

35 Changing places

Migration and adaptation to climate change

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Introduction

Demographic change is a central part of human-environment interactions; relocation and population mobility are some of the key strategies that make environmental change tolerable. While almost never fully ascribable to environmental change, migration is one of many adaptation strategies to deal with changes in resource productivity and risk to life and livelihood. Therefore, migration can be conceptualized as an adaptation strategy to insecurity caused by environmental and other stressors and an important process in the sustainability of resource use in both sending and receiving areas.

Much of the discussion of migration and environmental change has focused on international migration and the impact of people moving across borders as a threat or challenge to state and regional security (White, 2011). While large-scale displacements of populations are possible in the incoming century triggered by climate and other environmental stresses (Gemenne, 2011), an emphasis on this type of migration hides the significance of individual movement and relocation decisions that are affected by environmental change everywhere.

When adapting to environmental stress means changing location, there is a significant set of psychosocial, cultural and economic challenges to individuals and communities. This makes the decision to migrate a complex process and “rarely the adaptation of first resort” (McLeman, 2009: 297) as changing location in itself involves large financial and psychological costs. In this way, migration and mobility can both contribute to and decrease human security in the context of environmental change.

Environmental change matters because it affects the things people really care about: their health, their homes and neighborhoods and subsequently their sense of place and belonging, through impacts on the local environment to which they attach significance. Sense of place is an important asset that promotes resilience and human security (Adger *et al.*, 2012; Fresque-Baxter and Armitage, 2012; Smith *et al.*, 2012) and the environment is important in its creation (Adams and Adger, 2013).

Hence, in this chapter we examine migration as a social phenomenon that is central to the needs, rights and values of human security. We suggest that

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environmental change affects the individual's migration decision through the productivity of ecosystem services on which not only he or she depends for income, but also to which he or she forms attachment. Changes in ecosystem services affect the place utility gained from a location and whether the decision is made to stay or relocate. This is a new framework for analysis that emphasizes agency and makes explicit the interaction of individuals with environmental risks within migration decision-making (Adams and Adger, 2013).

Migration is multi-faceted and the delineation of what constitutes migration involves judgments of permanence, distance and duration. Most migration occurs over short distances and on "temporary" cycles ranging from diurnal to many years. Remittances and social networks play key roles in initiating migration and defining the destination of migrants. The causes of migration are usually various and act upon the migrant both directly and indirectly making the drivers of migration difficult to define.

The next section briefly summarizes the interaction of environmental change and demographic change over the coming decades. The chapter continues by examining how changes in the environment will affect migration decision-making through benefits gained from the environment at the level of the individual. Migration as a form of adaptation is then discussed. Finally, policy discourses on adaptation are examined. The chapter concludes by calling for the reframing of migration as an important component of any policy response to environmental change.

Climate change impacts, people and settlements

The world will undergo unprecedented change over the incoming two or three generations in both economic and environmental dimensions. While climate and other environmental change will be ever more significant, demographic changes associated with population growth and stabilization will form the backdrop to how these environmental risks play out in specific countries and regions.

Communities facing a changing climate will have to deal with slow changing variables; with changing risks associated with extreme events; and with unforeseen and possibly rapid onset regime shifts in climate and resource availability. There are three major likely climate change drivers of change that will directly affect settlements and hence migration flows: changes in sea level; flood and other extreme weather-related risks; and land degradation. Land degradation will be driven through processes such as desertification, glacial retreat and snowpack loss.

Table 35.1 summarizes major projected impacts of climate change in a qualitative way from the Intergovernmental Panel on Climate Change (IPCC) reports in 2007 and suggests where and how these may translate into potential movement of people or changes in the location of economic activities. Many impacts of climate change will first be experienced through weather-related hazards, but longer term processes such as coastal erosion and impacts on biodiversity also directly affect ecosystem services available to people (McLeman and Hunter, 2010). There is growing evidence suggesting that systems may

Table 35.1 Projected fast onset, slow onset and long-term hazards from projected climate change and potential associations with future population displacement and migration. Source: Adapted from McLeman and Hunter (2010) with trends in impacts summarized from IPCC (2007)

<i>Projected changes (from IPCC, 2007)</i>	<i>Regions affected</i>	<i>Associated mobility and displacement implications</i>
<i>Fast onset hazards</i>		
Increased extent of areas affected by drought	Widespread across semi-arid areas	Loss of productivity resulting in seasonal displacement; specific impacts on pastoralist economies
Decreasing crop productivity due to extreme heat and drought	Dry tropics and seasonally dry regions	Potential for amplification of rural-urban migration flows
More intense precipitation events	Widespread across regions and climates	Risk of flood displacements and to settlements in flood plains
<i>Slow onset hazards</i>		
Reduced water availability in regions dependent on mountain snowmelt	Himalayan region including China; western North America; western South America	Implications for agricultural viability and labor demand in agriculture; impacts on urban water use from water scarcity
Increased risk of coastal erosion from sea level change and coastal storminess	All coastal regions, with some already more sensitive than others	Potential for inundation and involuntary relocation for small coastal settlements; large coastal cities likely to be protected and act as population growth poles
<i>Longer term processes</i>		
Decreased snow and ice cover	Arctic	Expansion of shipping and economic activities potentially stimulating population movement
Increases in average river runoff and water availability	High latitudes and wet tropical areas	Risk of flood displacement in settlements on flood plains
Decreases in average river runoff and water availability	Mid latitude and dry tropics	Water availability limiting economic activities and labor demand; new areas prone to such impacts
Ecosystem disturbance and plant and animal species at risk from localized or global extinction	Global	Limit on economic activity for economies dependent on narrow range of resources with demographic implications

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be more sensitive to climate change than previously perceived (Füssel, 2009; Smith *et al.*, 2009). Observed and projected sea level rises, for example, may exceed those reported by the IPCC, exacerbating the vulnerability of coastal communities.

The timescales of many of the major climatic risks coincide with other major demographic trends – continued urbanization driven in part by rural depopulation, migration from country to city, and increasing population density at the coast. The impact of climate change on these trends is not clear, but it will be a critical issue (Black *et al.*, 2011). By 2050 there may be an additional 2.6 billion people living in urban areas as a result of both migration and growth (UNDESA, 2011). The majority of this increase is expected in Asian and African cities (Montgomery, 2008).

The big move: making decisions

Will climate change impacts amplify or stall this trend in urbanization around the world? The answer will depend on both structural factors and on individual decisions. In general, individuals in resource-dependent, rural areas make a decision to relocate on the basis of expected benefits of moving, relative to staying in the same place, along with factors of security, identity and perceived well-being. In resource dependent societies, much of satisfaction with place (place utility, or the net composite of utilities that are derived from the individual's integration at some position in space (Wolpert, 1965: 162)) is created by the quality of the environment in which people live. Importantly, the environment contributes to both instrumental and affective aspects of place utility; individuals form attachment to nonmaterial aspects of the natural environment, as much as they rely on the environment for income (Adams and Adger, 2013).

Environmental change, such as changing climate, through its negative impacts on agricultural productivity, the availability of water resources and flood frequency (among others) will alter the utility that a location offers its population. It is changes in these ecosystem services, to follow the terminology of the Millennium Ecosystem Assessment, that mediate between environmental change and the decision to migrate through mechanisms of:

- Productivity – provisioning services from marketed and non-marketed goods in sending and receiving areas;
- Risk – role of regulating services such as flood and micro-climate control in sending and receiving areas;
- Well-being – cultural services and other elements that make up the utility of places of residence accruing to individuals and communities.

Although environmental risks cannot generally be traced through to individual migration decisions, climate change will alter the relative attractiveness of sending rural areas and receiving urban areas. Climate change is likely to reduce productivity within agriculture and have detrimental impacts on other ecosystems

in many rural areas, particularly in the semi-arid tropics (Easterling, 2007). However, increased flood risk or declining water resources may equally affect the relative pull of urban areas (see Rosenzweig *et al.*, 2011).

Existing studies show a complex relationship between environmental degradation, ecosystem services and rates of outmigration depending on the location, the form of environmental change and the social drivers of migration. Whether migration increases or decreases depends on the duration and distance of the migration and social structures. For example, with respect to desertification, a reduction in resources during drought reduces the possibility of long-distance international migration (Jónsson, 2010) but been shown to also increase the possibility of short-term migration (Henry *et al.*, 2004). Poor soil quality has been associated with out-migration (McLeman and Ploeger, 2011) but the effects may be gendered (Gray, 2010; Gray and Mueller, 2011). Furthermore, this migration may be taking place in societies that are already highly mobile. In pastoral economies, movement of people cannot necessarily be described as migration but an adaptation to climate variability and harsh climate conditions (Black, 2001; Mortimore and Adams, 2001; Henry *et al.*, 2004; McLemen, 2009).

Interactions between demographic change and environmental change are not unidirectional. Migration can impact negatively on the environment of the sending area through the investment of remittances in unsustainable environmental practices. Migrants can also cause environmental degradation at the receiving area; migration to frontier agricultural areas drives forest loss and other environmental degradation in many parts of the world.

In the case of Vietnam, significant rural-rural migration to the highlands as part of the coffee boom in the past two decades has undermined sustainability and made these areas sites for environmental degradation (Winkels, 2008).

Figure 35.1 demonstrates the relationship between environmental factors as both a trigger of migration decisions and the environmental consequences of movements themselves for both sending and receiving areas. Extreme events lead to large-scale but generally short distance and temporary migration with a strong environmental weighting in the decision to move. Slow onset events such drought, which gradually affect the natural resource base in an area, tend to lead to migration decisions based on maintaining a livelihood and can involve longer distance more permanent moves of one member of the family (to remit) or the entire household. The weighting of the environment in the decision to migrate varies between these two extremes. When people move, they enhance the linkages between sending and receiving areas, such that remittances and people moving back and forth often benefit both areas (Figure 35.1). Characteristics of the individual and their decision-making process further influence migration. A fall in place utility because of environmental change and the likelihood of migration as a result of that change depends on exposure to hazard, contributors to identity and place attachment and levels of social capital and networks (Smith *et al.*, 2012; Adams and Adger, 2013).

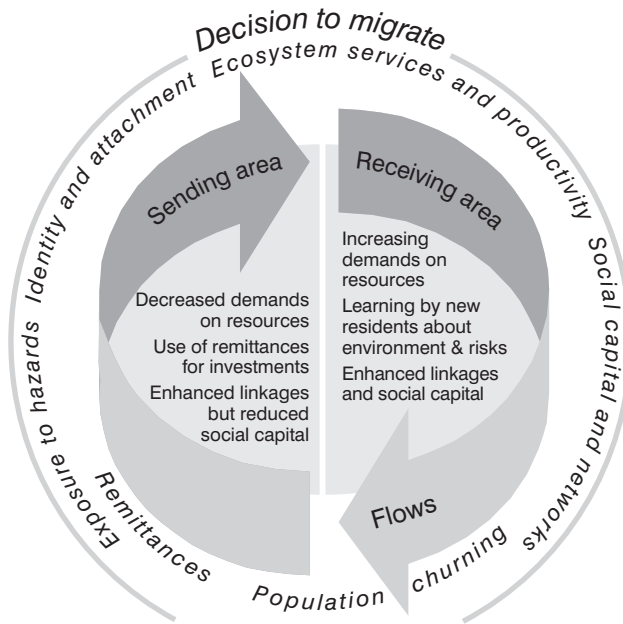


Figure 35.1 Environmental and social implications of migration in sending and receiving areas related to individual migration decision-making.

Migration as an adaptation

Migration in relation to adaptation can be conceptualized in one of two ways. It can be seen as the action of last resort, that which takes place when all other types of adaptation have been implemented and failed. In this framing the end goal of adaptation is to recover livelihoods after an external shock. An alternative framing suggests migration as one of many coping mechanisms used to diversify incomes to reduce risks associated with uncertainty. In reality, the interaction of migration and environmental change produces both migration of the last resort and migration as an adaptation. These two types of migration are discussed further below.

Human-induced climate change is a special case of environmental risk in that it is an imposed harm. Hence, some necessary migrations associated with direct displacement as a result of changing sea level or radically altered productivity of land can only be conceived of as forced and migration a necessity. The government of the Maldives is contemplating such migration. Almost 80 percent of the 1,200 islands of the Maldives are no more than one meter above sea level and, without the large sea defenses that protect Male the capital, the islands may be uninhabitable if sea levels rise by more than one meter. Hence, the former Maldives President Mohamed Nasheed talked of a “survival deal” on global climate change and the potential for the 400,000 residents to move en masse to a

“new home” in Asia or Australia on land purchased through a sovereign wealth fund (New York Times, 2009).

However, more common is for migration to act as a coping mechanism to a changing climate and greater climate variability. There are two obvious means by which migration serves to help a household adapt along a continuum from pre-emptive to responsive adaptation. First, with greater levels of *pre-emption*, migration of a family member on a diurnal, seasonal or yearly cycle is a rational deployment of human capital across locations and economic sectors to increase income and minimize risk to livelihood sources (de Sherbinin *et al.*, 2008). Such migration patterns have diverse impacts in sending and receiving areas. In sending areas, remittance incomes are often vital and there is evidence across the developing world that such flows tend to be invested in education and other forms of capital (Ellis, 2000). Likewise, the ability of remittances to allow investment (for example in technology or education) in the sending area further increases the resilience of households in the sending area. At a more responsive level, a family can elect to send a family member (or additional family members) to seek work elsewhere in order to prevent the entire household from migrating from an area where environmental variability, change or degradation is reducing the productivity of other income sources.

Adger *et al.* (2002), using data from rural coastal Vietnam, showed how remittance income was used to spread risk, though increased overall income inequality in sending areas. The authors concluded that for those areas migration was an important element in maintaining social resilience. The second area is migration in *response* to climate change impacts. Here, the important element is the ability of migration to provide access to new livelihoods or a new location in which to carry out a livelihood. In the context of displacement as a result of extreme events, migration provides access to the support of social networks and reduces mortality.

Policy and discourse on adaptation and migration

Dominant discourses on migration in the context of environmental change tend to depict migration as both a negative outcome of climate change impacts and a negative form of demographic change in itself (White, 2011). Promoting migration as an effective form of adaptation requires significant changes in how it is conceived by governments and the public everywhere. The evidence on the benefits of migration for sending areas (via remittances); receiving areas (through a supply of labor) and the migrants (through higher wages) is persuasive. Pritchett (2006) estimates that increasing the rate of South to North international migration by 3 percent over present rates could benefit developing country economies by amounts greater than overseas development assistance, trade and debt relief combined. Putnam (2007) further suggests that international migration increases diversity that has positive spin-offs in terms of creativity and human development.

The Foresight report on Migration and Global Environmental Change (Black, 2011; Foresight, 2011) goes some way to promoting the benefits of migration as an

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adaptation and the need to prepare for a more mobile world under environmental change. If migration is accepted as an established adaptive response to all kinds of changes in the social, cultural and natural environment, then to enable effective adaptation governments will need to create policies to allow and support migration and population mobility (Tacoli, 2009). Suggestions for how this can be undertaken range from ensuring access to non-farm activities in small and intermediate urban centers (Tacoli, 2009) to a global protocol on the protection and resettlement of climate change refugees (Biermann and Boas, 2008).

If governments are to make policies which encourage and enable migration as an adaptation to climate variability then there will be increasing demand for legal definitions of environmental or climate migrants (Dun and Gemenne, 2008; Martin, 2010) since if environmental migrants cannot be defined then they cannot be counted. Various definitions of environmental migrant have been attempted based on the type of environmental change and the length and distance of migration (Barnett and Webber, 2009; and Warner, 2009). However, any definition of an environmental migrant will be unsatisfactory since the decision to migrate will always be the result of a combination of drivers. A clear definition of “environmental migrants” is, however, only a marginal issue for governments. Their primary concerns with respect to managing the impact of environmental change on society focus on the impacts of migration on sustainable cities, land use planning and the economic viability of agriculture and primary industries.

A further challenge for policy of migration and its human security implications is the level of uncertainty around migration flows, particularly international flows, and the multicausality in individual decisions (Barnett and Webber, 2009). This is compounded by the uncertainty surrounding climate impacts and how interactions between the environment and migration may play out in the future with increased climate change. The standard reaction to uncertainty in scenario studies has been to project climate change and postulate how this may influence migration in the future (Feng *et al.*, 2010; Barbieri *et al.*, 2010). Common criticisms are that estimates of future migrants are based on exposure to risk and not on an analysis of how such risks might interact with the migration decision. The effectiveness of adaptation in ameliorating the impacts and protecting populations and settlements is rarely incorporated. Cultural factors, such as the perceived benefits of “home,” are not easily captured in assessments or standard welfare criteria and are often discounted.

Conclusion

This chapter has outlined some of what is known about migration response to environmental change in the context of human security. We have stressed that migration as an adaptation strategy should be examined in the context of both multi-dimensional adaptation to change and of broader demographic changes and trends. We propose that environmental change is transmitted as changes in ecosystem services that directly affect the place utility of individuals through the availability of provisioning, regulating and cultural services.

Adaptation to change aims to enhance, or at a minimum maintain, human security in the face of multiple risks and other changes and relocation is just one of these possible actions. Given the social and cultural costs of migration, the evidence concurs with McLeman's (2009) notion that migration is rarely the "first resort" adaptation in the face of specific environmental stressors, yet is an important dimension in the long-term human security of regions, households and individuals. In the same manner, migration as a response to climate change will only alter the macro-scale patterns of population movement that have existed and accelerated throughout human history.

The focus on migration in many climate change policy debates is therefore somewhat misplaced. The discourse on migration focuses primarily, if not exclusively in some circles, on the perceived negative consequences of international migration as a problem to be managed. States seek to protect their borders and manage their labor markets rather than view migration as a humanitarian or human security issue (Biermann and Boas, 2008). In many ways, this skewing of the debate hinders serious consideration of migration, including international migration, as a critical adaptation strategy in the face of climate change. It also underemphasizes the economic dimensions of for both sending and receiving countries and areas and for the migrants themselves. With these observations in mind, the debate on migration needs to take a positive turn to realize the benefits of population movement on social resilience and human security.

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