

Impact of migration on urban destination areas in the context of climate change

This paper has been developed to stimulate discussion at the European Commission roundtable on the *Development Impacts of Forced Migration and Environmental Migration* on 04 and 05 September, 2012, on behalf of Foresight, UK Government Office for Science as a part of the programme of work following the publication of the *Migration and Global Environmental Change: Future Opportunities and Challenges* report published in October, 2011.

The authors of this paper are Helen Adams, Neil Adger, Stephen Bennett, Priya Deshingkar, Jon Sward and James Waters, with Helen Adams and Jon Sward presenting the key findings at Session 2 of the roundtable; *Environmentally-induced migration and development*.

This paper was commissioned by Foresight as a contribution to European Commission policy reflection on climate change and migration. It does not necessarily represent the views of the European Commission or HM Government.

Contents

I. EXECUTIVE SUMMARY	3
II. THE SCIENCE AND THE EVIDENCE	5
1) CONTEXT AND FUTURE TRENDS	5
1.1 <i>What are the links between climate change and migration?</i>	5
1.2 <i>Summary of Foresight's broad approach to the links between migration and climate change, and three key conclusions</i>	6
1.3 <i>Internal vs. international migration</i>	8
2) THE VULNERABILITY OF URBAN MIGRANT-RECEIVING AREAS TO CLIMATE CHANGE	9
2.1 <i>Opportunities and risks: the complex landscape of rural to urban migration</i>	9
2.2 <i>The impacts of climate change in urban areas of opportunity</i>	9
2.3 <i>Development challenges in areas with marginalised migrant populations</i>	10
2.4 <i>Vulnerability, exposure and adaptive capacity of migrants and urban areas</i>	11
III. THE NEED FOR POLICY CHANGE	19
A. CHANGE PERCEPTIONS OF RURAL-URBAN MIGRATION AND REFORM POLICIES TO MINIMISE COSTS AND RISKS OF MIGRATION; NEED FOR POLICY RECOGNITION OF THE ROLE OF URBANISATION IN POVERTY REDUCTION IN RURAL SOURCE LOCATIONS	19
B. SOCIAL PROTECTION AND MIGRANT SUPPORT – RECOGNISING MIGRANTS' SPECIFIC NEEDS IN THE CONTEXT OF ENVIRONMENTAL CHANGE	21
REFERENCES	23

Summary of key points

- This paper seeks to move away from debates on ‘environmentally induced migration’, and instead understands migration as a multi-causal phenomenon, with environmental change affecting key migration drivers (economic, social, political, environmental and demographic).
- In low income-countries, many people are moving *into* urban areas that are likely to experience significant climate stress in the coming decades, including sea-level rise, flooding and water stress.
- Migrants to urban areas may be highly exposed to the impacts of climate change as they often move to cheap and vacant land in environmentally marginal areas and live in poor quality, densely packed housing. However, migrant vulnerability profiles are heterogeneous and often differ from those of longer-term residents because of variation in adaptive capacities based on access to networks, services and demographic profiles.
- There is an urgent need for urban policy to plan for future scenarios characterised by continuing rural-urban migration, *and* increased environmental risks, as these dual processes could exacerbate cities’ current adaptation deficits.
- Despite largely negative policy discourses on rural-urban migration as well as the potential vulnerability of slums and informal settlements to climate change, there is emerging evidence that internal migration can play a key role in poverty reduction and that the economic dynamism of informal settlements offers employment opportunities for rural-urban migrants which in turn, can lead to poverty reduction.
- Policies are needed to address the significant risks and costs that threaten the potential benefits that rural-urban migration can have for poverty reduction and migrant households’ resilience and adaptive capacity.

I. EXECUTIVE SUMMARY

This paper analyses the impact that climate change may have on urban migrant receiving areas and their populations, and provides possible first steps in addressing the substantial policy challenges in this area. Rather than trying to draw a distinction between environmental and other migrants, it considers migration occurring for different, possibly overlapping reasons, within the wider context of global environmental change. This approach is consistent with the conceptual framework of the Foresight Report on Migration and Global Environmental Change (2011) which concluded that environmental change is likely to affect existing drivers of migration, possibly transforming current migrant flows or leading to new patterns of movement while also influencing a wide range of different types of human migration, ranging from ‘voluntary’ migration to displacement. The Foresight Report also highlighted less-discussed dimensions of the debate on migration and environmental change: it noted that in many cases, people in low income countries are moving into urban areas that will be characterised by a high degree of risk to environmental change in future decades; and it also hypothesised that poor people may be increasingly immobile in the face of future environmental change if they lack the financial or social capital to leave their place of residence, creating the risk of ‘trapped’ populations.

Environmental factors are clearly in some cases already contributing to wider patterns of rural-urban migration, but it is also the case that cities themselves are often vulnerable to environmental change and extreme weather. In countries undergoing demographic transition, individuals may migrate to access the informal labour markets of urban areas, for example, because of environmental degradation and a gradual erosion of land ownership and capital assets in rural areas. However, cities are often located in environmentally risky locations, for example, on coasts liable to coastal flooding or in dry land areas dependent on remote sources of water. By virtue of their size, cities expose large populations to those risks. Climate change and variability is experienced in cities through extreme weather events such as coastal and riverine flooding, as well as gradual changes such as shortages of water due to glacial retreat and decreases in precipitation. High rates of population growth and in-migration mean that the cities experiencing these impacts are already overstretched and are in many cases unable to provide infrastructure and services for existing populations.

In this context, migrant vulnerability is a function of exposure to hazard and adaptive capacity as well as the degree of policy support to mitigate risk. Migrants to cities are likely to experience higher exposure to the impacts of climate change. Lack of financial capital leads migrants to cluster where there is low-cost and vacant land or in informal settlements, usually in areas of environmental risk with low provision of services, for example in urban flood plains and hillsides. Densely packed, poor quality housing further exacerbates migrant exposure. Migrants often have different profiles for adaptive capacity. While more exposed to hazard, migrants are not necessarily more vulnerable than the resident population; their adaptive capacity exhibits various offsetting characteristics. Migrants are self-selecting, so they often represent the healthiest, most adaptable portion of the population. They may also have strong social networks that originally brought them to and helped them acclimatise in the urban setting that they can utilise in times of stress. Links maintained to areas of origin also provide financial and emotional support.

The social and policy environment largely determine the adaptive capacity of migrants, which is likely to differ from longer-term residents. In some respects new migrants to urban areas can face a particular set of challenges when they move to a new location that can reduce their adaptive capacity; they are more likely to experience discrimination and violence, and tend to have lower access to services, less political representation and insecure land tenure. Migrants may also show a lack of climate-specific adaptive capacity, for example if they are unaware of local norms of cooperation in their host settlement and the most effective responses to climate hazards. Migrants are a heterogeneous group and some may be less able to adapt than others due to a range of factors. For example, young people are often more vulnerable to exploitation, women may suffer from lack of access to reproductive and maternal health services and migrants who are unable to be officially registered cannot gain access to services.

Urban migrant populations therefore have the potential to be disproportionately exposed to environmental hazards, although this can be offset by the dynamism of slums and local forms of resilience. For example, migrant populations may in some cases find it difficult to adapt *in situ* or liquidate assets to migrate away from climate risk. Populations unable to use migration as a coping strategy may end up displaced as a matter of emergency. Others, having migrated, may be unable to return home. However, despite these significant challenges the populations of informal settlements can show dynamism, resilience and a high ability to self-organise. Commercial interests are beginning to acknowledge this and provide services specifically adapted to the needs of these populations. Furthermore, migration to urban areas is traditionally an important strategy for rural populations to cope with seasonality of income and climate variability. Migration has demonstrated benefits from poverty reduction for both the migrant and the household receiving the money he or she remits.

A key policy requirement is to plan for continuing rural-urban migration in the context of environmental change. A necessary condition for such policy reform is a more balanced understanding of the causes and impacts of rural-urban migration and the role that it can play in poverty reduction. At present, policy positions on rural-urban migration remain predominantly negative. Policies are needed to address the significant risks and costs that threaten the potential benefits that rural-urban migration can have for poverty reduction and migrant households' resilience and adaptive capacity. In particular, action is urgently needed to address the social protection needs of urban migrants who are often unable to access pro-poor programmes, because they are not officially recognised as residents in their host city or town (although this is also a salient issue in urban areas where official recognition systems do not exist). Urgent steps also need to be taken to map vulnerability to climate change in slums and provide social protection to the urban populations most at risk. In addition, remittance services that are safe, efficient and affordable would allow migrants to maximise the benefits of migration. In this vein, there is an important role for civil society organisations to play in addressing gaps in social protection encountered by urban migrants.

II. THE SCIENCE AND THE EVIDENCE

I) Context and future trends

I.1 What are the links between climate change and migration?

Since the 1970s there has been an increasing interest from academics, policy-makers and commentators in the links between climate change and human migration. More often than not this has been an endeavour to understand the one-way causal impact of a changing climate on predominantly international migration or refugee flows. Reports by the Worldwatch Institute (Brown 1976) and UN Environment Programme (El-Hinnawi 1985) first gave prominence to the term ‘environmental refugee’, whilst the environmental scientist, Norman Myers, first tried to estimate those at risk of becoming environmental refugees by 2050 (Myers & Kent 1995). Recent years have seen, if anything, an increase in the references to environmental refugees (also broadened to consider migrants more generally), with prominent references to environmental/climate migrants found in The Stern Review (2007), Christian Aid (2007) and Friends of the Earth (2007).

However, the Foresight Report (2011) has raised serious methodological concerns with the very concept of trying to define and identify a group of ‘climate migrants’¹. Most significant is that migration is often a multi-causal and complex phenomenon, and it is scientifically unsound to ascribe causation to one particular driver. Figure 1 shows Foresight’s conceptual framework for how environmental change interacts with the five categories of drivers of migration: economic, social, political, demographic and environmental.

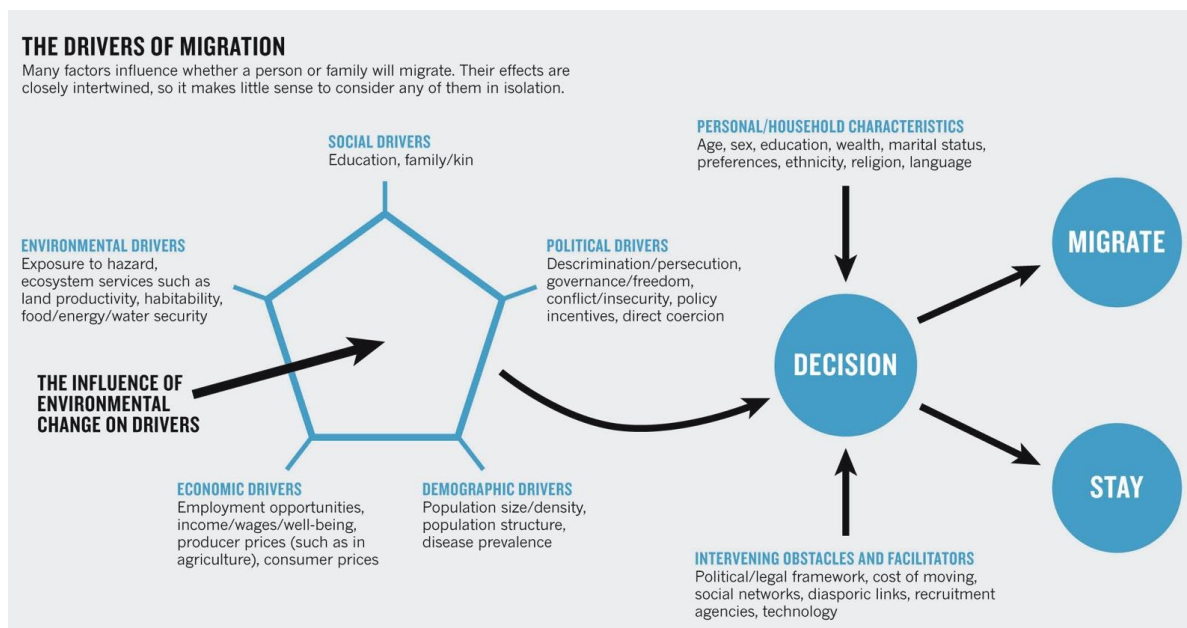


Figure 1: Foresight’s conceptual framework for how environmental change affects migration (Black et al. 2011a)

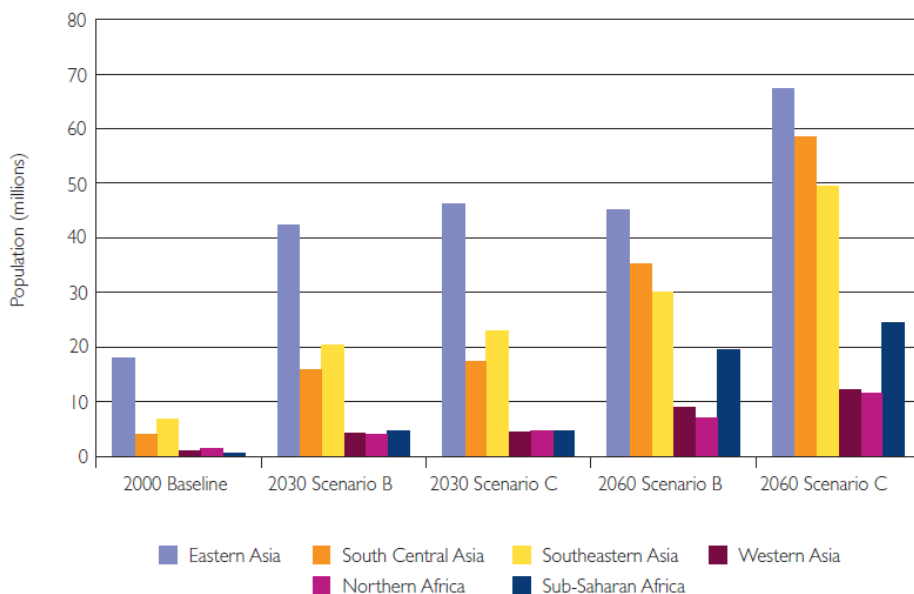
¹ The term ‘climate migrants’ will be used from now in this paper, but the insights are equally applicable to ‘environmental migrants’ or indeed ‘climate/environmental refugees’.

Millions of people are already migrating for a complex and intermingled set of reasons, whilst millions will also be thinking of migrating but are without the political, social or economic capital to do so. If climate or environmental change does affect migration, it will do so in the context of these many other existing factors. For example, reduced rainfall in a rural part of a country may mean that agriculture becomes less productive and there are fewer employment opportunities. But if migration occurs, is this migration purely environmentally stimulated, or also a result of structural features of the local economy? Furthermore an individual is more likely to migrate if they have social links in the destination area, for example a family member who can provide affordable accommodation, and indeed if they perceive there are economic opportunities to be had.

1.2 Summary of Foresight’s broad approach to the links between migration and climate change, and three key conclusions

Perhaps the most persuasive case for abandoning the search for ‘climate migrants’, and indeed the search for a definition of climate migrants, is that such an approach artificially limits the scope of scientific enquiry and policy response. Whilst the Foresight report argues that it is problematic to identify a group of ‘climate migrants’, it also highlights three key conclusions where migration takes place in the context of environmental/climate change.

The first is that rather than migrating away from deteriorating environments, millions are more likely to migrate *towards* areas which will become increasingly vulnerable to climate change. Work commissioned for the Foresight report shows that in one scenario of the future, approximately 190 million additional people will live in urban coastal floodplains in Africa and Asia by 2060, with the increase most extreme in Sub-Saharan Africa (from 0.7m in 2000 to 25m in 2060), and South Central Asia (4.1m in 2000 to 59m in 2060) (Vafeidis 2011, see Figure 2). The issue is not just limited to coastal areas, as dryland cities are also expected to increase in size. For example Mexico City is projected to grow by over five million people between 2010 and 2025 (UNDESA 2009) whilst becoming increasingly vulnerable to environmental changes such as desertification and water stress. The implications of these trends for migrants and the destination areas will be explored in this paper.



Explanatory note: Scenario B is lowest and Scenario C is highest, therefore representing the full range from these scenarios.

Figure 2: People living in urban coastal flood zones in 2060 (Vafeidis 2011, reproduced in Black et al. 2011a)

The second key conclusion from the Foresight report builds on an earlier point that the relationship between environmental change and migration is particularly complex because, whilst individuals may *want* to migrate, political, social and financial factors will also determine their *ability* to migrate, as shown on the right hand side of Figure 1 ('Personal/household characteristics' and 'Intervening obstacles and facilitators'). There is a considerable literature which argues that the ability to migrate is largely correlated to an individual's level of wealth, as defined by social assets (networks of friends and families in destination areas), political assets (for example visas, legal access to services in destination areas) or economic assets (money to finance a move, transport, accommodation) (see for example Skeldon 1997; Goldin 2011). This positive correlation is shown by the red line in Figure 3, which is juxtaposed with a line showing the negative correlation between vulnerability to environmental change and the same broad indicators of wealth (see, for example, Smit and Wandel 2006 on the relationship between vulnerability and wealth).

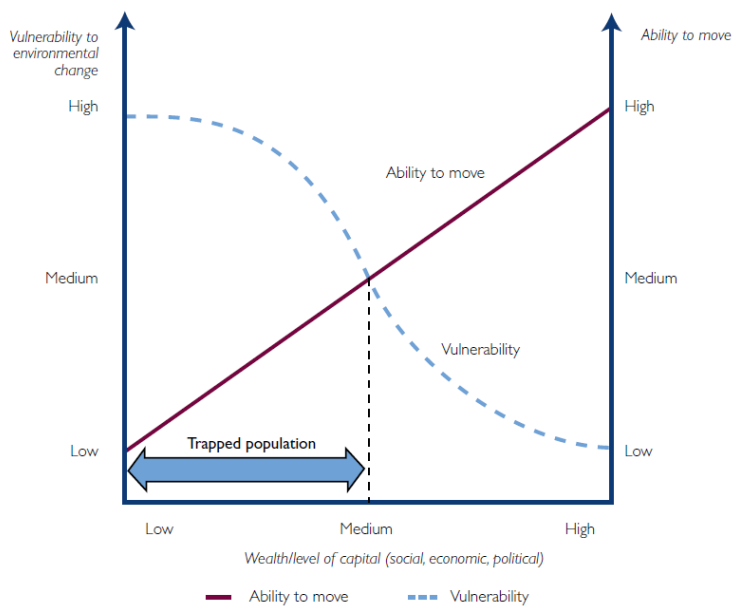


Figure 3: Representation of how the level of wealth/capital (social, economic or political) correlates with vulnerability to environmental change and at the same time determines ability to move (Foresight 2011)

The diagram indicates a subset of people who have low wealth, broadly defined, and thus are particularly vulnerable to environmental change yet have the fewest opportunities to migrate away from areas susceptible to it. The Foresight report argues that this group of people are the hidden 'trapped populations'. The reasons that prevent them from migrating also mean that they are a long way from public attention. In fact, this group are highly vulnerable and deserving of policy makers' attention. (Indeed, even if this population are not literally trapped, they are likely to have fewer options for migration than wealthier citizens, and would therefore be vulnerable if they move in unplanned or disorganised ways.) Box 3 explores the situation of 'trapped populations' further.

The relevance of the 'trapped population' to this paper on urban destination areas is found in the third Foresight key conclusion. The Report argues that migration should not necessarily be seen as a failure of adaptation, but can actually be seen as a way of achieving long-term, transformational adaptation (see also Black et al. 2011). In particular, migration is a way that predominantly rural households or communities can diversify income streams so that not all income depends on agriculture (which is more susceptible to climate change). In addition to economic opportunities for migrants in urban areas, Section IIIa of this paper explores how migration can be a coping strategy and/or way of managing risk and reducing poverty, as well as potentially leading to agricultural investments in source areas. Furthermore, migration can

enable the transfer of skills, best practice, money and the development of social networks which all enhance individual, household and community resilience to environmental change. Banjeree and colleagues (2012) provide a more detailed discussion on migration as a form of adaptation to climate change, but the relevance to this paper is that migrants in urban destination areas can enhance the adaptive capacity of origin areas, so long as policy in destination areas is attuned to this fact. To do this policy needs to allow migrants to move freely back and forth, allow for the cheap transfer of remittances, allow for source and destination areas to maintain strong linkages, and to ensure migrants are not vulnerable; themes brought up later in this paper.

1.3 Internal vs. international migration

Much of the literature concerned with 'climate migrants', as recorded earlier in this paper, implicitly or explicitly focuses on international migration. There are two reasons why the Foresight report places equal if not more focus on internal migrants, i.e. those migrating within a country's boundaries. The first is the simple fact that internal migrants outnumbered international migrants by approximately 740 million in 2009 to 210 million in 2010 (UNDP 2009; IOM 2010), and, unless there are compelling reasons not to, this implies policy makers should take a proportional focus on internal migrants. Perhaps more important is that, if people are likely to migrate and be vulnerable to environmental change, they are likely to be poorer individuals who will not have the assets or wealth to migrate internationally. However, even this seemingly likely trend is contested in reality (see Box 4).

This does not mean international migrants are unimportant however. As seen in 2008 in South Africa, where millions of drought-affected Zimbabweans migrated to South Africa and were vulnerable to xenophobic attacks, being an international migrant in the context of climate change can result in particular dangers and difficulties (McGregor 2011). Box 4 highlights other ways in which international migrants may be more vulnerable than internal ones, although it is recognised that the differences are complex and not always clear-cut.

To summarise, rather than taking a focus on 'climate migrants' which are presumed to be international migrants, this paper takes as a starting point the Foresight conclusions, and therefore:

- Focuses on those who migrate in the *context* of climate change, whether the climate change is taking place in the destination area or the source area;
- Where environmental and climate changes are forecast to take place in the destination area, focuses on the implications for migrants themselves and the wider receiving communities;
- Where the environmental/climate changes are forecast to take place in the source area, focuses on how urban migration (including policy) can benefit the source area in terms of facilitating adaptation and greater resilience to environmental change;

By taking this approach, the Foresight Report has widened the scope of the issue. Instead of a narrow, one-way causal relationship between climate change and migration, the Report develops a more nuanced, sophisticated and complete analysis, which includes the positive opportunities in migration for adaptation to climate change, and also how migration and climate change can act together to pose challenges to destination areas and individuals. This paper builds on this approach.

2) The vulnerability of urban migrant-receiving areas to climate change

2.1 Opportunities and risks: the complex landscape of rural to urban migration

Throughout the world in countries still under a demographic transition, individuals or whole families migrate to gain access to the informal labour markets of urban areas. The three key conclusions from the Foresight report noted above include the fact that migrants are moving to areas vulnerable to climate change, and that this migration is a multi-causal phenomenon. As one of five potential key drivers of this, environmental change often takes the form of environmental degradation leading to the gradual erosion of ownership of land and capital assets, with concomitant trajectories into poverty. As a response to this, urban immigration has the potential to contribute significantly to a reduction in poverty, notably through temporary or circular coping strategies, or remittances that improve the resilience of rural 'source' households (cf. third key conclusion; see Section III for further discussion). Significant benefits exist therefore for migrants and their source communities. What must be considered alongside is the potential vulnerability of migrants themselves, who may find themselves in receiving areas in situations of increased insecurity, exposure to environmental risks and with little capacity to cope with the consequences. As will be discussed later, the policy context has the potential to address these setbacks and make the migration landscape less vulnerable for migrants.

Cities are likely to be the crucibles of impacts and adaptation to future climate risks, especially as many more people come to live in climate-vulnerable areas (e.g. see Figure 2). This report emphasises that migrants often have a different vulnerability profile to longer-term residents as many migrant groups are likely to be more exposed to the impacts of climate change. Migrant groups also have different adaptive capacities because they lack access to services, yet sometimes have well-established networks already in place. Critically, the experience of different migrants will not be homogeneous; thus attention in policy-making should be paid to the specifics of environmental change and climate change risks, and the heterogeneity of migrant populations' vulnerabilities.

2.2 The impacts of climate change in urban areas of opportunity

Migrants are moving to areas at risk from climate change, often in the hope of economic opportunity. Many cities are located in areas prone to coastal or riverine flooding and constraints on water resources. Combined with high population density, they are particularly vulnerable to climate change (IPCC 2012). Climate change will affect cities in various ways. On one hand, extreme weather events will have serious impacts, such as on built infrastructure. Extreme heat events, combined with the heat island effect of urban areas, will have negative impacts on health. Increased requirement for climate control in summer and winter will lead to higher energy demand in many regions. At the same time, less dramatic, more incremental changes will impact urban areas and may be as consequential for well-being (Moser et al. 2010). Changes in precipitation for example may lead to changes in the availability of potable water and hydroelectrical energy (Hunt & Watkiss 2011).

Climate change will obviously affect cities differently according to where they are located. Cities in low-elevation zones will be vulnerable to sea level rise and accompanying higher flood risk and inundation of land. Most information on the impact of climate change on cities focuses on the coastal zone due to the concentration of cities on the coast and the relative reliability of projections of sea level rise in comparison with other climate change impacts (Hallegatte & Corfee-Morlot 2011). The coastal zone in fact contains 65 per cent of cities with populations greater than five million (Hunt & Watkiss 2011). Even without climate change, 40 million people are presently at risk of a 1 in 100 year coastal flood event (Hanson, Nicholls et al. 2011). The megadeltas of Asia contain some of the largest urban populations of the globe (see Figure 4).

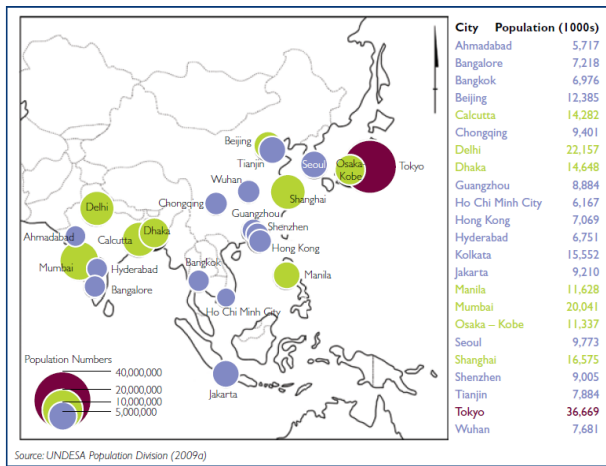


Figure 4: Location of cities with a population of five million and over in Asia and the Pacific in 2010 (Foresight 2011)

High altitude cities are likely to be severely affected by changes in precipitation. In high altitude cities in Latin America, changes in water supply related to the loss of small tropical glaciers will be highly localised but acute. Some tropical glaciers are projected to disappear completely within the next few decades with implications for cities such as La Paz in Bolivia and Quito in Ecuador where glaciers can supply up to 40 per cent of the potable water and where there is reliance on them to supplement dry season water supply in the absence of rainfall (Bradley et al. 2006; Vergara et al. 2007; Hardoy & Pandiella 2009). Climate change also puts the hydroelectric supplies of cities at risk, if insufficient storage exists to accommodate changes in the timing of peak streamflows as higher temperatures lead to earlier snowmelt. Cities such as Lima in Peru are, to various degrees, dependent on runoff from mountain regions for water and hydroelectricity generation since they are located in arid coastal regions.

Meanwhile, in inland cities urban flooding is becoming an increasing problem, which can damage infrastructure, disrupt crops, and cause landslides, as is the case in Thiempu, Bhutan for example. Such flooding is commonly exacerbated by the problem of blocked and insufficient drainage systems, which can lead to epidemics of infectious disease, as for example in Kampala, Uganda (IIED 2009). Dryland cities on the other hand are likely to face increased water scarcity and increased sandstorms due to climate change (IIED 2009).

2.3 Development challenges in areas with marginalised migrant populations

These climate impacts will most notably be felt in low-income country cities in large part because of the failure to protect present populations and to provide sufficient services (Hunt & Watkiss 2011). More than half the world's population currently lives in urban areas and this number is expected to increase to 59 per cent by 2030 according to one estimate, with 90 per cent of that growth expected to occur in cities in low-income countries. This rapid growth is leading to 'urbanisation without development' whereby populations are clustering in areas without access to services. This has also been shown to lead to social unrest associated with poverty. Influxes of migrants into an area where conflict persists can exacerbate existing tensions (Foresight 2011). However, it is significant to note that the majority of population growth in cities is in fact mostly due to natural growth rather than rural-urban migration (UN 2010). Figure 5 shows quite how large these overall increases in populations have and will be, in environmentally vulnerable locations; and as noted above the most extreme growth will be in Sub-Saharan Africa and South Central Asia.

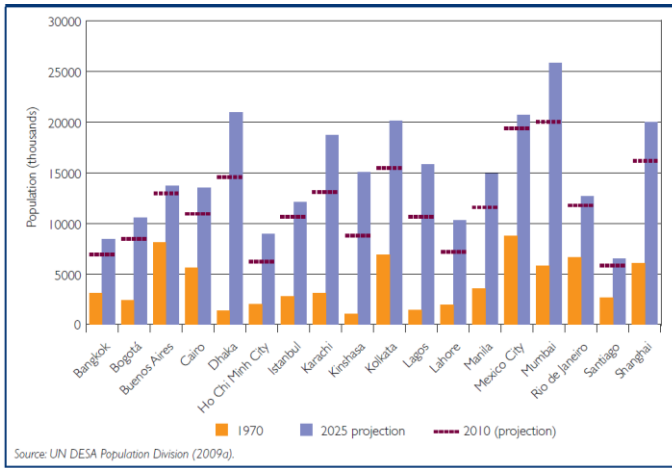


Figure 5: Growth in populations of urban agglomerations of relevance to environmental change and migration between 1970 and 2025, with 2010 shown for reference (Foresight 2011)

One key challenge in terms of service provision in rapidly growing cities is water supply and availability. Already 150 million people live in cities with water stress. It is an issue of both quality of water, quantity available to the city, and ensuring fair distribution and access. An influx of migrants means there are more people using the already limited supply of water. Secondly, there are issues of installing infrastructure to ensure that fresh water and sanitation services reach the informal settlements of the newest migrants. Increasing population places additional pressure on essential public services and infrastructure. Infrastructure, such as transport networks, water supply and sanitation is important for the successful assimilation of migrants into cities (Foresight 2011).

In terms of rapid urbanisation and the availability of services and infrastructure therefore, many urban areas are in an 'adaptation deficit' to withstand current climate variability (Hunt & Watkiss 2011).

2.4 Vulnerability, exposure and adaptive capacity of migrants and urban areas

As discussed above, many low-income country cities will face significant challenges from climate change impacts in coming decades (see Rosenzweig et al. 2011 for a survey). While there is significant economic potential for migrants in cities, the migrants themselves in those destination areas may be vulnerable to such changes in ways that are significantly different to the existing populations of these cities. Their vulnerability is made up of exposure to hazards associated with environmental change, and by their adaptive capacity, both individually and collectively. These terms are explained in Box 1 and are a standard means of assessing differences across populations. The evidence suggests that urban migrants in the developing world will be more exposed to environmental risks than the overall population. As for their adaptive capacity, migrant populations have demonstrated adaptiveness in their mobility, but are likely to be disadvantaged in terms of development of strong networks, local knowledge, and access to services. In summary, as cities expand into environmentally risky areas, the populations in these areas are more exposed to hazards, while also being those with the least capacity to adapt.

Box 1: Exposure, risk, vulnerability and capacity

Vulnerability of a population is a function of both their exposure to risks and to their adaptive capacity. The IPCC, in their Special Report on Extreme Events and Climate Change summarise a number of relevant terms (IPCC 2012):

- Disaster risk: “the possibility of adverse affects in the future” (IPCC 2012: 69);
- Hazard: “the possible, future occurrence of natural or human-induced physical events that may have adverse effects on vulnerable and exposed elements” (IPCC 2012: 69);
- Vulnerability: ‘the propensity of exposed elements such as human beings, their livelihoods, and assets to suffer adverse effects when impacted by hazard events (IPCC 2012: 69).

While vulnerability has most often been defined as a function of exposure, sensitivity and adaptive capacity to a particular climate risk, this can be simplified to two primary dimensions in the context of social systems: exposure and adaptive capacity. Levels of risk vary over time and space. Adaptive capacity is more socially driven and dependent on factors such as wealth, education, race/ethnicity/religion, gender, age, class/caste, disability, and health status (IPCC 2012: 67).

In order to anticipate and avoid the negative impacts of extreme weather events (i.e. have a level of adaptive capacity), different kinds of capacity are required: capacity to anticipate risk, the capacity to respond to a natural hazard or environmental change, and the capacity to recover and change after the event (IPCC 2012). This is similar to showing resilience to natural disasters; the amount of disturbance a system can absorb before it changes to a different state, which includes the ability of the social system to self-organise and adapt (e.g. Folke 2006).

2.4.1 Migrant exposure to environmental risks and change

Climate change brings a number of threats to the urban poor: “increasing risk of storms, flooding, landslides, heat waves and drought and overloading water, drainage and energy supply systems” (Wilbanks et al. 2007). Climate risks are set to increase for cities as urban expansion occurs in exposed areas, with continued migration into cities (Adamo 2010). For example, loss of lives due to cyclones and storm surges on the east coast of India is likely to increase due to rural-urban migration in recent years (Revi 2008). The populations living in urban floodplains are predicted to rise from 30 million in 2000 to between 83 and 91 million in 2030 and then 119–188 million in 2060 (Foresight 2011). The Foresight report provided further evidence of the relative greater exposure of migrants to the impacts of climate change, due to their propensity to find housing in exposed areas. Figure 6 provides the projections of the increases in population living in urban flood zones for 2030 and 2060 for various regions of the world. Significant increases are expected in both scenarios for all parts of Asia.

Given the ‘adaptation deficit’ noted above, any further damage to infrastructure given its vulnerability to environmental change (through flooding, high winds, excessive heat etc) will exacerbate the exposure of migrants to these shocks further.

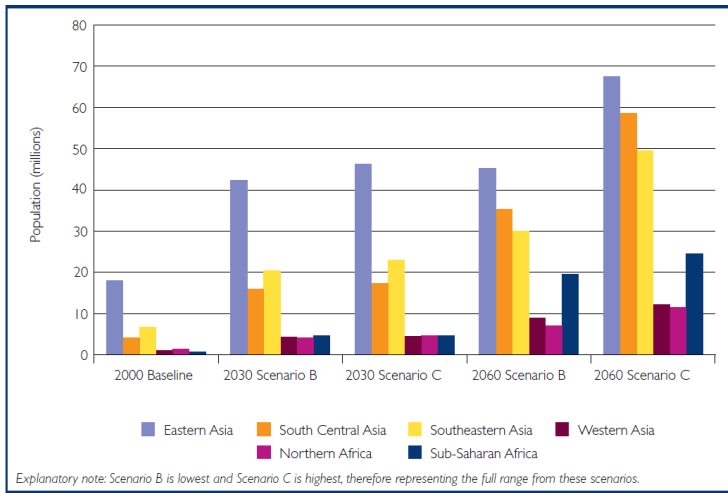


Figure 6: Projections of populations living in Urban Flood Zones in 2060 by region (Foresight 2011)

Moreover, the exposure of the urban poor to climate shocks is in large part due to their location in slums and informal settlements, often where migrants first move. It is important to note that this propensity of migrants to find housing in slums and exposed areas however is a situation that has arisen out of negative policy positions on rural to urban migration. Slums are often high-density settlements located in marginal areas, such as steep hillsides, floodplains, or other areas, which are at a very high risk from the impacts of climate change and natural hazards (Baker 2012). New migrants who have not yet built up capital are likely to move to such areas due to being located on affordable and vacant land. However this is often where there is least infrastructure and highest risk of environmental hazards (Hardoy & Pandiella 2009). In these locations housing is of poor quality and tightly packed, further increasing the exposure of migrant populations. For example, in Dakar, Senegal, an estimated 40 per cent of migrants who have arrived within the past decade have moved to zones with high flood potential (World Bank 2010). Similarly, immigrant populations in Mombasa, Kenya, and Esteli, Nicaragua, suffer disproportionate impacts from localised hazards, such as flooding and winds (Moser et al. 2010). Meanwhile, around 20 per cent of the population of Rio de Janeiro live in favelas, many of which are susceptible to landslides and floods, with a significant proportion of those being migrants from dryland areas in northeast Brazil (Blake et al. 2011). The most marginalised groups who inhabit the most hazardous areas (Bicknell et al. 2009).

Box 2: Prospects for migrants in slum areas in cities in low-income countries: Social exclusion versus adaptive capacity

In addition to the fact that slums (as migrant-receiving areas) are often located in highly exposed areas, there are further reasons for their potential vulnerability to climate impacts. The first reason is that slum populations already experience a suite of physical, social, and legal vulnerabilities. Under conditions of loss accumulation and exclusion from the formal economy, even small events may challenge daily survival. Levels of poverty and competition for opportunities mean that whilst some generate financial capital, many are not able to accumulate enough to protect themselves (Mitra 2009). Slum residents often lack 'a voice' or representation politically. This is especially true for migrants, and "with higher power divides, inhabitants are reduced to supplicating" (Zimmer 2009). This lack of representation often occurs in tandem with a lack of tenure rights meaning that residents squat on vulnerable land. Moreover, individuals are less likely to invest in longer-term adaptation measures, when there is a threat of eviction. These factors can be described as socio-economic vulnerability, and politico-legal vulnerability (Moser et al. 2010). In turn, these vulnerabilities contribute to a lack of services and poor or inexistent planning. Indeed, evidence from Kenya and Nicaragua shows that a lack of tenure leads to less service provision (Moser et al. 2010). As expected, climate impacts are likely to be greater where those services are lacking (e.g. urban flooding in Mombasa, Awuor et al. 2008).

Against this backdrop however, slum residents often show significant resilience and means of adaptive capacity, and it is crucial to include alternative perspectives of slum life to capture this (Myers 2011). In high or some middle-income countries urban resilience to extreme weather comes from 'accumulated resilience' – services and infrastructure mainly provided by the government. In slums in low-income nations, resilience instead comes from inbuilt assets, capabilities, and networks (Satterthwaite 2012). Indeed, it is this resilience that gives migrants to urban areas the potential to build complex asset portfolios and pursue small-scale enterprises that can lead them out of poverty.

Hence, whilst inherent pre-existing vulnerabilities often exist for slum populations, so too does the potential for local resilience.

2.4.2 Adaptive capacity of migrants to climate change impacts in urban areas

While migrants' exposure to climate risk in cities is highly likely to be higher than longer-term residents, their adaptive capacity exhibits various offsetting trends. Migrants, by virtue of their demographic profile, may be more able to cope with environmental risks, but their place in urban society and labour markets may limit their capacity to cope.

Box 3: The possibility of urban trapped populations: immobility under increasing environmental risk

The Foresight report highlighted the need to pay attention to the households and individuals that do not leave; that either chose to stay despite environmental stress or who are unable to use migration as an adaptation to relieve that stress. It is difficult to define whether immobility is a personal choice or externally imposed; mobility potential (i.e. the propensity of a person to migrate) is not always related to the physical ability of a person to migrate but tied to factors such as attachment to place and attitudes to risk (Adams & Adger 2012).

The discourse around 'trapped' populations is one that considers entire 'mobility outcome' of a natural disaster, not only displacement. The mobility characteristics of the individual or their household influences their vulnerability before an extreme event, exposure during the event and post-disaster recovery are all influenced by and interact differently with the migratory characteristics of the population (Black et al. 2012). Even in an extreme event, out-migration from an area is not guaranteed: the context decides whether the destruction caused by adverse climate impacts leads to increase or decrease in the requirements for labour (Black et al. 2012).

The poorest households lacking in assets and wealth will likely be those in this group, and they will be double-hit by the impacts of climate change. They are the most vulnerable to its impacts, unable to adapt in situ, and the least able to liquidate their assets and migrate away from climate risk. This group, unable to use migration as a coping strategy to livelihood stress and uncertainty, may end up being displaced as a matter of emergency or requiring external assistance and aid (Foresight 2011 p.84; Black et al. 2012).

The processes that lead to inequality in impacts of natural disasters, also prevent the poorest from being able to react to those disasters by migrating or returning to their homes when the risk is past. Populations of migrants can be trapped outside of their city if they are unable to return home. Temporary displacement as a result of a disaster, depending on the social vulnerability of those displaced can lead to longer-term forms of migration, as issues surrounding the rebuilding of destroyed areas and the social differentiation of exposure to risk come into play (Black et al. 2012).

Therefore, the set of processes that leads to migrants being concentrated in urban areas highly exposed to environmental change is the same set of processes that will lead to a situation in which they are unable to migrate away from climate risk.

The levels of adaptive capacity of migrants to urban areas are complex and highly heterogeneous (and therefore difficult to predict). On the one hand, migrants have the potential to build resilience and pursue economic opportunities that may take them out of poverty. Some (voluntary) migrants are self-selecting and therefore have mobility potential, are likely to arrive with skills and be adaptable, and may have secured positions of employment or residence (Ferre 2011; also personal/household characteristics in Figure 1). There is also evidence for a “healthy migrant hypothesis”, whereby young migrants to a city are healthier on average than local residents (Tutu 2012 for review). In addition, they may already have good networks in the urban area, having intentionally moved to locations where networks from their home areas already exist (Tacoli 2011). These networks based on place of origin will help migrants acclimatise and adapt to environmental risks. Furthermore, migrants rarely fully sever links with source areas and as a result can rely on their location of origin for financial and emotional support (Cohen 2011).

Further, there is evidence that migrants can turn this adaptive potential into successful adaptation. In some parts of the world high degrees of social cooperation and trust can be observed within slums (e.g. Southeast Asia, Carpenter et al. 2004); migrants may be able to address their vulnerability through collective action such as savings groups (e.g. Peruvian migrants to Buenos Aires, Hardoy & Pandiella 2009); alternatively residents form networks to help them adapt and thrive in trade (e.g. traders in Nairobi, Lyons & Snoxall 2005); and social capital and collective action can ensue (e.g. Jakarta, Wilhelm 2011). Lastly, slum communities show asset adaptation and bottom-up provision of help from local institutions (Moser et al. 2010), and in light of this resilience are often able to build on economic opportunities (and even send remittances: see Section III).

It is clear therefore that mechanisms exist to enable resilience and economic opportunity for urban migrants. However whilst that potential exists, many circumstances may cause migrants to lack adaptive capacity, and be particularly vulnerable. First they often face discrimination and prejudice, especially if host populations perceive them to be receiving unfair access to services or driving down real wages (e.g. receiving communities of Hurricane Katrina, review in Adamo 2010). Secondly, migrants may lack the knowledge and capacity required to adapt, due to the time it takes ‘to learn the norms of collective action and response to environmental hazards in the community’ (Foresight report, p. 160). Such lack of knowledge of disaster risks for example puts them at great vulnerability, for example in the case of migrants to the hillsides of Rio de Janeiro with mudslides there (Hardoy & Pandiella 2009), and migrants in Shanghai with typhoons (Wang et al. 2012). Thirdly, even if such disaster awareness is there, migrants are less likely to have access to services owing to lower representation and lack of tenure. This is especially true in slums, often the first destination of migrant populations (see Box 2). They may lack access to social protection, labour markets and civic engagement too; and may be willing to endure temporary undermining of capabilities and rights in this regard (Sabates-Wheeler & Macauslan 2007). Finally, this context of poor service provision can lead to health inequalities that leave migrants less able to respond in the longer term (Foresight 2011), and it has even been questioned whether migrants have the ability to accrue capital after moving to the urban area (Mitra 2009).

The next key point to note is that in terms of adaptive capacity, migrants are not a homogeneous group, and thus different groups will show divergent vulnerabilities. Whilst some migrants will arrive to pre-existing and known social networks, others will arrive to discrimination, ignorance about local hazards and risks, and inability to access local services. These differences will exist between particular international groups for instance (see Box 4). There are other groups who are especially vulnerable. New migrants may be more vulnerable, having had less time to develop social networks, gain representation and familiarise themselves with local climate risks. Furthermore, new migrants have been found to face higher rates of victimisation, discrimination and violence (Raleigh 2012). Likewise, temporary migrants are often particularly vulnerable, especially when national systems of identity registration as in

China reduce the ability of the individual migrant to access social protection and avoid over-exploitation (Wang et al. 2012; see Section IIIb for example on Vietnam example). As noted earlier, women are likely to suffer, given lack of access to health services, particularly for reproductive and maternal health. The young, who make up a significant proportion of rural-urban migrants (Tutu 2012; Tacoli 2011), are vulnerable to threats such as worker exploitation, since they lack the parental presence, schooling, and social connectedness of longer-term residents (Erulkar et al. 2006). Similarly children are particularly at threat, and again may be strikingly numerous: 50 per cent of those displaced from climate-exacerbated natural disasters are expected to be children. Older individuals may be more likely to leave some slums (e.g. Nairobi, Falkingham et al. 2012) while others become 'trapped' as their social networks cease to exist. Indeed, much like the subset of individuals discussed in relation to Figure 3 who are unable to migrate in the first place, there are groups such as the elderly who have migrated to slums but despite later wanting to leave, are now unable to do so because they lack the financial capital to do so (e.g. Kampala, Waters 2012; see discussion of 'trapped populations' in Box 3).

In summary, there is the potential for urban migrants to build adaptive capacity through cooperation, networks and local institutions, which could reduce their vulnerability to climate shocks, and will allow them to pursue economic opportunities. However many circumstances such as discrimination, lack of local knowledge, tenure and services often preclude them from doing so, in particular for new arrivals and certain groups such as the young or very old. Policy responses that build on these opportunities and provide enough social protection for urban migrants to thrive will be an important contribution (see Section IIIb in this paper).

Box 4: Internal versus international migrants to urban areas

Both the causes of migration decisions, and characteristics of migrants, are highly heterogeneous. The same is true for international migration as for internal. Some international migration will be as a result of involuntary displacement and will generate highly vulnerable immigrants lacking local knowledge, capacities or networks. On the other hand, other movements of people are highly intentional, using one country as a 'stepping-stone' through established networks to another. The vulnerabilities of migrants in these two cases for instance will be highly different. Little is yet known about the vulnerability of international versus internal migrants, with conflicting evidence as to whether the very poor are able to internationally migrate for instance (Tutu 2012).

However, international migrants are likely to face problems that internal migrants will not. These include victimisation and prejudice, xenophobia (Crush & Ramachandran 2009), language barriers that inhibit knowledge of climate risks, an exacerbated lack of access or rights to land and service provision and, potentially, fewer contacts in the area. International migrants are less likely to develop strong, wide social networks in receiving areas as internal migrants might. These issues are embodied in the case of Zimbabwean migrants to urban areas in South Africa where large influxes of migrants as a result of political and economic crises exacerbated by drought have led to urban conflict (Foresight 2011, p115).

The vulnerability of international migrants is likely to be highly context specific. In a study in Kampala in Uganda, the vulnerability of populations to poverty and their access to ecosystem services is shown to be in part dependent on the origin of the migrant group (Waters, in prep). Specific international migrant communities are ostracised and excluded by the host population, lacking support to build networks and adaptive capacity. Other groups however, such as the Somalese community, have very strong internal networks as well as links with friends and relatives overseas who support individuals financially thereby bolstering resilience.

Lastly, after arrival, international migrants may face more difficulties assimilating than internal migrants who have easy access to support networks, have the potential to work and are able to leave. International migrants will also lack those rural-urban linkages that can be important for the survival of poor urban households (Frayne 2004; Owuor 2007). Once again the vulnerability outcome of internal versus international urban immigrants is highly complex, and may come down to the establishment and development of strong networks both within and to outside the community.

III. THE NEED FOR POLICY CHANGE

A necessary condition for policy reform is a more balanced understanding of the causes and impacts of rural-urban migration and the role that it can play in poverty reduction. For instance, policy typically ignores the dynamism of slums and the urban informal sector. But commercial interests such as banks and courier companies are beginning to realise that slum settlements represent large, untapped markets. To cite one example, TNT Express has designed a system for collecting and delivering parcels in Dharavi slum in Mumbai, where residents lack formal postal addresses. Banks have also begun to set up remittance services which are specifically designed for internal migrants². The rationale for undertaking these measures is clear: the annual business turnover in Dharavi slum is US\$500 million a year, according to one estimate (Iyer et al. 2009).

a. Change perceptions of rural-urban migration and reform policies to minimise costs and risks of migration; need for policy recognition of the role of urbanisation in poverty reduction in rural source locations

By-and-large, policy positions on rural-urban migration remain predominantly negative, as 67 per cent of all governments had policies intended to halt or limit rural-urban migratory flows in 2009 (United Nations 2010). Policies that subscribe to this 'old paradigm' perspective of rural-urban migration remain commonplace across many countries in Africa (Adebusoye 2006) and Asia (Deshingkar 2006) although in most cases there is very little hard evidence on implementation to substantiate these claims. Instead, there is a pervasive belief that rural-urban migration cannot lead to positive outcomes for migrants, their families, or their areas of origin or destination. Thus, a number of countries have attempted to reduce rural-urban migration through investing in programmes in receiving areas, though as Skeldon notes policies designed to 'keep them on the farm' have generally failed in all but the short term (Skeldon 2009).

The origin of negative narratives on rural-urban migration can be traced to theories of migration, urban unemployment and slums (see Todaro 1969) as well as statistics indicating worsening unemployment and poverty levels in urban areas. Empirically, it is evident that the urban share of poverty in many African countries has grown at a faster rate than nation-wide poverty levels, and migration into slums is commonly cited as one of the reasons for this phenomenon. For example, data from the Ghana Living Standards Survey show that poverty in Accra has increased by more than 50 per cent in recent years, rising from 4.4 per cent in 1999 to 10.6 per cent in 2006 (GSS, 2007). Importantly, there is a strong perception that this increase has occurred concomitantly with growing rural-urban migration. Overall, many governments perceive slums as stagnant pools of poverty, crime and disease which offer their residents few prospects for upward mobility (Deshingkar & Sward, forthcoming 2012). Unsurprisingly, the policy response has been, at best, negligence with many slums persisting for decades without services, or, at worst, slums have been threatened with demolition, with residents evicted without the provision of any real alternatives as highlighted in recent reports

² According to the Indian Centre for Microfinance, ICICI Bank is offering remittance services to 500,000 urban migrants from poor rural families across India (http://ifmr.ac.in/cmfr/partners_other.html); Axis Bank has teamed up with the mobile phone operator Airtel to offer remittance services to migrants in Delhi and Mumbai (<http://www.businessweek.com/news/2012-07-03/slumdog-city-retail-banking-to-boom-with-wireless-tech>).

from Bangladesh (Al-Mahmood 2012), India (Bhan 2009) and Kenya (Amnesty International 2012).

However, there is emerging evidence that contradicts negative views of both urban slums (e.g. Myers 2011) and the impacts of rural-urban migration on both receiving and source areas (see Box 2 above). First, regarding receiving areas, Moser (1998) has shown that the urban poor often have complex asset portfolios; and there is evidence that migrants in particular are active in a range of micro-enterprises, such as retailing food and household appliances, small scale manufacturing, and so on. In contrast to previous arguments which viewed the economic activities of the urban poor mainly as survival activities (House 1984; Mead & Liedholm 1998; and Shaw 2004), more recent research suggests that such micro-enterprises can put people on a path out of poverty (Gulyani & Talukdar 2010). As for the source areas of those migrants, there is emerging evidence that poor migrants earn and remit significant amounts of money (Deshingkar et al. 2006; Deshingkar & Farrington 2009). In fact, new analysis of household survey data suggests that in both India and Ghana the total sum of internal remittances is greater than that of international remittances (McKay et al. 2011)³. As these internal remittances are from poorer migrants reaching a larger number households in poor source areas households, the impacts on poverty are likely to be quite significant (Castaldo et al. forthcoming 2012).

More generally, migration, especially short-term seasonal migration or circular migration, has been a historically important coping strategy for people living in areas that are prone to climatic shocks and stresses in parts of Sub-Saharan Africa, Asia and Latin America. For example, in East Africa pastoralist and agro-pastoralist communities have a long history of mobility due to erratic rainfall patterns. Existing research has produced mixed views on the impacts of this type of migration. On one end of the spectrum, a study by Beegle and colleagues (2010) in Tanzania showed a correlation between migration and significant poverty reduction, with consumption growth increasing by 36 percentage points in the 13 years between 1991 and 2004. However, other research has found that migration has not resulted in an improvement in the situation of families left behind in source areas, with some being worse off due to the adverse impacts of migration (Dungumaro 2009). In other words, while migration can provide a route out of poverty, its ability to do so is mediated by the context in which migration occurs, the heterogeneous attributes of the individual and household (as discussed in Section II), as well as local job markets and policies related to migration (Deshingkar & Sward, forthcoming 2012).

There is evidence that in some cases remittances can help the rural poor to manage risk, and over time may help lead to poverty reduction for both migrants and their families (in both source and destination areas). This idea is supported by the co-insurance theory developed by Stark (1980) and Lucas and Stark (1985) which suggested that credit constrained families in rural areas pursue the migration of some family members in order to better manage risk and help ease credit constraints of rural enterprises. Importantly, there are strong indications that such injections of cash can lead to a reduction in poverty in source communities over time: for example, Deshingkar and Akter's (2009) analysis of panel data between 2001-2002 and 2006-2007 revealed that the proportion of migrant households who were poor decreased from 45 per cent to 29 per cent in Andhra Pradesh and from 81 per cent to 41 per cent in Madhya Pradesh over the same time period. Other studies have yielded similar findings: research conducted over a seven-year period by Krishna (2010) which spanned more than 35,000 households in five countries including India, Kenya and Uganda suggested that access to the urban informal

³ Analysis of household survey data shows that international remittances in Ghana totalled US\$283 million, compared to US\$324 million for internal remittances; the same study found internal remittances in India totalled US\$7.5 billion, compared to US\$3.8 billion for international remittances.

sector was the most important reason for poverty reduction for rural households in India and Uganda and the second-most prominent reason in Kenya after crop diversification.

Similarly, recent research has also shown that remittances can help to improve the resilience of poor, rural source households to both economic and environmental shocks, with capital investments enabling both agricultural intensification and de-intensification although this does not always equate to an improvement in the ecological resilience of the system (Deshingkar 2012). For example, evidence from Burkina Faso shows that migrant households were more likely to practice improved soil and water conservation techniques. By contrast, in the eastern Indian state of Jharkhand, remittances have also been invested in agriculture but at the same time traditional techniques of soil and water conservation have suffered due to a migration-induced shortage of labour.

Overall, while migration can have important implications for poverty reduction, there are also considerable risks for migrants and their families, as highlighted above (see Box 1). Without effective social protection policies in place, the potentially positive impacts of migration can be compromised by illness, injury or even death. Due to the negative stance of many governments towards rural-urban migration, migration to urban areas along with the remittances that are subsequently sent to families in receiving communities occurs in a context that is heavily biased against migrants and imposes high risks and costs on them (Deshingkar & Sward, forthcoming 2012). Indeed, many policies and programmes directly and indirectly attempt to reduce, halt or otherwise control rural-to-urban migration rather than supporting it. This situation may be further exacerbated in future decades with the onset of environmental change in urban areas.

b. Social protection and migrant support – recognising migrants' specific needs in the context of environmental change

Policy responses that seek to address the significant challenges posed to urban areas by climate change require an integrated approach that includes action at multiple levels of government, and also at the level of individuals, households, communities and civil society (Moser & Satterthwaite 2010). This extends to the specific challenges faced by migrant-receiving urban areas in the context of both ongoing rural-urban migration and the potentially significant impacts of environmental change (Foresight 2011). The existing debates on social protection for migrants largely involve issues relevant to international migrants, such as the portability of benefits and access to rights between different countries (cf. Sabates-Wheeler & Feldman 2011), while less attention is given to providing access to citizenship rights for internal migrants. Following Deshingkar and Sward (forthcoming, 2012), action is needed in three interconnected areas:

First, action is urgently needed to address the social protection needs of urban migrants who are unable to access pro-poor programmes. In some cases this is due to the fact that migrants are not officially recognised as residents in their host city or town, although even in cities where formal registration systems do not exist (e.g. Sub-Saharan Africa) migrants may be disproportionately excluded from access to services too (see Section II). To cite an example of the former case, in Vietnam migrants without *Ho Khau* registration have historically been excluded from receiving benefits in their host communities, and even with some recent concessions, new arrivals must still wait for a period of three years before they are eligible for services (Duong 2011). Significantly, a large proportion of the rural-urban migrants who are in the city to earn and remit fall into this non-resident category (GSO and UNFPA, 2006). Recent research from India tells a similar story, as access to healthcare and health insurance are problematic for internal migrants (Borhade 2011), which is particularly important as expenditure on health has been identified as the most important determinant of deepening poverty in the country. In fact, the 60th National Morbidity and Healthcare Survey in India showed that some

11.88 million households were pushed below the poverty line in 2004 because of healthcare expenses (Berman et al. 2010).

Second, there is an important role for civil society organisations to play in addressing social protection gaps that urban migrants may encounter. One example where this is already occurring can be found in Ghana, where a number of hometown associations have evolved to support both internal and regional migrants according to shared ethnic backgrounds, such as the Yoruba and Fulani (Basiakoh 2009). Another example can be found in Western India, where the Disha Foundation, an action and advocacy organisation, is helping migrants to gain access to government housing and social protection schemes related to shelter and food⁴.

Third, urgent steps need to be taken to map vulnerability to climate change in slums and provide social protection to at-risk urban populations. Moreover, urban governments often ignore the needs of such informal settlements, or actively seek their removal. However, community vulnerability mapping of informal settlements has taken place in Kolkata, while in Bangladesh the establishment of early warning systems coupled with social protection have proven effective (Baker 2012: 88). Such vulnerability assessments will be especially important given significant heterogeneities of vulnerability between different sub-areas and people groups within those migrant receiving areas. Channelling climate change adaptation funds to state-civil society partnerships is important to pursuing such critical projects (Deshingkar & Sward, forthcoming 2012).

Finally, remittance services for poor migrants which are safe, efficient and affordable are sorely needed, as migrants may incur substantial losses through theft and cheating when hand-carrying money or sending it via informal agents. One of the most notable experiments is the MPesa initiative in Kenya which has yet to become established in other contexts, while remittance services offered by banks in India have also met with limited success. It is important to take research in this area further to ascertain what contextual, household and societal factors are serving to obstruct or facilitate such remittance programmes.

⁴ Personal communication July 2011, A. Borhade, Director, The Disha Foundation, India

REFERENCES

ADAMO, S.B. 2010. Environmental migration and cities in the context of global environmental change. *Current Opinion in Environmental Sustainability*, 2(3), 161–165.

ADAMS, H., ADGER, W.N., 2012. Changing places: migration and adaptation to climate change. In: O'Brien, K., Sygna, L., Wolf, J. (Eds.), *The Changing Environment for Human Security: New Agendas for Research, Policy, and Action*. Earthscan, London, in press.

ADEBUSOYA, P.M. 2006. *Geographic Labour Mobility in Sub-Saharan Africa*, International Development Research Centre (IDRC) Working Paper No. 1 on Globalization, Growth and Poverty, March, Ottawa, <http://www.idrc.ca/uploads/user---S/11438237051GGPWP1---migration.pdf>.

AL-MAHMOOD, S.Z. 2012. *Dhaka slum dwellers live under threat of eviction*. Guardian Global Development blog, published 11 April. Available online: <http://www.guardian.co.uk/global-development/2012/apr/11/dhaka-bangladesh-slum-dwellers-eviction?INTCMP=SRCH> [accessed 28 August 2012].

AMNESTY INTERNATIONAL, 2012. *Kenya 2012*. Submission to the UNHRC for the 105th Session of the Human Rights Committee, Geneva, 9-27 July.

AWUOR, C.B., ORINDI, V.A. & ADWERA, A.O. 2008. Climate change and coastal cities: the case of Mombasa, Kenya. *Environment and Urbanization*, 20(1), 231-242.

BAKER, J.L. (ed). 2012. *Climate Change, Disaster Risk, and the Urban Poor*. Washington DC: The World Bank.

BANJEREE ET AL. 2012. *Migration as an effective mode of adaptation to climate change*. Policy paper for the European Commission. Sussex Centre for Migration Research, University of Sussex.

BANNERJEE, S., GERLITZ, J.Y. & HOERMANN, B. 2011. *Labour Migration as a Response Strategy to Water Hazards in the Hindu-Kush Himalayas*. Kathmandu: ICIMOD.

BASIAKOH, A. 2009. *The Role Of Migrant Associations In Adjustment, Integration And Development: The Case Of Nigerian Migrant Associations In Accra, Ghana*. International Migration Institute, University of Oxford. <http://www.imi.ox.ac.uk/publications/pdfs/bosiakoh-briefing>

BEEGLE, K., DE WEERDT, J. & DERCON, S. 2010. *Migration and Economic Mobility in Tanzania: Evidence from a Tracking Survey*. Bureau for Research and Economic Analysis of Development, Policy Paper 21. <http://ipl.econ.duke.edu/bread/papers/policy/p021.pdf>

BERMAN, P., AHUJA, R. & BHANDARI, L. 2010. *The Impoverishing Effect of Healthcare Payments in India: New Methodology and Findings*. *Economic & Political Weekly* April 17, 2010, vol xlv(16), 65–71

BHAN, G. 2009. "This is no longer the city I once knew". Evictions, the urban poor and the right to the city in millennial Delhi. *Environment and Urbanization*. April 2009, 21(1), 127-142.

BICKNELL, J., DODMAN, D. & SATTERTHWAIT, D. (eds.) 2009. *Adapting Cities to Climate Change: Understanding and Addressing the Development Challenges*. London, Earthscan.

BLACK, R., ADGER, W.N., ARNELL, N.W., DERCON, S., GEDDES, A. & THOMAS, D. 2011b. The Effect of Environmental Change on Human Migration. *Global Environmental Change*, 21(1), S3-S11.

- BLACK, R., ADGER, W.N, THOMAS, D, & ARNELL, W. 2012, Migration, immobility and displacement outcomes following extreme events, *Environmental Science and Policy*, in press.
- BLACK, R., BENNETT, R.G., THOMAS, S. & BEDDINGTON, J.R. 2011a. Climate change: Migration as adaptation. *Nature*, 478(7370), 447-449.
- BORHADE, A. 2011. *Migrant's (Denied) access to health care in India*. Paper presented at UNESCO-UNICEF National Workshop on Internal Migration and Human Development in India (6-7 December, 2011).
- BRADLEY, R.S., VUILLE, M. ET AL. 2006. Threats to water supplies in the tropical Andes. *Science*, 312(5781), 1755-1756.
- BROWN, L. 1976. *World Population Trends: Signs of Hope, Signs of Stress*. Worldwatch Paper 8. Washington, DC: Worldwatch Institute.
- CARPENTER, J.P., DANIERE, A.G. & TAKAHASHI, L.M. 2004. Cooperation, trust, and social capital in Southeast Asian urban slums. *Journal of Economic Behavior & Organization*, 55(4), 533–551.
- CASTALDO, A., DESHINGKAR, P. & MCKAY, A. Forthcoming 2012. *Internal Migration, Remittances and Poverty: Evidence from Ghana and India*. Migrating out of Poverty Working Paper No. 7. Brighton: Migrating out of Poverty Research Programme Consortium, University of Sussex.
- CHRISTIAN AID. 2007. *Human Tide: The Real Migration Crisis* [Online]. Available: <http://www.christianaid.org.uk/Images/human-tide.pdf>.
- COHEN, J. H. 2011. Migration, Remittances, and Households Strategies. *Annual Review of Anthropology* 40(1), 103-114.
- CRUSH, J. & RAMACHANDRAN, S. 2009. *Xenophobia, International Migration and Human Development*. Human Development Research Paper, 2009/47 UNDP.
- DESHINGKAR, P. 2012. Environmental risk, resilience and migration: implications for natural resource management and agriculture. *Environmental Research Letters*, 7, 1-7.
- DESHINGKAR, P. & AKTER, S. 2009. *Migration and Human Development in India*. Human Development Research Paper 2009/13. New York: United Nations Development Program.
- DESHINGKAR, P. & FARRINGTON, J. 2009. *Circular Migration and Multilocational Livelihood Strategies in India*. New Delhi: Oxford University Press.
- DESHINGKAR, P. & SWARD, J. Forthcoming, 2012. *Urbanisation, Migration and Social Protection in the Context of Global Environmental Change*. Draft version of paper prepared for the DFID-Foresight seminar, London, 5 July.
- DESHINGKAR, P. 2006. Internal Migration, Poverty and Development in Asia. *IDS Bulletin*, 37(3), 88-100.
- DESHINGKAR, P., S. KUMAR, H.K., CHOBAY & KUMAR, D. 2006. *The Role of Migration and Remittances in Promoting Livelihoods in Bihar*. Report for the World Bank- funded Bihar Rural Livelihoods Project (BRLP).
- DUNGUMARO. 2009. *Consequences of female migration for families in areas of origin, The Case of Tanzania*. Paper presented at the IUSSP International Conference on Population.

- DUONG, L.B., LINH, T.G. & THAO, N.T.P. 2011. *Social protection for rural-urban migrants in Vietnam: current situation, challenges and opportunities*. CSP Research Report 08. Brighton: Institute for Development Studies, University of Sussex.
- EL-HINNAWI, E. 1985. *Environmental Refugees*. Nairobi: United Nations Environment Programme.
- ERULKAR, A.S. ET AL. 2006. Migration and Vulnerability among Adolescents in Slum Areas of Addis Ababa, Ethiopia. *Journal of Youth Studies*, 9(3), 361–374.
- FERRE, C. 2011. *Is Internal Migration Bad for Receiving Centres? Evidence from Brazil, 1995-2000*. Working Paper No. 2011/21, UNU-WIDER.
- FOLKE, C. 2006. Resilience: The emergence of a perspective for social-ecological systems analyses. *Global Environmental Change*, 16(3), 253-267.
- FALKINGHAM, J., CHEPNGENO-LANGAT, G. & EVANDROU, M. 2012. Outward Migration from Large Cities: Are Older Migrants in Nairobi “Returning”? *Population, Space and Place*, 18(3), 327–343.
- FORESIGHT. 2011. *Migration and Global Environment Change*. London: Government Office for Science. London.
- FRAYNE, B. 2004. Migration and urban survival strategies in Windhoek, Namibia. *Geoforum*, 35(4), 489-505.
- FRIENDS OF THE EARTH. 2007. *A Citizen’s Guide to Climate Refugees* [Online]. Available: http://www.safecom.org.au/pdfs/FOE_climate_citizens-guide.pdf.
- GENERAL STATISTICAL OFFICE AND THE UNITED NATIONS POPULATION FUND. 2006. *The 2004 Viet Nam Migration Survey: The Quality of Life of Migrants*. GSO,Hanoi.
- GOLDIN, I. 2011. *The future of global migration and the impact of environmental change*. <http://www.bis.gov.uk/assets/foresight/docs/migration/drivers/11-1172-dr3-future-global-migration-impact-environmental-change.pdf>
- GSS. 2007. *Pattern and Trends of Poverty in Ghana 1991-2006*. Accra: Ghana Statistical Service.
- GULYANI, S. & TALUKDAR, D. 2010. Inside Informality: The Links Between Poverty, Microenterprises, and Living Conditions in Nairobi’s Slums. *World Development* 38(12), 1710–1726.
- HALLEGATTE, S. & CORFEE-MORLOT, J. 2011. Understanding climate change impacts, vulnerability and adaptation at a city scale: an introduction. *Climate Change*, 104(1): 1-12.
- HANSON, S., NICHOLLS R., ET AL. 2011. A global ranking of port cities with high exposure to climate extremes. *Climate Change*, 104(1): 89-111.
- HARDOY, J. & PANDIELLA, G. 2009. Urban poverty and vulnerability to climate change in Latin America. *Environment and Urbanization*, 21(1), 203–224.
- HOUSE, W.H. 1984. Nairobi’s informal sector: Dynamic entrepreneurs or surplus labor? *Economic Development and Cultural Change* 0013-0079/84/3202-0006, 277–302.
- HUNT, A. & WATKISS, P. 2011. Climate change impacts and adaptation in cities: a review of the literature. *Climate Change*, 104(1): 13-49.

IIED. 2009. *Climate change and the urban poor. Risk and resilience in 15 of the world's most vulnerable cities*. International Institute for Environment and Urbanization. London.

IOM. 2010. *World Migration Report*. Geneva: IOM.

IPCC. 2012. *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change* [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, UK, and New York, NY, USA, 582 pp.

IYER, L., MACOMBER, J.D., & ARORA, N. 2009. *Dharavi: Developing Asia's Largest Slum*. Harvard Business School Case No. 709-047. Boston: Harvard College.

JACOBSON, J.L. 1988. *Environmental Refugees: A Yardstick of Habitability*. Worldwatch Paper 86. Washington, DC : Worldwatch Institute.

KRISHNA. 2010. Who Became Poor, Who Escaped Poverty, and Why? Developing and Using a Retrospective Methodology in Five Countries. *Journal of Policy Analysis and Management*, 29(2), 351–372.

LUCAS, R.E.B. & STARK, O. 1985. Motivation to Remit: Evidence from Botswana, *Journal of Political Economy*, 93(5), 901-918.

LYONS, M. & SNOXELL, S. 2005. Creating Urban Social Capital: Some Evidence from Informal Traders in Nairobi. *Urban Studies*, 42(7), 1077–1097.

MCGREGOR. 2011 *Conflict, migration and the environment: the case of Zimbabwe*.
<http://www.bis.gov.uk/assets/foresight/docs/migration/case-studies/11-1159-cs6-conflict-migration-environment-zimbabwe.pdf>

MCKAY, A., CASTALDO, A., GENT, S., DESHINGKAR, P. & SANDI, S. 2011. *Internal migration and poverty: Evidence from Ghana and India*. Briefing Paper 1, Migrating out of Poverty RPC. Brighton: Migrating out of Poverty Research Programme Consortium, University of Sussex.

MEAD, D.C., & LIEDHOLM, C. 1998. The dynamics of micro and small enterprises in developing countries. *World Development*, 26(1), 61–74

MITRA, A. 2010. Migration, Livelihood and Well-Being: Evidence from Indian City Slums. *Urban Studies*, 47(7), 1371–1390.

MOSER, C. & SATTERTHWAITTE, D. 2010. Toward Pro-Poor Adaptation to Climate Change in the Urban Centers of Low- and Middle-Income Countries. In: Mearns, R. and Norton, A. (eds.) *Social Dimensions of Climate Change; Equity and Vulnerability in a Warming World*. Washington DC: The World Bank, 231-258.

MOSER, C. 1998. The asset vulnerability framework: Reassessing urban poverty reduction strategies. *World Development* 26(1), 1–19.

MOSER, C. ET AL. 2010. *Pro-Poor Adaptation to Climate Change in Urban Centers - Case Studies of Vulnerability and Resilience in Kenya and Nicaragua*, Sustainable Development Network, Social Development Department: The World Bank. Available at:
http://scholar.googleusercontent.com/scholar?q=cache:FOP-CdzQgFoJ:scholar.google.com/&hl=en&as_sdt=0,5 [Accessed October 11, 2011].

- MYERS, G. 2011. *African Cities: Alternative Visions of urban theory and practice*. London & New York: Zed Books.
- MYERS, N. & KENT, J. 1995. *Environmental Exodus: An Emergent Crisis in the Global Arena*. Washington, DC: The Climate Institute.
- OWUOR, S.O. 2007. Migrants, urban poverty and the changing nature of urban-rural linkages in Kenya. *Development Southern Africa*, 24(1), 109-122.
- RALEIGH, C. 2012. *Violence, Vulnerability and Migration*. Trinity College Dublin.
<http://www.open.ac.uk/socialsciences/bisa-africa/files/africanagency-seminar3-raleigh.pdf>
- REVI, A. 2008. Climate change risk: An adaptation and mitigation agenda for Indian cities. *Environment and Urbanization*, 20(1), 207–229.
- ROSENZWEIG, C., SOLECKI, W.D. ET AL. (eds). 2011. *Climate Change and Cities: First Assessment Report of the Urban Climate Change Research Network*. New York, Cambridge University Press.
- SABATES-WHEELER, R. & FELDMAN, R. (eds.). 2011. *Migration and Social Protection, Claiming Social Rights Beyond Borders*. London: Palgrave Macmillan.
- SABATES-WHEELER, R. & MACAUSLAN, I. 2007. Migration and Social Protection: Exposing problems of access. *Development*, 50(4), 26-32.
- SATTERTHWAITE, D. 2012. *An Alternative Take on What Builds Resilience*. Notes for the presentation to the international symposium on *Urban Transitions in Comparison: contested pathways of urban climate change responses North and South*, Durham University, March 22-23, 2012.
- SHAW, J. 2004. Microenterprise occupation and poverty reduction in microfinance programs: Evidence from Sri Lanka. *World Development*, 32 (7), 1247–1264.
- SKELDON, R. 1997. *Migration and Development: A Global Perspective*. Harlow: Longman.
- SMIT, B. & WANDEL, J. 2006. Adaptation, Adaptive Capacity and Vulnerability. *Global Environmental Change*, 16(3), 282–292.
- STARK, O. 1980. On the Role of Urban-to-Rural Remittances in Rural Development. *Journal of Development Studies*, 16(3).
- STERN, N.H. 2007. *The Stern Review of the Economics of Climate Change*. Cambridge: Cambridge University Press.
- TACOLI, C. 2011. *Not Only Climate Change: Mobility, Vulnerability and Socio-economic Transformations in Environmentally-fragile Areas of Bolivia, Senegal and Tanzania*. International Institute for Environment and Development, London. In: <http://pubs.iied.org/105920IIED.html>
- TODARO, M.P. 1969. A Model of Labor Migration and Urban Unemployment in Less Developed Countries. *The American Economic Review*, 59(1), 138-148.
- TUTU, R. Self-rated resilience among young migrants in old Fadama, Accra, Ghana. *GeoJournal*, 1–17.
- UN DESA POPULATION DIVISION. 2009a. *World Urbanization Prospects: The 2009 Revision*. New York: UN DESA.

UNDP. 2009. *Human Development Report 2009: Overcoming Barriers: Human Mobility and Development*. New York: UNDP

UNITED NATIONS. 2010. *World Population Policies 2009*. New York: Department of Economic and Social Affairs.

VAFEIDIS, A, NEUMANN, B, ZIMMERMAN, J, NICHOLLS, R.J. 2011 *Analysis of land area and population in the low-elevation coastal zone (LECZ)*.
<http://www.bis.gov.uk/assets/bispartners/foresight/docs/migration/modelling/11-1169-mr9-land-and-population-in-the-low-elevation-coastal-zone.pdf>

VERGARA, W., DEEB, A.M. ET AL. 2007. Economic impacts of rapid glacier retreat in the Andes. *Eos Trans. AGU* 88(25), 261-268.

WANG, M.-Z., AMATI, M. & THOMALLA, F. 2011. Understanding the vulnerability of migrants in Shanghai to typhoons. *Natural Hazards*, 60(3), 1189–1210.

WATERS, J.J.J. 2012. *Reconsidering Resilience in Rapidly Urbanising Areas*. In Chelleri, L. & Olazabal, M. (eds.) *Multidisciplinary Perspectives on Urban Resilience: A workshop report*. Forthcoming.

WATERS, J.J.J. In prep. *Building Resilience in Rapidly Urbanising Areas: The Role of Ecosystem Services and Adaptive Capacity*. Unpublished doctoral thesis. University of East Anglia, UK.

ZIMMER, A. 2009. Social Relations in Waste Waterscapes: The Case of Delhi's Informal Settlements. *UGEC Viewpoints*, No.2, 9-12