Muslim. The villagers are mainly engaged in wage labour activities. There is no authentic source of data on the total number of households that have been rendered landless and homeless due to river erosion in the Ghoramara Gram Panchayat. The method of random sampling has been used to identify the households having multiple (>1) experiences of flooding in these villages. The residents who were willing to speak were selected for in-depth interviews. 74 villagers from different geographical locations were interviewed between June 2017 and November 2017.

The households identified for conducting the study were broadly divided into two categories: (a) households living on the floodplain and (b) households that had moved to safer areas. The households belonging to the first category were divided into three sub-categories based on the distance from the river: (1) households living at the embankment or next to the embankment (17 respondents), (2) households living between the embankment and the parallel protective road (17 respondents), and (3) households living in safer areas of the affected village (17 respondents). The second broad category of households has been divided into two sub-categories based on place of resettlement: (1) households living in the resettlement colony of the government (17 respondents) and (2) households that have shifted inland or to the mainland by their individual efforts and that will no longer be affected by floods or erosion (6 respondents).

The research is exploratory in nature. It has followed the qualitative methodology to explore the complexities of human behaviour in a chaotic environment (Phillips, 2014). Qualitative research into disaster is dependent on 'naturalism' (Lincoln and Guba, 1985), which emphasises how researchers approach the field. In-depth interviews of settlers living in river-side villages were conducted to explore the loss of land due to river erosion. The interviews help to establish a relationship between the loss of land and the changing socio-economic status of households living in flood-prone areas. They also help to identify the determinants and nature of the spatial movement of people in Sundarban islands. The questionnaires for the interview include general queries about the loss of land and related socio-economic changes, trends of spatial movement, strategies to cope with losses, and damages incurred by affected or potentially affected households.

The in-depth interviews were conducted among settlers at the Jibantala resettlement colony of Sagar Block in West Bengal. There are no specific records available at the Gram Panchayat offices of the households that settled in the colony between 1990 and 1993. Therefore, random sampling was applied to identify the households from Jibantala colony. Many affected households had purchased land on the mainland to avoid the impact of flooding and river erosion on their lives. These households were identified through the method of snowball sampling in order to conduct in-depth interviews with the settlers.

Respondents in resettlement areas were categorised into two groups: below 30 years—this group was expected to share the challenges of socio-economic vulnerability; and above 30 years—this group was expected to share experiences of the disaster and the processes of resettlement. All the respondents living on mainland were above 50 years. However, respondents from river erosion affected island were categorised into three groups: below 21 years (mostly unmarried migrant labourer); 22-45 years (most of them were married migrant labourer and active members of political parties) and above 45 years (most of them were return migrants and engaged with traditional village authority, but not with politics).

Separate questionnaires were used for households in the resettlement colonies on Sagar island and those living on the mainland. The questionnaires had two sections. The first section was semi-structured and included questions on the loss of land and resulting socio-economic impact. The second section was open ended and included questions on the trends of movement, the general mobility of the people, their coping mechanisms, and the government measures. The themes of the interviews were as follows:

Questionnaires for households in resettlement colonies:

(A) Respondent above 30 years

1. Number of displacement during lifetime;
2. Strategies adopted for shifting to safer places;
3. Support received during displacement;
4. Improvement or deterioration in living conditions after resettlement;
5. Economic activities after resettlement;
6. Strategies to avoid discrimination from local people;
7. Participation in community activities; and
8. Strategies adopted to assimilate with local people.

(B) Respondent below 30 years

1. Challenges to get higher education;
2. Alternative livelihood activities other than migration; and
3. Participation in local government.

Questionnaires for migrant households in the mainland:

1. Factors in selecting the place for migration;
2. Livelihood activities at previous and present home;
3. Developing relationship with local people; and
4. Frequency to visit previous home.

Questionnaires for households living on the island:

(A) Respondent below 21 years

1. Impact of river encroachment on education;
2. Future plan to cope with river erosion

(B) Respondent between 22-45 years

1. Impact of the losses and damages due to river encroachment;

2. Factors influencing to stay at risk;
3. Living with disasters, job diversification, inadequate social infrastructure;
4. Future plans for migrating to safer places; and
5. Regular communication with villagers who have shifted to safe places.

(C) Respondent above 45 years

1. Impact of disasters on residents;
2. Strategies to cope with disasters; and
3. Support from the government

The data was analysed to address the research questions. Data analysis involved transcribing interviews, translating parent interviews from Bengali into English, developing matrices, choosing categories, coding statements, and linking themes. The analysis focused on living without disaster and coping with crisis of livelihood and social infrastructure (school, road network and trading place). The interviews from all the study areas were analysed together in six matrices:

(1) River encroachment (landlessness and homelessness, crisis of livelihood, perception of disaster, living at risk)

(2) Residential mobility –inland (distance of mobility, social capital, job diversification)

(3) Residential mobility - colony (socio-political discrimination; coping with lack of social infrastructure, job, and education)

(4) Residential mobility – mainland (distance of mobility, familiarity of destination, social capital; participation in community activities)

(5) Maintaining independent local government i.e., Gram Panchayat (decreased population; social infrastructure)

(6) Resettlement and rehabilitation (government policy)

There were thirteen main interlinked categories and six themes found from these matrices. In each matrix, the pseudonyms of interviewees were written in the columns and the interview questions written in the rows. An abbreviated version of each response was recorded in the section corresponding to the question asked. This helped to compare and contrast responses by and among interviewees. Participant observation data was used to validate interview data and enrich the explanation of the analysis, which presented an overall, collective picture of activities in the different phases of a disaster.

4 RESULT

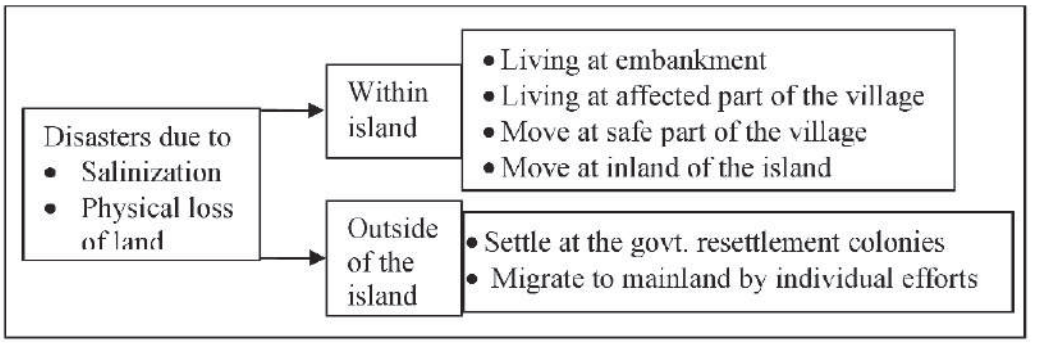
Farming families in the river erosion affected villages become buyers of food. The loss of agricultural land creates low demand of agricultural labour in the village. As a result, labourers lose their bargaining power and agree to work at low wage rates. Nuclear families living at the embankment or in flood-prone areas find it particularly difficult as the adult members cannot leave behind young family members and migrate in search of jobs. Therefore, they seek to move the entire family to a safer place. Weiss and Reyes (2009) have emphasised the prevailing social and physical vulnerability, poverty, and inequality that (together with the degrading environment) create pressure on affected communities to move away from vulnerable areas.

River encroachment becomes most problematic with the growing size of the average family. Joint families have broken up to cope with the crisis of resources, and moving out of flood prone areas is necessary to avoid risks. Instead of leaving the encroached land immediately, affected families usually wait until they find a safer location. They leave the vulnerable location, but settle close to their previous home so that they can continue to pursue their daily livelihood activities. Mass shifting also occurs when the encroachment affects large areas. Affected households are rehabilitated in neighbouring villages or islands. However, affected families do not like to move too far away from their area because of their comfort with the available livelihood opportunities and kinship. Shifting to a new location, even though it may be safer, creates pressure on the family members because they need to find alternative means of subsistence to survive.

In accordance with flooding risks, people are forced to relocate repeatedly given their financial inability to relocate to the mainland. People living on the floodplain observe the impacts of land erosion and voluntarily decide to move to safer places. They buy plots on inland or on the mainland, depending on their individual financial capability, support from relatives, educational background, and livelihood activities. The social infrastructures, and political, and geographical importance of a place does not necessarily affect migration decisions. People usually select the place of migration based on the available sources of income. Those who belong to the farming community, look for agricultural land instead of attempting to move to a city. Business activities are not taken seriously because of the general lack of experience in trading.

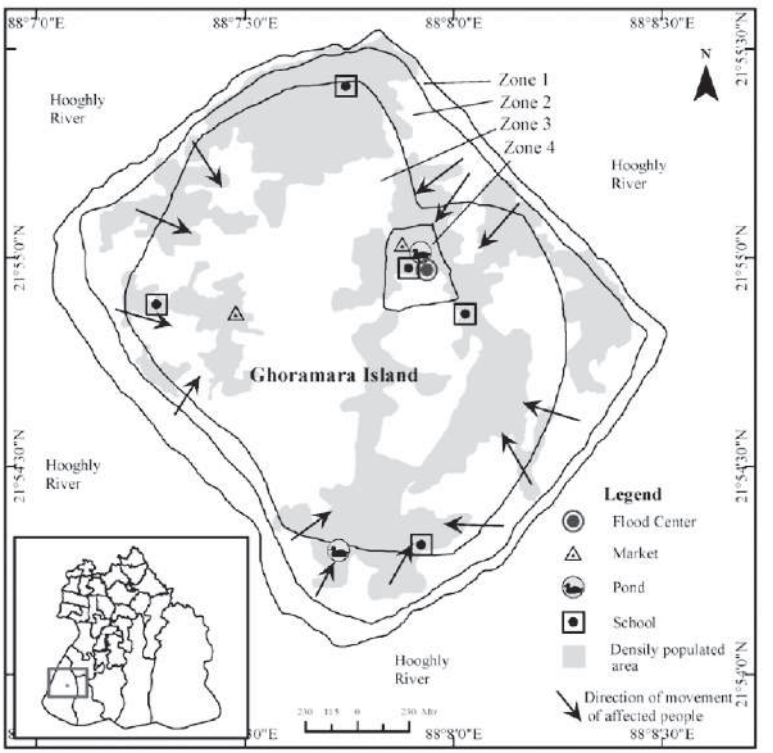
The displaced people are often seen to move to the mainland or to inland areas to ensure their wellbeing. Therefore, residential mobility can occur within the island or outside the island (See Figure 1). Residential mobility outside the island can be in a resettlement area or on individually purchased land.

Figure 1 Trend of Residential Mobility



1. Shifting within the island

Figure 2 Inland Shifting in Ghoramara Island



Spatial shifting within the island can be divided into four zones based on average distance from the river:

(a) Zone 1 (<50 mtrs): People living at the embankment;

(b) Zone 2 (50–150 mtrs): Most flood-affected area;

(c) Zone 3 (151–1000 mtrs): Least affected area; and

(d) Zone 4 (>1000 mtrs): Safe area (See Figure 2).

Generally, people of Ghoramara island shift from the embankment to safer inland locations. However, some households find it difficult to buy land in interior areas of the village because of their financial limitations. Such households tend to buy cheaply available land next to the embankment. Some people also build houses at the embankment and shift as per the movement of the embankment. Affected people prefer to shift to the nearest safe area where they can live with people belonging to the same socio-cultural background. The north-eastern part of Ghoramara (Zone 4) is dominated by Muslim households (See Figure 2.) Similarly, people from the southern and north-western parts of Ghoramara island move to the nearest Hindu dominated localities. Newly established markets in the western part of the island attract settlers from the south, west, and north. Markets in the northern part of the island have been closed due to encroachment. Traders either moved their shops to the central part of the island or stopped trading altogether. There are four densely populated hamlets between two protective parallel roads. The factors affecting the decision to shift to safer places inland are discussed below:

(a) *Marriage relations in safer places:* The boys of the affected area have a tendency to get married in safer villages. In most cases, they demand land in inland locations as dowry. Once they get the land, family members shift there. Families with daughters also look for grooms settled in safe places.

(b) *Buying farming land collectively at different places:* Joint families buy small plots of land to build houses in safer places, preferably where alternative livelihood opportunities are available. They also buy cheap farming land far away from the newly built houses to grow food grains. Elderly and sick family members as well as children are shifted to the new houses. Most of the male members prefer to stay in their old homes so that they can pursue their daily livelihood activities. They only shift to their new houses during emergencies.

(c) *Living at risk:* Landless households often buy cheaply available land in flood prone areas to build their houses. Neighbouring households provide housing materials and offer free labour.

(d) *Movement with shifting trading place or nature of trading*: River encroachment of marketplaces affects economic transactions. Affected traders prefer to move to the nearest major trading place.

(e) *Movement as per livelihood options*: Many local quacks have bought land in safe places but do not leave the affected villages because of the patients who continue to

live there. They shift their house and dispensary in accordance with the movements of the village population. The number of patients decreases considerably as a result of migration to safe places. Therefore, the quacks prefer to shift to the marketplace closest to the affected area so that they can get new patients from safe areas in addition to their existing patients from the affected areas.

Households engaged in weaving fishing nets prefer to move to places near the fishing port. However, they do not leave the affected village permanently because they hope to receive government support in the future.

2 Shifting outside the island

(a) Moving to resettlement areas:

Poor households are dependent on the government to shift them to safer locations to escape from flooding and land erosion. The government has distributed land and houses to the displaced families in the resettlement areas of Sagar island. Although most of the benefitted households shifted to the resettlement areas by 1993, they did not settle immediately due to a crisis of drinking water and firewood and the general unavailability of employment. As the resettlement areas were primarily reclaimed salt marshes, the inhabitants had to work hard to convert the reclaimed land into productive farming land.

Rehabilitation areas are locally known as refugee colonies. These colonies have become a part of the neighbouring villages. Their children are enrolled in the neighbouring primary schools. Most of the high schools are far away from the colonies. Children complete their primary education but drop out of high school in large numbers. Teenage boys migrate with their fathers or other relatives in search of jobs. However, girls continue to study in school in hopes of getting government jobs. Many of the first-generation settlers in the colonies could not continue their education due to poverty. At present, family members work hard to support their children so that they can pursue higher education.

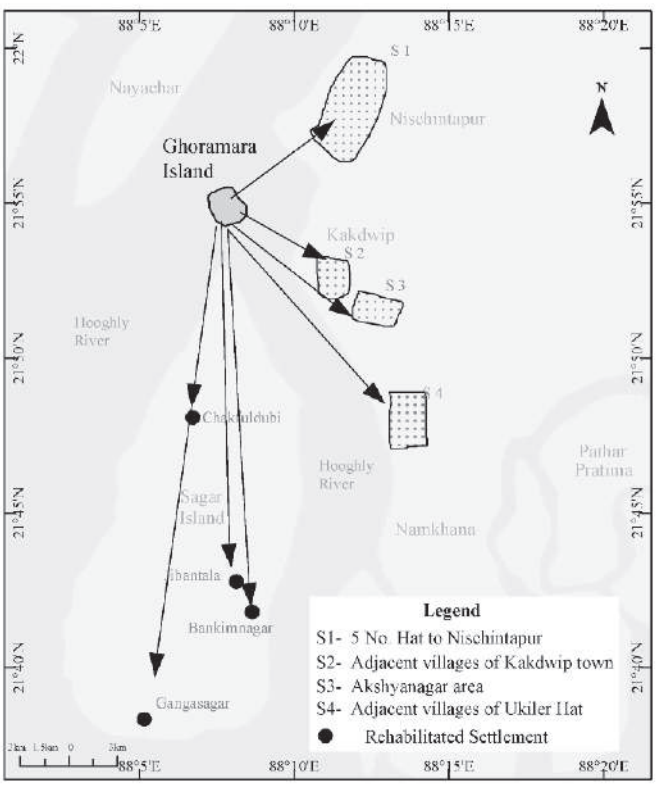
Some of the affected people in the resettlement areas have changed their traditional livelihood activities. Fishermen have become rickshaw pullers and farmers have become wage labourers. While male members often migrate in search of jobs, female members generally remain at home. Life is easier when the settlers can continue their current livelihood activities. "*I brought my rickshaw to the colony. It helped me to cope with the crisis at the new place.*" (Respondent P). Although poverty prevails in the colonies, people are not scared of floods. "*I am not losing land, my house will not be damaged, I will not shift my house every year*" (Respondent A).

People in neighbouring hamlets did not always respond to new settlers positively and discriminated against them by referring to them as 'refugees'. Rehabilitants were were sometimes accused of theft. Notably, most of the newly settled households belonged to lower

caste and minority communities. Neighbouring upper caste households did not allow them to participate in the socio-cultural activities of the village. It was, however, necessary for the new settlers to develop a good rapport with the local people so that they could secure employment opportunities in neighbouring villages. Rehabilitants also worked as agricultural labourers in the villages, thereby encouraging greater interaction with the local community. Local residents sometimes pressurised the new settlers to support the ruling political party to get government support. Therefore, new settlers often changed their political affiliations to survive in the new land. By embracing a new political identity, accepting new work opportunities, and engaging in monetary and other transactions with local people, the rehabilitants attempt to cultivate trust and interdependence between the two communities.

(b) Buying land and shifting to the mainland

Figure 3 Spatial Shifting from the Island



No rehabilitation programme was organised by the government after 1993. Affected households spent their lifelong savings to purchase land in the mainland so that they could settle safely. These households mainly settled in four areas (See Figure 3):

(a) Ukiler Hat and its adjacent Bishalaksmipur to Rajnagar Srinathgram village;
(b) Gangadharpur Natun Rasta to Akshyanagar;
(c) Adjacent area of Kakdwip town; and
(d) 5 No Hat to Nischintapur.

Affected people are attracted to these places not only due to the safety they offer but also due to the existence of good infrastructure and transportation networks and the availability of agricultural land. Many people have also purchased land at Sagar Island in order to live with close relatives. They engage in traditional livelihood activity i.e., farming, but migrate in search of job for short period of time. Getting higher education is the main priority for all these households. They also temporarily visit their old homeland to meet friends and relatives. The frequency of these visits depends on their holdings on the island and the number of relatives living there.

5 DISCUSSION AND CONCLUSION

Barnett and Adger (2003) argue that social issues shape the response to sea-level rise more profoundly than its direct impacts. There is a strong awareness about disasters among the residents living in of low-lying islands (Church and Gregory, 2001; Nurse and Sem, 2001). This could accelerate the decision to move to safe places. Although migration has been established as a strategy of adapting to risk, people living in affected villages do not have alternative options to migration. Thus, the important questions are: who might shift and where might they shift? During the fieldwork a handicapped respondent said, *"I become landless and homeless due to river encroachment. I do not have resources to buy land. I have been waiting for government support to shift at colony"* (Respondent G1).

There is a high level of poverty in the areas affected by river erosion. However, unlike in Bangladesh (Hutton and Haque, 2003: 416), affected households in the Indian Sundarban islands are dependent on the local government to secure them space in safe locations. Movement to safe places can be planned or spontaneous. The level of spontaneity involved in environment-induced residential mobility depends on livelihood activities as well as socio-economic status (Henry et al., 2004: 431; Lucas, 1997).

Social networks play an important role in the spontaneous movement of people. People living in affected areas can buy land in safe places on the mainland through their social networks. Newly settled households in a particular area on the mainland (See Figure 1) generally belong to the same socio-cultural background. As Curran (2002) and Lutz and Scherbov (2000) have suggested, social networks and cultural capital are deeply connected with residential mobility (particularly in the selection of the place of shifting). Nee and Sanders (2001) have correctly argued that cultural capital (including social and financial

capital) affect the destination choice of the migrants and their ability to integrate into the new community (McLeman and Smit, 2006: 39).

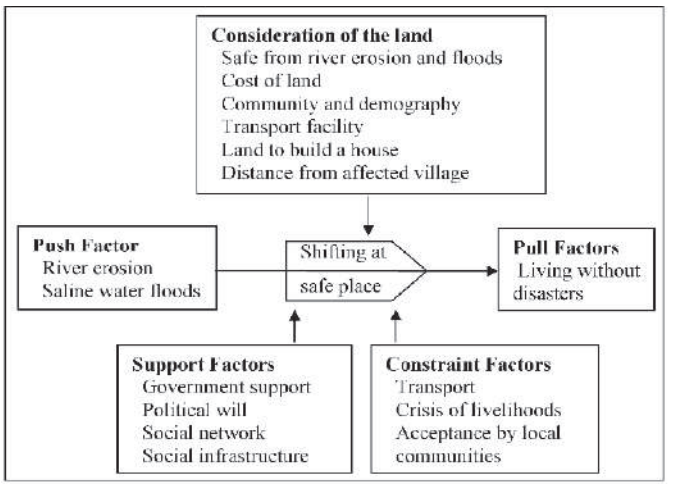
Turton and Turton (1984: 179) have stated that distance from the homeland and livelihood activities are the driving forces behind the selection of the new place of settlement. Usually, residents choose destinations close to their homeland. Distance in this context encompasses geographical, linguistic, and social distance. Similar to the studies on the Ghaghra floodplain in India (Kayastha and Yadava, 1985), hurricane affected Florida (Smith and McCarty 1996, 2006), and Holland island (Gibbons and Nicholls, 2006). Like them, the displaced people of the Sundarban islands also shift to safe places in the same region.

Like Pacific islanders (Farbotko and Lazrus, 2012), migrants in the Sundarban region maintain regular contact with their home island to retain an awareness of their region. The rehabilitants have developed a marketplace near the resettlement area where they meet people from Ghoramara. Roseman (1971: 595) has discussed the process of assimilation of migrants with local people. Migrants generally prefer to settle with people belonging to the same caste, religious, and ethnic background. Haque and Zaman (1989: 309) have correctly pointed out that strong socio-cultural ties and networks help people cope with the experience of displacement. The present study does not support Myers's (1993: 200) conclusion that migrants travel far away from the homeland. Rather, their choice of destination is influenced by the same socio-cultural boundaries that govern their everyday lives.

The familiarity of the destination is an important factor in destination choices. Familiarity of the destination comes through regular mobility to the places and gathering information from diverse sources. The people of Ghoramara prefer to shift to familiar places that they already frequent for various purposes, including education, health, academic activities, and administrative activities (see Figure 3). It has also been observed that academic qualifications and technical skills influence decisions on migration. Residents having higher academic degrees prefer to settle near urban areas in order to secure jobs. Residents who have acquired useful technical skills (idol making, wood working, weaving fishing nets, running businesses) also prefer to settle near urban areas even if they do not have high academic qualifications. Researcher agrees with Turton and Turton (1984: 179) and Tacoli (2009: 517) in observing that the availability of livelihood opportunities is the principal driving force behind the selection of a place of migration.

It has been observed that crucial decisions on where and when to shift from the affected area are more individual than collective. Although the cost of land is an important factor in determining the choice of a destination, people generally prefer to live within the same community (See Figure 2). If they are unable to afford land in the areas they prefer, they have no choice but to accept and live with a different community. The selection of a place for residential mobility is influenced by certain factors (See Figure 4) that vary with the impact of the natural hazard as well as the socio-economic condition of the people.

Figure 4 Factors affecting residential mobility



Salauddin and Ashikuzzaman (2011: 629) have established a connection between occupational shifting and disaster-induced displacement. The present study has found that occupational shifting does not happen suddenly. It depends on the types of natural hazards and the nature of shifting. People living in flood prone areas have diversified livelihood activities. Once the conventional livelihood activity is disrupted, alternative sources of income become a priority. In the Sundarban islands, changing the priority of livelihoods is more important than occupational shifting. Research has revealed that migrant households are economically doing better than the non-migrants (mainly people living on embankment or near the embankment).

The research reveals that social vulnerability has not reduced after residential mobility in colonies and within the island. There is a higher rate of illiteracy and unemployment and a high dependency on risk livelihoods and wage labour (See Table 1). In addition, marginal incomes and the near absence of assets have affected people's coping capacities to land erosion induced displacement.

Table 1 Changing lives and livelihood activities

	Within island	**Resettlement areas**	**Mainland**
Sources of income	Reduced dependency on farming, inability to maintain, commercial farming (betel leaf), small scale trading	Daily wage labour work, deep sea fishing, Long term migration, farming and small-scale trading	Farming, trading, commercial farming (betel leaf farming)
Economic stability	High level of poverty and regular loss of resources	High level of poverty, but no loss of resources and interested in savings	Stability

Table 1 Changing lives and livelihood activities (contd.)

	Within island	**Resettlement areas**	**Mainland**
Education	Large number of school dropout given the families inability to provide support	Families support higher education for second generation settlers	Families support children's education
Participation in community activities	Active participation	Not positively accepted by local people	Active participation
Participation in local government	Active participation	No active participation	No active participation
Local infrastructure	Deteriorating local infrastructure	Lack of local infrastructure	Good infrastructure
Social network and community bonding	High	Very low	Low
Perception of disaster	Living at risk	Living without damages, loss and shifting house	Living without disaster

The major challenge for the island is to maintain the status of a local self-government i.e., Gram Panchayat because of its reducing population. If the Gram Panchayat is merged with another local governing body of the mainland, the demands of the affected people will not be addressed properly. A similar problem was experienced in Holland island, which was eventually abandoned because the government could not provide social infrastructure for a rapidly dwindling population (Gibbons and Nicholls, 2006; Perch-Nielsen et al., 2008: 386).

Resettlement policy is an integral part of national development. The state needs to find safe places to rehabilitate people from chronically disaster-affected areas. By referring to the 1984-1985 resettlement programme in Ethiopia (Kloos and Adugna, 1989: 114), the present research has found that the success or failure of resettlement programmes depends on the services provided by the government and the capability of the new settlers to adapt to different conditions. Despite experiencing a crisis of livelihood (Table 1), affected settlers in the Sundaban islands have accepted that the 'colony' is a better solution to perpetual seasonal shifting of homes every year.

Rapid land erosion forces the villagers in Ghoramara island to move away from the hamlets affected by river erosion in order to live a life not threatened by the losses from inundation. The trend of residential mobility is mainly influenced by the nature of river erosion, the people's capability to cope with disasters, and their views about future climate and living conditions. Although livelihood opportunities play an important role in determining the place of migration, safety is the primary concern of the people. Villagers accept the government's rehabilitation schemes because of their inability to secure safe places individually. There is not much difference in livelihood activities and living standards between people in the rehabilitation areas and those living near the embankment. People shift to safer areas**,** but they cannot easily overcome their socio-economic vulnerability.

Although spatial mobility is a strategy to avoid river erosion, it cannot be a strategy of disaster adaptation. Spatial shifting has also changed the demographic patterns of the affected villages as well as those of newly settled villages. However, the villagers settled in new geographical areas are doing better than those who continue to live in flood-affected areas of the island. This research has found that institutional assistance is required to support affected residents. The National Rehabilitation and Resettlement Policy, 2007 (NRRP-2007) and the Land Acquisition, Rehabilitation and Resettlement Act, 2013 emphasises support to people displaced due to environmental issues. However, people displaced due to river erosion do not receive the benefits of the aforementioned Acts. As many people continue to live in highly vulnerable areas in the Sundarban islands, it is necessary to urgently ensure a long-term rehabilitation programme to cope with the effects of river erosion.

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