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Climate-related displacement and human security in South Asia

A review of the social science research

Susan Chaplin

La Trobe University
Institute for Human Security

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Institute for Human Security
La Trobe University
Victoria, 3086
Australia

T: +61 (0)3 9479 4702
F: +61 (0)3 9479 1997
E: t.lee@latrobe.edu.au

www.latrobe.edu.au/humansecurity

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CLIMATE-RELATED DISPLACEMENT AND HUMAN SECURITY IN SOUTH ASIA

A REVIEW OF THE SOCIAL SCIENCE RESEARCH

Susan Chaplin

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Introduction

Climate-related displacement is one of the key challenges facing South Asia in the coming decades. Although there is considerable debate about the salience of the term 'climate refugees' and extent to which climate change is a primary cause of forced displacement, there is no doubt that large numbers of people are already having to cope with the impact of environmental changes on their livelihoods and everyday life. The impact of climate change on the populations of South Asia is particularly worrying given that this region has high levels of poverty and large and extremely dense populations living in fragile environments. There are estimates that if global temperatures rise 4–5 degrees over the century, up to one hundred and twenty-five million people will be displaced in the South Asia region. This would bring about incremental and localised changes in sea levels which would be the greatest driver of forced displacement and migration. In South Asia there are at least forty-seven million people living in highly vulnerable Low Elevation Coastal Zones[1] in Bangladesh, India and Pakistan. These zones include one of the most populous delta regions of the world—and megacities such as Mumbai, Kolkata, Dhaka and Chennai—where some areas are only 2–10 metres above the current sea level (Rajan 2008).

As flooding and drought increase in frequency, this will have devastating impacts on livelihoods, and slow economic growth within the countries of South Asia, thereby increasing the number of people living in poverty and the number of triggers for displacement and forced migration. Small farmers living in the coastal zone are particularly vulnerable to storm surges, salt water ingress, and flooding which damages crops and creates conditions for seasonal attacks by insects and rats. Rural wage labourers are even more vulnerable to climate changes as their opportunities for employment will be reduced and as they will have fewer assets to sustain their households during times of disasters. In urban areas, poor households are particularly vulnerable as their members are forced to live in 'high risk areas' due to a lack of affordable housing and to a lack resources needed for adaptation to changing climatic conditions. Effective responses to climate-related displacement need to be informed by a robust research base, with a strong and dynamic social science approach bringing together local, regional and international knowledge and experience. This paper reviews the key issues facing South Asia in relation to climate-related displacement and identifies the gaps in social science research in relation to responses to these key issues. The aim is to contribute to building the capacity of social science research to

[1] Areas that are less than ten metres above average sea level.

contribute to timely and effective responses to displacement and climate-related events.

The first part of this paper provides an overview of the predicted 'hot spots' and key issues, along with a brief discussion of the climate-induced displacement terminology. The second part examines the relevant existing social science literature on environmental degradation, natural disasters and displacement, and on what triggers migration as an adaptation strategy for individuals, households and communities. The third part highlights the gaps in social science research and provides a focus for the research that will be needed if we are to build up a comprehensive understanding of which populations may be displaced due to the impact of climatic changes.

One way to begin to frame the contributions of social science research to the study of climate change and displacement is to explore the issues in terms of a human security approach. Within this context, social science research would aim to increase our understanding of which individuals, households, communities and populations, in both rural and urban areas, are most vulnerable to the predicted increased frequency of natural disasters and longer term environmental degradation caused by climatic changes. There is also a need to understand *why* these individuals, households, communities and populations are vulnerable to such climatic changes. These questions necessitate a holistic and multidisciplinary approach which includes broader issues such as urban and national governance, the lack of social and economic development in rural areas, urban and rural poverty, the lack of basic infrastructures, and the impact of globalisation on agricultural productivity. In such contexts, climate change can be understood as a 'threat multiplier that exacerbates these underlying structural factors of vulnerability' (International Organization for Migration [IOM] 2009: 21). Without such a human security focus, it is possible that such vulnerable communities and populations will actually be plunged into increased poverty by ill-conceived adaptation strategies and by inappropriate social protection schemes developed by governments and international development organisations as they respond to climate changes. A human security approach also highlights the importance of local knowledge and participatory, community-based approaches and of partnerships for socially relevant research.

Despite substantive economic development in India and rapid improvements in human development indictors in Bangladesh since the early 1990s, rural and urban poverty continues to be a major barrier to human development across South Asia. India still accounts for a third of all the people in the world living in poverty. Of key importance, is a knowledge base that can assist households and communities to develop their own strategies to adapt to the impacts of climatic changes. This means that adequate attention must be given to livelihoods and social infrastructure if

resettled communities are to develop resilience to cope with future environmental changes. We know that vulnerable households living in risky and changing environments adopt an array of coping strategies to protect their livelihoods; these include distress migration, intensification of existing activities and diversification into new ones, the use of social relationships and informal credit networks (with households drawing upon their sometimes very limited assets and adjusting their food consumption patterns) (Mishra 2007).

Predicted hot spots and key challenges

Across South Asia there are various 'hot spots' where it is predicted that climatic changes will have a very large impact. As detailed in Table 1, these 'hot spots' are: the Eastern Ganges Basin; the major river deltas (i.e. the Ganges-Brahmaputra, the Indus and the Kaveri); the arid zones in Afghanistan, Pakistan and Western India; the Deccan Plateau; the middle hills of the Himalaya and the High Himalayan regions; and coastal areas affected by salinity, extreme storms and sea-level rise. Across the Ganges basin, the specific vulnerabilities to which climate change contributes are droughts, floods, super cyclones and other storms, and sea-level rise. The entire basin is heavily dependent on the monsoonal system. In the upper reaches, the Himalayan glaciers, which provide the winter flows, are experiencing changes in melting rates and density (Institute for Social and Environmental Transition [hereafter ISET] 2008).

Bangladesh will be one of the most severely affected countries because nearly eighty percent of its total land area is prone to flooding. Every year approximately twenty to twenty-five per cent of the country is inundated by floods from rivers, heavy monsoonal rainfall and storm surges, worsened by poor drainage and haphazard development in urban areas. But with increasing frequency, floods are inundating much larger areas. For example, in 1998, about 80 per cent of Bangladesh was flooded for between a few days and several months. This caused more than a 1,000 deaths, damaged more than half a million homes and affected an estimated 30 million people (Shah 1999). In India, monsoonal floods frequently inundate states such as Bihar. This was the case in 2008 when the Kosi River changed its course, affecting 4.7 million people. Cyclones coming up the Bay of Bengal have affected many coastal regions, including the megacities of Dhaka and Calcutta. In July 2005, floods brought Mumbai to a standstill for 48 hours, following a day of record rainfall.

In Bangladesh, the environmental problems that can trigger displacement are different in the northern and southern areas of the country. In the north, heavy monsoonal rainfall often leads to floods that destroy crops and household assets and cause a continual shifting of upstream river channels. This creates riverbank erosion which displaces an estimated five hundred thousand to one million people a year

(many of whom live on the *chars*[2]). It is a major reason for the increasing impoverishment and marginalisation of rural households and communities. This riverbank erosion is exacerbated by the intensity of floods created by melt water from glaciers, which are expected to increase as the global temperature rises. During the dry season these same populations face water and food insecurity (Poncelet 2009).

In the south, displacement is caused by cyclones and tidal surges, sea-level rise and salinity. In November 2007, Cyclone Sidr (a super cyclone with wind speeds of 220 km per hour and the worst since 1991) affected the livelihoods of seven million people, killed 3,000 and injured more than fifty thousand. At particular risk from sea-level rise are the people living on the islands of the Sunderbans in the Bay of Bengal. The decrease in flow of the Ganges River due to the construction of the Farakka Barrage in West Bengal (India) now means that seawater pushes up the delta, creating heavy inland flooding during tidal surges. This has destroyed rice fields and thus forced people to find alternate jobs in Bangladesh. While some employment has been created by the cultivation of shrimp, they are too expensive for local consumption and this has meant that rice must now be imported. This further marginalises the poor, and, with the decrease in employment, forces many men to migrate, leaving behind women, children and the elderly (Poncelet 2009).

Potentially the most significant climate change risk for India comes from increases in the severity, the frequency and geographical spread of drought as a result of monsoonal variability (late arrival or early departure of the rains). At particular risk are the semi-arid areas of western India and the Deccan plateau where cycles of seasonal and distress migration, combined with increasing debt, have already contributed to the suicides of many farmers (Sainath 1996; Revi 2008). A similar scenario is being painted for western Pakistan, while deforestation is already forcing local displacement in Nepal's Chitwan Valley.

Climate-related displacement/forced migration: the terminology

While debates over the term 'environmental refugee', over the links between environmental degradation and forced migration, and over the numbers that are likely to be displaced continues (see, for example, Castells 2002; Piguet, 2008; Morrissey 2009), there is nevertheless general agreement on how environmentally-forced migration may be defined and that it is caused by a range of climate-related changes. Renaud, et al. (2007) propose that there are three categories of climate-related

[2] The *chars* are riverine islands that during almost annual flooding are formed and re-formed by silt deposition.

displacement: environmentally- motivated migrants, who temporarily or permanently leave an environmentally deteriorating situation to avoid the worst; environmentally-forced migrants, who are forced to leave (often permanently) but who still have a choice regarding when they leave; and environmental refugees who must flee immediately (e.g. because of floods, droughts, or sea-level rise), regardless of whether they cross a border. The IOM finds that '[e]nvironmental migrants are persons or groups of persons who, predominantly for reasons of sudden or progressive changes in the environment that adversely affect their lives or living conditions, are obliged to leave their homes or choose to do so, either temporarily or permanently, and who move either within their country or abroad' (IOM 2009: 23).

There are two types of climate-related change which impact on livelihoods and force people to migrate: acute onset (or periodic) environmental degradation, and slow onset environmental degradation. Acute onset or periodic environmental degradation includes extreme weather conditions such as cyclones, flooding and storm surges which have different impacts on livelihoods and which are perhaps easier to document and analyse now. There is already some evidence globally, and from Bangladesh in particular, of increases in extreme weather conditions and in the frequency of natural disasters which are affecting larger numbers of people and with greater severity. Slow onset environmental degradation includes such phenomena as sea-level rise, water and natural resource depletion, declining fisheries, deforestation and the negative effects of rising temperatures upon human health. But it is exceedingly difficult to predict the types of displacement because such environmental degradation takes place over long time and is caused by multiple factors (Boano, et al. 2008).

What do we know about climate-induced displacement in South Asia?

As Bangladesh is one of the regions in the world most vulnerable to natural disasters and extreme weather events, there is already a substantial literature on environmental degradation and displacement. The increasing frequency and magnitude of cyclones, floods, rising sea levels, drought and riverbank erosion has had a direct impact on social and economic development. The areas of the country which are most vulnerable are also the poorest. This has created increasing inequality and directly contributed to the weak development of the agriculture sector and to a recurring threat to food security. Indeed, there has been a food crisis in seven of the last eleven years. When combined with the fact that nearly half of the rural population is landless, environmental degradation has become one of the drivers of increased rural-urban migration and unemployment. Rural-urban migration to the two biggest cities, Dhaka

and Chittagong, accounts for two-thirds of Bangladesh's annual urban growth (Sharma and Hugo 2009; Herrmann and Svarin 2009).

As the decision to migrate or to adapt to changing environmental conditions will usually be made at the individual or household level, what understandings can be obtained from an analysis of existing studies of circular, short and long-term internal migration in South Asian countries? Who is likely to become a climate-induced displaced person in the near future? Will entire communities be forced to migrate? What we do know is that '[c]limate change tends to exacerbate difference among various groups, in terms of vulnerability and ability to cope with the effects' (UNFPA 2009: 35). In South Asia these vulnerable and marginalised groups include the urban and landless rural poor, tribal populations, women and children, the elderly and disabled.

Studies of natural disasters such as floods, riverbank erosions and cyclones in South Asia show that when the most vulnerable populations suffer temporary displacement from acute or periodic environmental degradation they usually return to re-establish their homes and livelihoods. This means that it will be slow onset environmental changes such as sea-level rise, salt water incursion and the increasing severity of droughts and water scarcity that will trigger larger-scale displacement and permanent migration. But the decision to migrate, as a strategy to cope with environmental changes, may not be open to very vulnerable individuals, households and communities. The act of migration 'depends not only on resources and information, but also on other social and personal factors, such as physical condition and precise adaptive capacity. The most vulnerable are most often those who cannot move; they are the ones who die when famine strikes as they have nowhere to go' (IOM 2009: 20).

There are numerous studies on circular or 'distress' migration[3] and its role as a coping strategy for the rural poor in India. This includes research which has focused on the diversification of livelihoods by families of landless agricultural labourers which have shown that the remittances from family members, particularly men, are a significant component of household coping strategies. These studies, though, rarely analyse what triggers decisions by vulnerable households about moving or staying to re-establish livelihoods. What are the trigger points for whole households to move to urban areas, either temporarily, step-by-step or permanently?

[3] Circular migration is defined as a temporary move from a person's normal place of residence for the purpose of finding work, and then a return. While circular migration is largely seasonal and often to the same place (particularly for landless labourers), it can also be a response to drought and flood when livelihoods are lost.

There is almost a total lack of social science research focusing on human-environment interactions in Pakistan (Khan, et al. 2007), Nepal and Bhutan. For Sri Lanka, there is important social science research on the impact of the 2004 Tsunami which has great relevance for the future development of effective rehabilitation and resettlement policies.

Lack of a gender perspective in disaster research

While disaster research has provided us with the concepts of risk and vulnerability which 'frame how social systems generate the conditions that place different kinds of people, often differentiated along axes of class, race, ethnic, gender, or age, at different levels of risk from the same hazard and suffering from the same event' (Oliver-Smith 2009: 18), so far much of this research in South Asia has lacked a gender perspective. Instead, disaster studies have tended to focus on infrastructure issues (embankments), disaster management policies and the performance of governments in relief and rehabilitation/resettlement of displaced populations. We know that '[w]omen die in greater numbers in disasters than men, and they tend to die at younger ages, but there is a lack of reliable data to document these phenomena, largely because there has so far been little focus by the international community on the gender impact of natural disasters' (UNFPA 2009: 45). It is also rare for the needs and priorities of women and children, be they temporary or permanently displaced, to be considered in the construction of relief and resettlement accommodation (Satterthwaite, et al. 2007; Tierney 2007).

The lack of a gender perspective was apparent in the relief and rehabilitation response to the December 2004 Tsunami that hit Sri Lanka. A small qualitative study by Divakalala (2007) found that women died because they could not swim or climb a tree or were so ashamed when their clothes were torn from their bodies by the waves. The Tsunami also left a legacy of many widowers having to look after their children. Women in shelters faced sexual harassment, particularly as there were no covered bathing areas. In the resettlement phase most of the livelihood restoration programs focused on activities done by men.

In the Bangladesh flood of 1991, the death rate was five times higher for women than men. Whilst warning information had been transmitted, it was between men in public spaces and was rarely communicated to the rest of the family. As many women are not permitted to leave their homes unless in the company of a male relative, they, and their children, perished while waiting to be taken to safety. In addition, most Bengali women have never learnt to swim, which further reduces their chances of survival in floods. Those women and children that survive flooding are often forced to spend days in unsafe conditions, such as on embankments exposed to the elements, because

shelter is inaccessible or too distant. Young and adolescent girls are often sexually harassed, while in storm conditions elderly and pregnant women faced great difficulty walking along muddy roads and slippery embankments (Ikeda 1995; Climate Change Cell 2008).

A recent study on gender and climate change in Bangladesh has noted that '[r]elatively few efforts have been made to understand the social, cultural, organizational and institutional factors which lead to the differential vulnerability of certain groups of people, including women, to adverse impacts of climate change' (Centre for Global Change 2008: 65). But when women are included, as at Cox's Bazaar in Bangladesh—where a concerted effort has been made to include them in the process of disaster preparedness and in the work of development organisations that are focusing on education, microenterprises and reproductive health—the outcome has been significant. There has been a very large reduction in the number of women who have been killed, displaced or otherwise affected by tropical cyclones (UNDP 2009).

Distress migration: a coping strategy for vulnerable populations

Seasonal or circular migration by landless labourers is not a new phenomenon in South Asia. During the late colonial period circulation had already become a necessity coping strategy for many small landholders and landless workers in India (Breman 1996). Such mobility expanded rapidly after Independence (along with the building industry in urban areas) and it includes the movement of people over short and long distances, both intra and inter-state. In a study of migration in India, Deshingkar and Akter (2009) argue that while the official estimates of temporary migration are 10 million, a figure of 100 million may be more realistic, with rural to rural migration still the dominant type at around 53 million. But there are significant shortcomings in official data such as the Census and the National Sample Surveys, as they have a tendency to underestimate or completely miss seasonal or circular migration.

While such seasonal or circular migration is not strictly forced, people can be still effectively be compelled by deterioration in their economic circumstances (due to the environmental impacts of floods, droughts and food and water scarcity) to undertake such journeys; doing so as a livelihood strategy to reduce the insecurities their households face. But such migration by the rural poor may only be 'helping these households to maintain their standard of living rather than [to] … [break] away from poverty' (Deshingkar and Akter 2009: 44). This has significant implications for attempts to develop adaptation strategies to climate change for such vulnerable populations.

As a large part of India is located within the semi-arid tropics, erratic variability in monsoonal rainfall often leads to drought in states such as Rajasthan, Madhya Pradesh, Bihar, Orissa and Andhra Pradesh, which also have some of the most economically disadvantaged regions in the country. This has resulted in particular regions within these states becoming well known as sources of migrants. For example, the poor and very drought-prone Mahbubnagar district in the Telegana region of Andhra Pradesh is well known as a source of construction workers. Orissa is another major source of migrants because 'multiple social, political and economic disadvantage and natural disasters leave the poor with few options for making a living' (Deshingkar and Akter 2009: 11). People from Eastern Orissa predominantly migrate to Surat to work in the diamond and textile industries, while those from Western Orissa go to the brick kilns in Andhra Pradesh. Orissa is also very prone to droughts and cyclones. The super cyclone in October 1999 killed approximately ten thousand people, made 1.67 million people homeless and affected another 18.3 million people. In 2001, an estimated 60,000 people migrated out of the very poor Bolangir district due to drought (Bhatt 2009). Bihar, in eastern India, which is flood-prone, and yet also often suffers from drought and subsequent food scarcity, has a long history of seasonal migration (de Haan 2002).

An examination of seasonal migration by landless households from Murshidabad district in West Bengal found that 'growing inequality, in the distribution of landholdings, demographic pressure, rapid ecological change, and the gendered ideologies of paid work mitigating against women earning a wage, combine to make seasonal migration more vital in bridging the consumption gaps between periods of work' (Rogaly and Rafique 2003: 680). In Western India, every year half the adult population from the Bhil (tribal) villages are forced to migrate to nearby towns (for up to six months) because of the lack of employment opportunities for forest, railways, or agricultural labour due to poor economic and social development and drought. There are two aspects of this migration. For the relatively better off households with some assets and food security, migration by young men is opportunistic. But in the case of the poor, entire households migrate for long periods as a survival strategy; but this often 'not only perpetuates debt and dependence, but exposes the poorest to extreme hardship and cruel exploitation' (Mosse, et al. 2005: 3036).

A study undertaken in the Western Chitwan Valley of South-Central Nepal also supports the argument that poor and vulnerable populations use short-distance, circular or temporary migration as a coping strategy rather than long-distance, permanent rural-urban migration. Using data gathered as part of the Chitwan Valley Family Study in 1996, and their own land use and demographic events surveys in 1997, Massey, et al. (2007: 15) found that as 'environmental conditions deteriorate, people indeed leave their immediate confines in search of opportunity, but mostly

they stay within the region'. They also found no evidence to link demographic pressure with decisions to move. Rather, it was the decline in agricultural productivity, reduction of vegetation coverage and increases in time needed to gather firewood, that were mobility triggers for lower-caste Hindu and non-Hindu groups. But increases in time taken to gather fodder and firewood from local forests because of deforestation is also a significant factor forcing women to move within the Chitwan Valley (Hunter and David 2009).

For the poor, circular migration is not only an expensive undertaking (for example, transport costs) but it also causes a complete disruption of social networks, both for men who migrate alone or for entire families (Bhatt 2009). In India, migrants also face varying degrees of exclusion from government schemes because entitlement to services is based on residence. These migrants do not have a 'ration card' to access the subsidised food provided by the Public Distribution Scheme, which forces them to buy food and kerosene at market prices. They are also excluded from voting as they are often out of their constituencies when elections take place. Children of migrants (conservatively estimated to be six million) are also disadvantaged as they miss school, and infants are not included in immunisation drives (Smita 2008; Sainath 2004; Deshingkar and Akter 2009). Some families are on the move for perhaps nine months of the year and this means their children 'will end up becoming an army of hard-core illiterates' (Sainath 2003). These are all major factors contributing to the perpetuation of intergenerational poverty; which means that large numbers of people will continue to be forced to migrate (in both circular and long-term fashions) from environmentally-degraded regions in India's economically- disadvantaged states. Bhatt (2009: 169) argues that this will continue 'until the breach between different regions tapers down or until unsustainable environs in the sending area drive out populations altogether'.

Riverbank erosion, displacement and resettlement

Riverbank erosion in Bangladesh is caused by the continual shifting of channels of the major rivers Jamuna, Ganges and Meghna. In the northern areas, most people will have moved at some time due to the sudden loss of land, and to escape the conflict that results from repeated disappearances and re-emergence of untitled lands. Often, many poor *char* families cope by temporarily moving around the region in the hope that their lands will re-emerge from river beds. As landlessness can be as high as 70 per cent, many affected households suffer several displacements because they are forced to resettle in more disaster-prone areas (Poncelet 2009; RMMRU 2007). While such communities may have developed strategies to cope with the somewhat predictable seasonal floods, they have very few formal or informal mechanisms and resources to cope with the increasing frequency of riverbank erosion and massive

floods. The most vulnerable groups (households with few assets, adolescent unmarried girls, and elderly people lacking family support) are therefore caught in a process of increasing impoverishment (Shahabuddin and Ali 2006). As some of the case studies below show, displaced people initially try to resettle within their village, or neighbouring ones, perhaps opting to send men to find work in other areas. The most marginalised households often only have the option of taking shelter on nearby embankments. These households are frequently headed by women as the men have migrated permanently; a circumstance which can force young women into prostitution as their only alternative income-generating activity (Climate Change Cell [CCC] 2008).

Hutton and Haque (2004) examined the relationship between riverbank erosion displacement and gender, age and socio-economic status. The research was conducted in August and September 1998 in which 468 displaced households in the city of Serajganj and the rural sub-district of Shariakandi were surveyed. The displaced respondents only included those who had been forced to migrate within the previous five years. The majority of the respondents had suffered multiple displacements which increased their impoverishment and consequently limited their opportunities to build savings, to reduce debt and to improve work skills. There were also high levels of illiteracy. The survey found that whilst whole villages had been displaced, with a resulting loss of livelihoods, such en masse migration did enable households to maintain their community and social supports, thereby reducing social fragmentation in an urban environment. This is particularly significant for women and the elderly who are the most vulnerable and hence have a greater dependence on kinship ties for their survival. While this study showed that gender, age and education were not significant factors in the adaptation of these displaced communities to urban environments, 'the magnitude of poverty and marginalisation endured by displacees is such that it ameliorates whatever advantages that more "advantaged" displaces (namely younger, more-educated men) may bring to resettlement' (Hutton and Haque 2004: 57).

Another study (Abrar and Abzad 2004) found that the large majority of poor people who have been displaced by riverbank erosion have suffered from increased impoverishment. This has particularly applied to around twenty-five per cent of the women interviewed, who reported increased food insecurity, a lack of access to sanitation, health care facilities and drinking water, and increased psychological stresses from having to cope with providing a livelihood when husbands who migrated did not provide any remittances. But 50 per cent of respondent households did report that the impact of displacement could be greatly reduced when they had access to government programs, skill training and community participation.

In India, the Calcutta Research Group commissioned a study of displaced women in North Bengal which involved 7,700 families in three districts. This study found that women were doubly disadvantaged by such displacement. The first occurred because their specific needs were not considered in the relief camps or the rehabilitation programs. The second related to their need to obtain paid work outside their households because large numbers of men had lost their livelihoods and been forced to migrate. Because the women were disadvantage in work opportunities and paid much less for the same work than men, some were forced to find other activities so as to be able to feed their children. For example, many women living near the Bangladesh/India border had to engage in the 'illegal profession' of smuggling which meant they were often compelled to 'please' security guards. Other women became beggars. Some of the displaced families, who had lost their homes many times before, resettled temporarily on the *char* lands. But these were difficult living conditions for women as there were no civic facilities and only limited work opportunities (Bandyopadhyay, et al. 2006).

Floods, displacement and poverty

Are floods a trigger for displaced individuals and households to migrate as a strategy to replace the assets they have lost? We know that it is flash flooding rather than annual flooding that causes greater devastation for households and communities because of its unpredictability and the lack of warning of its occurrence. Houses are submerged, standing crops are severely damaged, fodder for livestock rots and tube-wells[4] are submerged (Climate Change Cell 2008). A study by Rayhan and Grote (2007) addressed these questions by interviewing 595 households in four districts in rural Bangladesh after a flood in 2005. They analysed the poverty and vulnerability of those households in the context of migration, finding that 89 per cent of all households had at least one member who had migrated from the village to a nearby city, six per cent had a member who migrated to another village and five per cent had a member who went to another country. Significantly, what this study showed was that the decision to migrate was affected by the costs of such migration. Those who migrated to urban areas came from second and third quartile income groups, while it was the poorest and most vulnerable households that chose temporary migration.

In September 2000, the 'millennium flood' in southern West Bengal damaged 4.9 million houses and affected 4.4 million people. While floods are an accepted part of the monsoon season, the 2000 flood lasted for three days. This meant that poor

[4] A tube-well is a type of water well in which a long 100–200 mm wide stainless steel tube or pipe is bored into the underground aquifer (the length required depends on the water table depth). An electric pump at the top lifts the water for irrigation.

households lost the opportunity of paid work harvesting crops, leaving many without food for three days. The outcome was that more people than usual migrated for manual work and this created an oversupply of agricultural labour at the usual places of seasonal migration. Thus the severity of this flood pushed people to migrate further to Kolkata which involved increased costs and risks (Rafique 2003).

Bihar, India

In August 2008, the Kosi River changed its course in the Ganges Basin, shifting 120 kilometres eastward and submerging 110,000 hectares of farmland. An estimated 3.5 million people were affected in India and 60,000 in Nepal. The floods were not the result of an extreme climatic event, but caused by a breach in the embankment which had probably outlived its effectiveness as it had not been modified to cope with the increased sediment fluxes in the Kosi River (Moench 2010). Such floods followed the 2007 floods which had been some of the worst in Bihar's contemporary history. A report by Jha and Raghavan (2008), compiled in the immediate aftermath of the floods, found evidence of widespread social exclusion in the provision of relief supplies and processes of evacuation. Such discrimination was found to be on the basis of caste, class, age and gender. Large numbers of men (leaving women and children behind) were being reported as migrating from the area to cities such as Patna, Delhi, Ludhiana and Amritsar because their livelihoods had been completely destroyed. Such findings are reinforced by a report by Dalit Watch (2008) which monitored 205 relief camps in Bihar. This report found systemic discrimination in relief camps against people from Dalit communities who comprised thirty to forty per cent of the displaced in some relief sites. This discrimination was evident not only in the late provision of food to Dalits, but in the poorer quality of that food. One interviewee observed that the 'food earned from begging would have a better quality' (Dalit Watch 2008: 14). Dalits were also served their food at separate locations. In addition, no consideration was given to the needs of especially disadvantaged people such as those with a disability, pregnant women or elderly people in the design of the facilities at the relief camps. Also, only 55 of the 204 sites monitored had provided toilets.

Nearly six months later, a small study of 200 households in 10 villages in the Kosi flood area found that some people from very poor households had been living in government-established relief camps for about three months. These households had suffered a substantial loss of income and did not receive any compensation from government-funded relief programs or other development schemes. Despite this lack of financial assistance, very little permanent migration was observed, even in four of the ten villages which had no land under cultivation. Instead, households had used their cash savings to survive with the result that 'long-term prospects for this area appear quite grim … Moreover, the state apparatus has done very little so far to help

with adaptation to this dramatically changed physical environment' (Somanathan and Somanathan 2009: 57).

Bangladesh floods

In a study of the coping strategies of households in two flood-prone villages in Bangladesh, Paul and Routray (2010) found that they fell into three distinct stages: preventive, adaptive and distress migration. The preventive strategies included measures to improve shelter; to save household items, livestock, poultry and fisheries; to protect crops; and to ensure access to drinking water, food and fuel. After the flood, the adaptive strategies were found to include people changing eating patterns, selling assets such as livestock and borrowing money. Income, education level, occupation, distance from a riverbank and the efficacy of the provision of external assistance were found to be major determinants of a household's capacity to cope with shock of flooding. But these indigenous coping strategies were only found to be effective in a normal flood. When there are flash floods and rapidly rising water, or at times of prolonged flooding, households cross a critical threshold which forces people to move to a safer place. The loss of shelter, household goods and livestock can then trigger distress migration for one or more household members.

Pakistan floods (2010)

In late July 2010, devastating monsoonal floods affected 20 million and submerged about a fifth of Pakistan's landmass. More than one thousand nine hundred people were killed, seven million people were displaced, 1.8 million homes were destroyed, 2.2 million hectares of farmland were swept away, and water, power and transportation infrastructure were destroyed in many areas. The floods were the outcome of a change in climate patterns which caused the monsoon rains to collide with a wave of low pressure carried by the jet stream. Usually this low pressure bypasses Pakistan, but a depression that year in the jet stream over western China pushed it south. Deforestation and poor flood control engineering also contributed to the devastation. Many people have now been twice displaced. In the north-west, they were initially displaced by conflict, while in the provinces of Punjab and Sindh people have been moved into camps and out of the schools and other government buildings in which they had initially sought refuge. The rehabilitation and resettlement process has in many areas been uncoordinated and under-resourced. Many returnees are living in or nearby what remains of their homes so that they can secure their property; but they lack ready access to water, sanitation and food. It is has been estimated that about thirty per cent of Sindh's poorest farmers could be forced to migrate to Karachi to try to find new livelihoods (Thomas and Rendón 2010; Walsh 2011).

Hazards and displacement in urban areas

Megacities such as Mumbai and Dhaka are highly vulnerable to the impacts of climate change as they are two of the most hazard-prone cities in the world. The forecast increased frequency and intensity of natural disasters has the potential through even a single catastrophe to undermine decades of economic and social development in such megacities. Their vulnerability to sea-level rise also poses a threat to development. Haphazard urban development, including buildings constructed over flood plains, and a lack of drainage, increases the severity of flooding. Such flooding frequently causes the temporary displacement of the inhabitants of low-income settlements and slums who live in 'at risk' areas such as floods plains, along the banks of rivers, in peripheral squatter settlements located in ravines or on unstable slopes in dense inner city slums.

The size and scale of megacities along with the speed of change in them (e.g. Greater Dhaka is one of the world's most rapidly growing cities, having expanded from 6.6 million people in 1990 to almost 13 million by 2010) and their complexity shapes their vulnerabilities to single-hazard events. Problems such as totally inadequate infrastructures (e.g. sanitation, water and health care), weak planning, overwhelming socioeconomic inequalities, the poor implementation of disaster mitigation strategies and climate-induced environmental change (such as rising sea levels), all threaten the wellbeing and livelihoods of the urban poor. This was dramatically illustrated on 25 July 2005 when Mumbai recorded India's highest rainfall in a single day This downpour caused breakdowns in the telecommunications, transportation, power and the financial services sectors (Stecko and Barber 2007). The poor bore the brunt of the flooding as they were living in such 'at risk' areas as the clogged, sewer-like Mithi Creek in central Mumbai.

The vulnerability of the urban poor may be further increased by the complexity of such megacities and the cascading effects of a natural disaster such as a flood or storm surge created by a cyclone (Hansjüurgens, et al. 2008). While forced displacement following floods is usually of a temporary nature, it can have a devastating impact on the livelihoods of the urban poor because the majority of them work in the informal sector and are often paid on a daily basis. Flooding means they cannot to get to their workplace. This increases the anxiety and financial distress they suffer when in relief centres, disaster shelters or staying with friends and family. Living in such hazard-prone localities in the central areas of cities is often preferred because the advantages of having greater accessibility to employment and urban services outweigh the risks for the urban poor (UNDP 2009).

There are very few social science studies which have analysed the impact of urban floods on slum dwellers and other poor communities in South Asia. Even Dhaka—which experienced major floods in 1954, 1955, 1970, 1974, 1980, 1987, 1988, 1998 and 2004, due to the overflowing of surrounding rivers—has only drawn the attention of a few social scientists. While there are many disaster studies that have focused on the responses of state and local governments in Bangladesh, very few have examined the vulnerability of the urban poor. One of these is an article by Rashid (2000) which examined how men and women from five slums coped with being displaced into temporary shelters by the 1998 Dhaka flood. There is also a small study by Chatterjee (2008), who examined the coping strategies of 50 households during Mumbai flood in July 2005. Likewise, for Pakistan there is only the research by Mustafa (2003 and 2005) on the July 2001 flood in Islamabad and Rawalpindi.

Dhaka: floods and coping strategies of the poor

In Dhaka, flooding often causes temporary displacement for the inhabitants of informal settlements and slums. While the embankments along the Balu, Turag and Buriganga rivers are usually high enough to protect large areas of the city from moderate flooding, the eastern side of the city, which lacks such embankments, is prone to inundations during the peak of the monsoon. As this rapidly growing city lacks adequate drainage, intense rainfall from storms can trigger flooding in low-lying areas. Such flooding is intensified because developers have built over the natural water retention ponds and depression areas. Floods in September 2004 affected more than two million people, the majority of whom were slum or shanty dwellers who sought shelter in the garages of some high-rise buildings (Centre for Global Change 2008) or with friends, family and neighbours.

In 1998, floods submerged two-thirds of Bangladesh. Lasting for more than sixty-five days, these floods displaced 33 million people and 1.1 million sought refuge in shelters and relief camps. In Dhaka, virtually everyone was affected by floodwaters and continuous rain which submerged roads, blocked drains and sewers, creating immense environmental problems. A qualitative study carried out in five slums during this flood provides an insight into how men and women coped with living in such conditions. The majority of families reluctantly moved to shelters such as schools, hospitals or relief camps despite fears of having their homes looted of valuable possessions. Women and children were the most vulnerable and had to cope with the lack of toilets and having to bathe in the public gaze. They were also drenched by the continuous rain when walking to get relief items and this made them feel 'inappropriately' covered. There was also great difficulty in obtaining safe drinking water. Being informal sector workers, many became unemployed for two to three months. The impact of lost income is often greatest for women, because many are self-employed food vendors who target rickshaw drivers in particular. The onset

of torrential downpours and temporary flooding means that city roads become un-passable (Climate Change Cell 2008).

One of the most significant impacts of such temporary displacement for slum dwellers is that their social networks are broken. This undermines a community's capacity to keep members informed about the distribution of relief goods and to provide support to each other (Rashid 2000). About a third of Dhaka's population live in slums and squatter settlements, and about fifty per cent of those households can be classified as 'hardcore poor', meaning that they have insufficient income to cover even their very basic needs. When there is serious flooding, displacement and unemployment can substantially increase their vulnerability to extreme impoverishment (Hossain 2007).

In some instances, the construction of flood embankments to reduce Dhaka's vulnerability to floods has created greater vulnerabilities for the urban poor because they have been evicted from their informal settlements by the construction process. Due to the centralised nature of decision-making in Bangladesh, the powers of local government and authorities have been weakened. This has meant that issues relating to housing, employment and welfare of the urban poor have been greatly neglected in national policies. This limits the impact of any local mobilisation by communities of the poor, which has been further diminished by a history of unmet expectations that has made them wary of NGOs (Banks 2008). One central government assumption that underpins this lack of an effective urban policy is that slum settlements are a transitory phenomenon and that their presence can be addressed by stemming rural-urban migration. Such assumptions have provided the basis for governments refusing to develop pro-poor programs that could provide basic services and improve environmental conditions. This has resulted in continuing structural inequalities leaving about seventy per cent of slum dwellers in Dhaka lacking access to adequate sanitation and without security of tenure (Rashid 2009).

Jabeen et al. (2010) have provided one of the few insights into the urban poor's adaptive capacities and coping strategies for disasters such as floods. They found that people sleep on their furniture when it has been placed above the flood level, they use portable cookers, participate in community initiatives to improve drainage around their homes and will share household services and food with neighbours who are unaffected by the floods. The main economic strategy is having some savings so that affected households can rebuild because there is often no government support to do so. Fifty per cent of the households surveyed used a community managed savings group for this purpose Whilst these finding are only based on a study of 30 households in Dhaka's largest slum Korail, they do highlight the 'double vulnerability' of poverty and the risks of climate change.

Mumbai floods (2005)

Analysis of the Mumbai floods in July 2005 has focused on the failure of degraded infrastructures and the poor performance of the Brihanmumbai Municipal Corporation. More than one million people were directly affected by the flood, and the lives of many millions more were disrupted as it took three days for the waters to subside. The epicentres of the flood were Colaba, the city's central business district, and the suburban areas surrounding the Mithi Creek in central Mumbai. In Colaba, the one hundred year old drainage system is cracked and frequently leaks into drinking water pipelines. Every monsoon season streets are closed due to the drains being flooded when heavy rains raise the sea water level which then mixes with street sewage. In Central Mumbai the open sewers leading to the Mithi Creek are usually blocked with garbage and plastic bags and this causes flooding even from 'normal' rainfall. The flow of water in the creek is further impeded by the informal settlements that have crowded onto the embankments (Stecko and Barber 2007).

For many people, the 'shock was not so much the ferocity of the worst rainstorm in the city's recorded history, but the breakdown of Mumbai's 150-year old institutions of civic management and governance and the apparent lack of an effective emergency response' (Revi 2005: 3912). Within three days, most of the city was creeping back to normal. But for ten days after the flood, 70 per cent of the area occupied by slum and pavement dwellers near the Mithi River remained waterlogged and without access to basic services and shelter (Stecko and Barber 2007).

Despite the poor bearing the greatest burden of the flooding, the only study which focused on their coping strategies is by Chatterjee (2008) who examined 50 households in two slums in L and P South wards. Slum dwellers sought refuge in suitable buildings or on higher ground. As the water rose so quickly, flooding their settlements, most families could not save documents, money or other assets. Christian families took shelter in religious centres, while Hindu and Muslim households relied on their social connections. Families from nearby areas in Maharashtra sought refuge with relatives, while people working in IT and service industries found shelter in formal places such as hotels. Of particular note, is the relatively limited role played by government in relief, resettlement and rehabilitation efforts—this was largely left to non-government organisations, private institutions and local people. Most families (80 per cent) also lacked access to information after the flood because it was largely broadcast on private TV channels to which people living in the poorest slums and areas had no access (Date 2005). In 56 per cent of the households surveyed there was an average loss of pay for two weeks for those with jobs. In 86 per cent of households there was at least one person who suffered from health problems after the floods (Chatterjee 2008).

People who had lived in these slums for 10–20 years coped best as they found refuge through their well established social networks. The most vulnerable were the older residents and new residents who were dependent on randomly available places for shelter. They tended to receive less relief and assistance from the various agencies (Chatterjee 2008). One of the saddest stories reported during the floods was of a widow from the Dalit quarter of Bharatnagar slum in Bandra East whose house literally melted away because it was made of thick cardboard which she had collected during her daily rounds as a rag-picker. She was invisible to government officials because her 'house' was not registered, she did not have a ration card and she was not on a voters list (Bavadam 2005).

This vulnerability of slum dwellers to disasters worsens the vulnerability of the city as a whole. Without governments actively working to provide suitable housing, flood-prone and other at risk areas will continue to be built upon by the poor. 'This enhances and accelerates the intensity of the negative impact of disasters on all Mumbaikers. The exclusion of slum dwellers inevitably contributes to the poor management of the city's infrastructure. When a disaster strikes, the city is unable to address existing vulnerabilities or prevent the burgeoning of new vulnerabilities' (Stecko and Barber 2007: 13). This marginalisation of slum dwellers from urban development processes also puts them at risk of further displacement and thereby only increases their vulnerability to future climatic changes and natural disasters.

Islamabad and Rawalpindi floods (2001)

In July 2001, a devastating flood occurred in Islamabad and Rawalpindi which affected more than four hundred thousand people living on the flood plain of the Lai Creek in largely illegal settlements. The flood was the result of two factors. The first was the unplanned and ad hoc urban growth of Islamabad which led to increased and more rapid runoff into the Lai Creek. The second was that the encroachments by lower income households and squatters on the floodplain in Rawalpindi had severely restricted the flow of the creek. In 2002 a survey of 158 households and businesses was conducted to get information on the damage caused by the flood, on the displacement and rehabilitation experience and their expectations for help from various institutions in future floods (Mustafa 2003).

The main findings relevant to this study were that 38 per cent of the respondents reported a loss of livelihood, 90 per cent suffered property damage and 33 per cent reported not getting any material relief or rehabilitation aid. Many women designated the provision of shelters as a high priority because their households could not afford to protect themselves against future floods. But such vulnerability to flood disasters is just another stressor for the urban poor as they cope with the impacts of environmental degradation, neo-liberal reforms, poor governance and increasing

population densities (Mustafa 2003). The subsequent compensation provided as part of the Lai Creek Improvement Works, which removed encroachments from the floodplain, failed to reach the poorest households. This was because the authorities ignored the land tenure situation. As most of these households were renting, some for more than 30 years, most of the compensation went to landlords instead of the poor tenants (Mustafa 2005).

Indian studies on drought and food scarcity

About sixty-eight per cent of India's agricultural production areas are highly prone to monsoon variability—late onset, early withdrawal and long breaks between rainfall activity. This has given India a long history of drought of diverse magnitudes and durations. Between 1871 and 2002 there were 22 major droughts which affected 1.06 billion people and killed an estimated 4.25 million; but significantly 10 of these drought years were between 1965 and 1987. Local and state level drought relief strategies have been characterised by a top-down approach that have focused on the immediate impacts. What is lacking is any focus in these strategies on what mechanisms communities can use to reduce their vulnerability to droughts over the longer term (Prabhakar and Shaw 2008).

In Rajasthan, migration by pastoral groups between ecological zones has a long tradition. Estimates have suggested that this involves 45 per cent of the sheep flock and 200,000 families annually (Bhatt 2009). During 2002–2003, a total of 32 districts in Rajasthan were severely affected by drought as they received less than 55 per cent of their average annual rainfall. This was the fifth year in succession of drought and it affected 40 million people, caused more than sixty per cent of wells operated by hand pumps to dry up or become unusable. The widespread crop failures created a scarcity of fodder and the loss 50 million livestock. Despite the implementation of a Food-for-Work Programme by the Indian Ministry for Rural Development, most of the male population in the Tonk district migrated to nearby towns in search of work as day labourers (Chatterjee et al 2005). Of those who remained in villages, it was the elderly women who bore the brunt of food shortages, while children were withdrawn from school since their labour was required to help the household cope (Sivakumar and Kerbart 2004).

A study of 955 women in Tamil Nadu who had migrated to Coimbatore/Tirupur (470 women) and Chennai (485 women) found that in 50 per cent of cases the reason for their migration was a lack of employment (90 per cent had been employed before migrating) as a result of drought which had been caused by very poor monsoonal rains. Two- thirds of these women had family members who had already migrated. The migration of unmarried girls is a recent trend and they tend to be unskilled and

poorly educated. Thirty-two per cent of the respondents had migrated four times before reaching their final destination (Sundari 2005).

In northern Orissa, members of the Oraon Tribe have long coped with crop failure and food scarcity caused by drought through circular migration to other parts of Orissa, or to other states. This circular migration is now being facilitated by the improvements that have taken place in roads and transport (Mishra 2007). In the Chhattapur district, in Madhya Pradesh, a combination of drought and subsequent crop failure, chronic unemployment and the failure to effectively implement the *Mahatma Gandhi National Rural Employment Guarantee Act* [2005][5] has seen perhaps one hundred and fifty thousand farmers migrate in one month. This translates to eight to ten thousand people leaving every day. But the nature of this circular migration is changing as people travel longer distances (such as to Delhi), thereby increasing the probability that such migration will become permanent (Singh 2009). But the danger for tribals and other poor communities is that when they are constantly forced to use such strategies to protect their livelihoods in a changing environment, they become survival strategies. This means they are gradually depleting their assets and savings and becoming increasingly impoverished (Mishra 2007).

Potential for climate-induced migration to cause conflict

Climate-induced migration has the potential to promote conflict in the areas into which people move. Such migrants can flood the labour market and increase local demands for food and other basic services. In the case of South Asia, the arrival of Bangladeshi environmental migrants in India during the 1970s and 1980s caused conflict in Assam.[6]. Within Bangladesh during the same period an estimated 600,000 people were forced to move to the Chittagong Hill Tracts region because of environmental degradation and loss of livelihoods due to floods, drought, water scarcity, erosion and desertification. This large scale movement of people caused ethnic conflict between the new arrivals and the minority resident tribal people who demanded regional autonomy so as to protect their livelihoods (Reuveny 2007). The construction of the Farakka Barrage on the Ganges River in India in 1975, to divert dry season flows to other rivers, is also an ongoing cause of tension and dispute. This

[5] This Act provides a legal guarantee for one hundred days of employment, in every financial year, to adult members of any rural household willing to unskilled manual work on public work-related projects at the statutory minimum wage of a little more than USD 2 a day. See http://nrega.nic.in/ NREGArpt_eng.pdf for more information.

[6] This has not been the case in West Bengal even though it has also received large numbers of Bangladeshi migrants (Swain 1996).

diversion of water led to significant environmental degradation of agricultural land in southwestern Bangladesh which has lead to the displacement of an estimated two million rural poor during the period 1981–1991. Many of these displaced rural poor have migrated illegally to India. In 1991, some one hundred and fifty thousand Bangladeshi were reported to be living in just one slum cluster in Delhi, and they gave land erosion, floods and poverty as the reasons for their move (Swain 1996).

Whilst it is difficult to forecast where conflict may occur in South Asia, it is possible that large-scale migration from Bangladesh to India could be such a catalyst given the somewhat strained relations between the two countries. This is highlighted by the fence that India has recently constructed along the border (Shamshad 2008). Within India, there have been violent incidents against Bihari migrants in Mumbai which have been instigated by right-wing political parties, along with infrequent calls to restrict migration to some cities and to deny other migrants access to basic urban services. Climatic changes could also exacerbate existing conflicts such as in North Eastern India and those involving Maoist/Naxalite extremists who are currently operating in 231 of the 626 districts in India and providing de facto government. The Naxalites obtain much of their support from tribal areas where the state and its agencies have largely failed to implement development programs, to reduce atrocities and to prevent displacement due to mining projects. Increases in the incidence of drought, water scarcity and forest degradation will possibly force larger numbers of poor tribals, who lack the assets to migrate, into joining such an insurgency as a survival strategy (Ramakrishnan 2009; Mahaprashasta 2009). The same scenario will mostly likely continue be played out in the western areas of Pakistan unless effective development and climate change adaptation strategies are implemented.

Aftermath of the Tsunami: rehabilitation and resettlement in Sri Lanka

The only social science research focusing on Sri Lanka relevant to this study of climate-related displacement is that which has examined the rehabilitation and resettlement of communities affected by the December 2004 Tsunami which displaced an estimated one million people. Studies by Ruwanpura (2009) and Hyndman (2008) have highlighted that it is particularly necessary to include a gender perspective and an understanding of the existing inequalities and ethnic tensions in the rehabilitation and resettlement processes otherwise they will be exacerbated. Many women were left without spouses or their extended families which meant they lost an array of social relations which would normally provide them with security and social respectability as widows and material supports for daily living (Hyndman 2008).

A failure to include a gender perspective in the re-housing programs by international development agencies and non-government organizations resulted in a lack awareness of Sri Lanka's property rights regime, which is based on bilateral and matrilineal inheritance patterns. The outcome has been that title deeds to new houses were often granted to men and this could 'create new tensions that may undermine long-term social stability because of the close relationship between everyday violence and inequitable property ownership' (Ruwanpura 2009: 450). This lack of awareness of local gender norms was also evident in the design of the resettlement homes which often did not take into consideration the practices of everyday life. Colombo based architects designed new homes for rural communities based on their ides of urban kitchens which are mostly used and run by domestic servants in middle and upper class households (Ruwanpura 2009). The Tsunami also displaced middle class Burgher and Sinhalese communities in Southern Sri Lanka, which was a new experience for them. The women in particular faced many difficulties and economic deprivations in coping with temporary displacement because they lacked middle-class connections which can facilitate arrangements for alternate accommodation. They found the shelters to be bleak and were similarly excluded from consultations about the resettlement process (Ruwanpura 2009).

Many people and communities in Sri Lanka have now suffered multiple displacements due to the civil war and the Tsunami. Large numbers of those displaced in the hardest-hit eastern districts of Batticaloa[7] and Ampara had previously been displaced (often repeatedly) by the civil war and forced to move to the coastal locations to escape the associated violence. After the Tsunami the decision by the government to establish buffer zones in January 2005 of 100 metres in the South and 200 metres in the East for public safety led to many of the people, who had began to res-establish their lives, being displaced again (Hyndman 2007).

Social science research agenda: the gaps in knowledge, methods and approaches

As the preceding survey of literature on climate-related displacement in South Asia has shown, there is an urgent need for social science research to be more empirically-grounded rather than focusing on studies of disasters. Such empirical research should be focused on the known 'hot spots' and problematic urban and rural locations, and include both specific episodic climatic events such as droughts, cyclones, storm surges and floods and longer term processes such as sea-level rise and other changing

[7] Batticaloa is a coastal town hosting fishing communities located in a severely depressed part of Sri Lanka.

environmental conditions (Boano, Zetter and Morris 2008:13). Therefore social science research needs to 'shift towards identifying the *sensitivity* of the driver of migration to climate change and variability … [and this will] provide a more robust way forward in terms of predicting future migration flows, although there remains an insufficient evidential base to make clear predictions at present' (Black, et al. 2008: 7).

At the heart of any responses to climate-induced displacement by governments and international development organisations will be the need to identify practical courses of action that will assist affected poor and vulnerable communities and populations in South Asia to adapt to new livelihoods. Based on current understandings of how the rural poor have coped with seasonal deprivations due to drought, floods and other natural disasters, it seems highly probable that migration will become a central strategy for adaptation. This migration will be varied: forced and voluntary, temporary or permanent, short or long distance, circular, within and across regions, from rural to urban and over borders. The climate-related displacement research agenda will therefore have to focus on improving our understandings of the reasons that contribute to such migration and on 'the new vulnerabilities migrants may face, particularly when they shift from rural land-based livelihoods to urban livelihoods' (ISET 2008: 66). This challenge of adaptation also confronts the urban poor who are particularly vulnerable to the impacts of climate change because they are forced to live in slums and in degraded housing that is highly susceptible to flooding, storm surges, landslides and rises in temperature.

One of the most useful recent studies, which focused on the key research areas and capacity-building programs that could support adaptation to climate change by poor and vulnerable populations in South Asia, is the report by the Institute for Social and Environmental Transition (ISET). This report, based on consultations across Asia and on a literature review, found that one of the major challenges facing the development of a research and capacity-building program to support adaptation processes is the current lack of a common understanding and language between the development, disaster risk reduction, humanitarian relief and climate change communities. Presently, the 'climate change community has little conceptual and research experience with the social, political and economic dynamics that contribute significantly to vulnerability and is even less well equipped to offer tangible adaptation strategies' (ISET 2008: 11) or to provide insights into the thresholds of climate stress that displace individuals, families and entire communities. There is also a need to understand 'how access to key infrastructures may enable the alleviation of relative poverty and increase the resilience to climate change of vulnerable populations, particularly women, the poor and socially marginalised groups' (ISET 2008: 30).

Another challenge for social science research is how to develop effective rehabilitation and resettlement programs and to implement them for those permanently displaced. Anthony Oliver-Smith (2008: 100) has suggested that '[i]f people are to be restored to resilient communities and sustainable livelihoods, and not simply [be] warehoused in permanent refugee camps, research must focus on improving our knowledge of the resettlement process as it interfaces with the cultural specificities of environmentally displaced peoples'. Such research needs to draw on work already undertaken in the fields of disaster, conflict and development-forced displacement. In particular, such research needs to be directed towards establishing the thresholds of environmental change which force individuals, families and entire communities to migrate. Such research could draw on methods such as 'ethnographic community research within a participatory action framework; formal and informal questionnaires, community mapping and long term participant-observation' (Oliver-Smith 2008: 103).

Understanding the survival strategies of vulnerable populations

Another area that urgently needs the attention of social scientists is where agricultural regions are being exposed to both globalisation and climate change. Such double exposure will 'likely pose simultaneous challenges to … areas where farmers are adapting to a variable and changing climate under conditions of economic stress' (O'Brien, et al. 2004: 309) in South Asia. Particularly affected will be those farming communities lacking access to irrigation. High priority should be given to research which helps to develop an understanding of how households, communities and governments have responded to rising sea levels by studying how socially diverse coastal communities have responded in the past (Perch-Nielsen and Battig 2008). This will be extremely relevant for vulnerable populations living in the coastal areas of Bangladesh, Gujarat, Orissa, and Tamil Nadu in which land erosion and salt water ingress is already a problem. Also needed, is research on the impacts of salt water ingress in tidal areas and storm surges on embankments in Bangladesh.

Living in illegal settlements and working in the informal sector has meant that the urban poor are not seen as being a critical part of a city's economy even though their work underpins the lifestyles of the middle and upper classes. Instead, authorities view them as holding back the development of the city. The result is that urban development policies often actually increase the vulnerability of the urban poor to disasters and to other environmental hazards (Satterthwaite, et al. 2007: 3). The urban poor 'spend most of their lives adapting to changing conditions – changing economic opportunities, changing political circumstances and changing risks to their homes' (Satterthwaite, et al. 2007: 47). But these strategies to cope with floods and other hazards often come into conflict with efforts by authorities to reduce risks. A recent study in Dhaka (Rashid, et al. 2007) found that an offer of flood-free land to

inhabitants of two squatter settlements was not enough incentive for people to resettle unless it had been accompanied by economic incentives such as employment. But some respondents were still inclined to stay because they would lose their social networks by relocating.

Another area of vulnerability for the urban poor is the possibility that governments may displace communities from areas designated to be at risk of sea- level rise, landslides and flooding without providing for their adequate resettlement. In such circumstances, slum communities not only lose their homes but their jobs as they cannot afford the subsequent cost of daily transport. Designating areas within a city 'at risk' also opens up the potential for developers to evict slum dwellers from valuable real estate.

Policy changes needed to support adaptation and resilience

Concepts and practices of resilience and adaptation challenge the deterministic notion of vulnerable groups being passive victims who are forced to migrate. If understandings of adaptation and resilience are to be developed as counterparts to increased vulnerability and forced migration, a wider and more interdisciplinary approach must be taken 'than much current impact-driven sectoral adaptation research and programs. It embraces components such as initial well-being, livelihood resilience, self-protection and social capital' (Boano, et al. 2008: 19). There is also a need for more comparative and cross-scale research at both the macro and micro levels that studies and analyses recent instances where environmental factors have played a key role in forced migration 'in order to develop a fuller understanding of the multi-dimensional interplay between environmental, political, social and economic factors and forced migration outcomes' (Boano, et al. 2008: 26). Such understanding will be crucial to the development of appropriate policies and organisational responsibilities.

Another major gap identified in this paper is that there is little understanding within development organisations at both the local and regional level about how different groups, particular poor and vulnerable populations, respond to natural disasters and other climatic changes. This means 'the impacts of climate risks on migration, the growth of small peri-urban towns and unplanned urbanisation need to be better understood. The economic, social and institutional divide between urban and rural is becoming blurred. This is fundamentally changing the exposure of populations and the livelihoods on which they depend to climate risks' (ISET 2008: 26).

In India there is a need for systematic and up-to-date data on distress and seasonal migration. Because of conceptual and empirical difficulties, The Census and the National Sample Survey do not capture the extent of such migration: the definitions of

migrants are not linked to employment and only give the main reason for migration (Smita 2008). These gaps in data, and the lack of adequate understandings about the scale of such migration and the impact it has on households and communities, has meant that the issue of circular migration, and the need for effective social protection programs to support such mobility, has not become part of the policy discourse in India. There is a similar need for reliable and verifiable data on migration and displacement in Bangladesh and more in-depth research in urban areas such as Dhaka and Chittagong to examine how these new migrants are integrated into slum populations and what policies are being developed by governments to help this process (Poncelet 2009).

But what is needed is a 'radical change in perceptions of migration and a better understanding of the role that local and national institutions need to play in making mobility be seen as part of the solution rather than the problem' (Tacoli 2009: 514). Government policy needs to shift from a focus on controlling distress migration to recognition that circular and temporary migration are livelihood strategies adopted by poor households and communities to cope with changing environments. Such migration should become a vital component in climate change adaptation strategies and in poverty reduction, as we know how important remittances are to households. This was shown in a study of six villages (1297 households) in Madhya Pradesh which found that 31.4 per cent of household income came from such migration in comparison with only 15.9 per cent from cultivation (Deshingkar, et al. 2008).

Natural disasters can actually represent an opportunity for planners, governments and researchers to understand how natural, socioeconomic and development activities have contributed to the impacts of floods, cyclones or droughts. This can be done by building up our understandings of the linkages between livelihood strategies and the environment which are exposed in the aftermath of floods or droughts. This will contribute to the development of disaster mitigation and livelihood adaptation strategies that would reduce levels of displacement, either temporary or permanent (Moench and Dixit 2007).

Currently the strategies and policies being developed and implemented to mitigate the impacts of climatic changes in South Asian countries often neglect the gender dimensions of displacement. The different experiences of men and women during natural disasters are 'another foundation [on which] to build empirical and theoretical knowledge about the gender-climate-migration nexus' (Hunter and David 2009: 14). Social science research has a critical role to play in enabling policy makers to understand the role of women in communities and their knowledge of ecosystems, as well as the strategies and skills they have developed to cope with natural disasters and water shortages. This would assist in the formal recognition of women's

experiences and facilitate their inclusion in mitigation, adaptation and relief efforts. Therefore, it is 'essential to mainstream considerations of gender, age and diversity into the analysis of climate-change consequences and to focus policy responses on these groups' (UNFPA 2009: 35) to prevent such vulnerable populations from becoming increasingly marginalised, impoverished and displaced.

Conclusion

This review of existing literature has highlighted the current lack of substantive and comprehensive social science research on climate/environmental degradation-induced displacement in South Asia. Therefore, I argue that there is an urgent need to develop a wide ranging knowledge base which can contribute to the development of effective policies at the local, regional and national levels in South Asia to mitigate the forced displacement of vulnerable and marginalised households, communities and populations, in both rural and urban areas. One way to do this is to take a human security approach to climate-induced displacement because it is 'closely linked to the development of human capabilities in the face of change and uncertainty. Individuals and communities faced with both rapid change and increasing uncertainty are challenged to respond in new ways that protect their social, environmental and human rights' (O'Brien, et al. 2008: 26). We know that climate change will exacerbate the differences between groups, communities and populations (such as rural and urban poor, women and children, the elderly and other marginalised groups) in relation to their vulnerability to such changes and with regard to their subsequent capacities to cope with the effects. To prevent such vulnerable populations from becoming increasingly marginalised, impoverished and displaced, it is essential that policy responses to the consequences of climate change are focused on these groups (UNFPA 2009).

Climate-induced displacement is already underway in the Sunderbans where rising sea-levels have already submerged several islands and forced people to move to other islands or to the mainland. Cyclone Aila, which devastated the Sunderbans in May 2009, showed that embankments were no match for such a natural disaster. Cultivable land was rendered saline on the islands most exposed to the Bay of Bengal. This created a famine-like situation as the price of food skyrocketed and left people waiting for work under the National Rural Employment Guarantee Scheme (Mukherji 2010) or being forced to migrate to Kolkata. In the Bangladesh area of the Sunderbans, some displaced farmers have tried to find jobs in the shrimp industry, while others have tried fishing and scouring the mangrove forests for honey and firewood. But this is the refuge of the Bengal tiger and pirates. Therefore the only option left for many is to move to Dhaka (Collectif Argos 2010: 53–66). But a lack of research means that we do not know the number of people involved, what factors triggered their final decision to

migrate, or how they are coping with a rapid change in their livelihoods and with adapting to urban living.

In Pakistan, the climate-affected monsoonal floods of July–August 2010 have created famine-like conditions for many of the displaced in Sindh, which, even before the floods, was one of the poorest regions in South Asia. Nearly twenty-five per cent of children under five are now malnourished and six per cent are underfed. Some villages are still under water six months after the floods, and will not be able to plant spring crops. In addition, some experts are warning that Pakistan may face a serious drought in 2012. If these risks are not addressed as part of the recovery process, they will have profound implications for further climate-related displacement and human security in Pakistan, as well as for political stability and long-term economic development (Walsh 2011 and Thomas and Rendón 2010).

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Table 1: Hot spots in South Asia and social science research*

Hot spot	Countries/regions	Climate change impacts	Issues and vulnerabilities	Research gaps
Eastern Ganges Basin	India, Nepal and Bangladesh, including Bihar, Uttar Pradesh (population: 440 million in India, 25 million in Nepal and 41 million in Bangladesh)	Glacial melt causing flash floods; increasing drought due to monsoon variability; river bank erosion; and lower groundwater, which could force millions to migrate to urban areas	One of the most politically and ecologically diverse and poorest regions in the world. The impacts of climate change on poverty in the Eastern Ganges [?] Basin will not be limited to the region alone but will threaten development, undermine poverty alleviation efforts and lower human security across South Asia	Limited to some studies in West Bengal Need to understand coping strategies so as to support changes in livelihoods
Major deltas of Ganges, Indus and Kaveri rivers	India, Bangladesh and 92% of Pakistan's urban population	High levels of physical exposure to extreme storms, flooding from upstream sources and inundation, salt water intrusion, degradation of wetlands	Large and particularly vulnerable populations in both rural and urban areas and human-induced exposure to hazards and maladapted land uses	Substantial research only in Bangladesh
Low elevation zones (less than 10 metres above current sea level)	Coastal areas of India, Bangladesh and Pakistan and large areas of Bangladesh	Sea-level rise, storm surges, salt water ingress, flooding and degradation of wetlands which could cause millions to migrate to inland cities such as Delhi, Ahmedabad, Bangalore, Pune and Hyderabad	Potentially affecting 130 million people, including 92 million urban residents. Megacities such as Mumbai, Calcutta, Dhaka and Karachi, which have large numbers of urban poor/slum dwellers, are highly vulnerable.	A few urban studies for Bangladesh and Mumbai
Semi-arid South West	Afghanistan, Sindh and Baluchistan in Pakistan,	Increased incidence of drought and water scarcity from monsoon	Livelihoods in this region depend on a combination of agriculture, non-farm activities, livestock and	Some work on Rajasthan drought and distress

Hot spot	Countries/regions	Climate change impacts	Issues and vulnerabilities	Research gaps
Asia zone	parts of western Indian states of Rajasthan and Gujarat	variability and its impact on 'chronic conflict' in Afghanistan and Pakistan.	animal husbandry, fisheries (in the coastal parts of Sindh and Baluchistan) and migration, both to urban areas and across national borders to Iran and Pakistan.	migration
Deccan Plateau	India –Madhya Pradesh, Karnataka, Orissa, Andhra Pradesh	Rain-fed agriculture is facing water scarcity and drought. The issue is the degree to which climate change is likely to compound existing patterns of vulnerability.	Lack of access to water harvesting and irrigation systems, alternative drought-resistant crops, or to social safety nets, has seen small and marginal farmers suffer from a double burden of increasing climate variability and negative impacts of globalisation. This has contributed to some farmers committing suicide and to the forced migration of others.	Most research done has focused on distress migration
			and	
Middle Hills of the Himalaya	Northern India, Nepal and Pakistan	Increases in rainfall variability and intensity could increase the number of floods and droughts and have major impacts on erosion and landslides.	Substantial populations whose agricultural livelihoods are potentially highly vulnerable to climate change in ways that are currently poorly understood. These populations are already very reliant on migration and remittances.	Virtually nothing
High Himalayan Region	Nepal, Bhutan	This hydrological system sustains the lives of the millions who live in the basin. Climate change will alter these dynamics and have major implications for vulnerable populations at a regional level	Populations in these regions are small and scattered. Snow and ice melt provide a critical source of base flow for the regional rivers	None; not even scientific data on glacier melt has been gathered

*Source: Institute for Social and Environmental Transition 2008 and Rajan 2008