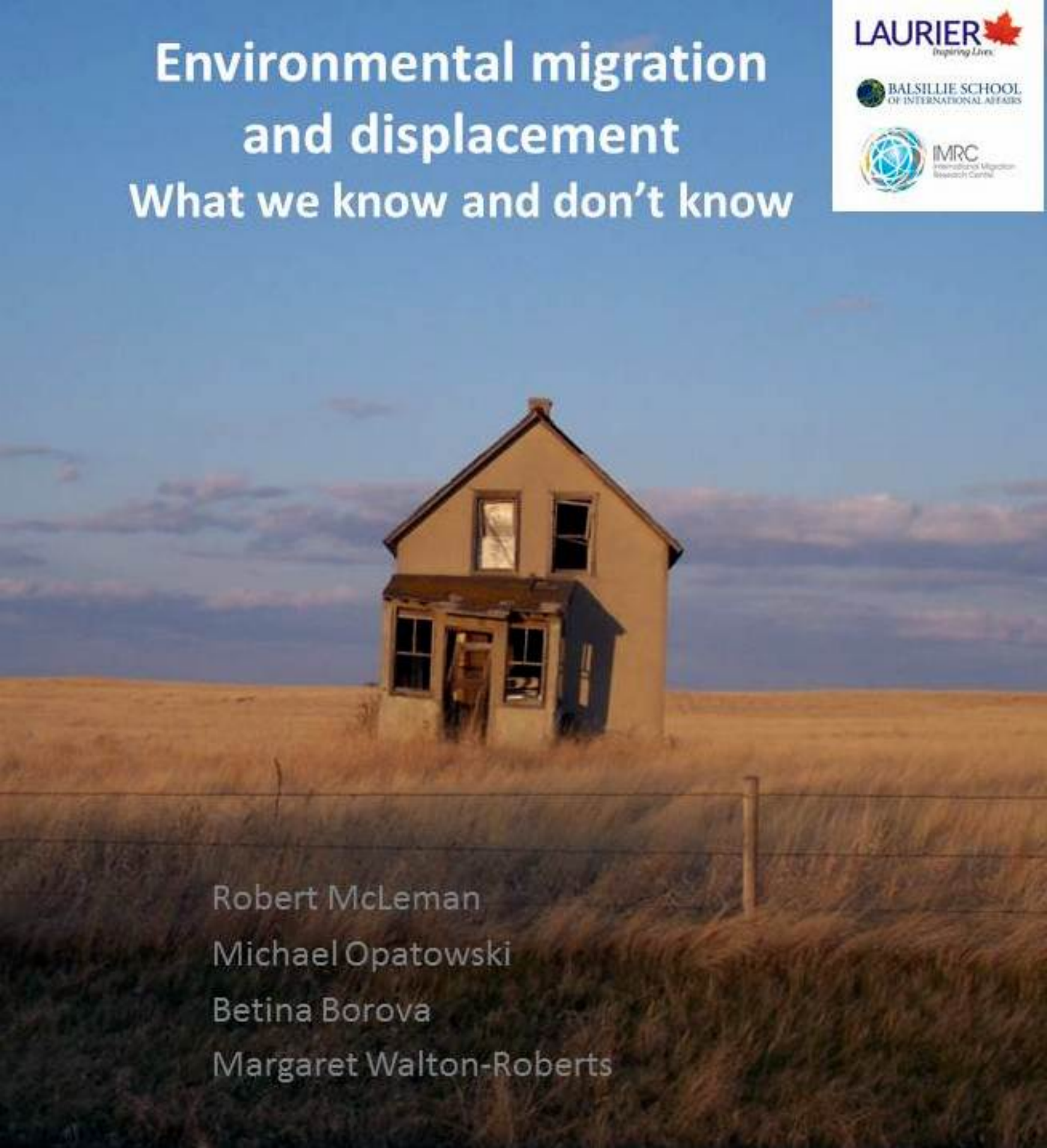
Environmental migration and displacement

What we know and don't know



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Summary

This report was prepared as advance reading for a workshop on environment and migration held in Waterloo, Canada from January 22-23, 2016. A full description of the workshop and a list of academic participants can be found at http://www.laurierenvironmentalmigration.com. The aim of the report is to summarize what is currently known and not known about environmental migration and displacement (EMD) in terms of the available empirical evidence. The report begins by defining how EMD is used in the report and by providing basic descriptive statistics of current EMD and of current general international migration flows to Canada and the USA.

There exists sufficient empirical evidence to make the following statements about EMD with reasonable confidence:

- Environment interacts with other drivers of migration
- Environment can be an independent driver of EMD, but such events are infrequent
- Those most likely to experience EMD are poorer groups living in poorer regions
- Rapid-onset environmental hazards and slower developing environmental changes both can trigger EMD, but the processes play out in different ways
- Most EMD takes place internally, within countries
- Most international environmental migration is between contiguous countries
- Environmental migration is both an outcome of and a contributor to socio-economic inequality in sending areas
- The number of people migrating for environmental reasons will grow in coming decades, for reasons related to climate change and global demographic patterns
- EMD has taken place in North America in the distant and more recent past.
- EMD is relatively small in comparison with larger global migration flows. Large scale EMD and complete settlement abandonment are particularly rare.
- EMD can be linked to political instability, but the security literature warns us to be wary of simple cause-effect assumptions

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The report also describes key aspects of EMD about which relatively little is know with certainty. Such topics include:

- We do not know how many people already migrate globally for environmental reasons
- We expect climate change will increase EMD, but we don't know by how much
- We are not actively measuring how much EMD is taking place in North America, within or between countries.
- We do not know how EMD trends will play out in the short- to medium term (i.e. between now and 2035). We can make some informed predictions
- There are unequal probabilities of EMD occurring in any given situation. We don't know how best to calculate these, and we don't know the "tipping point" at which EMD ensues.
- Is EMD good or bad? Desirable or undesirable? There is no consensus.
- Should environmental migrants receive preferential treatment?
- How can we use emergent technologies to monitor, model, and forecast EMD?
- There are important gender dimensions to EMD we need to learn more about
- We do not know how policy and program initiatives influence the potential for EMD, nor what may be best practices.
- Planned relocations are an oft-suggested option, but more work is needed to see that it is done right

The report concludes by describing existing and proposed international policy tools and initiatives for responding to EMD.

Environmental migration and displacement:
What we know and don't know

Robert McLeman, Michael Opatowski, Betina Borova, Margaret Walton-Roberts[1]

1. Introduction

Migration and displacement for reasons connected to events and changes in the natural environment is an ongoing phenomenon (McLeman 2014). There is growing concern among researchers and policymakers that the combined effects of rapid population growth in at-risk areas, environmental degradation, pollution, and the impacts of climate change will increase the frequency and scale of environmental migration and displacement in coming decades.

This paper provides a summary of what is known and not known about the relationship between environmental conditions and migration and displacement, based on available empirical evidence. In the remainder of this paper, we use the acronym "EMD" as a substitute for the phrase *environmental migration and displacement*, and use the following IOM definition of an environmental migrant, recognizing that there is ongoing debate among researchers and policymakers about how to define the term:

> *Environmental migrants are persons or groups of persons who, for compelling reasons of sudden or progressive changes in the environment that adversely affect their lives or living conditions, are obliged to leave their homes or choose to do so, either temporarily or permanently, and who move either within their country or abroad (from IOM 2015)*

We understand the term *displacement* to refer to migration that is undertaken with low agency (or involuntarily), while the more term *migration* refers to population movements more generally, of low or high agency.

2. Global and regional statistics

2.1 Global estimates of current EMD

Given the uncertainty in definition of EMD and its causality (see below), there is considerable uncertainty about the current number of environmental migrants globally. Gemenne (2011) suggests the most reliable figures come from the International Displacement Monitoring Centre (http://www.internal-displacement.org/), which provides annual estimates of people directly displaced by natural disasters. Since these refer primarily to internal displacements that (a) in many cases may not actually lead to migration and (b) do not measure international migration, IDMC statistics provide an idea of the scale of the EMD phenomenon, but are not an accurate measure of EMD.

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The number of people internally displaced by natural disasters fluctuates considerably from one year to the next, with, for example, 2009 seeing 17 million displaced globally, and 2010 seeing 42 million displaced. IDMC estimates that in 2014 roughly 19.3 million people were newly displaced by disasters, 86% of them in Asia (2015 summary statistics are not yet available from IDMC's website). China, India, and the Philippines experience the highest levels of disaster-related displacement on average; they also represent three of the main sources of long distance international migration to North America. Among small island developing states, Haiti and Cuba experience disaster related displacement most frequently (IDMC, 2015, 9).

To put these numbers into context, the UN Population Bureau estimates there are approximately 232 million international migrants globally (UN DESA 2013). The UNHCR in its mid-2015 update estimated there are over 60 million people worldwide who have been displaced internally and internationally by conflicts and violence (UNHCR 2015).

2.2 Brief comparison of sources of immigration to Canada and US

Given the significant differences in immigration and refugee policies between Canada and the US and the differences in scale of immigration to each country, the following statistics are provide simply to provide an indication of the geographic origins of international migration to the two countries. Charts providing more detailed comparative data are found in Appendix 1.[2]

2.2.1 Permanent residents

The single greatest source region of immigration to North America is Asia and the Pacific, being the origin of 40% of individuals granted permanent residence in the US and 48% in Canada. Other North American countries (principally Mexico) are the second largest source of immigration to the US; the second largest source region of immigrants to Canada is African and the Middle East. The most important source countries of people granted permanent residence in Canada in 2014 were the Philippines (15%), India (14%) and China (9%). For the US, the largest source countries of permanent immigrants in 2013 apart from Mexico were China, India and the Philippines. The Philippines is also the single largest source of temporary foreign worker migration to Canada. The high representation people from Asia is the greatest commonality in migrant flows to the US and Canada. The greatest discrepancy between the two countries is the high representation of Mexicans (13.6% of all permanent resident migrants) and people from other parts of Central America in migration flows to the US, representing almost one-third of all migrants to the US. Collectively, the Dominican Republic, Cuba, Colombia and Haiti comprise 10% of all people granted permanent residence in the US in 2013, but none of these countries rank in the top ten sources of permanent migrants to Canada. By contrast, Canada's second most-important source region for permanent residents is the Middle East and Africa.

[2] For US statistics, see US Department of Homeland Security (2014) 2013 Yearbook on Immigration Statistics; for Canadian statistics on Permanent residents, see Citizenship and Immigration Canada (2015) Facts and Figures 2014; for Canadian statistics on temporary migrants and refugees, see Citizenship and Immigration Canada (2014), Facts and Figures 2013.

2.2.2 Refugees/asylum seekers

The principal source countries of people receiving refugee status in Canada are China (7.3%), Pakistan (6.1%), Colombia (5.8%), Syria (4.7%) and Nigeria (4.5%). Note that the total number of refugees accepted by Canada consists of both refugees who have made claims in Canada and refugees who have been sponsored from abroad by private citizens and organization and by the government. The main sources of refugees accepted by the US in 2013 were from Iraq (27.9%), Burma (23.3%) and Bhutan (13.1%). The main African source countries of refugees accepted by the US are Somalia (10.9%), Democratic Republic of Congo, Sudan, Eritrea and Ethiopia. Cuban nationals accounted for 6% of refugees accepted by the US in 2013. Cuba, Central and South American refugees were largely non-existent in 2013 US refugee arrivals. The largest source countries of people granted asylum in the US (an immigration category not used by Canada) were China (30.8%) and Egypt (20.3%).

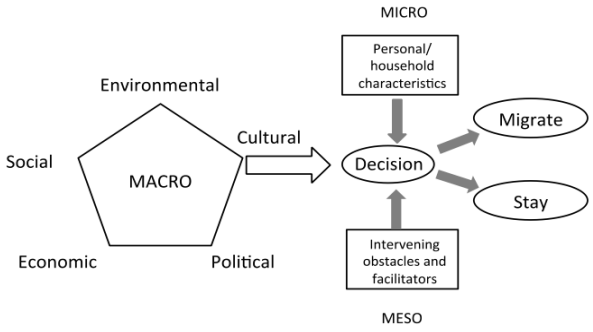
3. What we know about EMD, at global and regional scales

In this section we describe briefly key aspects of EMD for which there exist sufficient empirical evidence to make general conclusions.

3.1 Environment interacts with other drivers of migration

Most experts believe that environmental migration and displacement (EMD) is typically caused by the interaction of changes in environmental conditions with broader social, economic, political, demographic and/or cultural forces that influence migration patterns more generally. These environmental and non-environmental influences on EMD can operate at multiple scales, from the local to the global (Figure 1). When a significant change in environmental conditions takes place, its influence ripples through socio-economic systems. Households, communities and political units that can successfully adapt to environmental changes are less likely to experience EMD than are those less able to adapt. In many cases, EMD takes place in a grey zone between purely voluntary and purely involuntary migration (IOM 2015).

Figure 1. Interaction of environmental & non-environmental processes influencing migration. From McLeman (2014), adapted from Foresight (2011).



3.2 Environment can be an independent driver of EMD, but such events are infrequent

There are instances where environmental factors are the sole driver of EMD. For example, volcanic eruptions on the Caribbean island of Montserrat in 1997 made the immediate, permanent abandonment of the capital city of Plymouth essential. However, examples of complete settlement abandonment for environmental reasons are few, and even in the case of Plymouth, relocation destination choices were heavily influenced by social and political processes (Stone 2003). Even in the wake of extremely destructive weather events like Hurricane Katrina (2005) and Hurricane Mitch (1998), most of the damaged sites were quickly reoccupied. Further, though both Katrina and Mitch led to large amounts of migration, the composition and destination of migration were not random, but were in fact heavily shaped by prevailing social, economic, and cultural forces (see McLeman 2014 for reviews). In other words, the environmental event provided a catalyst for the migration event, but the migration event itself was heavily shaped by non-environmental forces.

3.3 Those most likely to experience EMD are poorer groups living in poorer regions

Most documented examples of EMD in the last twenty years have taken place take place in non-OECD countries. This is because lower-income countries:

- tend to have large concentrations of people living in geographic locations that are highly exposed to environmental hazards (such as floods, extreme weather events) and/or are water scarce and drought prone
- have larger numbers of people with livelihoods tied directly to agriculture and local natural resources that are inherently sensitive to fluctuations in environmental conditions
- have less institutional capacity to help citizens cope with/adapt to environmental ricks and hazards (e.g. the Netherlands and Bangladesh are both situated in flood-prone, low-lying coastal deltas, but the Dutch have greater capacity to invest in infrastructure that reduces the potential for loss and damage).

In the case of future risks due to climate change, the combination of high exposure and low adaptive capacity means the frequency of EMD in less developed countries will increase (IOM 2015). This does not mean that OECD countries are immune from EMD, but that the enormous financial and institutional capacity of OECD nations means that EMD events tend to be much smaller and localized, with large EMD events like Katrina being relatively infrequent.

3.4. Rapid-onset environmental hazards and slower developing environmental changes both can trigger EMD, but the processes play out in different ways

Evidence shows that the nature of EMD varies according to the nature of the environmental event. For example, a high-intensity tropical cyclone event like Katrina or Mitch will generate immediate evacuation and displacement as people seek out safety and shelter. In the weeks that follow, a variety of potential migration responses may unfold, one common one being a pulse of labour migration of young adults out of the affected region, who hope to earn money to remit to those remaining at home. The reconstruction of damaged homes and infrastructure may simultaneously generate an influx of labour migrants and speculators into the affected region. This “churn” of

people moving in and out of the affected area may continue for an extended period of time, and cause significant changes in demographic composition, as was seen in New Orleans in the wake of Katrina (Fussell 2009, DeWaard et al 2015). Over the longer term, there may be permanent migration in and out of the affected area depending on such factors as housing availability and rental prices, and how quickly (and how well) public infrastructure is rebuilt. The pace of rebuilding can be very slow in less developed nations; for example, thousands of poorer Bangladeshis displaced from coastal villages by Cyclone Aila in 2009 were still in temporary accommodation over two years later (Mallick & Vogt 2012)

By contrast, a drought typically does not trigger immediate, large-scale permanent migration out of the affected area. Populations that live in drought-prone areas tend to have developed over the course of time a variety of adaptive strategies they will employ to mitigate the impacts of drought (Morrissey 2014). In many dryland areas in lower income countries, these strategies often include deliberate temporary migration of some household members (especially young men and women) out of the affected area, easing demands on local food stocks and water supplies, and creating a potential to generate remittance income. Larger scale, indefinite EMD tends to emerge only in one of two situations:

- drought persists for such an extended period of time that other forms of adaptation are exhausted and/or food insecurity escalates
- drought strikes an area where drought events are not typically common (research has shown, for example, that rural populations in Bangladesh are much better able to cope with inevitable flood events than with infrequent drought events (Gray & Mueller 2012)

3.5 Most EMD takes place internally, within countries

This is not entirely surprising, since most migration takes place within countries, and because there are typically far fewer physical, institutional, and financial barriers to migration and mobility within a country's borders than there are to international destinations. Even in China, which maintains internal controls on mobility, large-scale internal EMD has occurred following severe flood events, and to escape from forced resettlement to unsatisfactory locations during the construction of the Three Gorges Project (Tan & Hugo 2011, Wilmsen et al 2011). In most cases, the migration destination is large coastal cities that offer the greatest employment prospects.

3.6 Most international environmental migration is between contiguous countries

The best-documented examples of EMD to international destinations come from examples of cross-border migration between contiguous countries, such as Bangladesh-India (Alam 2003), Burkina Faso-Côte D'Ivoire (Henry et al 2004, Barbier et al 2009), Haiti-Dominican Republic (Alscher 2011), and Mexico-USA (Hunter et al 2013). With the exception of Mexico-USA, most documented examples of cross-border EMD are found within the Global South (Obokata et al 2013). There are very few empirical studies documenting international EMD between non-contiguous countries. Migration from Haiti to the US surged in the year immediately following Hurricane Mitch (McLeman 2014), and there is some evidence that environmental degradation in urban centres in sub-Saharan Africa, Haiti, and Bangladesh may be stimulating the migration of urban professionals to Canada (Veronis and McLeman 2014, Mezdour et al 2015). The decision to

undertake international migration and the selection of potential destinations is shaped heavily by the presence of social networks and cultural/historical ties between sending areas and potential destinations, and by the migration policies of potential destinations (Palloni et al 2001).

3.7 Environmental migration is both an outcome of and a contributor to socio-economic inequality in sending areas

Rarely does environmental migration occur as a random or wholesale departure from an affected area. Rather, most studies show that environmental migrants will share common socio-economic or demographic characteristics. Migration, whether short distance or long, entails particular costs, risks and potential hardships for both the migrant and his/her household and extended family networks. It is therefore not typically the first-order response households will take when confronted with environmental hardship. Households that are socio-economically better off typically have greater adaptation options and greater migration options and opportunities should they so choose. The poorest of the poor, especially those with clear or secure land tenure or shelter ownership, may be at high risk of displacement but typically have few adaptation options, and may not even have the ability to migrate at all, trapping them in situations of environmental degradation (Black et al 2012). Thus EMD flows often include large numbers of young, mobile adults seeking wage labour opportunities. Remittances received from environmental migrants may enable households in the sending area to make socio-economic gains relative to households unable to send a migrant (e.g. Adger et al 2002). Socio-economic differences thus become reinforced in the sending area (see McLeman et al 2015 for review).

3.8 The number of people migrating for environmental reasons will grow in coming decades, for reasons related to climate change and global demographic patterns

IPCC (2013) reporting suggests the adverse impacts of anthropogenic climate change will be felt strongly:

- in low-lying coastal areas, particularly deltaic environments, atoll islands, and in regions with high levels of exposure to tropical cyclones
- in dryland and water-scarce regions
- at high latitudes and high altitudes

Most often, these impacts will be experienced as exacerbations of existing environmental conditions that already generate EMD (e.g. cyclones, coastal erosion, droughts, flooding). Hundreds of millions of people worldwide presently live in such environments, where population growth rates are disproportionately high due to natural increase and in-migration. Mega-cities in Asia's river deltas (in Bangladesh, Burma, China, Pakistan, and Thailand) have enormous levels of arithmetic population increase; many urban centres in Sudano-Sahelian Africa, though being smaller in absolute numbers, have high percentage growth rates, as do many small island atoll nations. In the US, population growth rates are very high along the southern Atlantic coast and the Gulf of Mexico (areas highly exposed to coastal hazards and storms) and in the already water-scarce southwest. The global and regional picture is one where environmental risks and global population growth patterns are converging to create increasing probability of EMD (McLeman 2014).

3.9 EMD has taken place in North America in the distant and more recent past

The combination of drought-related crop failures and economic depression in the 1930s prompted hundreds of thousands to migrate out of the North American Great Plains, and led governments in Canada and the US to actively promote the relocation of farmers from marginal areas (policies that were abandoned following World War II (McLeman et al 2013). Drought-related crop failures continue to have an observable impact on rural migration patterns to this day, with Feng et al (2012) calculating that in the US Corn Belt each 1% decline in crop yield corresponds with a 0.17% decline in population, caused primarily by the outmigration of young adults.

Statistical evidence shows that during periods of drought in rural Mexico, rural-urban migration within Mexico and Mexican migration to the US increase (Nawrotzki et al 2015). Feng et al (2010) estimate that a 10% decline in crop yields in Mexico corresponds with a 2% increase in migration to the US above existing levels. Much of this migration originates in areas of Mexico that are already water-scarce to begin with, and tends to follow social networks (Hunter et al 2013).

In the twelve months following Hurricane Mitch (1998), increased numbers of undocumented Honduran nationals were intercepted entering the US via Mexico (McLeman 2014). Cross border migration rates within Central America also increased, with larger-than-usual numbers of Nicaraguans entering Costa Rica and Guatemalans entering Belize (Glantz and Jamieson 2000). There is no evidence of significant numbers of people entering Canada in recent years due to EMD. However, recent research suggests that air pollution, water contamination, and other forms of environmental degradation in Port-au-Prince, Dhaka, and various cities in sub-Saharan Africa may be prompting professionals in those cities to pursue immigration to Canada under the skilled worker program (Veronis and McLeman 2014, Mezdour et al 2015).

3.10 EMD is relatively small in comparison with larger global migration flows. Large-scale EMD and complete settlement abandonment are particularly rare

Most people migrate for reasons related to employment, family connections, lifestyle preferences or other reasons that are not directly linked to environmental change. The documented examples of EMD are therefore a small subset of larger migration patterns. Settlement abandonment is still more rare. Even settlements that are located in locations that are obviously untenable in the long term are slow to lose their entire populations even after a significant environmental event (McLeman 2011). Even EMD events that numbered in the hundreds of thousands or millions (e.g. the Dust Bowl, Hurricane Katrina, Yangtze River floods of 1998), the majority of people affected did not migrate or relocate.

There are good reasons. First, such places tend to have amenities that make them desirable for habitation most of the time, which is why they were settled in the first place. Second, social networks tend to be place-specific which, combined with the common phenomenon of emotional attachment to specific places, can discourage relocation (Chamlee-Wright and Storr 2009). Third, private property rights tend to discourage relocation. As one extreme example, in the 'char' lands of southern Bangladesh, even when a family's land disappears under water because of floods and

shifting channels, they tend not to migrate away from the area. This is because their property rights continue to persist indefinitely, and there is always hope that a future flood may expose the inundated land by shifting the channel elsewhere, allowing for a resumption in productive activities (Lein 2009).

3.11 EMD can be linked to political instability, but the security literature warns us to be wary of simple cause-effect assumptions

Within the environmental security literature, EMD is seen as both an outcome of and a potential contributor to political instability (Brown et al 2007). However, researchers warn against making sweeping conclusions about potential cause-effect/stimulus-response relationships. Most security analysts currently see environmental change and EMD as factors that can serve as "threat multipliers" that worsen situations of existing political instability or conflict, and generate conditions of chronic vulnerability that make instability and distress migration more likely (Raleigh 2011). Darfur has been cited by UN sources through the popular media (Borger 2007) as an example of environmental conflict and displacement, with drought, desertification, and food scarcity creating the background conditions against which violence took place (UNEP 2009). However, researchers have noted that the Sudanese government actively incited perpetrators of inter-ethnic violence while using droughts as a political smokescreen (Brown et al 2007). It was also noted that similar drought conditions occurring simultaneously in other parts of the region did not result in large scale inter-ethnic violence, even in chronically unstable areas like northern Nigeria (Nyong et al 2007).

A recent example of the threat multiplier/chronic vulnerability dynamic is Syria, which experienced severe drought in the period 2007-2010 that in turn led to an influx of migrants to Damascus, especially young males seeking work (Kelley et al 2015). This placed additional strain on housing stock and labour markets, and amplified conditions for civil unrest. Although rural-urban migration rates often increase in low income countries during periods of drought, in this case outside observers believe it may have helped tip Syria into its present state of chaos. There is no empirical way of proving cause/effect, but it is reasonable to conclude that the drought certainly did not help the deteriorating civil conditions in Syria, and very likely exacerbated an already unstable situation (Gleick 2014).

4. What we do not know about EMD

There are many aspects of EMD about which there is a lack of empirical information; we have here prioritized some of the most glaring needs.

4.1 We do not know how many people already migrate globally for environmental reasons

Part of this is a problem of definition, since environmental factors work on a sliding scale of causal influence, including:

- being a direct cause of displacement (e.g. evacuation and displacement following natural disasters)

- having an indirect causal influence on migration (e.g. drought-related crop failures triggering food price increases on local markets, in turn leading people to migrate in search of wage labour (McLeman 2013))
- creating general background conditions that make migration more likely, without actually serving as a proximate cause of individual decisions to migrate (e.g. ecological decline in African cities making urban life unappealing to mobile professionals (Veronis & McLeman 2014))

Depending on the definition used and the degree of causal influence on attributes to environmental factors, the number of environmental migrants globally could be relatively modest under the most restrictive definition, or hundreds of millions when using a broader definition. The statistics offered in section 2 above are therefore only a coarse estimate that may well be too conservative, depending on how EMD is defined.

4.2 We expect climate change will increase EMD, but we don't know by how much

Forecasts have been made suggesting climate change-related EMD will be on a scale of hundreds of millions by mid-century (e.g. Myers 2002, Christian Aid 2007). These reflect little more than informed guesswork. There are several key factors limiting our ability to make future predictions, including:

- we do not know what future greenhouse gas (GHG) emissions will be. If GHG emissions are curtailed quickly, future growth in EMD may be relatively modest. If we follow a "business-as-usual" scenario or worse, the scale of EMD may indeed be enormous in the latter decades of this century
- we do not know with great certainty how global or regional precipitation patterns will respond to climate forcing, nor how marine and terrestrial systems will respond
- we do not know what future trends will be in terms of economic development and growth in highly vulnerable nations, a critical factor in anticipating the ability to adapt to risks through means other than EMD
- we do not know if technological innovations yet to be developed will reduce GHG emissions and/or help build adaptive capacity

4.3 We are not actively measuring how much EMD is taking place in North America, within or between countries.

In addition to the aforementioned challenges in quantification is another simple reality: no one actually asks migrants about environmental factors. Canadian and American immigration and visa systems ask would-be migrants from foreign destinations any number of questions, including their family connections, job skills, education, language skills, personal net worth, and so forth. Except in specific cases (e.g. US Temporary Protection Status granted to Hondurans following Hurricane Mitch) no questions are asked about possible environmental motivations, and there is no incentive for migration applicants to voluntarily disclose such information.

Given the lack of internal controls and exit controls, there is no direct way of estimating EMD in real time within Canada or the US. Census data can be used after-the fact to measure population

change, but it typically does not shed light on migration causality. Post-Katrina research studies have suggested indirect methods of estimating EMD in real time (e.g. surveys and post office change-of-address information (Elliott and Pais 2006)), and research in other countries has suggested using cellphone and tax return data, but acquiring and using such information raises significant privacy concerns.

4.4 We do not know how EMD trends will play out in the short- to medium term (i.e. between now and 2035). We can make some informed predictions.

Simply extrapolating from existing disaster displacement data, we should expect annual EMD numbers to continue to be in the tens of millions each year, with an overall increasing trend that reflects population growth in high-risk areas, and high levels of inter-annual variability. Beyond that, little can be predicted with certainty. EMD can be expected to be a chronic risk in areas already experiencing EMD on a periodic or ongoing basis, especially erosion-prone coastal settlements (in Alaska, in Bangladesh, on multiple Pacific atolls). Occasional large-scale 'pulses' of EMD will continue to be triggered by sudden-onset events like earthquakes (e.g. Nepal 2014) and tropical cyclones (e.g. Typhoon Haiyan in 2013).

4.5 There are unequal probabilities of EMD occurring in any given situation. We don't know how best to calculate these, and we don't know the "tipping point" at which EMD ensues.

It is widely agreed that the probability of EMD occurring is contingent on the nature, scale and duration of the environmental event in question and on the larger environmental, socio-economic, political and cultural context of the exposed area. We do not know with any certainty, however, the specific workings of such interactions. Much of what we do know has been assembled from studying past EMD events and using these as learning analogues from which to make generalizations (McLeman & Hunter 2010). Researchers suspect there is a threshold or tipping point at which livelihoods become so compromised by environmental conditions or events that EMD accelerates suddenly (McLeman 2011), but much more research is needed on this. There is also uncertainty as to the type of migration that may ensue from a given event. In some instances migration is undertaken on a temporary or circular basis by only some household members (e.g Jülich 2011); in others it is a permanent relocation of the entire household, as in the 1930s Dust Bowl migration. We are not yet able to predict with confidence what particular type(s) of migration will occur under any given circumstances.

4.6 Is EMD good or bad? Desirable or undesirable? There is no consensus.

Researchers and UNFCCC policymakers increasingly see EMD as a means by which exposed people adapt to challenging environmental conditions or hardship (Black et al 2011). If so, under what conditions is such a form of adaptation desirable? How would we measure whether EMD is a successful or unsuccessful adaptation? From whose perspective do we make such a judgment (The migrant's? The receiving area's? The sending area's?)? And what criteria might we use? For it is possible what is "successful" from one perspective may not be from another. There is also often a divergence between the state's interests and that of the individual. Many less-developed countries actively discourage rural-urban migration because of inadequate urban infrastructure, housing, and employment to accommodate further growth. As seen in Europe in 2015, there are limits in

the willingness and capacity of developed nations to accommodate large influxes of international migrants.

4.7 Should environmental migrants receive preferential treatment?

Given the international community's current inability to provide adequately for people who already qualify for protection under the UN refugee convention, what would be the implications should new categories of protection be created to address EMD (Mayer 2015)? Can migration help those left behind? Research in Vietnam (Adger et al 2002) suggested under some circumstances remittances from migrants can foster sustainable development in the sending area. How universal are such findings? Should migrants receive greater attention than trapped populations left behind in difficult conditions? We know especially little about how the elderly, disabled, and other highly vulnerable but less mobile groups experience EMD. Examples like Katrina show that such groups have high casualty rates during sudden-onset disasters, and are heavily reliant on the combined assistance of immediate family members and institutions for relocation (Jonkman et al 2009).

4.8 How can we use emergent technologies to monitor, model, and forecast EMD?

We have a good general understanding of the types of people and places that are highly vulnerable to the impacts of environmental events and changes, but it is not yet possible to compare across countries or across populations within a given country and project with certainty which households or groups are most likely to be subject to EMD. Progress is being made, however. Recent developments in remote sensing and in geospatial and statistical modeling are making it more possible to (1) identify such migration after it occurs, and (2) make area-specific projections of high potential locations for EMD (McLeman 2013, Fussell et al 2014). An ongoing limitation is obtaining reliable socio-economic data on such things as labour markets, wage differentials, and social capital in less developed countries.

4.9 There are important gender dimensions to EMD we need to learn more about

There is considerable evidence that women and children in least developed countries are especially vulnerable to environmental risks, but have fewer mobility options. We know relatively little about how the processes that lead to EMD filter through or reinforce gendered vulnerability and inequality. This may have implications in migrant sending and receiving areas. For example, many female refugees from Somalia now living in Canada experienced severe environmental hardships before coming to Canada, hardships particular to the role of women in that culture (Veronis 2014). Additional research in this area would be highly desirable for improving the effectiveness of humanitarian assistance, disaster relief, and government-assisted refugee programs.

4.10 We do not know how policy and program initiatives influence the potential for EMD, nor what may be best practices.

In terms of preventing EMD, it is generally believed that economic development enhances adaptive capacity and thus reduces the risks of displacement and distress migration following environmental events. While there is considerable research taking place on how adaptation can be

most successfully built and what the best practices are, there is no conclusive evidence of a one-size-fits-all solution, particularly in terms of EMD reduction. It may be that some policies and practices increase the potential for EMD, even here in North America. For example, Canadian and American governments favour "recovery in place"; that is, they actively discourage relocation from at-risk areas, and permit building/rebuilding of settlements in areas at obvious risk (e.g. drought- and wildfire-prone dry hills of California) or even after extreme events (e.g. New Orleans) or even in the face of obvious environmental hazards waiting to happen (e.g. water shortages in western North America, wildfire hazards in dry mountain areas).

In terms of post-EMD-event policies and practices, there are no binding international laws requiring action (see next section). A small number of non-binding and regional initiatives exist that are applicable to some aspects of EMD, but these are invoked infrequently. There is thus no inventory of "best practices" to draw upon for dealing with international or cross-border EMD. Canada and the US have in the past acted unilaterally to offer protection in specific cases of EMD, such as Temporary Protection Status given to Hondurans by USINS following Hurricane Mitch (1998), and Canada initiating special visa programs following earthquakes in Udine, Italy (1976) and Haiti (2010). Lessons might be drawn from those and other past experiences. Another ongoing challenge is that EMD typically straddles multiple policy- and decision-making silos in governments, and does not fall neatly within any one department/ministry's responsibilities.

4.11 Planned relocations are an oft-suggested option, but more work is needed to see that it is done right

Planned relocations of settlements, whether for development purposes or in response to disaster events, often result in people being less well off and more vulnerable than they were in their original locations (Cernea 2009, Scudder 2012). In North America and in other regions, resettlements are being planned or considered for people living in highly exposed areas (e.g coastal villages in Alaska and Louisiana (Maldonado et al 2013). Resettlement may also occur as part of greenhouse gas mitigation projects and adaptation planning (de Sherbibin et al 2011). We lack clear guidance on how best to implement planned relocations while respecting the rights and well-being of those affected (Ferris 2012).

5. Existing and proposed international policy tools and directions for responding to EMD

There are no specific, legally binding international instruments for responding to EMD. The UN Convention for the Protection of Refugees does not apply to people who are displaced for environmental reasons. There is a non-binding UN document called the *Guiding Principles on Internal Displacement* that does stipulate an individual's right to protection and assistance in instances of internal displacement for environmental reasons, and the African Union has adopted this as part of its Kampala Accord. The *Guiding Principles* have not been invoked in response to an EMD event. The closest such time was in 2008, when the UN became concerned by the inadequate response of Myanmar authorities to the displacement caused by Cyclone Nargis, and its unwillingness to accept international humanitarian assistance. There was security council discussion of invoking the UN doctrine of Responsibility to Protect (R2P) to force Myanmar to accept outside assistance, but this was not acted upon (Barber 2009).

The UN Security Council has twice discussed the security dimensions of climate change and potential for EMD, and recommended that such topics be dealt with through the UNFCCC negotiating process. The Cancun Adaptation Framework negotiated through the UNFCCC encourages least developed nations to include migration and relocation planning as part of their adaptation action planning. Article 50 of the Paris Agreement signed in December 2015 requires the creation of a task force to study climate-related displacement and make recommendations to signatories at a future date. See Appendix 2 for an analysis of the implications of Article 50.

A number of proposals have been floated in recent years on responding to various aspects of EMD, more notable ones including the Nansen Initiative on Disaster-Induced Cross-Border Displacement and the Peninsula Principles on Climate Displacement Within States (the latter promoted by the Swiss-based non-profit Displacement Solutions). The Nansen Initiative (https://www.nanseninitiative.org) seeks to establish a protection agenda that would help states develop sufficient responses to displacement prior, during and after their occurrence. The first stage of the Nansen Initiative was funded by the Norwegian and Swiss governments, with a plan for the next stage still emerging at time of writing.

Governments of small island states like Kiribati have advocated for a "migration with dignity" strategy that would see developed nations allow labour migration from highly vulnerable countries so as to facilitate remittances and acquisition of job skills by young people, in anticipation of the potential future need to relocate elsewhere (McNamara 2015). In 2015 New Zealand's highest court rejected the appeal of Ioane Teitiota, a Kiribati national who asked not to be deported to his home country for humanitarian reasons, those being that his home island was rapidly becoming uninhabitable because of erosion and climate change. The court noted that there was no evidence he would face persecution in Kiribati, and that there was no evidence the government of Kiribati was failing to protect its citizens from harm. Teitiota's case appears to have been the first such case to make its way through the courts of a common law country with jurisprudence similar to Canada and the US.

The Climate Vulnerability Forum (CVF) is a South-South intergovernmental platform for governments to act in concert and cooperate to enhance responses to climate change related challenges. Following the 2011 Dhaka Ministerial Declaration, 20 countries signed the 2013-2015 Climate Vulnerability Action Plan to address climate-change related migration and displacement. In the 2015 in its Manila-Paris Declaration, the CVF sought to establish a climate change displacement coordination "facility" to coordinate efforts to address the climate change-related displacement, which led to Article 50 of the Paris Agreement referred to above.

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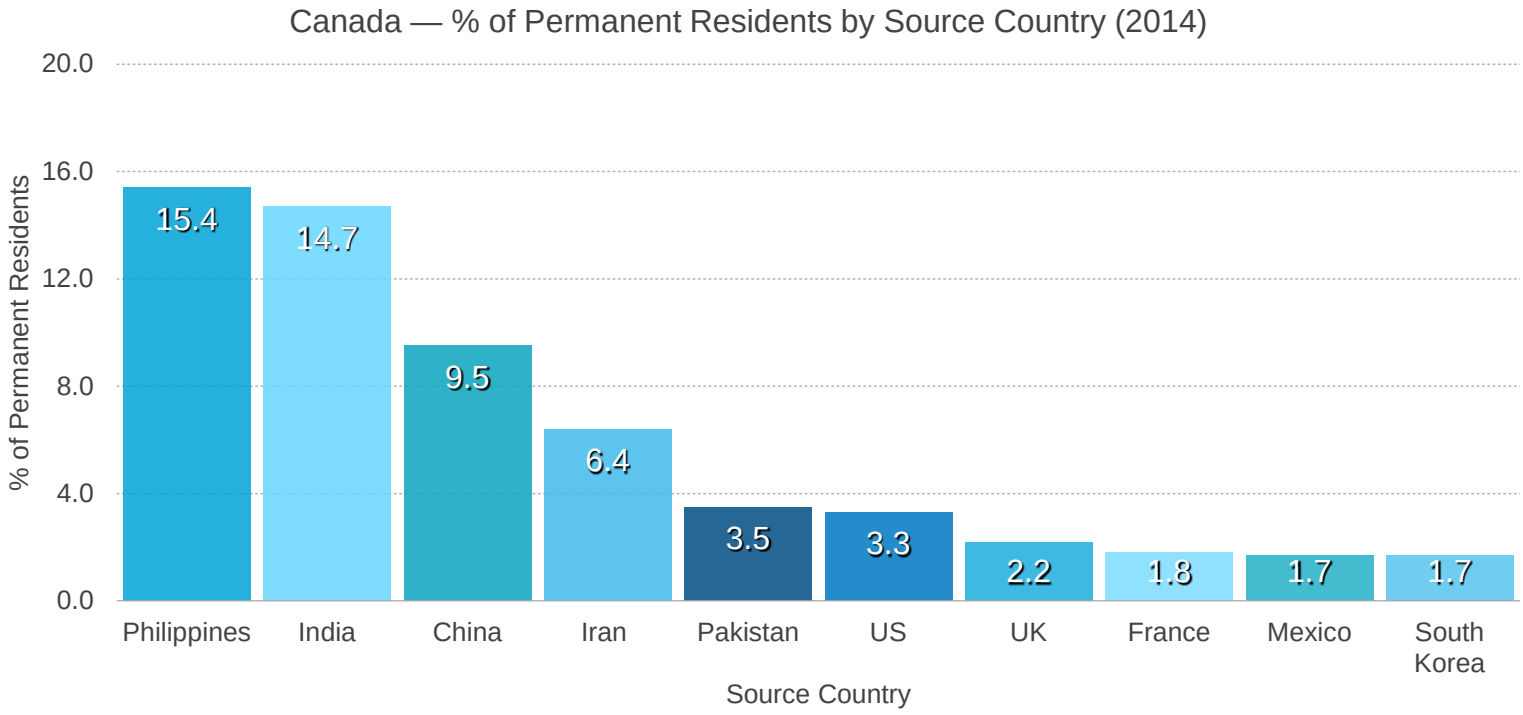
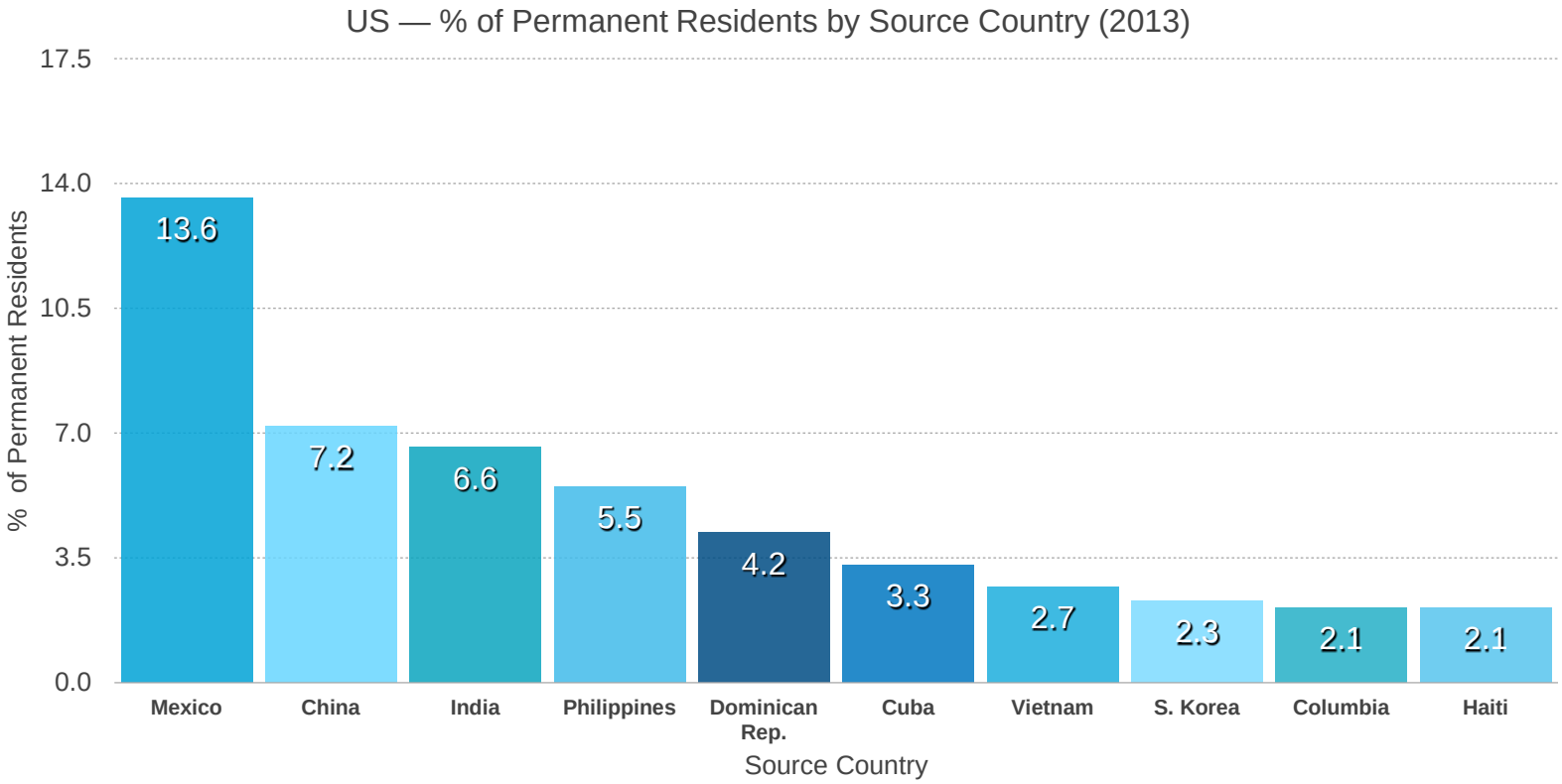
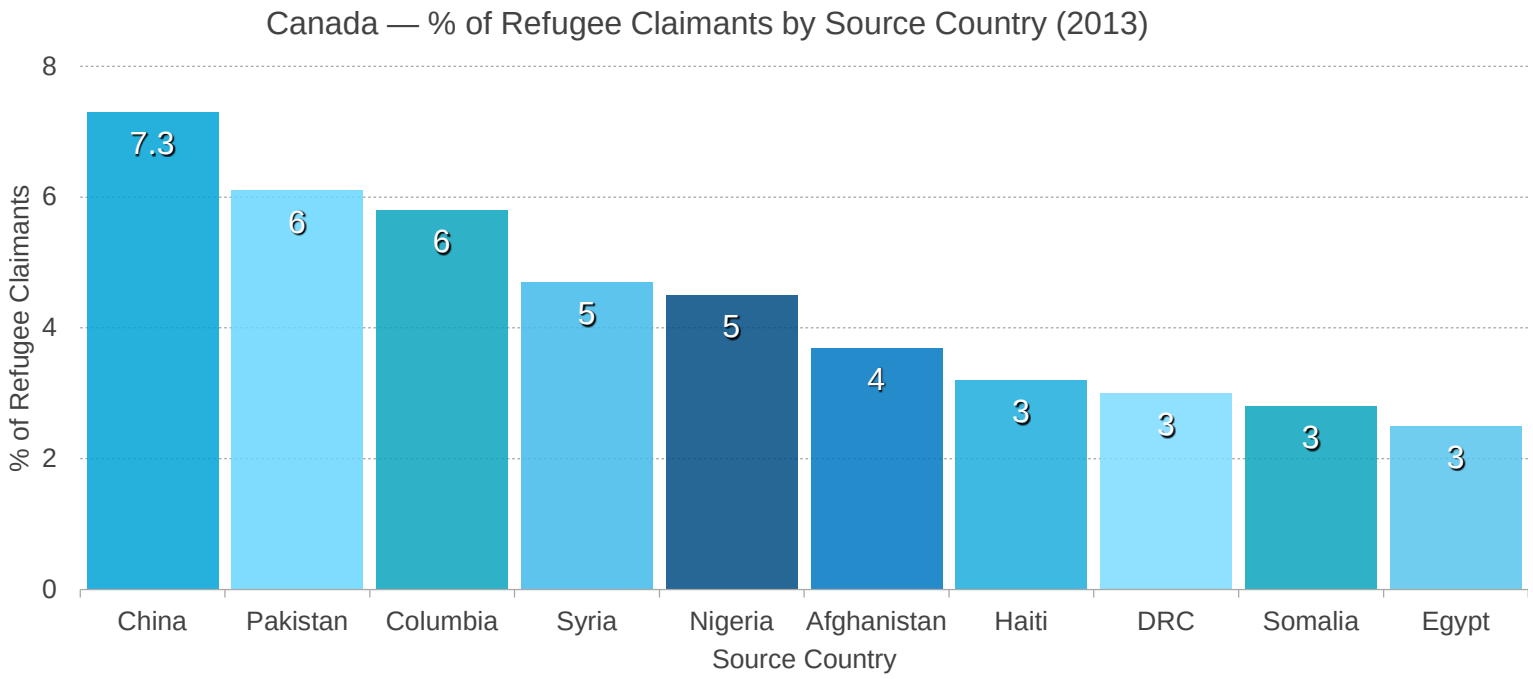
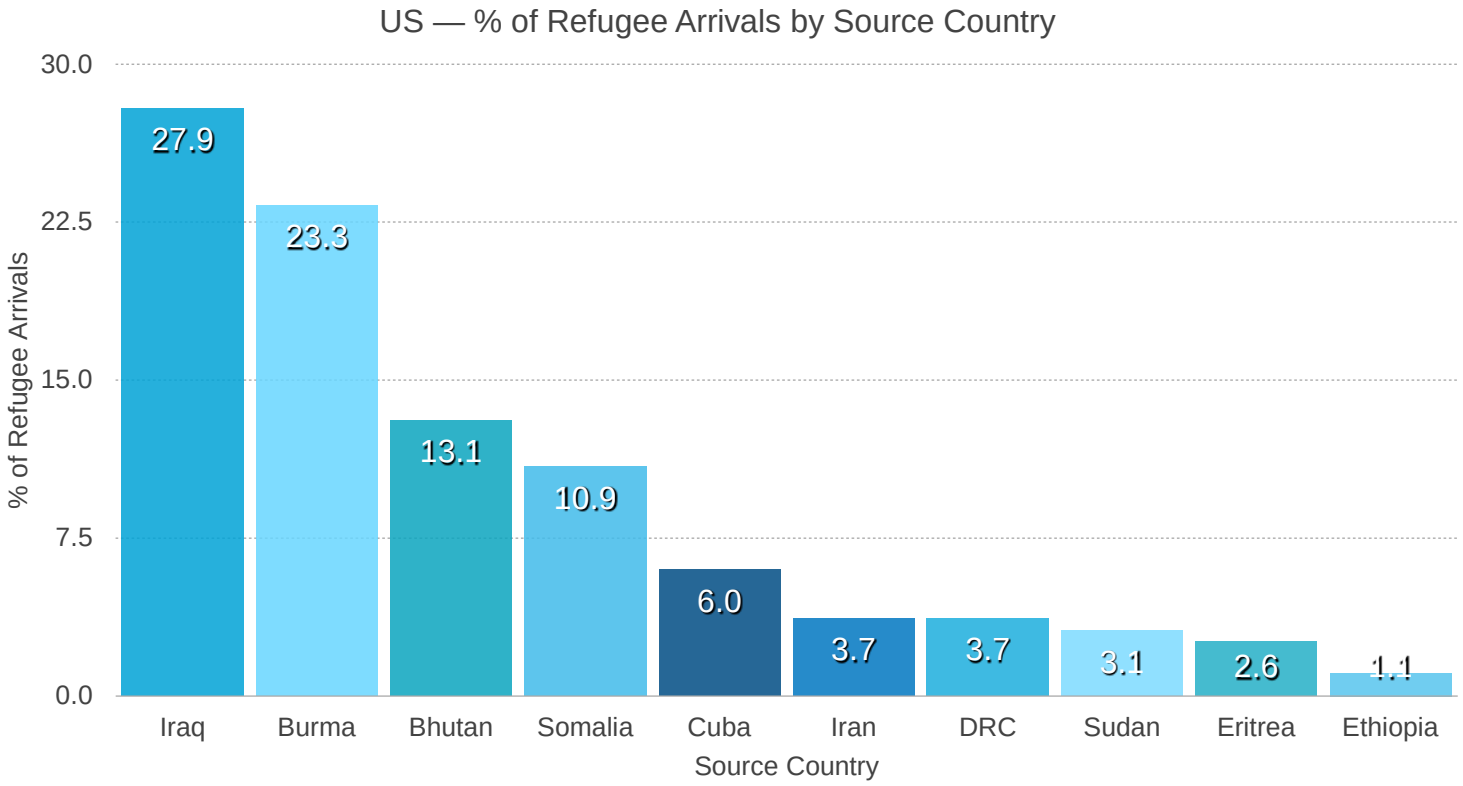
Appendix 1


Canada — % of Permanent Residents by Source Country (2014)
20.0
16.0
12.0
8.0
4.0
0.0
% of Permanent Residents
15.4
14.7
9.5
6.4
3.5
3.3
2.2
1.8
1.7
1.7
Philippines
India
China
Iran
Pakistan
US
UK
France
Mexico
South Korea
Source Country


US — % of Permanent Residents by Source Country (2013)
17.5
14.0
10.5
7.0
3.5
0.0
% of Permanent Residents
13.6
7.2
6.6
5.5
4.2
3.3
2.7
2.3
2.1
2.1
Mexico
China
India
Philippines
Dominican Rep.
Cuba
Vietnam
S. Korea
Columbia
Haiti
Source Country


Canada — % of Refugee Claimants by Source Country (2013)
% of Refugee Claimants
8
6
4
2
0
7.3
6
6
5
5
4
3
3
3
3
China
Pakistan
Columbia
Syria
Nigeria
Afghanistan
Haiti
DRC
Somalia
Egypt
Source Country


US — % of Refugee Arrivals by Source Country
% of Refugee Arrivals
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22.5
15.0
7.5
0.0
27.9
23.3
13.1
10.9
6.0
3.7
3.7
3.1
2.6
1.1
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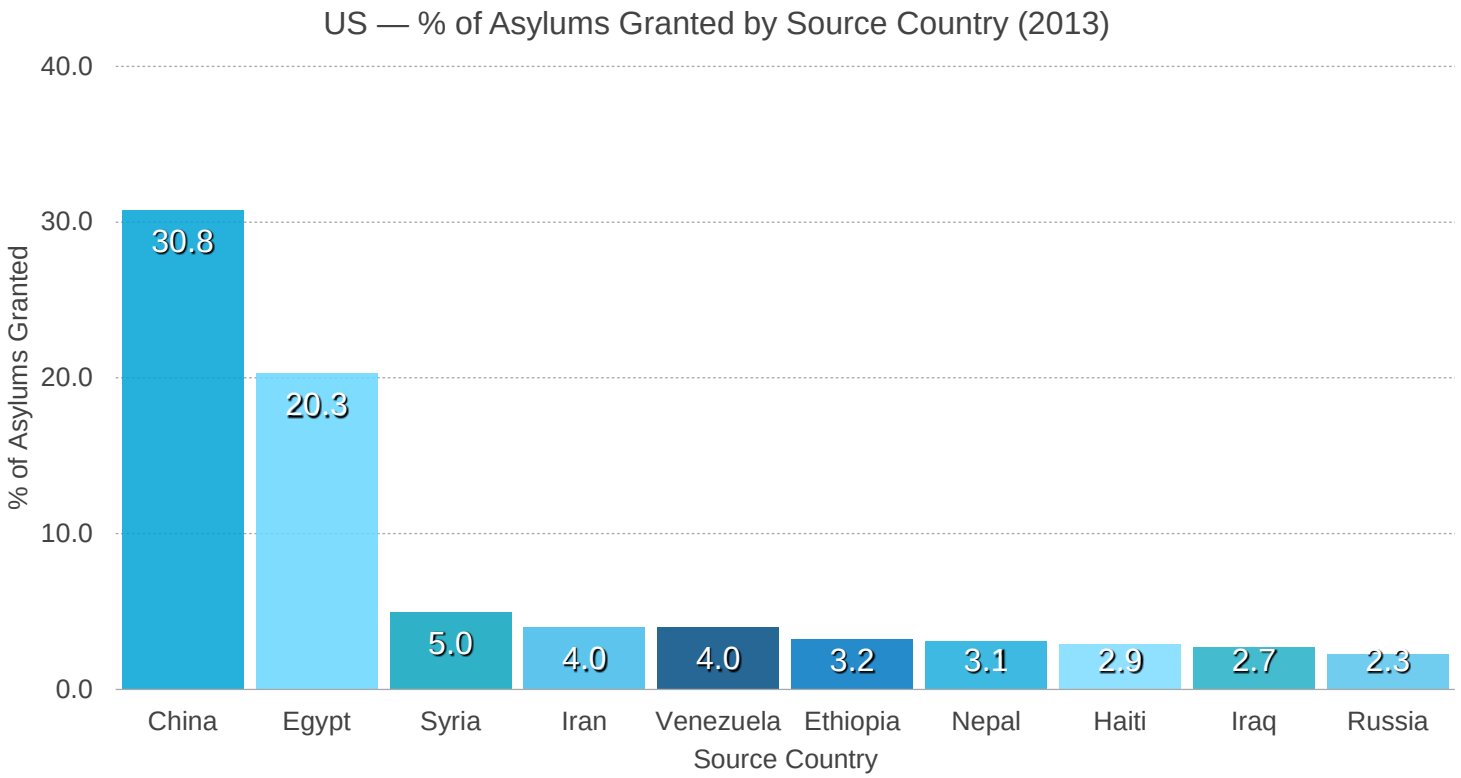
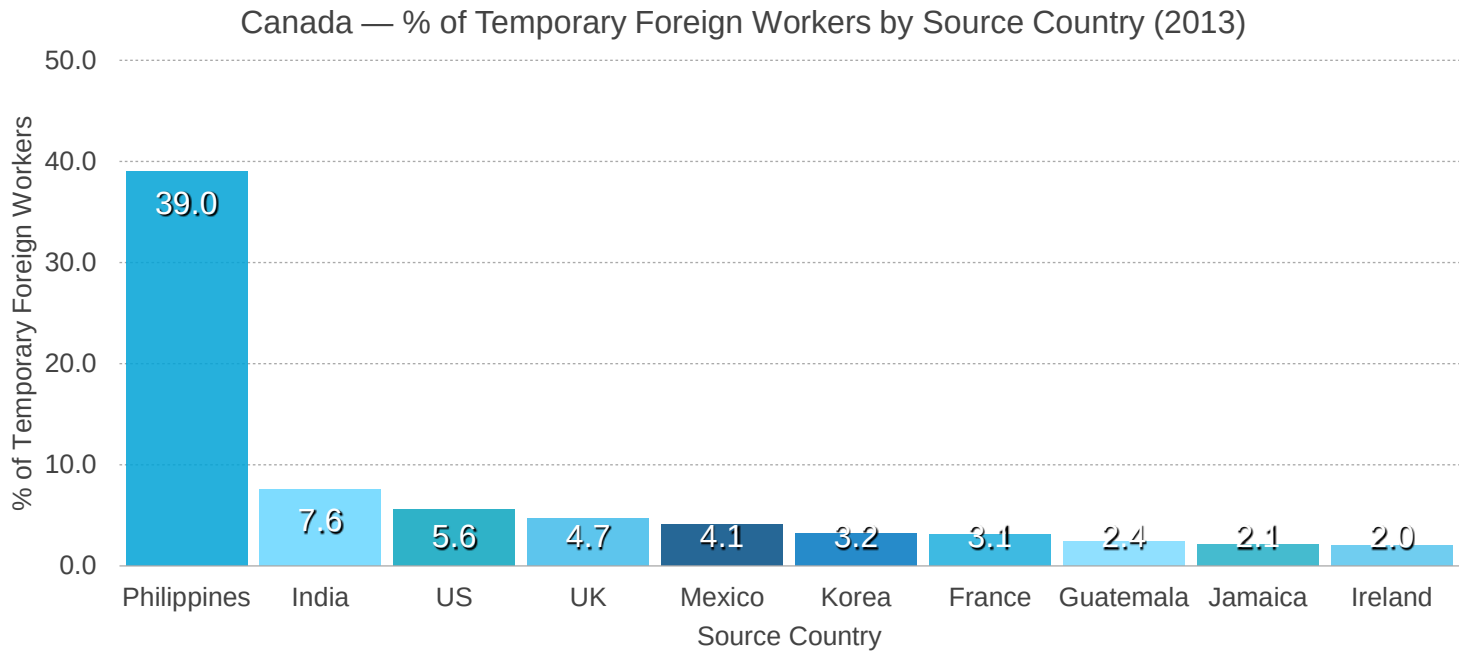
Burma
Bhutan
Somalia
Cuba
Iran
DRC
Sudan
Eritrea
Ethiopia
Source Country


US — % of Asylums Granted by Source Country (2013)
40.0
30.0
20.0
10.0
0.0
% of Asylums Granted
30.8
20.3
5.0
4.0
4.0
3.2
3.1
2.9
2.7
2.3
China
Egypt
Syria
Iran
Venezuela
Ethiopia
Nepal
Haiti
Iraq
Russia
Source Country


Canada — % of Temporary Foreign Workers by Source Country (2013)
50.0
40.0
30.0
20.0
10.0
0.0
% of Temporary Foreign Workers
39.0
7.6
5.6
4.7
4.1
3.2
3.1
2.4
2.1
2.0
Philippines
India
US
UK
Mexico
Korea
France
Guatemala
Jamaica
Ireland
Source Country

Appendix 2: What the Paris Agreement on Climate Change says about displacement and migration

Synopsis prepared by Robert McLeman December 15, 2015.

The following is a synopsis of how climate-related displacement and migration are treated in the Paris Agreement on climate change.

What is the 'Paris Agreement'?

On December 12, 2015, the 21st Conference of Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC) concluded with the release of the Paris Agreement, a 32-page document spelling out a global plan of action for addressing the underlying causes of anthropogenic climate change and for developing strategies to plan for and respond to its impacts. Nations that are Parties to the UNFCCC must now ratify this Agreement according to their own national political processes and sign it before April 2017, at which time it will come into effect, assuming enough countries sign it. The full English text of the Agreement can be found here.

Where do displacement and/or migration appear within the text of the Paris Agreement?

The Paris Agreement contains numerous sections; climate-related displacement is addressed once, in Article 50, which appears in the "Loss and Damage" section of the Agreement, and reads that the COP…

> Also requests the Executive Committee of the Warsaw International Mechanism to establish, according to its procedures and mandate, a task force to complement, draw upon the work of and involve, as appropriate, existing bodies and expert groups under the Convention including the Adaptation Committee and the Least Developed Countries Expert Group, as well as relevant organizations and expert bodies outside the Convention, to develop recommendations for integrated approaches to avert, minimize and address displacement related to the adverse impacts of climate change;

What specifically does Article 50 mean? What actions are to be taken?

The inclusion of Article 50 means the international community formally acknowledges that the future impacts of climate change may necessitate the abandonment and/or relocation of people and settlements in highly exposed locations. Article 50 directs that a task force be established to develop recommendations to the COP on how to avert or minimize future population displacements linked to the impacts of climate change, and to develop recommendations on how to address such displacement that does occur.

Who will make up the task force?

Responsibility for establishing the task force will be given to the Executive Committee of the Warsaw International Mechanism (see below). Membership will consist of the UNFCCC's Adaptation Committee, its Least Developed Country (LDC) Expert Group, and outside

organizations selected by the task force. Although these outside organizations are not specified, it is reasonable to expect that multilateral groups with strong interests in refugee affairs and international migration will be invited, such as the UN High Commissioner for Refugees and the International Organization for Migration.

What is the Warsaw International Mechanism? What is the Adaptation Committee? What is the Least Developed Country Expert Group?

In 2013 at COP19 in Warsaw, Poland, the COP established the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts. Its purpose is to address loss and damage associated with impacts of climate change, including extreme events and slow onset events, in developing countries that are particularly vulnerable to the adverse effects of climate change.

Following the COP16 meeting in Cancun, Mexico in 2010, the Adaptation Committee was established to provide technical support and guidance to the COP on adapting to climate change, to facilitate sharing of information and best practices, and to provide guidance on the financial and technological means and incentives needed to facilitate adaptation. Its membership includes representatives from developed and least developed countries, and small island developing states.

LDC Expert Group was established in 2001, and provides technical support and advice to LDCs on the planning their adaptation strategies. "Least Developed Countries" refers to a specific group of states identified by the COP, a full list of which can be found here.

What about climate-induced migration more generally? What does the Paris Agreement say about it?

Not all climate-related migration is involuntary. The Paris Agreement does not use the term "migration" anywhere, it only makes reference to "displacement". Similarly, the French language version uses only the term "déplacements". The Agreement does not provide a specific definition for its use of the term "displacement". The ordinary meaning of the term "displacement" according to the Oxford Dictionary is "The enforced departure of people from their homes, typically because of war, persecution, or natural disaster". This implies that the Paris Agreement task force is being asked to consider only those situations where people are or may be obliged to migrate involuntarily for reasons associated with climate change. It would be up to the task force to decide whether facilitating voluntary, proactive migration in anticipation of the adverse impacts of climate change would be an approach that might avert or minimize the risk of involuntarily departures at a future date.

Why is voluntary migration important?

Countries that are highly vulnerable to the impacts of climate change, such as the small island state of Kiribati, have begun advocating for a "migration-with-dignity" approach to adapting to climate change. This means that involuntary relocation should be viewed as an option of last resort. Instead, opportunities should be created now that would enable voluntary labour migration of people from LDCs to developed nations, so they can develop employment skills,

increase household incomes, and remit money home to facilitate development and investment. Should the day come when their home communities need to be abandoned, residents will then have greater resources and agency to shape their future, and will not be obliged to flee like refugees. For further information on the Kiribati description of migration-with-dignity, click here.

Does the Paris Agreement mean that other countries will financially compensate people who are displaced because of climate change?

No. Article 52 states explicitly the Agreement does not create any liability or basis for compensation.

Is this the first time displacement or migration has appeared in official UNFCCC agreements?

No. At the 2010 COP in Cancun, the COP signed the Cancun Adaptation Framework, which "invited" signatories to consider developing measures that would "enhance understanding, coordination and cooperation with regard to climate change induced displacement, migration and planned relocation, where appropriate, at the national, regional and international levels" (Article 14(f) of the Cancun Agreements). As the wording implies, there was no binding requirement that countries take such actions. The main effect was to explicitly describe migration as a potential means of adapting to the impacts of climate change, and to encourage signatories, especially LDCs, to formally begin considering migration and displacement in the context of their wider adaptation planning.