

Climate change and migration: a case study from rural Bangladesh

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Migration in response to climate change should not be seen as a failure to adapt, but as a strategy undertaken to increase household resilience. This will, however, happen when migration is planned and supported and not under distress. This article focuses on people's movements in the aftermath of cyclone Aila. It looks at factors influencing migration in five coastal villages in Bangladesh, and their migration experience.

Key words: climate change; migration; vulnerability; adaptation; Bangladesh

Introduction

How can they migrate? They know life in the city is not easy. Here at least they know people. Once they leave, who will guard their land? How will they support their family in the city? They will continue to live here, no matter how bad the situation gets. They will learn to cope. These village people are very resilient. But I cannot speak for the future. (Interview with Asim Kumar Mridha, Chairman of the Munshiganj Union, 10 July 2009)

Environmental problems – both sudden and gradual – have always caused different forms of displacement around the world, but recent studies have emphasised that more people are likely to migrate in the future, owing to climate change (Intergovernmental Panel on Climate Change 2007). Estimates for people likely to be displaced because of environment factors and/or climate change range from 150 to 200 million by 2050 (Stern 2007, 3). Despite uncertainty over the exact number of people likely to migrate, there is agreement between scholars that the phenomenon of ‘environmental migration’¹ will turn worse in coming years, owing to climate change (Warner *et al.* 2008). Under this scenario, an argument has been made to recognise people migrating because of climate change reasons as a separate category of ‘climate change displacees’ or ‘exiles’, so that international climate finance can be used directly for their benefit (Hodgkinson and Burton 2009).

A traditional view holds that increased international migration because of climate change will cause more conflicts and political instability (Reuveny 2005). The argument behind this view is that as climate change affects the availability of resources and reshapes geographical boundaries, communities will be forced to migrate to gain

access to natural resources, and seek more productive livelihoods. This will likely drive conflict, as people struggle over limited resources and cross national borders.

However, an alternative way of thinking about climate change-induced migration has emerged recently, drawing inspiration from the established history of migration as a coping response to environmental stresses, such as nomadic pastoralism in the Sahel region. This view of migration is that far from being a failure to adapt, or a concern for security, migration is a process that helps households cope with risks and shocks, enhancing their capabilities, and reducing social, economic and ecosystem-related vulnerabilities (Tacoli 2009). As such it presents migration as a development issue. This view raises the question: if migration does have adaptive potential, then what can be done (or is being done) to facilitate communities to migrate? Analysing who migrates, why, how, and where they go, can provide useful insights for development planners and practitioners aiming to support poor women, men and their families.

This paper draws on literature on environmental migration and fieldwork carried out in rural Bangladesh, in five villages in the districts of Satkhira and Khulna,² and slums in Khulna city, in the wake of cyclone Aila, which occurred in 2009. The villages in the study were Jilekhali, Harinagar, Singertoli, Neeldumuria and Chauramukha. Methods of investigation included observations, semi-structured interviews, focus-group discussions, and participatory rural appraisal (PRA) exercises, such as historical visualisation, mobility mapping, and social mapping. Respondents were chosen using selective³ and snowball sampling. In all, 101 households were included in the survey, and 22 expert interviews carried out. Interviews were conducted with the head of the household (predominantly male in the sample), or with the adult member available at home at the time of the interview. Only one household in the sample was headed by a woman.

The first part of the article looks at the vulnerability of households living in coastal Bangladesh, the ways in which climate shocks and stresses affect rural households, and how these relate to migration. The second section looks at the trends of migration in the five selected villages. I ask what factors governed household decision-making in the study areas, and highlight the constraints households faced when making the decision to migrate. In the third section, I highlight the vulnerabilities of Aila displacees, to bring out both the potential and the limits of migration to serve as adaptation. I conclude by suggesting ways in which involuntary displacement may be minimised, and planned migration supported.

A context of vulnerability

Bangladeshi coastal communities have been facing environmental challenges for centuries (Lein 2000). Bangladesh, one of the most densely-populated countries of the world, is situated in the world's biggest delta, formed by the rivers Ganga, Brahmaputra and Meghna. It is termed a least-developed country (LDC)⁴ by the

United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and the Small Island Developing States (UN-OHRLLS 2010), with 63% of its population employed in the sectors of agriculture, forests and fisheries Bureau of South and Central Asian Affairs (BSCAA 2010, 1).

All the three primary livelihood options are determined by environmental conditions and access to natural resources. Bangladesh and its population are thus extremely vulnerable to the adverse effects of climate change. The scale and frequency of extreme climate events has been steadily increasing, making survival difficult and expensive (Government of Bangladesh, Ministry of Environment and Forest 2005). Unable to cope with these events, according to some estimates more than 26 million people in Bangladesh are likely to migrate (Myers 2002, 611). That is almost 16% of the total population of the country.

The villages in the study are located in the coastal areas of Bangladesh bounded by the Bay of Bengal on one side. Coastal villages are typically densely populated and regularly experience coastal floods, river erosion, saltwater intrusion and other natural calamities made worse by sea-level rise. Increasing sea-level in the future, coupled with existing problems, can push many on the move. For instance, in 2007, this area was hit by cyclone Sidr, a category 5 cyclone. This was followed by a category 1 cyclone, Aila, in 2009. These caused widespread deaths, large-scale destruction of livelihoods and property forcing villagers to migrate. As repeated exposure to such disasters depletes the asset base of households, it makes future recovery very hard.

Environment stresses and their impact on the villages

Four important aspects of life are affected by climate change events in the five villages. Aila and other similar events damage shelter, affect livelihoods, decrease the amount of safe water available, weaken the embankment erected as a coastal defence, and create a threat to life.

Shelter

The poorest families in the villages live in *kuccha* houses, made from clay collected from the river bank. Villagers reported that these houses often develop cracks and start collapsing in the dry season owing to the high saline content of the soil.

One of the migrants interviewed – Deepika, 24 – shared her experience. She used to live in Singertoli, but migrated with her family to Jilekhali, one day after Aila. All her belongings, her savings, her animals were destroyed in the cyclone. Their family lived in one of the study villages, Singertoli, but had no land, so they had built a house on the embankment, and this was one of the first houses to be destroyed. She has had her house destroyed twice in six months by the river current – once by a storm, and now by Aila. The first time this happened, they rebuilt their house, and life moved on. But this time the damage has been extensive. She is glad to have found shelter in her father's

house but knows this can only be temporary. She is restless to move back but apprehensive about the future, 'I am scared to return. What if the cyclone happens again?'

Livelihoods

The three primary forms of livelihood practised in the coastal areas are all based on natural resources, exhibiting great vulnerability to climate shocks and stresses. In two of the sub-districts within the region, Shyamnagar and Koyra, over 64 per cent of households depend on the climate-sensitive sector of agriculture as the main source of livelihood (Bangladesh Bureau of Statistics 2001a, b).

1. *Shrimp farming*. Introduced in the area in the 1980s, this has proved to be one of the most popular livelihood options in Bangladesh because of its ability to generate high economic returns. According to the chief executive of Shyamnagar sub-district, 30 per cent of all Bangladesh's shrimp exports are from this sub-district, and shrimp farming is the primary source of revenue for the district employing around 0.3 million people annually (interview with Dileep Bonik, Thana Nirbahi Officer, Shyamnagar Sub-District, Government of Bangladesh, 17 July 2009). However, shrimp farming has been criticised by environmentalists as unsustainable, and Shahin Islam, from a local non-government organisation (NGO), Barcik, argued that wetlands that preserved biodiversity have been lost shrimp farming (interview, 15 July 2009). Shrimp farming has also been responsible for damages to the embankment, further increasing risk from climatic forces, as farmers build unauthorised sluices to allow saline water to enter their farms in monitored volumes (interview with Qazi Intiaz Hashmi, Deputy Director, Planning, Department of Environment, Government of Bangladesh, 21 July 2009). The intrusion of brackish water makes the possibility of cultivating other crops minimal, forcing neighbouring farmers also to take up shrimp farming (if they can afford it), or find other sources of employment. Bibek, a daily-wage agricultural worker from Chauramukha, reported: 'Our options are limited. If we can get a loan, we start a shrimp business. Or we go elsewhere to find a job' (interview with Bibek Das, 12 July 2009).

Smallholder farmers, like Bibek, face another barrier to becoming shrimp farmers, in the form of the high cultivation costs: shrimps require expensive fertilisers, and regular outbreaks of viral diseases compromise production. While big farmers reap economies of scale and accumulate assets that allow them to weather climate shocks, small farmers are forced to lease their lands and work as agricultural labour, or migrate. A senior government official reported that the introduction of shrimp farming, which is a capital-intensive enterprise, has increased unemployment and seasonal migration in the region (interview with Abdus Samad, Deputy Commissioner, Satkhira District, Government of Bangladesh, 18 July 2009).

After Aila, households that had taken on micro-credit loans to invest in shrimp farming reported taking on additional loans to counteract losses. With interest rates as high as 25–30 per cent per 100 Taka,⁵ these loans represent additional pressures for the future, creating uncertainty and instability. For instance, Hasina Khatoon, 26, whose husband had taken another loan of 30,000 Taka from the world's largest NGO, BRAC, complained: 'He does not sleep at night. We are both worried'. Their previous loan of the same amount, taken three months before Aila, was used for investing in a small shrimp business. But just as they were beginning to benefit from their investment, Aila washed everything away. Now, they are stuck with the hard task of finding ways to pay off the interest and the instalments. Without a regular job, and a steady source of income, their future appeared bleak. Since they did not have any land of their own, Hasina's husband worked as a daily-wage labourer on others' lands, earning 50 Taka daily (less than US\$1 a day). She was unsure if there would be any job for her husband in the village, even after the water receded. In such situations, farmers with big pieces of land are better off as they can rely on their savings. The future of landless daily-wage labourers like Hasina's husband, however, hangs in balance.

2. *Paddy farming.* While shrimp farming is predominant in the area, one village in the sample exclusively practised paddy farming. However, increasing salinity in soil and groundwater were reported to have been affecting crop yield in the area. According to farmers, fluctuating rainfall patterns have also been a problem for rice farmers.

3. *Forest resource extraction.* The *Sunderbans* is a vast forest area lying in the delta in south-west Bangladesh. It is a rich source of natural herbs, medicines and other resources, such as honey and timber. Villagers frequently enter the forest area in search of fuel wood, and to catch fish from the ponds inside the forest. Villagers highlighted that frequent storms⁶ made access to and availability of forest resources difficult.

Water scarcity

Ponds are the main source of drinking water. Climate variability in the form of slow-onset changes such as unpredictable rainfall, and an increase in salinity, have together created acute drinking water shortages in the area, and also been responsible for skin diseases. After Aila, all the open water sources had become unusable, and villagers had to rely on tankers of water supplied by the government.

Weak embankments

Embankments were constructed in the late 1990s to protect the area from floods and cyclones under the Bangladesh Coastal Embankment Rehabilitation Project (World Bank 2005). However, these have proved inadequate in the face of abnormal, and regular cyclonic storms and floods (Islam 2002). Households reported that continuous

exposure to floods and storms had weakened the embankment. They complained of a lack of regular maintenance by the government. Villagers also claimed that the embankment created drainage problems, because it meant saline water from storm surges flooded both the shrimp and the paddy fields increasing soil salinity. The local administration highlighted the villagers' role in damaging the embankment: 'We do periodic repairs [on the embankment]. But they [villagers] dig holes in the embankment for their farming. How can we be blamed then?' (interview with Asim Kumar Mridha, 11 July 2009).

Linking climate change and migration

A review of the responses reveals that climate shocks and stresses have been affecting households by aggravating existing problems. Migration occurs in response to multiple pressures, and it is difficult to isolate environmental pressures from ongoing economic ones. Thus, the effects of climate change increase the impetus towards migration, forcing people to go in search of safer environments that can offer them reliable livelihoods, and household security (Black *et al.* 2008). A village elder from Neeldumuria said: 'It is so hard to live here. Everyday something happens. Who do we blame if there is a storm? There is nothing to do but find another home. How long can we go on living like this?'

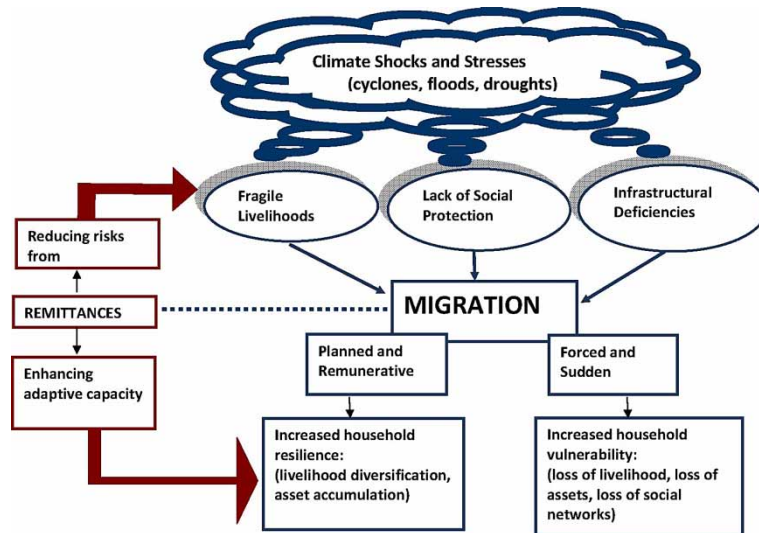
While rising population pressures and the search for better education and employment have always encouraged people to migrate, the increasing fragility of their surroundings has been putting an additional burden on their resources acting as a push toward migration. Further, the recurrence of environmental disasters wears down a households' ability to cope and adapt to future environmental pressures. Migration in such cases has become a last survival strategy (Figure 1).

Even before Aila, migration for work has been common in this region. This is largely owing to the fact that agriculture has been under pressure due not only to the fragile ecosystem, but to an increase in population in the region which has led to landholdings getting smaller as they are sub-divided. An elderly woman in Singertoli reported:

When I got married we had a big family but enough land to farm. Nature has never been our friend here. But even after a storm or a heavy flood we managed. Then came the sons and their wives and then their children. Now when a disaster strikes, we have no option but to send our children to work elsewhere. The family has broken up.

The fact that agriculture in the area is seasonal, and typically people grow only one crop, means it becomes important for household members to migrate seasonally to nearby urban areas, and diversify their livelihood. It is largely small farmers or landless labourers who have been migrating.

Figure 1: Climate change, livelihoods and migration.



Migration from here can be seasonal, temporary or permanent. Seasonal migration usually involves one or two male members of the household, migrating to nearby urban areas in Shyamnagar, Khulna, Dhaka, and sometimes even India. They work there for six months in mills, as construction workers or as rickshaw pullers. In an overwhelming 90 per cent of cases, seasonal migrants were found to be landless. Permanent migration tended to involve households that either lacked access to any profitable form of livelihood, or could not survive adequately on the wages they received in the villages. For instance, in the village Jilekhali, landless households or those with very small pieces of land (under 2 Bighas)⁷ had sold their house and whatever little land they had, and migrated permanently to India.

After Aila: vulnerability of migrants

Immediate provisions by the Government of Bangladesh (GoB) for Aila victims included food relief, provision of work under the Food-for-Work programme (FWP),⁸ distribution of seeds and fertilisers and announcement of a housing scheme in Shyamnagar sub-district allocating 3000 Taka⁹ for reconstruction of houses (interview with Dileep Kumar Bonik, 18 July 2009). Support also came in the form of humanitarian relief and sanitation kits from many development organisations such as Caritas, Bangladesh Red Crescent Society etc. (interview with Mohun, Executive Director, LEDARS, 10 July 2009). However, the following quote from a female respondent in

Singertoli village highlights some of the limitations of short-term humanitarian relief and problems migrants face:

The water had increased to such an extent that we did not know how we would manage our next meal. I had no clothes to wear, no land, no work. As we starved, we went to the relatives' house but they did not allow us to stay. They had their own problems. They told us to wait and see what happens next. We have been to my parents' house and they told us how they could provide for us as they are old. There is no way open before us. We are not getting the opportunity to work as day labourers and we do not have any net to catch fish.

While humanitarian relief addressed some of the immediate concerns of Aila victims, a lack of long-term and sustainable solutions to their problems emerged as a major concern in the research.

Respondents who had undertaken long-distance migration (often to urban areas) reported serious economic problems. They were excluded from any relief assistance – both government and NGO – as they had moved far away from the affected areas. In the case of households where cyclical rural–rural migration took place, their income went down after Aila, as there was a shortage of work, and competition was high. In the case of households where someone migrated to a city for work, the migrant reported difficulty in finding employment with a limited skill set.

Further, even in cases where their urban income was higher than what they usually earned back in their villages, migrants still could not manage to recover from the losses of Aila. This was because the cost of living was reported to be significantly higher in urban areas. The research also revealed that households which were forced to migrate after Aila could not find money to enable them to pay for the cost of migration. Often they also lost livestock, jewellery, and savings. This lack of economic security slowed down their post-disaster recovery significantly.

Aila also damaged households socially. Households that migrated lost much of their social capital since the networks which had previously been supportive to them now no longer existed. Many households reported tension between the migrants and receiving communities, over resources including water and employment.

Male members of some households who had moved from one rural area to another temporarily after Aila managed to find work as daily labourers under the FWP. However, women from these households reported losing access to whatever limited livelihood options they previously enjoyed. Women migrants reported that their situation was made worse by a lack of privacy, and poor access to proper sanitation facilities in the few, overcrowded shelters.

From a psychological perspective, a disruption of their regular life and reliance on financial support from friends and extended family were reported as sources of frustration, especially by the male respondents. Women and children expressed both apprehension and uncertainty over their return, fearing a repeat of storms and cyclones.

After Aila, additional forced migration in response to the disaster was seen by some as temporary, but there was no consensus on whether the families that had migrated to urban areas would eventually return to their villages. Short-distance migration to the closest urban areas or to the nearest cyclone shelter, or a relative's house in a nearby village appeared to be predominant. In the case of rural–rural migration, household members expressed a strong intention to return to their previous village as soon as the embankment was rebuilt. However, it seemed highly probable that displacements to urban areas would end up being permanent, especially in cases where children had been enrolled in a school in the new area. Local NGOs and government officials tended to concur: Samir Ranjan Gayan, Executive Director of *Sudipti*, argued, 'Those that have nothing to come back to, will not return permanently. They might come to visit their relatives. But once they start a new life, they will not uproot themselves again' (interview, 8 July 2009).

Factors influencing decisions to migrate after Aila

Table 1 enumerates all the important factors that influenced the decision-making of households that employed migration as a coping strategy in the aftermath of Aila. They are ranked in the order of importance allocated to them by the respondents.

There are two common assumptions about climate-induced migration, which determine estimates of numbers likely to migrate: first, that all the people in the affected areas will migrate, and second, that they will all migrate permanently. Yet, this reasoning does not take into consideration the different ways in which people respond to similar events (Black *et al.* 2008). This is partly because of variation in the amounts of social and financial capital available to them, and partly because of the different ways in which individuals experience and perceive the effects of climate change, within the same region.

The research confirmed that resource scarcity, including, lack of information, financial and social capital, and social protection, can constrain households from considering migration as an option. Households that lack financial and social capital are unlikely to undertake long-distance migration because of the costs involved, even if they do opt for short-distance migration. Gender inequality emerged as another constraint to migration in the study areas. With the exception of one individual in the total sample, women never migrated independently, and in all cases migration decisions were made by the male head of the household. This implies that those that are most vulnerable to the effects of climate change are often the least equipped to migrate. In cases where the landless and the poorest did migrate, they did so more because they were compelled and less out of choice, and as such their movement can best be described as displacement.

In the study areas, household decision-making was significantly influenced by five important factors regulating the number of migrants. This was true even for those

Table 1: *Reasons for migration*

Push factors	
1.	Destruction of livelihood by Aila: farms submerged, crops destroyed.
2.	Destruction of household, shelter and assets by Aila.
3.	Landlessness, poverty.
4.	Lack of available cyclone shelters.
5.	Dissatisfactory living conditions in shelters: congested, unsanitary, lack of privacy for women etc.
6.	Insecurity in children: disruption of education, fear in children over living near the embankment etc.
7.	Lack of optimism about any improvement in the villages regarding the embankment or their livelihood in the near future.
8.	Threat to life – through the outbreak of diseases.
Pull factors	
1.	Better pay and multiple work opportunities in urban areas.
2.	Presence of friends and families in other areas.

households whose migration decisions had been strongly affected by Aila, over and above the underlying causes of migration (listed in Table 1).

Key findings in the research included the following points. First, households who had prior knowledge about the destination area and available livelihood opportunities, owing to previously having had a household member or neighbour migrate there found decision-making about migration easier because of this. The information they held and passed on to other households encouraged others, without any history of migration, to migrate. As a respondent from Singertoli explained: 'People have been going to work in the city for a long time. They come back with money and new things. We know that there are more opportunities in the cities. We have grown up seeing this'.

Another crucial factor which informed household decision-making about migration was whether or not they could call on help from social networks, in the form of financial assistance, assurance of shelter, and so on. For Madhurima, a seamstress from Neeldumuria, getting help from her family was instrumental in her decision to move:

I have been living at my sister-in-law's house for a month now, ever since Aila happened. Her husband is a contractor in Khulna [city] and earns better than most people in the village. We knew we could get help here. So we came.

Migration was avoided by some of the poorest and the worst-affected households that managed to procure government or NGO relief or support from affluent families in

the villages. Some landless households chose to migrate because there was no incentive for them to stay behind (in the form of any ancestral property for instance, or access to the housing scheme announced in the wake of Aila). Those that received some humanitarian relief, but found it insufficient to address their long-term concerns over employment and stability, also migrated. Interestingly, interviews in the urban slums revealed that all of those that negated the possibility of returning to their villages were landless.

Other households appeared unwilling to undertake long-distance migration because they wanted to retain their social networks, were familiar with the government officials of their region, and had rights and entitlements there. Also, the costs involved in long-distance migration were reported to be higher and often out of the budget of poor households.

Migration as an adaptation strategy: what the Aila example shows

These findings suggest that migration may not always serve as an adaptation strategy for households. Literature on climate change and migration has argued that migration may serve as an adaptation in two ways. First, individuals facing unemployment because of chronic livelihood insecurity migrate elsewhere to take up jobs other than what they have practised in the past. Second, migrant remittances create a multiplier effect on the home economy, leading to infrastructure development, and job creation that benefits others in the community as well (Maimbo and Ratha 2005). Typically, this would imply that only one or a few members of the household undertake migration, and do so in a more-or-less planned manner. If all members of the household migrate, then it can more appropriately be termed 'displacement'.

In the case study areas, household reliance on remittances was negligible to absent in the case of post-Aila migration, because of the recent nature of the event. However, even in the case of movements before Aila, remittance flows were inconsistent and unreliable, especially from international undocumented migrants. In the case of migration to India, all the migrants were found to be irregular. Owing to a lack of proper documentation, they had to rely on the services of informal 'brokers' that charged a heavy commission at the border to exchange their earnings into the local currency, and lost a sizeable portion of their earnings to the black market. The absence of credible service providers encouraged migrants to remit money through relatives or friends going back to their village from India. This happened occasionally, and was not something that household members staying back could rely on. Further, irregular migrants to India find jobs in the informal economy securing low wages. While their income is sufficient for them, they often find it difficult to remit anything substantial to their families in Bangladesh. Since over 90 per cent of the households with seasonal migrants to urban areas were landless agricultural labourers, their earnings did not help them substantially in asset accumulation.

The potential of migration to enable households to adapt may also be limited by the scale, frequency and nature of climatic events. While remittances may help households to adapt to slow-onset climate changes, reducing the number of those that choose to migrate, rapid-onset and extreme events, such as Aila, may still push many on the move. This sentiment was captured in a statement by a focus-group discussion participant:

This is my motherland. I cannot abandon it. But slowly it is abandoning me. Look at the river. It has become so big and strong. Everyday it eats away pieces of our land. One day I will have nothing left. What will I do then with the rice [relief] that the government gives me?

Thus, if households experience environmental problems (such as water insecurity, storms, soil salinity, river erosion) frequently and with increasing intensity (aggravated by climate change) they might still choose to relocate despite support from remittances or humanitarian agencies. Also, events like Aila, induce distress migration. Families reported: 'If we don't go, how will we live?'

Finally, migration as a temporary coping strategy cannot be termed 'adaptation' for it may not improve the resilience of households to deal with future climate shocks and stresses. This is especially so if migrants face resource scarcity at their destination, conflict with existing population, lower income and/or loss of rights during the process of resettlement in a new area.

Lessons from this case study provide useful considerations for future policy and research. First, the predominant trend for migration in response to extreme events, such as Aila, is likely to be local and regional, and not international, owing to capital and social constraints. Short-distance and temporary migration as an immediate, knee-jerk reaction to a climate shock is not likely to enable households to adapt in the long-term and increase their resilience to future shocks. In the case of rural-rural migration, migrants continued experiencing livelihood and resource scarcity, because the socio-economic profile of the recipient areas (usually the nearest safe village) was not much different from their own village. In the absence of a government-supported resettlement programme, there was a high probability that these short-distance migrants would return to their home villages and continue practising unsustainable livelihoods despite the risk of repeated floods and cyclones. In the case of rural-urban migration, migrants experienced a substantial increase in their living expenses (rent for their houses, school fees for children, price of daily ration) and difficulty in finding jobs owing to their limited skills and lack of training, and difficulty in paying off previous debts. While many secured work through their networks they were found to be living in shabby, disease-infested slum areas in illegal structures under a constant feeling of insecurity.

Migration in the wake of extreme events such as Aila is characterised by a lack of choice and agency in the decision-making process (as the primary concern is immediate survival), and as such it can best be termed displacement. This reduces the

likelihood of households improving upon their previous living conditions and livelihoods, or becoming more resilient in the process. In 99 per cent of cases there was no evidence of households having increased their resilience to environmental hazards or their incomes, or decreased their reliance on natural resources. Their inability to preserve their assets (livestock, savings kept at home, utensils) during their flight had only made post-disaster recovery difficult. In the case of rural cycling, they were still struggling to find a stable means of employment, and a permanent shelter.

This is not to say that despite the involuntary nature of the movement there were no attendant benefits. The physical act of moving away from a site prone to cyclones and flooding to a relatively safer one afforded them protection of life. In the cases where one or two members of the family had migrated, the other family members reported enjoying an increase in their disposable income with fewer mouths to feed. On the other hand, households where the main earning member had migrated in search of work after Aila, the reverse was reported.

Conclusion and future considerations

Growing population pressures, marginal landholdings, increased competition in the labour market, and environmental problems have been pushing people from rural to urban areas in Bangladesh for centuries. Apart from these traditional problems the additional problem of incremental and repetitive climate shocks and stresses not only add to pressures for migration but also make the terms of this migration unfair.

This case study shows that while migration that is necessary and unavoidable needs to be planned, and supported through institutional measures, forced displacement needs to be avoided. Stern's (2007) report unequivocally states that: 'The exact number who will actually be displaced or forced to migrate will depend on the level of investment, planning and resources' (p. 112). This can happen by stepping up social protection, improving access to sustainable livelihoods, providing better infrastructure to people vulnerable to climate change, and planning relocation.

In particular, the research showed that the limited number of cyclone shelters with their inadequate sanitation facilities, along with government negligence of the upkeep and maintenance of the embankment, emerged as major concerns for people in this area. To respond to this concern, the disaster management community would need to assess local infrastructural needs in keeping with trends on population growth, and frequency of disasters if the vulnerability of migrants is to be reduced. This would require better vulnerability profiles at the local level. Sizeable investment, beyond the scope of the GoB budget, would be required to increase the resilience of existing infrastructure and facilitate community adaptation. All of these would imply securing additional resources from funds under the United Nations Framework Convention on Climate Change (UNFCCC), which are specially designed to help LDCs cope with climate impacts.

Finally, for low-lying countries like Bangladesh eventual resettlement of vulnerable populations will need to be explored as a viable policy option. Discussions are already underway in the small island developing states of Tuvalu and Maldives over how best to address attendant governance issues. Expanding the definition of ‘refugees’ under the Geneva Convention of 1951, or extending the framework of international human rights to accommodate the concerns of climate refugees are submissions in front of the international community. But neither can allocate a legal liability to industrialised countries for footing the costs of actions required to address the impacts of climate change. Further, lessons from mismanaged relocation programmes in the past (such as in Ethiopia in response to droughts in 1985) will need to be borne in mind (Martin 2010). The terms of the relocation should be such that they assure basic amenities, livelihoods and access to them as entitlements and not as concessions. This can only happen through a protective instrument under the aegis of the UNFCCC that functions in keeping with the principle of common but differentiated responsibility.

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Notes

- 1 The term ‘environmental migration’ has a contested history in literature but is broadly defined as the phenomenon wherein environmental factors (such as floods, desertification, land erosion, sea-level rise etc.) act as catalysts to push people on the move.
- 2 Bangladesh is divided into six divisions, which are further sub-divided into the administrative units of districts, sub-districts and unions. The study was carried out in two districts – Satkhira and Khulna – both falling under the Khulna Division. The five villages selected fall under the sub-districts of Shyamnagar, Koyra and Khulna.
- 3 Selective sampling involves choosing households with specific characteristics that are relevant for the purpose of research. Here, the intent was to look for households that had a recent history of migration, and not interview all the households in the village.
- 4 A country is defined as an LDC if it consistently ranks low on socio-economic indicators such as gross domestic product, gross national income, and human welfare as measured through the Human Development Index. For details see <http://www.un.org/special-rep/ohrlls/ldc/ldc%20criteria.htm>.
- 5 US\$1 = 71 Bangladeshi Taka approximately.
- 6 Villagers reported three storms and one cyclone in a span of six months.
- 7 1 Bigha is equal to 1600 square yards in Bangladesh.

- 8 The FWP is a nationwide rural employment scheme operating in Bangladesh since 1975. After Aila, villagers received 5kg of rice per day for performing construction work on the embankment under the FWP.
- 9 3000 Taka is approximately US\$43.

References

- Bangladesh Bureau of Statistics** (2001a) *Population Census-2001: Community Series, Zila-Satkhira*, Dhaka, Bangladesh: Planning Division, Ministry of Planning
- Bangladesh Bureau of Statistics** (2001b) *Population Census-2001: Community Series, Zila-Khulna*, Dhaka, Bangladesh: Planning Division, Ministry of Planning
- BSCAA** (2010) 'Background Note: Bangladesh', <http://www.state.gov/r/pa/ei/bgn/3452.htm> (last accessed 11 July 2009)
- Black, R., D. Kniveton, R. Skeldon, D. Coppard, A. Murata, and K. Schmidt-Verkerk** (2008) 'Demographics and Climate Change: Future Trends and their Policy Implications for Migration', Migration DRC Working Paper T-27, University of Sussex, UK
- Government of Bangladesh, Ministry of Environment and Forest** (2005) *National Adaptation Programme of Action (NAPA)*, Dhaka, Bangladesh: GoB
- Hodgkinson, D. and T. Burton** (2009) 'Towards a Convention for Persons Displaced by Climate Change: A Discussion Note on the Relationship between Adaptation and Displacement', <http://www.hodgkinsongroup.com/documents/Draft%20Discussion%20Note%20Adaptation%20and%20Displacement.pdf> (last accessed 16 July 2010)
- Islam, S.** (2002) 'The causes of vulnerability in rural livelihoods', in K.A. Tofique and C. Turton (eds.) *Hands not Land: How Livelihoods are Changing in Rural Bangladesh*, Dhaka, Bangladesh: Bangladesh Institute of Development Studies
- Lein, H.** (2000) 'Hazards and "forced" migration in Bangladesh', *Norsk Geografisk Tidsskrift* 54: 122–7
- Maimbo, S., and D. Ratha** (2005) *Remittances: Development Impact and Future Prospects*, Washington: World Bank
- Martin, S.** (2010) *Climate Change, Migration and Adaptation*, Washington, DC: The German Marshall Fund of the United States
- Myers, N.** (2002) 'Environmental refugees: a growing phenomenon of the 21st century', *Philosophical Transactions of the Royal Society B* 357: 609–13
- Parry, M.L., O.F. Canziani, J.P. Palutikof, P.J. van der Linden, and C.E. Hanson (eds)** (2007) 'Climate Change 2007: Impacts, Adaptation and Vulnerability', contribution of Working Group II to the Fourth Assessment Report of the IPCC, Cambridge, UK: Cambridge University Press, http://www.ipcc.ch/publications_and_data/ar4/wg2/en/contents.html (last accessed 15 June 2009)
- Reuveny, R.** (2005) 'Environmental Change, Migration and Conflict: Theoretical Analysis and Empirical Explorations', <http://www.gechs.org/downloads/holmen/Reuveny.pdf> (last accessed 23 June 2010)
- Stern, N.** (2007) *The Economics of Climate Change: The Stern Review*, Cambridge, UK: Cambridge University Press

- Tacoli, C.** (2009) 'Crisis or Adaptation? Migration and Climate Change in a Context of High Mobility', International Institute for Environment and Development <http://www.unfpa.org/webdav/site/global/users/schensul/public/CCPD/papers/Tacoli%20Paper.pdf> (last accessed 24 July 2010)
- UN-OHRLS** (2010) 'Least Developed Countries: Country Profiles', <http://www.unohrlls.org/en/ldc/related/62/> (last accessed 9 December 2010)
- Warner, K., T. Afifi, O. Dun, M. Stal, S. Schmidl, and J. Bogardi** (2008) 'Human security, climate change and environmentally induced migration', In *Climate Change: Addressing the Impact on Human Security*, Policy papers. Athens, Greece: Hellenic Foundation for European and Foreign Policy (ELIAMEP) and Hellenic Ministry of Foreign Affairs
- World Bank** (2005) 'Bangladesh Coastal Embankment Rehabilitation Project: Project Performance Assessment Report', [http://lnweb90.worldbank.org/oed/oeddoclib.nsf/b57456d58aba40e585256ad400736404/d857403c4d25a50885257070007cc629/\\$FILE/ppar_31565.pdf](http://lnweb90.worldbank.org/oed/oeddoclib.nsf/b57456d58aba40e585256ad400736404/d857403c4d25a50885257070007cc629/$FILE/ppar_31565.pdf) (last accessed 18 June 2009)