Climate change, migration and critical international security considerations

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CONTENTS

LIST OF ACRONYMS

CNA	–	Center for Naval Analyses
GHG	–	Greenhouse gas
IPCC	–	Intergovernmental Panel on Climate Change
UNFCCC	–	United Nations Framework Convention on Climate Change
UNHCR	–	United Nations High Commissioner for Refugees

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EXECUTIVE SUMMARY

The impacts of anthropogenic climate change are expected to lead to large-scale population displacements and migrations in the coming decades, with the potential to create instability and conflict in the most vulnerable regions. An oft-cited prediction by Myers (2002) suggests that climate change and other environmental factors could lead to 200 million people being displaced by mid-century; other estimates suggest that as many as 1 billion people could be displaced. Such estimates are not based on statistical or empirical evidence, and it is arguable whether any population movements presently being observed are attributable to climatic change.

That said, climate-related conditions and events can and do stimulate population displacements and migrations. Scholars see migration as one of the many possible ways by which people adapt to the climate. Anthropogenic climate change is expected to increase the frequency and/or magnitude of many climatic events and conditions known to stimulate migration, with sea level rise posing new risks to coastal settlements and small island states. The first migration movements in the coming years that will be clearly attributable to climate change are likely to be movements of opportunity-seeking economic migrants into Northern regions as sea and land ice disappears.

Over the longer term, the greatest volume of climate change-related migration is likely to emerge in dryland and coastal regions that are highly exposed to the emergent physical impacts of climate change and where population growth rates are high. Where such conditions coincide in developing regions, there will be a heightened potential for conflict, violence and distress migration due to increased scarcity of critical resources or increased valuation of geographically concentrated resources. However, in most instances, there will be many opportunities for prevention and intervention before violence emerges.

Avoiding large-scale climate-related population displacements and migrations in the future will require concerted international effort to mitigate greenhouse gas (GHG) emissions and build adaptive capacity in the most vulnerable regions. Limited progress is presently being made in international negotiations on either front; in the meantime, global GHG emissions continue to rise and access to critical food and water resources is becoming increasingly precarious in many developing regions. Unless current trends change, population displacements and migrations seem inevitable and are likely to emerge within the next 20 years. The largest movements will occur internally within vulnerable countries and regions, although there will be increased international migration as well, especially along established migration routes and

networks. Current international law with respect to migration does not account for those displaced across international borders for climate-related reasons, presenting an additional future challenge for the international community.

In the worst-case scenario, the impacts of climate change will cause large-scale population displacements in unstable states such as Pakistan, reverse a decade of peace-building progress in West Africa, create new diasporas from small island states, and cause already-crowded urban centres to swell with additional impoverished rural migrants.

1. INTRODUCTION

It is increasingly feared that anthropogenic climate change may lead to widespread population displacements and distress migration on scales not previously seen (UNHCR, 2009a). Predictions from reputable commentators have suggested that hundreds of millions of people may become "environmental refugees" within the next few decades, with climate change being a key cause of displacement (Myers, 2002; Christian Aid, 2007; CARE International, 2009). The popular media has identified places as far apart as Shishmaref in Alaska, Cataret Islands in New Guinea and the Lake Chad region of Africa as being sites of the first climate change refugees (IRIN, 2008; Vidal, 2005; Willis, 2004; York 2010). Climate change-related migration is seen not only as a humanitarian threat, but also as a risk to international and regional security (Brown and McLeman, 2009). A United Nations Environment Programme (UNEP) assessment of the recent conflict in Sudan suggests that regional climate change contributed to instability and conflict in Darfur (UNEP, 2007), while the United Nations High Commissioner for Refugees (UNHCR) has stated publicly that climate change has become a main driver of forced migration (Borger, 2008). Panels of retired military officers and consultants to the US security establishment describe abrupt climate change as a potential "threat multiplier" that could trigger violent conflicts and stimulate waves of distress migration that further destabilize vulnerable nations (CNA, 2007; Schwartz and Randall, 2003). Bookshops now carry ominous titles like Climate Wars (Dyer, 2009) and Global Warring (Paskal, 2009).

Are we indeed on the cusp of an era of great climate-related population displacement? If so, will displacements destabilize states or entire regions, and trigger fresh waves of refugees to the gates of rich countries? While it has long been accepted that changes in environmental conditions can and do influence human migration patterns, predictions of future climate change migration often draw heavily on generalized scenarios, expert opinions, back-of-envelope calculations, and best guesses (Brown, 2008a) – not necessarily the best evidence on which to base international migration or security policy. There is not a great amount of statistical data available on climate-related migration on which to base future projections (Brown, 2008b), although Kniveton et al. (2008) suggest a number of possible directions for generating such information. There does, however, exist a fair amount of research on historical and present-day climate-related population displacements and migrations, which provides useful insights into the particular types of interactions between biophysical and socio-economic processes through which climate change may affect future migration patterns and behaviour (McLeman and Hunter, 2010).

As to how future climate change-related migration may in turn affect state or regional security, here again the empirical evidence is thin and the future outlook is

far from clear. There is considerable research showing that climate change can be expected to undermine agricultural productivity, deplete water resources, increase the likelihood of extreme weather events and decrease biodiversity in many regions around the world, all of which may be expected to increase the vulnerability of populations and the resources they depend upon (please refer to Parry et al. (2007) for a robust synthesis of these). In places where such circumstances become acute, there will be instances when people are displaced involuntarily, and many more instances when people will deliberately undertake migration as an adaptive response (McLeman and Smit, 2006; Tacoli, 2009). However, it cannot be assumed on the basis of existing empirical evidence that violent conflicts or similar outcomes that compromise state security will automatically follow. Conflicts attributable to environmental events, climate-related or otherwise, are not especially commonplace and, as will be shown later in this report, may arise under conditions of resource abundance as well as resource scarcity (Raleigh and Urdal, 2007; Wolf, 1998).

To enhance our understanding of climate change-related migration and its potential state, regional and international security implications, it is useful to begin with the clearest possible identification and functional understanding of socio-economic and environmental processes and how they interact to stimulate climate-related migration and their subsequent connections with security. The remainder of this report draws principally from recent scholarly literature and is deliberately normative. It is designed to provoke discussion among those who require such information to set or influence international migration and security policies in the coming era of tremendous environmental uncertainty.

As will be shown, the makings of a perfect storm are in place: human population numbers are growing fastest in the very regions where the physical risks of climate change are most likely to undermine livelihoods and stimulate migration. However, while hundreds of millions of people on the move and fragile states tipping into climate change-induced conflict are within the realm of possibility, whether such things come to pass is still within the influence of global policymakers. Two broad sets of potential interventions will be identified: ones that reduce the climatic triggers for distress migration and ones that build greater capacity within vulnerable populations so that they may adapt through means that do not lead to distress migration or conflict.

2. FORECASTS OF FUTURE CLIMATE-RELATED MIGRATION

Forecasts of future climate-related migrations and population displacements vary considerably. Estimates are often given in terms of "environmental refugees", a term that enjoys no formal recognition under international refugee law, but which generally describes involuntary migration stimulated by changes in environmental conditions, one subset of which includes changes in climate (Bates, 2002; El-Hinnawi, 1985; Westing, 1992). One oft-reproduced prediction from British ecologist Norman Myers suggests that there may be 200 million environmental refugees worldwide by mid- to late century, including many to be displaced by the impacts of climate change and related sea level rise (Myers, 2002). CARE International (2009) arrives at similar conclusions in a report produced in collaboration with the United Nations University-Institute for Environment and Human Security (UNU-EHS), the latter organization having previously warned in 2005 that 50 million environmental refugees should be expected worldwide by 2010 (UNU-EHS, 2005; this prediction has yet to be validated). The relief organization Christian Aid (2007) has suggested that as many as 1 billion people will be displaced from their homes by mid-century from the combination of anthropogenic climate change and other global environmental changes. McGranahan et al. (2007) avoid making specific predictions, but have observed that 10 per cent of the world's population lives within 10 metres of sea level, and is consequently exposed to the possibility of displacement by sea level rise.

To put such estimates into context, UNHCR (2009b) reported that there were 15.2 million refugees worldwide, and another 25 million involuntarily displaced within their own borders at the end of 2008 (the last year for which figures were reported at the time of writing). The Population Division of the United Nations Department of Economic and Social Affairs (UN DESA, 2010) puts the world's total annual migrant population at slightly more than 200 million. In other words, the climate change-migration projections suggested by Myers (2002), Christian Aid (2007) and others, if realized, would lead to as much as a forty-fold increase in the global population of involuntary migrants, and significantly increase the number of people on the move annually.

Statistics on current environment-related population movements are hard to come by, making it difficult to gauge the reliability of forecasts such as these (Brown, 2008b). The UNHCR – the one agency best equipped to make statistical projections of distress migration – offered no estimates in its 2009 policy statement on actions needed to address climate change-related migration. Similarly, in reviewing the literature pertaining to climate change and possible migration outcomes, the Intergovernmental

Panel on Climate Change (IPCC) reports no statistical evidence beyond the commonly cited Myers estimate (Adger et al., 2007). Alternative sources of statistics are the United Nations International Strategy for Disaster Reduction and the Centre for Research on the Epidemiology of Disasters, which provide annual estimates of the number of people affected by natural disasters, broken down by type of disaster (of which some, but not all, are climatic in nature). However, these provide only crude figures from which to work, and principally count only those events where at least 10 people are killed or 100 hundred people or more are affected. As Gutmann and Field (2010) observed, environmentally induced displacements and migrations are often driven by smaller, frequent or repetitive events that do not make the television news, and therefore tend not to turn up in disaster reporting. Moreover, those who are affected by disasters or who are obliged to evacuate their homes during disaster events do not necessarily become migrants; many return to their former place of residence as soon as it is safe to do so.

In summary, while there is wide agreement that climate change will affect future migration patterns and that the number of people potentially at risk is large, reliable statistics are presently not available from migration or disaster reporting; hence, any future estimates on climate change migration will inherently contain large assumptions and speculation. That said, there does exist reliable information from which to understand the ways by which climatic variability and change influences migration patterns and behaviour; this information is helpful in identifying the potential scale and location of future migration.

3. HOW CLIMATE AFFECTS MIGRATION

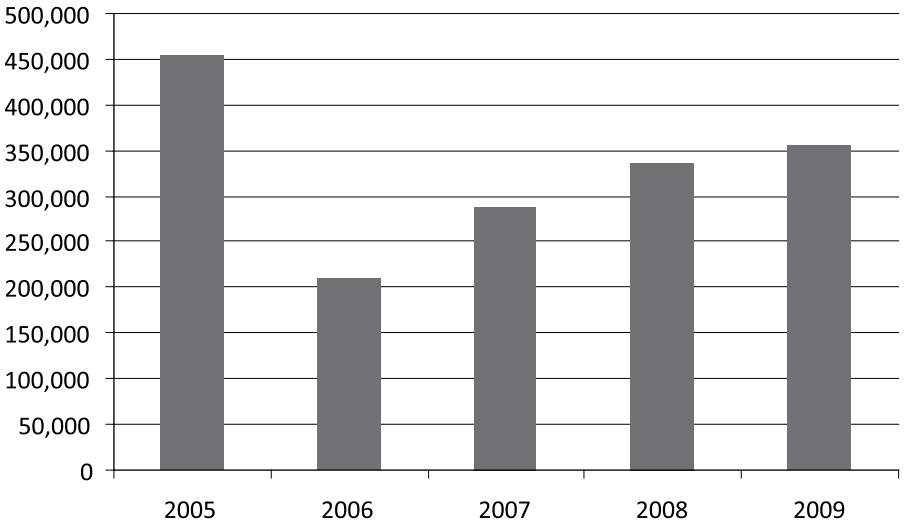
There is widespread recognition among scholars that environmental conditions, including climatic variability and change, can and do influence migration (Hugo, 1996; Hunter, 2005; Shah, 1994). Academic and popular discussions of climate-related migration tend to take place within the broader debate about "environmental refugees", a type of migration described by El-Hinnawi (1986) as occurring when people are involuntarily displaced in response to environmental conditions or events that may occur naturally (e.g. earthquakes) or are anthropogenic in origin (e.g. flooding of river valleys behind large dams). A range of climatic events and conditions, such as extreme storm events, droughts and so forth, have the potential to stimulate large pulses of environmental refugees, and the frequency and severity of many such events is expected to increase in many regions as a result of climate change (Solomon et al., 2007). Yet, environmental refugees represent only one end of a continuum of possible environment-migration outcomes (McLeman and Hunter, 2010). At the other end of the continuum is the environmental amenity migrant who voluntarily seeks better-quality environmental conditions. Examples might include a family with an asthma-prone child that leaves a congested megacity for another city's better air quality, or the retired "snowbird" who leaves the hard winters of northern North America for Florida's sunnier climes. Movements of amenity migrants can be sizeable; for example, one study suggests that each winter a full 1 per cent of the Canadian population spends more than three weeks (i.e. longer than the typical holiday vacation) in the southern United States (Coates et al., 2002). A great many other possibilities exist between the two extremes of environmental refugee and amenity-seeker, and, in many instances, it may be difficult to distinguish environmental influences from political, economic, social, and cultural factors that may also concurrently influence migration behaviour (Suhrke, 1994; Hunter, 2005).

In the scientific community, the human impact of climate change is typically described in terms of vulnerability – that is, the potential to experience loss or harm (Adger, 2006). Vulnerability, in turn, is seen as a function of the sensitivity of a given population, region or system to the types of climatic disturbances to which it may be exposed (often simply described as exposure), and the capacity of the population to adapt (Parry et al., 2007). This conceptualization of vulnerability allows past or present examples of climate-related migration to be used as analogues for identifying the types of environments and locations where settlements are especially sensitive to climatic disturbances, and to understand how migration emerges from adaptation processes (McLeman and Smit, 2006). With an enhanced understanding of the elements of sensitivity and adaptive capacity, information from general circulation models and downscaled regional climate models can then be used to identify areas with high levels

of exposure to future migration-inducing climate events, enabling the identification of populations most vulnerable to future climate change-related migration.

Some types of settlement locations and land uses are more sensitive to migration-inducing climate events than others. These include: low-lying coastal areas and small islands (especially those in regions subject to tropical storms); river valleys and deltas; dryland areas; regions where precipitation is highly seasonal; and high latitudes and high altitudes (McLeman and Hunter, 2010). In such locations, two categories of climate-related events may trigger migration, categories similar to those that have long been used to describe natural hazards (Burton et al., 1978). The first consists of extreme weather-related events that have a sudden onset, such as tornadoes, hurricanes, heavy precipitation, floods, wildfires, and the like. The duration and geographical scale of such events varies from brief and localized (e.g. tornadoes) to the many days and vast regions across which the effects of a single hurricane are felt. Particular locations are often prone to particular types of sudden-onset events; these locations include populated river valleys that experience frequent flooding (e.g. North America's Red and Mississippi river valleys and Asia's Ganges) or coastal regions that regularly experience tropical storms (e.g. the Gulf of Mexico and the South China Sea). Some types of extreme events happen infrequently, while others occur in the same regions on an annual basis, and the only uncertainties concern their specific paths, magnitudes and frequency of occurrence within a given season – uncertainties that remain notoriously difficult to pin down (for example, see Langland (2005) for complexities related to tropical storm forecasting). Given their nature, sudden-onset events are often associated with evacuations before or after the event and, depending on the magnitude of damage to physical infrastructure, they may result in a pulse of distress migration out of the affected region. New Orleans, which, at the time of writing, had fewer residents than it did prior to Hurricane Katrina in August 2005, provides a very visible example of the effects of sudden-onset events on population (see Figure 1).

Figure 1: Population of Orleans Parish, Louisiana, pre- and post-Hurricane Katrina



Source: US Census.

Slow-onset events and conditions are also known to potentially lead to migration; these include such things as droughts (which may be attended by soil erosion), and oscillations in precipitation and temperature patterns. They may unfold over months or years and may affect vast regions. It often takes time for exposed populations to realize and experience the full severity of these slow-onset conditions; hence, migration responses tend to be slow to materialize, as people first attempt other ways of adapting. For example, drought was implicated in North America's largest environmentally related migration event, known colloquially in the United States as the Dust Bowl migration (Gregory, 1989). In the early 1930s, precipitation on North America's Great Plains fell well below previously experienced levels and remained low for many successive years, causing widespread and repeated crop failures (Gutmann et al., 2005; Gilbert and McLeman, 2010; McLeman et al., 2010). The economic impacts of the concurrent Great Depression removed many of the fallback options agricultural households had used to cope with previous droughts, such as seeking work in mines, oilfields, railways, and other sectors (McLeman et al., 2008). By the mid-1930s, the cumulative effects of years of persistent drought and economic hardship had exhausted the adaptive capacity of many households, leading hundreds of thousands to migrate out of the Great Plains, and hundreds of thousands more to relocate elsewhere within the Plains region (Gregory, 1989; McLeman et al., 2010). Destitute roadside travellers, malnourished children, informal refugee camps and similar images we today associate with events like the Darfur refugee crisis were common across western North America throughout the second half of the 1930s (Lange and Taylor, 1939) (see Image 1).

Image 1: Ditch-side migrant squatter camp, California, 1936

Source: Library of Congress Prints and Photographs Division, Farm Security Administration - Office of War Information Photograph Collection, LC-USF34-009995-C. Dorothea Lange, photographer.

Subsequent decades have seen many changes take place in Great Plains demographic patterns and agricultural systems, such that droughts no longer trigger large migration within western Canada and the United States as they once did. Much Great Plains agriculture today uses irrigation from surface and underground water sources to offset the risks of drought, and a larger percentage of Great Plains population today lives in urban centres, with livelihoods less tied to agriculture. Scientists do raise concerns that the heavy withdrawal rates from aquifers and rivers are unsustainable, and will place Great Plains populations at renewed risk of future droughts (Rosenberg et al., 1999; Schindler and Donahue, 2006). In the meantime, drought-related migration still continues in western North America today, only now it takes on the form of higher rates of Mexican migration to the United States when drought conditions strike rural Mexico (Feng et al., 2010).

The IPCC suggests that the coming decades will see an increase in both sudden-onset events and slower-onset conditions of the types likely to trigger migration.

Table 1 summarizes those most likely to emerge and how they link with migration. Changes in mean sea levels will present a new set of climate-related drivers of population displacement in low-lying coastal regions. The current average rate of sea level rise of 3 mm/year is expected to accelerate given the current trends in global GHG emissions (Solomon et al., 2007); how fast it accelerates will be a critical determinant of how soon individual coastal settlements and small island state populations may need to be relocated or abandoned. It was noted earlier that various popular media reports have identified Shishmaref in Alaska and several small Pacific islands as being the sites of the first climate change refugees due to changing sea levels, but there is no clear scientific evidence to confirm climate change as the underlying driver. An Inconvenient Truth and other documentaries have described migration to Australia and New Zealand from Tuvalu as being the result of climate change, but the limited peer-reviewed research currently available has found that this migration has little to do with climate-related risks and is driven primarily by job-seeking and family reunification (Mortreux and Barnett, 2009).

Table 1: Expected impacts of anthropogenic climate change and potential associations with future population displacements/migrations

Expected biophysical changes	Regions at risk	Possible linkages to migration
Decreased snow and sea ice cover	Arctic	Economic migrants arriving to take advantage of newly accessible resources
Higher average river run-off and water availability; heavier precipitation events	High latitudes, some wet tropical areas	Flood-related displacements
Lower average river run-off and water availability; more droughts in dryland areas	Mid- to low-latitudes and dry tropics; drought-prone continental areas; areas receiving mountain snowmelt	Water scarcity, drought, and decreased crop productivity leading to migration, especially higher rates of rural–urban migration
Coastal erosion, extreme storms, sea level rise	Low-lying coastal regions, deltas and small island states	Relocation of settlements

Source: Adapted from McLeman and Hunter, 2010.

4. MIGRATION AS HOUSEHOLD ADAPTATION

There are a number of potential ways by which populations may respond to climate-related events and conditions. Adaptation may be undertaken at any level, from the individual or household level up to the level of state or international governance bodies (Adger et al., 2003; Smit and Wandel, 2006). Adaptation efforts may be undertaken in anticipation of events (such as the devising and implementing of monitoring and emergency response measures in hurricane-prone areas) or in response to events (such as deciding to resettle on higher ground after a flood). The range of adaptation options available to members of a given population is highly influenced by a complex set of interacting factors linked to economic development, financial stability, human capital, cultural norms, prevailing political dynamics, and social networks (Smit and Pilisova, 2003). Adaptive capacity therefore varies considerably from one region to another, differs among social groups and households within a given population, and is continually changing over time.

Migration is just one of the ways by which members of a given population may adapt to climate (McLeman and Smit, 2006; Perch-Nielsen et al., 2008; Tacoli, 2009). There are past examples of state-organized population relocation in response to climate-related events, such as those that occurred in parts of rural Ethiopia during the severe droughts and famines of the 1980s (Ezra and Kiros, 2001) and in south-eastern Alberta in Canada, where government policies sought to reduce the population of drought-prone "special areas" (Marchildon et al., 2008). Despite these examples, climate-migration unfolds most often as the result of autonomous actions of households and individuals, and consequently takes on many different shapes and forms (McLeman and Hunter, 2010). A single climatic event may stimulate a variety of possible migration responses. For example, in response to Hurricane Katrina, some New Orleans residents evacuated temporarily and returned swiftly to their homes; others took months or years to return; still others have not returned at all (Fussell et al., 2010). Employment opportunities created by the rebuilding effort attracted new residents to the city from elsewhere.

In developing regions, where economic systems and livelihoods are often closely tied to agriculture and natural resources, extreme climatic events and conditions may accelerate already growing levels of rural-to-urban migration (Hunter, 2005; McLeman and Hunter, 2010). Those at the lowest end of the socio-economic spectrum – particularly the landless labourer and the tenant farmer – are the most easily displaced. Landowners, business operators and other residents at the upper end of the socio-economic spectrum will also experience economic hardship during adverse climate conditions, but are much more likely to resist migration because their

household capital is tied to land and other assets that are not transportable (McLeman and Smit, 2006). In rural West Africa, migration has become a key tool in the ongoing adaptation of rural households to the seasonality of rainfall and frequency of droughts (Hampshire, 2002; Mortimore and Adams, 2001; Nyong et al., 2006; Rain, 1999). Many rural inhabitants migrate to the city each year during the annual dry season, their numbers increasing significantly during years of drought. When drought conditions persist for extended periods of time, as they often did in the last decades of the twentieth century, seasonal migration becomes more permanent. It is typically young, able-bodied males (and, depending on the cultural groups, similarly aged females) who participate in dry-season, rural-to-urban migration. These migration-related rural–urban linkages are important in building adaptive capacity and household resilience, something that has been identified by scholars working in other regions as well (Adger et al., 2002; Connell and Conway, 2000; Smit, 1998).

5. THE EMERGENCE OF CLIMATE CHANGE-RELATED MIGRATION

As noted earlier, although there is much talk about climate change causing environmental refugees, researchers are hard-pressed to point to specific population displacements or migration movements and state with certainty that climate change is the root cause. The most obvious impacts of climate change are currently being observed at high latitudes. In the Arctic, changes in permafrost, land and sea ice conditions are having a clear and documented impact on livelihoods, economic activities and social well-being (Berkes and Jolly, 2001; Ford et al., 2006). Infrastructure in some Arctic communities has been damaged or is in imminent danger of being damaged (Instanes et al., 2005). Indigenous peoples across the Arctic are having to make adjustments to their traditional hunting, fishing, and food gathering systems (Nuttall et al., 2005). However, at least so far, there is no documented evidence of people migrating out of the Arctic for climate change-related reasons. On the contrary, as Northern shipping lanes become increasingly ice-free and as resource companies enter the region in search of newly revealed hydrocarbon and mineral resources, the resultant economic growth can be expected to draw migrants to the North. The first large migration clearly attributable to climate change may therefore be an influx of opportunity-seeking migrants to Northern communities, likely numbering in the tens of thousands across various Arctic nations.

It may be years before large distress migration attributable to anthropogenic climate change are identified. This does not mean to say that climate change-related migration events will not occur in the meantime, but simply that identifying a clear climate change signal in such events may not be possible, even where such a signal is indeed present As an illustration, arid and semi-arid regions are seen as potential sites for future climate migration for a combination of reasons, including the inherent variability of precipitation and periodic droughts in such regions, observations of past dryland migration patterns, ongoing land degradation and desertification in many regions, and future predictions of climate derived from general circulation models. In Sahelian Africa, average precipitation was significantly lower in the second half of the twentieth century than in the first (Hulme, 2001), but there is insufficient data to say whether or not this is attributable to anthropogenic climate change. Like other arid and semi-arid regions, the Sahel has high intra- and inter-annual climatic variability, with extremes in temperature and precipitation being common, so teasing out any possible contribution to variability and extremes from anthropogenic climate change is a challenge. Moreover, GCM predictions for the Sahel are highly inconsistent, with some projecting greater dryness in the future and others projecting a wetter climate (Boko et al., 2007). As another example of future uncertainty in projecting

future dryland climate regimes, paleoclimatic data suggest that the twentieth century was an atypically wet period on the North American Great Plains, notwithstanding the migration-inducing drought events of the 1930s (Sauchyn et al., 2003). Severe droughts lasting many decades were common events on the Plains in past centuries and may be expected to reoccur, regardless of the effects of anthropogenic climate change. So again, identifying the anthropogenic climate change contribution to future variability and extremes will be challenging.

It is nonetheless hard to imagine any future scenario in which climate-related population displacements and migration will become less frequent. This is not only because the first principles of atmospheric physics tell us that the climatic stimuli for distress migration will become more frequent in a globally warmed world. It is also because the current rates of human population increase, according to United Nations data, are highest in regions that are highly exposed to adverse risks associated with climate change, some of which are already sites of conflict-related population movements (United Nations Population Division, 2008). These include areas where water scarcity is an ongoing problem, such as Sudano-Sahelian and dryland East Africa, much of the Middle East, and Afghanistan. Population increase is also high in many regions where deforestation and land clearance exacerbate soil erosion, land degradation and/or flood events, such as central Africa, Papua New Guinea and Guatemala. Many other countries with relatively low overall growth rates still experience high population growth in locations that are highly exposed to climatic risks. For example, water shortages are an ongoing phenomenon in continually expanding Mexico City, while Mumbai's water supply barely squeaks by from one monsoon season to another (Gandy, 2008; Mazari-Hiriart et al., 2008). High rates of population increase and urbanization are occurring in the low-lying deltas of Bangladesh, South-East Asia and China that are exposed to the combined risks of tropical storms, seasonal flooding, subsidence, and sea level rise (Walsham, 2010; Ericson et al., 2006). In the United States, southern coastal and dry western ("Sunbelt") states lead the nation in population growth and urbanization rates (Glaeser and Tobio, 2007). Some Sunbelt communities already experience periodic water shortages, while wildfires are a growing problem in others (Maloni and Franza, 2009; Westerling and Bryant, 2007).

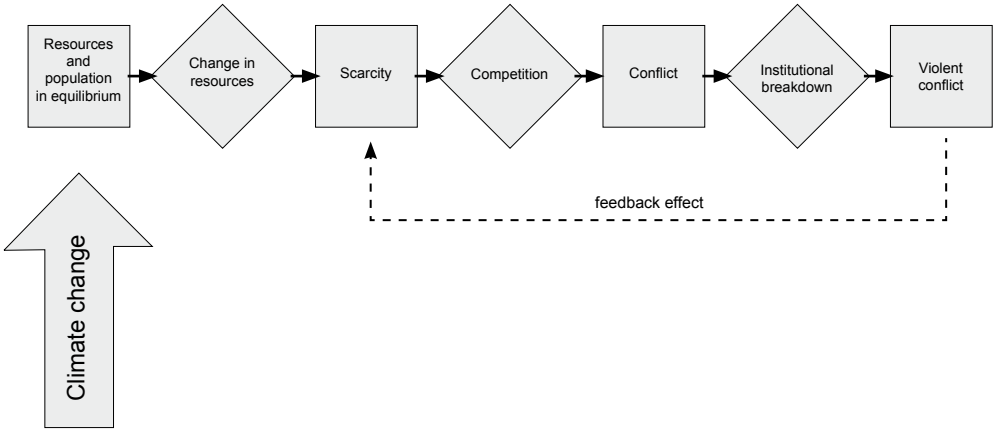
In short, the makings of a perfect storm are in place: human population numbers are growing in the very regions where the physical risks of climate change are most likely to undermine livelihoods and trigger migration, leading many to worry that this storm may be accompanied by political instability and violence in vulnerable regions.

6. SYSTEMS LINKAGES BETWEEN CLIMATE CHANGE MIGRATION AND SECURITY

The potential for climate change-related distress migration to create or exacerbate existing conditions of instability and conflict has been a concern for scholars over the past two decades (Barnett, 2003; Brown and McLeman, 2009; Dabelko, 2009). In the early 1990s, as violent conflicts emerged in a number of sub-Saharan African states, newly emerging evidence of anthropogenic climate change caused environmental security scholars to worry about its future effects on already conflict-prone areas (Homer-Dixon, 1991; Kaplan, 1994; Rønnfeldt, 1997). Subsequent research has looked at how climate change might threaten international and regional security by affecting precipitation patterns, water availability and food productivity (Hendrix and Glaser, 2007; Meier et al., 2007; Raleigh and Urdal, 2007; Swart, 1996). Lately, the retreat of Arctic sea ice has raised concerns of Arctic militarization, as Northern powers compete for access and control of shipping lanes and natural resources believed to exist under the seabed (Grajauskas, 2009).

Two general types of scenarios may be identified whereby climate change-related migration interacts with security. The first of these is the scarcity–conflict scenario; the system diagram illustrating it (Figure 2) first appeared in Brown et al. (2007) and is based upon early environmental security research such as Homer-Dixon (1991) and Kaplan (1994). In this scenario, a given population is dependent upon a given set of resources for livelihoods and economic well-being. The suite of critical resources will vary by population and setting: for an agricultural population, this may be some combination of precipitation and soil fertility; for an urban centre, this may be stored surface water for municipal use and imported foodstuffs. The balance between resource availability and livelihoods may be upset by a decrease in resource quality, availability, or accessibility caused by climate change. A prolonged period of scarcity of critical resources may engender competition between groups and individuals within the affected area. This competition, if allowed to continue unabated, may devolve into factionalized conflict, result in a breakdown of public order and institutions, and eventually lead to violence. Violence in turn will reinforce conditions of scarcity and competition for control over resources, creating a feedback cycle. In this scenario, anthropogenic climate change poses the risk of tipping a system of population–resource equilibrium into one of scarcity.

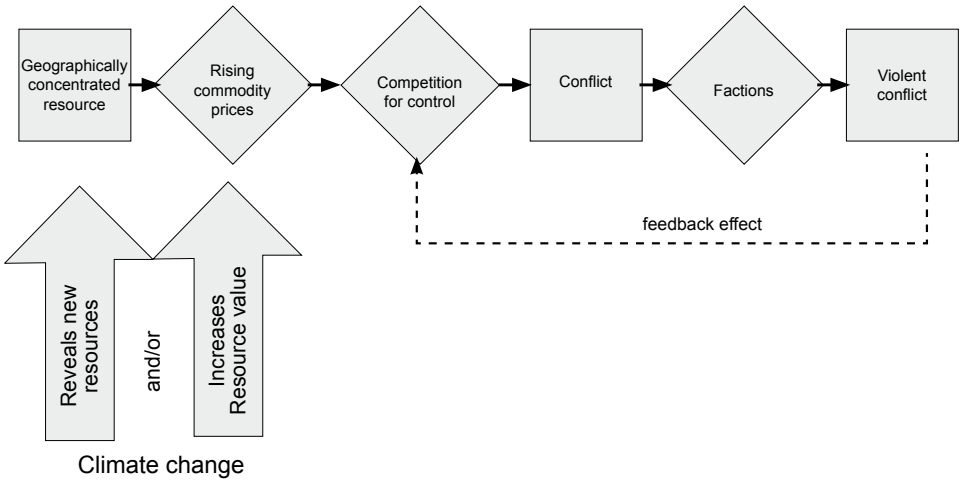
Figure 2: Scarcity-conflict hypothesis



Source: Adapted from Brown et al., 2007.

The second scenario may be described as an abundance–competition scenario (see Figure 3), which is based on research on conflicts related to diamonds and oil and sometimes described as "resource curse" conflicts (Le Billon, 2001; de Soysa, 2002). This scenario emerges in places where there exists a geographically concentrated resource that enables those who control it to extract economic rent from others who would access it. External demand and market prices that raise the value of the resource in question may stimulate competition for control, especially in states where not all societal groups share in the revenues. Where competition is not resolved through institutions, the potential exists for degeneration into factionalization and violence until questions of competition and control are resolved. Those living in the disputed resource area experience a rapid decline in living standards; they may become victims of violence and they may be displaced and forced to choose between migrating elsewhere and participating in violence.

Figure 3: Abundance-conflict hypothesis



Source: Author's own creation.

In this scenario, the impacts of climate change may work in two ways to stimulate a descent from equilibrium into conflict. One is by increasing the value of the resources in question, either by concentrating the geographical access points to particular resources or elevating their market prices. This scenario is already seen at the local level in large urban centres with inefficient water distribution systems, such as in Mumbai, where thugs will seize control of the few publicly accessible water taps in poorer neighbourhoods and demand payment from anyone wanting to use them (Bapat and Agarwal, 2003). It is easy to envisage climate change leading to an intensification and upscaling of local-level events such as these, not only with respect to water, but also with regard to access to choice fishing locations, high-quality stands of timber, highly fertile soil deposits, and other strategic resources.

A second possibility for climate change to drive the abundance–conflict scenario is by revealing new, previously inaccessible resources over which there are no clearly established governance mechanisms or rights of control. Competition over shipping lanes and seabed resources in the Arctic is the most obvious and best-known example (Berkman and Young, 2009), but others may emerge as climate change becomes increasingly influential on ecosystem processes. For example, the melting of Siberian tundra is revealing increasing numbers of mammoth tusks that are making their way onto international markets for ivory, a resource that has long been a source of low-level violence and conflict between gangs of poachers and government authorities in Africa (Kramer, 2008; Martin and Martin, 2010). It remains to be seen how ivory markets

will react to this new, climate change-driven expansion of supply, and how this will in turn affect demand for black-market ivory, poaching and related violence.

To summarize this section, environmentally based conflicts may emerge from conditions of both abundance and scarcity, and may stimulate migration outcomes that reinforce conditions of instability. Future climate change has a role to play in the potential emergence of both types of conflict. However, it is important to recognize that the scenarios depicted in Figures 2 and 3 represent potential progressions, not inevitable ones. There exist many possible intervention points along the pathways in each scenario, from reducing the likelihood of the climatic stimulus in the first place, to building and supporting robust governance structure and institutions, to enhancing local-level adaptability and conflict resolution mechanisms. Even in situations where distress migration does emerge, negative feedback effects on sending and receiving areas can be reduced by enabling the socio-economic integration of migrants into receiving areas (Black and Sessay, 1998). Recognition of these systemic linkages between climate change, migration and instability is important for developing appropriate policies to avoid the emergence of future conflict events, to enhance future prospects for international security, and to avoid worst-case scenario migration outcomes.

7. AVOIDING DISTRESS MIGRATION THROUGH CLIMATE POLICY

Based on the preceding discussion, two broad international policy directions need to be advanced as priority measures. The first of these consists of actions that reduce the climatic triggers for distress migration, while the second consists of actions that build greater capacity within vulnerable populations to adapt to extreme climatic events and conditions.

Reducing the climatic triggers for population displacements is, in essence, yet another way of reiterating that global GHG emissions must be reduced, commitments made under the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol must be honoured, and a post-Kyoto regime for curtailing GHG emissions from all large emitters must be found. However, progress on these fronts has stalled, with the 2010 conference of parties to the UNFCCC producing a convoluted and occasionally contradictory set of statements of intention to take future action, even as many countries fail to honour past commitments. The economic downturn that began in 2008 and media accounts of errors found in IPCC reporting (referred to colloquially as "climate-gate" and "glacier-gate") have helped contribute to an erosion of public and government interest in climate policy (see Nerlich (2010) for an interesting analysis of the deliberate attempts by interest groups to undermine public acceptance of science in the "climate-gate" affair). Political will, as opposed to technological wherewithal or socio-economic necessity, is increasingly the main barrier to action. Developed nations already possess the necessary technologies, expertise, and institutional and organizational capacity to maintain economic performance while mitigating GHG emissions if they so choose. The IPCC, the Stern Commission on Climate Change, and other institutions and scholars have clearly outlined the rationale for action, the specific policy pathways that may be followed to achieve emission reductions, and the economic consequences of inaction (Stern, 2007).

The need to build adaptive capacity in vulnerable regions grows proportionally with the degree of inaction in mitigating GHG emissions. Communities where people have stable livelihoods and secure land tenure, where basic health care and primary education are available, where women and girls enjoy fair access to resources and opportunities, and where local institutions have credibility, can cope with and adapt to a wide range of climate- and non-climate-related stressors without resorting to distress migration or violence. At its most essential, building adaptive capacity is an exercise in fostering sustainable economic development at the local and regional levels (Smit and Pilifosova, 2001). Achieving this requires coordinated action at all levels of governance, investments in the physical and social infrastructure of communities, and

partnerships between science and policymakers. These imperatives sound very much like those of traditional international development policy and programming. However, while building adaptive capacity for climate change is indeed inherently linked to these imperatives, climate change must not be seen as just another development challenge.

The term "mainstreaming" is often used to describe the goal of incorporating climate change information into policymaking and programming on an ongoing basis (Klein et al., 2007; Yamin, 2005). While important, mainstreaming alone is inadequate, for the impacts of climate change will exacerbate existing hurdles to development beyond the range of past experience and will introduce new challenges. For example, the risk of increased frequency and severity of droughts in the dryland regions of developing countries will necessitate new development plans for reducing the immediate impacts on rural livelihoods, for managing the consequent spikes of migration into urban centres, and for dealing with sudden declines in food security in both rural and urban areas (Mirza, 2003; Schmidhuber and Tubiello, 2007). In coastal communities, new development challenges will include adjusting to changes in ocean conditions that alter the availability of ocean-derived food supplies, as well as changes in mean sea level that erode coastal infrastructure and displace coastal residents in low-lying areas (Brander, 2007; Ericson et al., 2006; Mcgranahan et al., 2007). For challenges such as these, tinkering with existing policies will not suffice.

Certain economic trajectories currently being pursued in developing regions are fundamentally untenable given our climatic future, and may increase the likelihood of population displacements in the coming decades. One example is where governments of impoverished African nations lease out large areas of arable land to foreign (typically Asia-based) conglomerates for monoculture crop production, or permit foreign fishing trawlers (from Europe and Asia) to essentially strip-mine their territorial waters in exchange for trifling royalty payments (Cotula and Vermulen, 2009; World Bank, 2010; Zeba, 2000). The first-order effects of these economic practices are to kill local livelihoods, drive people out of rural areas and coastal communities and into cities that struggle to accommodate and employ them, and raise the number of young people migrating abroad (Nyamnjoh, 2010). In the longer term, these short-sighted transactions will not build societal wealth that can increase the capacity of developing countries to adapt to climate change, but instead accelerate and magnify the level of exposure to its worst impacts.

8. MANAGING CLIMATE CHANGE-RELATED MIGRATION WHEN IT EMERGES

If not altered, the combination of rising GHG emissions, population growth in highly exposed regions, and failure to build adaptive capacity among the most vulnerable will almost certainly lead to large-scale population displacements and migrations. Such migrations will likely begin within two decades, and will likely unfold in patterns similar to past climate-related migrations, with most migrants moving within their own countries or geographical regions. In some cases, these events may lead to the destabilization of governments, and may very well undermine regional economic productivity, thereby creating self-reinforcing stimuli for additional migration. A smaller but still significant number will use existing transnational communities and migration networks to make their way to developed nations as migrants, legal or otherwise, and will need to be accommodated and incorporated (McLeman and Hunter, 2010).

How the international community is likely to respond to such population displacements is unclear. Existing agreements and instruments are not designed to deal with international migration related to climate change (Bates, 2002; McLeman, 2010). The 1951 United Nations Convention relating to the Status of Refugees applies only to those who cross international borders on fears that they would otherwise be persecuted, and there is no visible appetite among the world's refugee-receiving nations to swell the number of Convention refugees worldwide by expanding the existing definition to include climate displacees. Even if the definition were to be expanded, the reality is that the international community does an inadequate job of protecting and sheltering the millions who meet the existing definition. Of course, states do have the right to make unilateral, bilateral or multilateral arrangements outside the Convention to offer protection or assistance to those threatened by displacement. Such arrangements are often discussed in the context of small island populations in the Pacific Ocean, for example, but they seem unlikely to progress much beyond the discussion stage until a pressing crisis arises (Barnett and Campbell, 2010). Even then, the international response may be slow and inadequate, if experiences like Darfur are any indication.

Less well-known than the United Nations Refugee Convention, the United Nations Human Rights Commission's 1998 Guiding Principles on Internal Displacement give an inkling of what a protocol for an organized system of assistance for those displaced by climate change might look like. Unlike the Refugee Convention, the Guiding Principles explicitly include those displaced by environmental disasters as having basic rights to recognition and protection (Cohen, 2004; Muggah, 2003). The Guiding

Principles dovetail nicely with article 4, section 4 of the UNFCCC, which requires signatories to assist vulnerable developing nations in adapting to the adverse effects of climate change. The Guiding Principles have been formally recognized by regional organizations such as the African Union and have made their way into the language and text of international agreements on a number of occasions. However, states are not bound by them to the same degree as signatories to the Refugee Convention or the UNFCCC are. This makes for practical limitations in applying the Guiding Principles more broadly in their current form.

For example, the twenty-fifth of the Guiding Principle declares that states shall grant those who would deliver humanitarian assistance unimpeded access to internally displaced populations, particularly where the host state is unable to provide such assistance itself. This principle has yet to be invoked. In the case of cyclone Nargis in 2008, neither the United Nations Security Council nor individual states were willing or able to force the Burmese junta to allow international relief workers to enter the country, notwithstanding the Guiding Principles (Stover and Vinck, 2008). Instead, the United Nations Secretary-General had to travel to Burma (Myanmar) to make a direct plea on behalf of the victims, which eventually enabled a restricted amount of relief assistance into the country. National sovereignty trumped high-minded principles to assist those in need, suggesting that anything less than an internationally binding agreement on the protection of those displaced by the impacts of climate change will be inadequate. Such an agreement could hypothetically emerge either as a protocol to the UNFCCC, an amendment to the Refugee Convention, an elevation of the status of the Guiding Principles, or, on its own merit, as a stand-alone convention. However, at present, there seems to be as little collective will to assist those displaced by climate change as there is to make meaningful reductions in GHG emissions. The business of assisting the relocation of displaced populations is therefore likely to be carried out on an ad hoc basis, informed by regional power relations and self-interest, especially if such displacements emerge on a relatively gradual or incremental basis, as opposed to a sudden pulse or explosion of catastrophic displacements that might galvanize an otherwise complacent international community.

9. THE WORST-CASE SCENARIO

In my own research and writing on climate-related migration, I focus on empirical research that looks for opportunities to build adaptive capacity, especially at the household and community levels, and on identifying policy barriers that stand in the way. I have always urged caution before accepting at face value the shrillest forecasts on the impact of climate change, simply because so much of what is yet to come remains within our ability to control. However, it cannot be ignored that if we keep to the present do-as-little-as-possible approach to the very real risks associated with anthropogenic climate change, large-scale population displacements lay ahead.

In the preceding sections, I have stuck closely to scientific literature in outlining my analysis. What now follows is my own interpretation of what is to come if a change of course does not take place. It is a reality of the human condition that our environment influences where and how we live and the quality of our lives. Changes in climate, whether fast or slow in their onset, can and do affect human migration and settlement patterns: this is fact. It would be nothing short of delusional to imagine that we are entering a period when climate will be more benign or will have less influence on human well-being and migration behaviour than it did in the past. Without rapid international movement toward policies and initiatives that rein in global GHG emissions, build adaptive capacity in vulnerable regions, and initiate plans for assisting those most at risk of displacement, we will be very fortunate if those displaced number only in the hundreds of millions. The most likely outcomes of inaction are unpalatable. A few examples of what lies in store: Pakistan will experience severe water shortages and massive population displacement from rural and mountainous areas, and the country will become a nuclear-armed version of Somalia. The Pakistan floods of 2010 were merely a test-run for the crisis to come and bode ill for the future. In West Africa, the current decade-long decline in the number of conflicts and refugees will be reversed. Residents of the Maldives will become a new and landless diaspora, with other island populations joining them. Rural-to-urban migration, already high in much of the developing world, will soar, and many developing cities will become increasingly ungovernable concentrations of the destitute, landless and jobless. The world's "bottom billion", as described by Paul Collier (2007), will become the bottom billions. While such outcomes remain mere possibilities as of this writing, the window for international policymakers to change course is rapidly closing.

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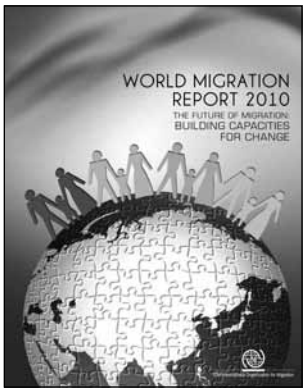

Migration is a constant and dynamic phenomenon increasingly requiring diversified policy intervention in order to maximize its potential benefits and minimize related costs for both countries of origin and destination as well as migrants themselves. Better knowledge and enhanced capacities in different policy areas are essential to ensure the protection of migrants, the facilitation of legal migration, the integration of migrants into the country of destination, the support for sustainable voluntary return and the greater interlinking between migration and development.

The challenge remains in translating improved understandings into policy and practice on the ground. State capacities around the world for managing migration are limited. Legal frameworks may need to be updated or overhauled to focus on new areas of migration, or to handle new influxes or outflows of migrants; staff working on the front line may need equipment, training and support; civil society and migrants themselves may not be adequately integrated into the process of data-gathering and making and implementing policy; vulnerability factors and health risks inherent to the migration process need to be better understood and addressed.

International migration is likely to transform in scale, reach and complexity, due to growing demographic disparities, the effects of environmental change, new global political and economic dynamics, technological revolutions and social networks. These transformations will be associated with increasing opportunities, exacerbate existing problems and generate new challenges.

The World Migration Report 2010 provides a tool for self-evaluation in terms of future scenarios, and demonstrates the need for a far more comprehensive approach to capacity-building for migration than has typically been adopted. The aim is not to prescribe 'one-size-fits-all' policies and practices, but to suggest objectives of migration management policies in each area, to stimulate thinking and provide examples of what States and other actors can do.

Part A of the report focuses on identifying core capacities in key areas of migration management, raising key concepts and outlining important examples of existing practices in these areas. Part B provides an overview of migration in the world today, from both the global perspective and through six regional chapters, drawn from the most up-to-date data.

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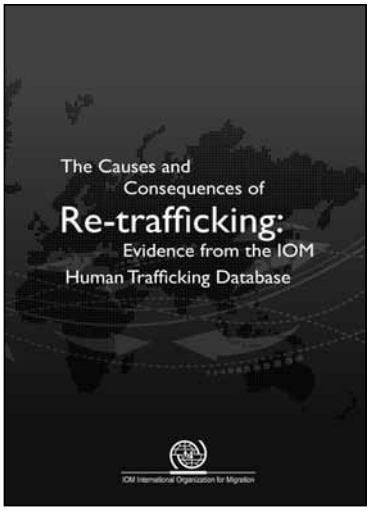
The Causes and Consequences of Re-trafficking: Evidence from the IOM Human Trafficking Database



Although there is consensus among different actors regarding the seriousness and significance of re-trafficking as a problem, there has been very little research conducted into its incidence, cause or consequence. This research paper, funded by United States Department of State Office to Monitor and Combat Trafficking (G/TIP), aims to address this gap through an exploratory analysis of known re-trafficking cases in the Human Trafficking Database of the International Organization for Migration (IOM). It is a rare look at the issue of re-trafficking, drawing upon a regional sample of 79 known cases of re-trafficking in the database.

The report examines a number of factors a means to better understand and tackle the issue of re-trafficking. These include the individual characteristics of (re-)trafficking victims, their experiences during and post-exit from trafficking, issues on return to their country of origin, and assistance and reintegration needs.

The report findings reveal that many existing reintegration programmes for victims of trafficking are not effectively tackling the economic realities faced by victims post-rescue. Assistance options should be better tailored to address the complex needs of trafficked persons if re-trafficking is to be avoided. The report offers a number of recommendations, concluding that it is only by finding sustainable ways to challenge the wider economic inequalities, both global and local can counter-trafficking efforts be truly effective

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There are growing concerns that climate change will lead to large-scale population displacements and migrations in coming decades. Many security scholars worry that these may in turn contribute to violence and conflict in the most vulnerable regions. Are these concerns supported by scientific evidence? And if so, what options are available to concerned policymakers? In response to these and other questions, this report reviews the available scholarly reporting on climate change, migration and security and describes the legal and policy challenges facing the international community.

While there is indeed considerable evidence that climate does influence migration, future estimates are hampered by a lack of reliable data. Climate-related migration is closely connected to the social, economic, cultural and institutional processes that shape the vulnerability and adaptive capacity of exposed populations. Conflict may potentially emerge in situations of resource scarcity and resource abundance, but in most cases there will be opportunities for intervention before violence occurs. Most climate change-driven migration is likely to occur with countries and regions, although there will be increased international movements along established migrant networks. To avoid large-scale distress migrations, the report outlines priority actions for policymakers to reduce greenhouse gas emissions, enhance adaptive capacity in vulnerable regions, and provide assistance to those displaced.

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