

Chapter 10

Internal Displacement Due to the Impacts of Disaster and Climate Change



Sanjib Kumar Saha and Dilruba Ahmed

Abstract It is evident that the greatest single impact of climate change might be on human migration and displacement: the IPCC predicted migration of 150 million people by 2050. This means that by 2050 one in every 45 people in the world and one in every 7 people in Bangladesh will be displaced by climate change. Against this backdrop, the *Comprehensive Disaster Management Programme (CDMP II)* carried out an in-depth assessment and analysis of the trend and impacts of population displacement due to disasters and climate change in Bangladesh. It is found that about 13% belong to the never displaced category, about 46% belong to the temporarily displaced category, about 29% belong to the in-between temporary and permanent category and about 12% belong to the permanently displaced category. The study found that people living in disaster-prone areas are somewhat more vulnerable and pushed to become displaced either temporarily or permanently. However, current knowledge on the relationship between climate change and migration and displacement of people is still limited. Migration and displacement owing to either natural (e.g. natural hazards) or man-made (e.g. climate change, socio-economic) reasons have a significant impact on people, their livelihoods, the surrounding environment and on the utilisation of resources. Understanding the process of migration, displacement in relation with climate change and disaster is an important topic which needs to be considered at policy as well as implementation level.

Keywords Migration · Displacement · Population · Vulnerability
Climate

Sanjib Kumar Saha, Response and Adaptation Management Analyst, CDMP II, UNDP, Corresponding Author, e-mail: kumarsanjib234@gmail.com.

Dr. Dilruba Ahmed, Director, Centre for Environmental and Geographic Information Services (CEGIS).

10.1 Introduction

The issue of climate change induced migration has received much attention in recent discourse. In 1990, the First Assessment Report of the *Intergovernmental Panel on Climate Change* (IPCC) indicated the significance of the impacts of climate change on human migration (Shamsuddoha/Chowdhury 2009). The report predicted the migration of 150 million people by 2050. More recent studies (i.e. Brown 2008) show an even more terrifying figure of climate change induced migrants: a ten-fold increase in today's population of documented refugees and internally displaced persons. This means that by 2050 one in every 45 people in the world will be displaced by climate change. This figure has a disproportionate spread. Notably, in Bangladesh, one in every 7 people will be displaced by climate change by 2050 (Shamsuddoha/Chowdhury 2009).

Trend analysis of internal displacement is difficult due to limitations in available data. In response to this, the *Comprehensive Disaster Management Programme* (CDMP) conducted an in-depth assessment and analysis of population displacement trends due to disasters and climate change. Four types of climate change induced hazard, namely riverbank erosion, flooding, salinity and waterlogging, were identified as the main catalysts for internal displacement.

Bangladesh experienced heavy rainfall in July and August 2011 (413.8 mm against the monthly average of 332.1). Although it did not cause flooding in other parts of the country, severe waterlogging occurred in three coastal districts: Satkhira, Jessore and Khulna. Satkhira, the most affected district, was inundated by 5–7 feet of water that resulted in the displacement of many people and destruction of houses, standing crops, homestead-based livelihoods and the local market (UNDP 2011).

10.2 Objective of the Study

The overall aim of the research discussed in this chapter was to carry out an in-depth assessment and analysis of the trends and impacts of population displacement due to disasters (riverbank erosion, inundation, salinity and waterlogging). The specific objectives were to:

- Identify population displacement trends in terms of prevalence, incidence and options (up to 2030 or beyond).
- Analyse the social, economic, environmental and other impacts of internal displacement on the directly affected population and the receiving/host communities.

10.3 Research Methodology and Approach

The research was conducted by CDMP jointly with the *Center for Environmental and Geographic Information Services* (CEGIS) in 2013. It adopted a mix of quantitative and qualitative methods. The present situation, parameters and scenarios of climate change and disasters were assessed through a review of available literature. Existing government documents, survey reports and research reports provided the historical trends of internal displacement. A detailed household survey was conducted to explore the vulnerabilities and decision-making processes behind displacement. Focus group discussions, case studies and sharing and brainstorming sessions were also conducted at the local, regional and national levels.

The impact analysis framework, used in this study to analyse climate change impacts, is divided into three different parts (Fig. 10.1). Part A shows the linkages between climate change and hazards; Part B outlines the cause and effect relationship between the hazards and internal displacement (situation analysis); and Part C focuses on the impacts (social, economic, environmental and demographic) of internal displacement on destination/host communities (*denoted by A, B, C and D*).

The study areas were selected on the basis of the intensity of natural hazards occurring in the area (in terms of area coverage). In order to select the study areas, a screening survey examining hazard intensity was conducted in 48 Unions of 24 Upazilas under 8 Districts. Based on the survey findings, 29 Unions of 17 Upazilas under 8 Districts were selected for the study. Within these 8 districts, 926 households were surveyed as part of the study. Figure 10.2 indicates the climatic hazards associated with some of the study areas and the study techniques applied.

10.4 Trend Analysis of Internal Displacement

Based on household responses, this section considers reported experiences of displacement, focusing on the experiences of households that have been displaced either temporarily or permanently. Those interviewed were able to recall several years of displacement trends but the study has considered only the recent past since it is easier for people to recall accurately.

10.4.1 Displacement Due to Floods

Flooding is a very common disaster in Bangladesh, and the country has repeatedly faced severe and devastating floods over the past few decades. Flooding affects up to about 80 percent of the country's land. In a normal year, 20–25 percent of the country is inundated by overflowing rivers and drainage congestion (MoEF 2005). Figure 10.3 highlights the percentage of households in the survey sample that were

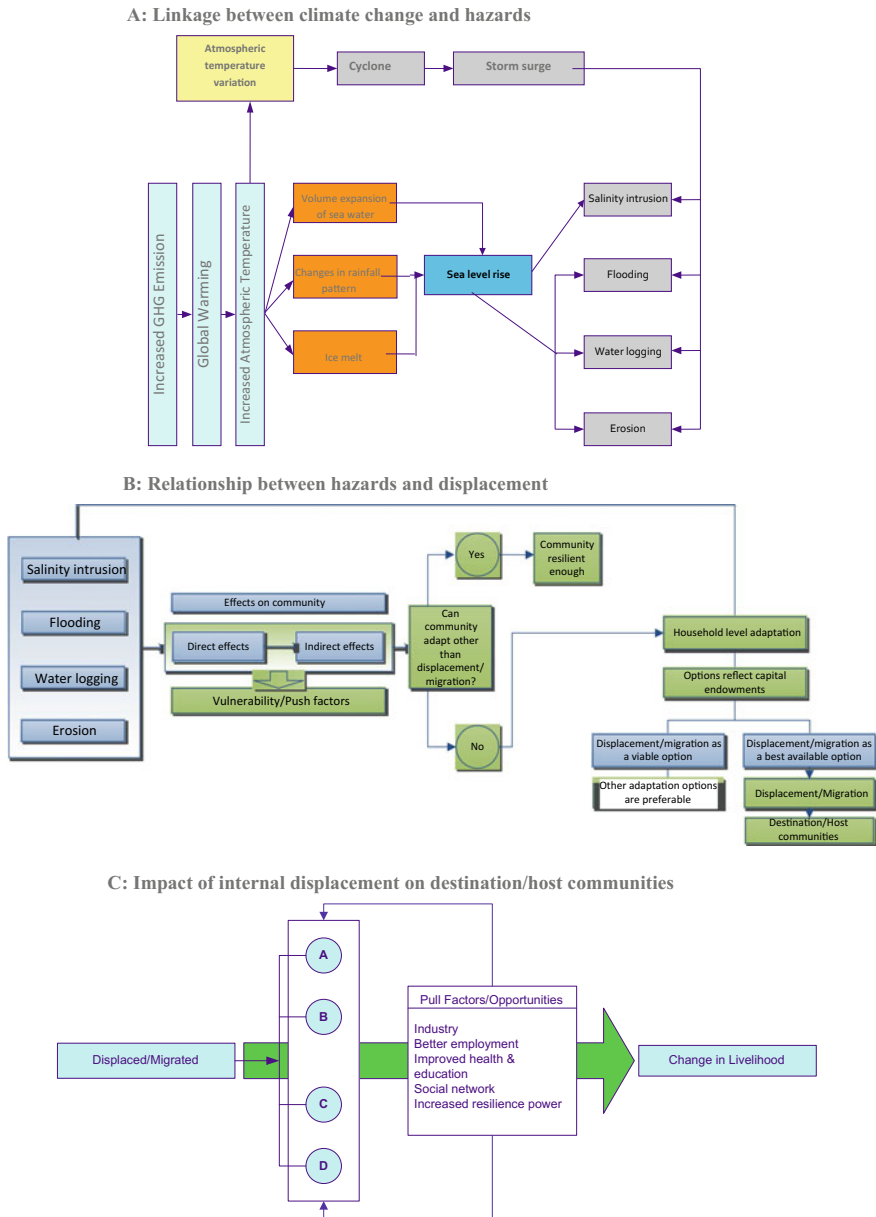


Fig. 10.1 Frameworks for situations surrounding and impact analysis of internal displacement. *Source* The authors

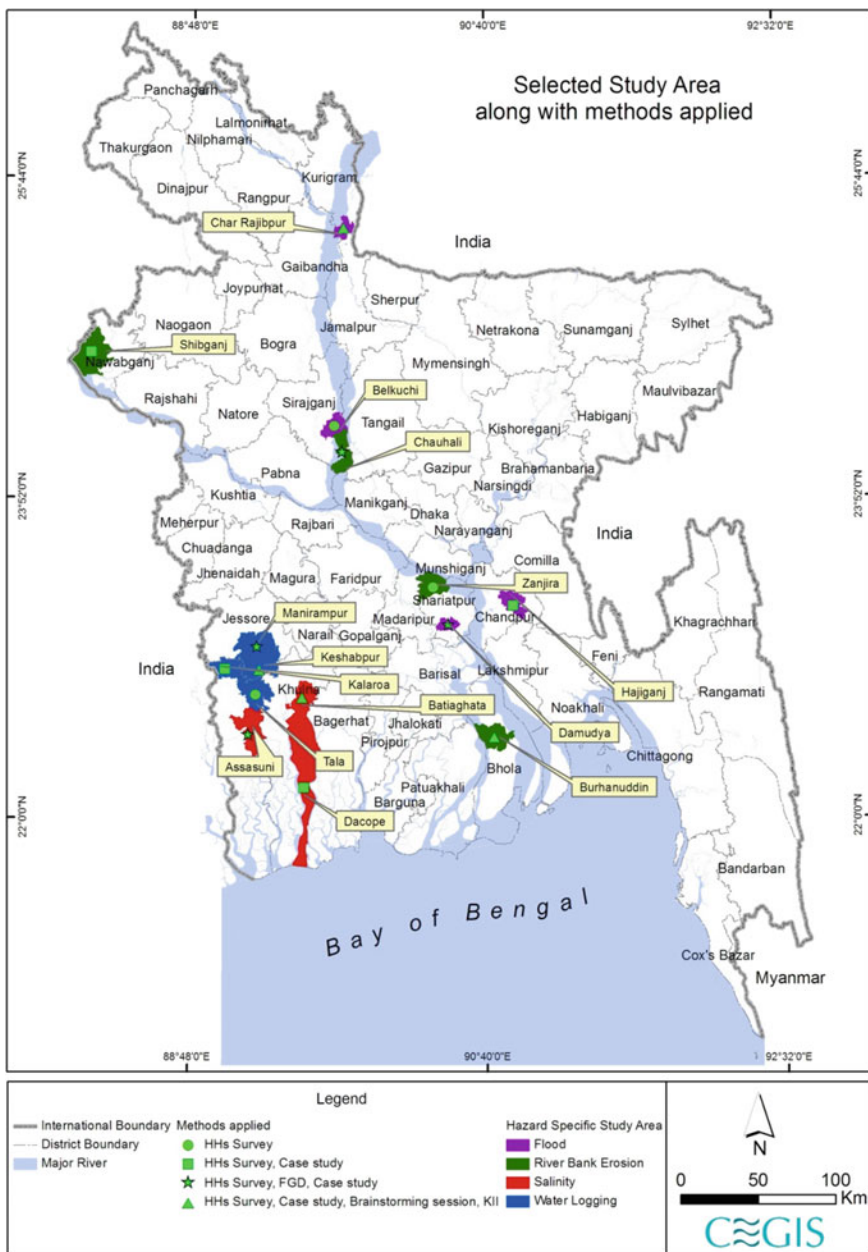


Fig. 10.2 Selected study area and methods applied. *Source* Authors own based on map from CEGIS, Dhaka

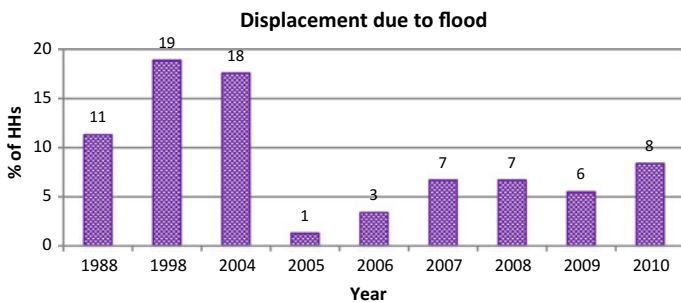


Fig. 10.3 Proportion of displaced households due to floods. The authors

displaced due to floods. About 11 percent recalled being displaced in 1988, about 19 percent in 1998 and about 18 percent in 2004. These years correspond to years of very severe flooding. Almost all of the households were displaced temporarily while only one household was displaced permanently.

10.4.2 Displacement Due to Riverbank Erosion

According to a study by CEGIS (2006), the present rate of riverbank erosion of the Jamuna River is about 2500 ha per year while riverbank erosion of the Padma River is about 1500 ha per year. In 2008, erosion along the banks of the Jamuna was 530 ha, the Ganges around 880 ha, and the Padma 535 ha, of which about 85, 75 ha, and about 100 ha respectively contained settlements (DoE 2012). In analysing trends, it was found that, of the survey sample, about 19 percent were displaced due to riverbank erosion in 1998, about 22 percent in 2005, about 15 percent in 2008, about 11 percent in 2009 and about 13 percent in 2010 (see Fig. 10.4).

It is evident that riverbank erosion is a disaster that pushes people toward rapid displacement. Case Study 10.1 tells the story of Sabura Khatun’s experience of being displaced due to riverbank erosion. In some cases, flooding aggravated the situation further, resulting in a comparatively higher rate of displacement in the years when severe floods occurred.

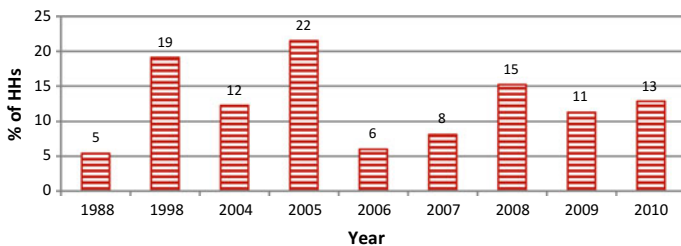


Fig. 10.4 Proportion of displaced households due to riverbank erosion. Source The authors

Case Study 10.1: Miseries created by nature. *Source:* This box was produced by authors of the migration chapter. Who granted permission to include the text here.

Sabura Khatun (age 27)
 Sabujbagh, Char Razibpur, Kurigram
 Affected by Riverbank Erosion

I am the seventh of the 10 children of my parents. My father was a share cropper who was always struggling to maintain such a big family. He sometimes worked as an agricultural day labourer to supplement the little he earned from share cropping. In 2006, I was given in marriage to my now-divorced husband, Shafiqul. We both came from the same village of Modoner Char and, like my family, he had settled here after being displaced due to a natural disaster. A year after we got married we were blessed with a son who brought great joy to our lives. However, later that year, our happiness was destroyed forever by riverbank



Sabura Khatun

erosion when it engulfed our house and that of my parents. That was the beginning of a very difficult time for us, as we did not have enough money to rebuild our home. My husband demanded that I ask my father to get him tin sheets to build the roof of a new house, but my father was also in financial crisis with no means of buying materials for their own home. He requested my husband to give him some time, but in the end he could not arrange the money.

Shafiqul berated me about it and it was not long before he beat me for failing to come up with the money. My situation became intolerable and then one day, he decided to divorce me. After separation, he went to Dhaka and I came back to my father's house. In our society, no woman can live with her parents after marriage, so it was really difficult for me to live in my father's house



Sabura Khatun with her parents

for long. I realised that there was nobody on earth who would stand beside me and that I had to do everything on my own for survival. I had to think of my son, as my only duty now was to help him become established in life. I managed to get a job here as a cook at the upazila dormitory. I earn 2000 taka per month and live in a small house that I rent. I earn very little and so there are periods when my son and I have only one or two meals a day. I cannot even buy new clothes for my son but have to wait for occasions such as Eid ul Fitr when poor people like me receive clothes in zakat. I am always afraid of what will happen to me and my son if I ever lose my job. It is the only support I have and without it there will be no one to give us shelter.

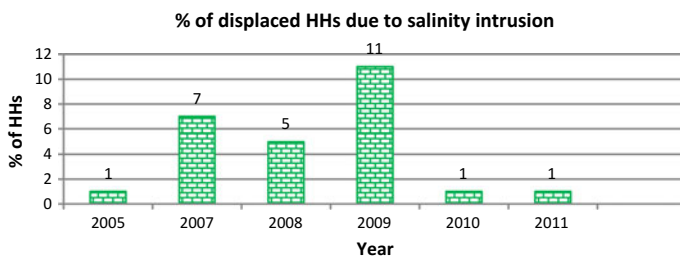


Fig. 10.5 Proportion of displaced households (Hhs) due to salinity intrusion. *Source* The authors

10.4.3 Displacement Due to Salinity

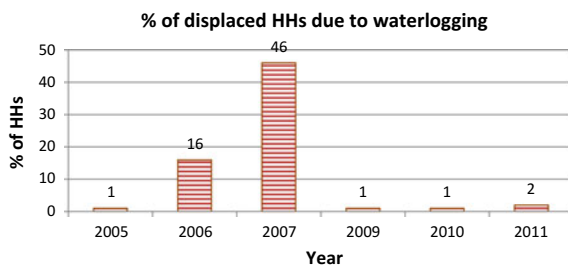
Displacement due to salinity does not occur frequently; it occurs when drastic natural events take place. Analysis shows high displacement rates due to salinity intrusion in 2007 and 2009 (Fig. 10.5). Two natural disasters occurred in those years – cyclone *Sidr* in 2007 and cyclone *Aila* in 2009. Both destroyed a significant amount of infrastructure including embankments, road networks, institutions etc. and eventually pushed saline water into the mainland. These cyclones and consequent salinity also damaged crops and vegetation, destroyed livestock, caused a number of fatalities, and resulted in many people becoming displaced between 2007 and 2009.

Scientists predict that more areas will come under tidal influence due to sea level rise. This would result in an increase in salinity levels and intrusion in coastal areas such as the study areas within Khulna and Satkhira districts. The areas are under high salinity influence, which is projected to increase by 5 to 15 parts per thousand by 2050 (CEGIS and IWM 2007).

10.4.4 Displacement Due to Waterlogging

Waterlogging is a result of a combination of factors, including excessive monsoon rains, inadequate drainage, mismanagement and a lack of maintenance of embankments, increased sediment and siltation of rivers, restricted river flows due to embankments built for shrimp farming, and the release of water from barrages upstream (Roy 2011). Bangladesh experienced heavy rainfall in July and August 2011 (413.8 mm against the monthly average of 332.1 mm) and, though it did not cause flooding in other parts of the country, extensive waterlogging was created in the three coastal districts of the study, namely Satkhira, Jessore and Khulna. Satkhira, the most affected area, was inundated by 5–7 feet of water that caused massive displacement in the population and severe destruction of houses, standing crops, livelihoods and local markets (Fig. 10.6).

Fig. 10.6 Proportion of displaced households due to waterlogging. *Source* The authors



In an overall assessment, no displacement patterns were found over the designated time period. However, it was found that there was much waterlogging in 2006 and 2007. People stated that cyclone Aila contributed significantly to displacement in 2007. Waterlogging is a slow onset disaster. It is not considered as a single factor contributing to displacement, as other factors such as flooding may contribute. In the case of waterlogging, displacement takes place very slowly and is usually temporary, but the duration of the displacement is longer than for flooding.

10.5 Impact Analysis

This impact analysis examines the impacts of various social, economic, and other factors associated with selected disasters, on internally displaced populations. It explores these impacts on displaced populations in both their places of origin and in their host communities (i.e. the communities that they move into). There are numerous impacts of internal displacement that influence the lives and livelihoods of both communities. While in many ways these impacts have negative connotations, there is a positive effect of displacement, suggesting that it can be considered as a coping strategy for climate-affected households. Exemplifying this, Case Study 10.2 provides a picture of the benefits that Monoranjan Mondal has experienced and of the opportunities he has created as a result of his household's displacement.

Households in the places of origin and destination are both captured in this analysis. Temporarily and permanently displaced households are considered in unison as 'displaced households'. Comparative analysis is made between the displaced (809) and never displaced (117) households. Education, health, occupation, income-expenditure and assets) are identified as indicators for the impact analysis.

10.5.1 Impact on Education

People that have never been displaced were found to have a better educational status than displaced people. With regards to the displaced households, most children dropped out of education at the outset of their displacement and a number

Table 10.1 Education status by nature of displacement.*Source* The authors

Type of education	Educational status of 7+ aged people (%)	
	Never displaced	Displaced
Not passed class I	31	33
Class I–V	36	31
Class VI–IX	22	18
SSC, HSC or equivalent	4	3
Bachelor degree & above	3	1

of them attempted to get involved in income generating activities for their survival. Children that were never displaced continued their studies in the same institutions in the place of origin where those institutions provided some support to the vulnerable children for continuation of their education (Table 10.1).

People who permanently left their place of origin tried to adjust to a new community and to ensure their children were as educated as others in their new community. However, it was more difficult for temporary migrants, as they could not enrol their children in new institutions because they knew that they had to return to their place of origin. Consequently, their children could not adapt to their new, temporary community.

10.5.2 *Impact on Health*

The health profile of the households in the study sample indicates that a high rate of people suffered from diarrhoea and fever/cold/cough compared to the national level (see Table 10.2). The incidence of illness among both displaced and never displaced households are similar for all ailments except malaria, which is significantly lower in displaced households. During disasters, especially flooding and water-logging, people suffered from waterborne diseases owing to the poor sanitation systems making the environment highly unhygienic.

Table 10.2 Ailments of the households

Ailment	Households suffering from ailments (%)		
	Never displaced	Displaced	National
Arsenicosis	2	0.55	–
Diabetes	3	5	5.4
Diarrhoea	64	72	5.08
Fever/cold/cough	99	98	58.03
Malaria	11	3	–
Pox	15	13	0.17
Tuberculosis	2	2	0.18
Others	12	21	6.29

Source The authors

Table 10.3 Occupation of the displaced and never displaced households

Occupation type	Involvement of occupants (%)	
	Never displaced	Displaced
Agriculture	20	20
Production & related work and transport work	20	23
Service work	7	4
Retired	35	38
Other	18	15

Source The authors

10.5.3 Impact on Occupation

Displaced households often have to move to places that are far from where they work. This increases their commuting time to work and many of them lose their jobs for failing to follow working schedules. Furthermore, disaster prone places are found to be unfavourable for employment, especially for wage earners, meaning that displaced wage earners tend to seek employment elsewhere. This drives relocation and displacement (Table 10.3).

The study found that households in disaster prone areas increasingly lost interest in agricultural activities due to the loss of cropland. In many cases these households have started to involve themselves in small businesses and transport related work and services.

10.5.4 Impact on Income and Expenditure

The average household annual income and expenditure and the resettlement cost of each household for respective disasters (if occurred) is presented in Table 10.4. It was found that the erosion-affected households spent the highest amount on house repair and resettlement, as most parts of their homesteads had been washed away by riverbank erosion. These expenses were lowest in salinity-affected households

Table 10.4 Households (HHs) average resettlement cost compared to yearly income and expenditure

Types of hazard	HHs avg. yearly income (BDT)	HHs avg. yearly expenditure (BDT)	Resettlement cost for each HHs (BDT)
Flood	137539	114750	40570
Riverbank erosion	162411	150552	295132
Salinity	139793	124161	13795
Waterlogging	102122	108940	36784

Source The authors

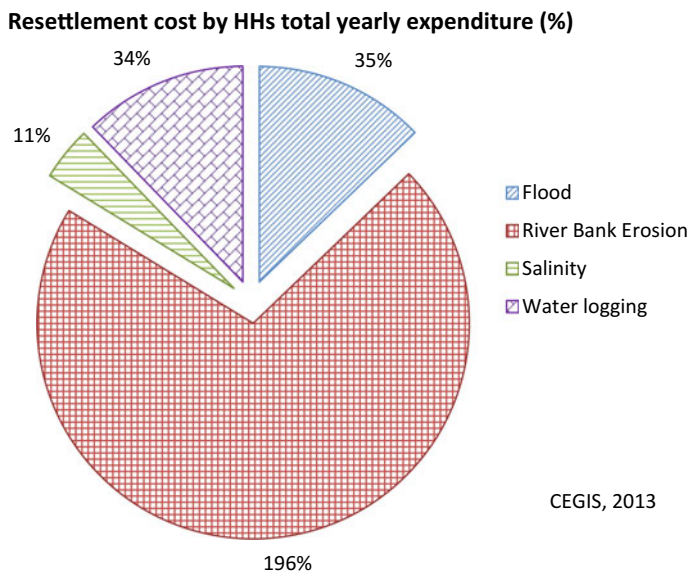


Fig. 10.7 Resettlement cost of households (Hhs) by total yearly expenditure for each hazard. *Source* Authors own based on data from CEGIS (2013)

because people only needed minor house repairs and sometimes cut back on their agricultural production.

Figure 10.7 shows the household resettlement costs based on different types of hazard, as a percentage of households' annual expenditure. Households affected by riverbank erosion spent, on average, almost twice (196%) their annual expenditure on resettlement after each disaster. Expenditure is particularly high for erosion-affected households, as most of the time they have to rebuild their homes in new places. As a result, they have to borrow money, which becomes a burden in the long run. For the remaining disasters, households could repair their existing houses afterwards, so their resettlement cost is much lower than that of the riverbank eroded households.

10.5.5 Impact on Assets

Assets such as poultry, livestock and gardens are endangered by the four disaster types. Most people surveyed had taken loans to acquire these assets, so had to spend most of their savings after losing these assets. As a result, households that had lost assets tried to permanently migrate and settle in new, safer areas.

10.5.6 Analysis to Identify Impact on Demographic Indicators

The impact on the above demographic features was statistically verified using a logistic regression test to determine the significance of different variables. Here, the comparison or dependency is measured for two types of households: (i) never displaced households and (ii) temporarily displaced households. Never displaced households are used as the reference category and the two types of households are identified by probability sampling.

As Table 10.5 shows, the dependency test suggested that the level of displacement decreases with the increasing land-holding size. This is with the exception of marginal land-holding households who are slightly more commonly displaced than small land-holding households. Therefore, the large land-holding households have the lowest chance of displacement.

The test also showed that the likelihood of household displacement decreases with increasing family size. The analysis indicates that displacement is lowest for the large family size households (0.826), the second lowest for the medium size households and the highest for the small family size households (Table 10.5).

The chance of household displacement seems to decrease with the increasing level of academic education of the household head. Our analysis found that households with heads having secondary or above education are less likely to be displaced than those with heads who are illiterate or only have primary education.

Table 10.5 Results of logistic regression analysis

Dependent variable	Independent variable	Categories of independent variable	B ^a	Significance ^b	Exp (B) ^c
Temporarily displaced	Intercept	Intercept	3.162	0.000	
	Land holding category	Marginal	0.075	0.871	1.078
		Large	-1.329	0.003	0.265
		Small	Reference		
	Family size	Medium	-0.003	0.993	0.997
		Large	-0.191	0.642	0.826
		Small	Reference		
	Education status of HHH	Primary	-0.243	0.425	0.785
		Secondary and over	-0.305	0.377	0.737
		Illiterate	Reference		
	Primary occupation of HHH	Labor	0.023	0.949	1.023
		Others	0.258	0.443	1.294
		Agriculture	Reference		
	Types of Hazard	Flood	-2.557	0.000	0.078
		River Bank Erosion	1.920	0.019	6.822
Salinity		0.622	0.338	1.862	
Waterlogging		Reference			

Note The **reference** category is: Never displaced

^aCoefficient of regression analysis

^bP value; probability of rejecting null hypothesis

^cOdds ratio; (Temporary displaced/Never displaced)

This is verified by the Exponential Intercept Value (Exp (B)) of 0.737, which indicates that displacement is lower for HHHs having secondary or higher education than for illiterate HHHs.

On the other hand, it is observed that the chance of displacement for households headed by labourers or other professions is higher than the households headed by farmers. In terms of Exp (B), other classes of households have more chance of displacement (Exp (B) equal to 1.294) than households headed by farmers and labourers (see Table 10.5).

Among the four different types of disasters examined, the chance of displacement is most significant for riverbank erosion. The likelihood of displacement is higher (Exp (B) at 5.466) for households affected by riverbank erosion than for the households affected by waterlogging (see Table 10.5).

Case Study 10.2: Fighting adversity to build a better life! This was produced by authors of the migration chapter who granted permission.

Monoranjan Mondal (age 49)

Education: H.S.C. Profession: Farmer

Affected by Waterlogging

I am the second son of my father Mr. Bipod Vonjan Mondal of Sujatpur village in 15 Kultia union of Monirampur upazila under Jessore district. In spite of being a small farmer, my father used to maintain our family very well. Natural disasters, however, snatched away the easy life we had. Waterlogging is the main form of hazard in our village, which first struck in the early 80 s. Since then, the situation has deteriorated. The village has been surrounded by water continuously over the last 8 years. Sujatpur is mainly a rice cultivated area where waterlogging for 7–8 months hampers rice production and causes untold sufferings to nearly 100 households. Crop production by marginal and small farmers is seriously hampered. Due to crop losses and no alternative sources of income, our family fell into serious financial crisis. I had 126 units of agriculture land which remained fallow due to waterlogging. 10 decimal of homestead land was also blocked by water all year round. Road communication became difficult as it was also disrupted by waterlogging. The wall around



Monoranjan Mondal

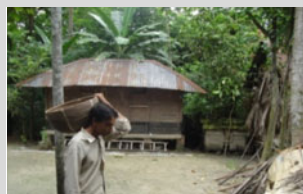


Monoranjan shows the level of water



Interview with Monoranjan

our house broke due to wave action during the monsoon and every year I had to spend around 10000 taka to repair my house. Insufficient work opportunities and all the other factors finally forced me to move to the village Sujatpur Uttar para of the same union in 2005. I prefer this area because it is more elevated than my previous village. Moreover, this vil-



Monoranjan on his way to the Village Market

lage is near my old home and people of my religion live here. As this area is free from waterlogging, it is very easy to look after my land and homestead. I have been able to adjust easily with the host community because of my education, knowledge and attitude. Since migrating to this area, I have been living a good life free from tension. I get more than 3 tons of food-grain every year from my land and so I am able to look after my family very well.

I have built a house on 3 units of land and started crop cultivation in a share cropping arrangement. I also have a seasonal business along with cow rearing and a small poultry rearing initiative. I had discontinued my studies in the early 90 s to help my father by earning an income for our survival. It was my special desire to continue my education to get a good job, but my dream did not come true because of what my family suffered due to natural disasters. However, I remain determined to fulfil my dream through my children. I have ensured that unlike me, my children have the opportunity for education. My eldest daughter is a college graduate and the younger one has obtained Masters of Arts (M.A.) and is now working as a teacher. My only son is an Honours student in Dhaka College. I am waiting for the successful completion of his studies as it will be the fulfilment of all my dreams.

10.5.7 Migration and Displacement Management Strategies

Findings and observations from the study reveal that there are enormous challenges caused by displacement due to various impacts of climate change and disaster. Those who are forced to leave their ancestral homes take shelter in places where they neither have rights nor are provided with basic social services. However, as the study finds, there are examples where people have settled in new locations, leveraging the opportunities to live better lives. So, while displacement can leave people in a state of misery, it also offers opportunities for coping and provides pathways to a resilient future.

In the context of Bangladesh, the issue of displacement and migration has to be addressed at both the international and national levels. There is also a need to incorporate it at the local level, so that proper action can be taken to deal with related problems. A national strategy encompassing the rights and entitlements of

the displaced people could possibly be sufficient to deal with the emerging problem. The strategic responses cannot simply be assumed to be a neutral activity affecting everyone equally and in a positive way. Any viable approach to displacement should be based on the principles of human rights enshrined in the international and regional human rights instruments.

Based on the findings and results, the following recommendations are made:

- Mainstream the issue of migration and displacement into national development plans;
- Develop policies to ensure social protection of more vulnerable or poorer migrants;
- Devise a contingency plan for relocation of communities threatened by river erosion;
- Design and implement community-specific local level projects to help migrants and displaced people to cope with the changing environment.

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