ON CLIMATE CHANGE, HUMAN MIGRATION AND WORST-CASE SCENARIOS

ABSTRACT

This article provides readers with a taste of some of the concerns being discussed by scholars and policy-makers over the potential impacts of climate change on human population movements, and emphasizes the need for greater involvement by demographers and migration scholars in the field of climate change impact and adaptation research.

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In February 2008, I attended a two-day conference in London with the self-explanatory title "Living with climate change: Are there limits to adaptation?" Organized by the United Kingdom's Tyndall Centre for Climate Change Research, the conference featured presentations from leading researchers preoccupied with how we shall adapt to the increasingly inevitable impacts of human-induced climate change. Unlike many academic conferences, there was a long waiting list of people seeking to be in the audience, many of whom were turned away. Presentations covered topics as diverse as how Inuit in Canada's Nunavut are adapting to shrinking sea ice and how climate-related changes in migratory bird patterns may increase the risk of an avian flu pandemic among humans.

The evening keynote speaker was the United Kingdom government's chief advisor on climate change science, who spoke of the need to know how human migration patterns will respond to the impacts of climate change. More specifically, he wanted to know if, when and how many people around the world may become environmental refugees as a result of climate change. My presentation the following day gave an overview of my recent empirical research into how household migration decisions are made during times of climatic stress, how rapid demographic change can undermine a community's adaptive capacity, and how geographical information systems can be used to trace drought-related migration. It undoubtedly came as a disappointment to the science advisor, it being a dry and detached review of methods and issues directed more at my fellow academics than at answer-seeking policy-makers.

This conference was not the first occasion at which the need for better information on climate change-related migration has been raised; both the most recent assessment report of the Intergovernmental Panel on Climate Change[1] (Adger et al. 2007) and the *Stern Review: The Economics of Climate Change*[2] (Stern 2007) have made similar statements. Nor is the concern about climate change triggering large-scale migrations a new one; the suggestion has appeared in scientific journal articles for more than two decades now. However, it appears that calls for more research are becoming louder and more voluminous than at any time previously.

There are a number of possible explanations for this; I will suggest three. The first is that there has been considerable sharpening in recent years of the scientific understanding of how the Earth's climate functions, and how anthropogenic emissions of greenhouse gases and ongoing reduction of the Earth's forests modify climatic processes. Scientists are becoming increasingly confident that changes currently being observed in many regions – such as shrinking sea ice and melting permafrost in the Arctic, the rapid retreat of mountain glaciers worldwide, and slow but steady increases in sea surface temperatures and mean sea levels – cannot be explained away as being solely due to the inherent, natural variability of climate. As understanding of the biophysical aspects of climate change has improved, governments have started to recognize that there will be consequences for human well-being, and decisions will need to be made in the not-so-distant future. Consequently, policy-makers now demand more information on options for adapting to the impacts of climate change.

Scholarly research has shown that climate change adaptation can be undertaken at any scale, from the individual or household right up to the international community as a whole (Smit and Wandel 2006). Some socio-economic and resources sectors (such as agriculture, water, fisheries and health) have received greater attention than others. Northern regions and developing countries – whose populations are widely believed to be especially vulnerable to climate change-related risks –

have also been the focus of a growing number of adaptation studies. As knowledge of adaptation processes in these areas and sectors continually improves, it has become increasingly evident that migration is one of the ultimate forms of adaptation to which households may resort when other adaptation options fail.

A second driver of current interest in climate change-related migration has its origins in the media. The Hollywood disaster movie *The Day After Tomorrow* (with its spectacular if physically impossible images of people fleeing a quick-frozen New York City) and Al Gore's inescapable and shrewdly-titled *An Inconvenient Truth* have done more for creating public awareness of climate change than did decades of scientific reporting. At the same time, there has been a continuous stream of commentaries in the print media and on talk radio juxtaposing climate change "believers" against climate change "skeptics," in much the same style that evolution and creationism are periodically offered up as competing "theories" of human origins.

One outcome of this dynamic has been a desire within the media and in the press releases of many environmental organizations to ascribe extreme weather conditions, droughts, storms and any number of other natural events as being the direct results of climate change. Where once Hurricane Katrina, California wildfires or droughts in the southeastern United States would have been declared "acts of God," they are now presented as evidence that global warming is upon us. This in turn has led journalists to anoint at least four different groups in areas as distant from one another as Alaska and New Guinea as being the first official climate change refugees (McLeman and Smit 2006a); in each case a population near the ocean shore has had to be relocated inland due to erosion or storm surges threatening built infrastructure.

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This lack of criticality in attri-buting undesirable events to climate change extends to a third driver of climate-migration discussion, that being the preoccupation of western governments with security. Security in this context takes on two forms – what Americans refer to as "homeland security" (the prevention of terrorist acts on home soil, in other words) and "failed states" (areas where conflicts emerge that break down civil governance and require outside intervention to resolve). In both instances, there is an anxiety that the impacts of climate change may become a driver of security risks, especially in less-developed and conflict-prone areas. A few years ago, a Pentagon-commissioned study of worst-case scenarios projected such possibilities as large-scale displacements of populations, international movements of environmental refugees and the potential need for American intervention in a number of regions (Schwartz and Randall 2003). The military intelligence community is not alone in making worrisome projections about the future impacts of climate change on global migration patterns; a variety of academic researchers and non-governmental organizations have issued warnings to expect widespread famine, political instability and anywhere up to a billion environmental refugees by the middle of this century (see McLeman 2008).

The environmental security literature that sees climate change leading to large-scale violence in developing nations often underestimates the power of local institutions to resolve conflicts without violence. It also often overlooks the many windows of opportunity for international development assistance, diplomacy and trade partnerships to mitigate the development of political and economic instability. While the conflicts in Darfur and Rwanda are often described as having environmental degradation and resource scarcity featured in their origins, severe environmental stressors have existed and do currently exist in many parts of the world where they have *not* led to outbreaks of violence. Why the difference? Resource competition led to violent conflict in Darfur because the government of Sudan encouraged violence; powerful elites played a similar role in Rwanda. In other words, there is no predetermined ecological inevitability stating that when scarcity occurs, violence is the only possible outcome.[3]

The types of risks associated with climate change are clearly severe, and it is *possible* that millions, hundreds of millions or more may eventually be displaced from their homes as an outcome. But are such outcomes likely? In reviewing existing climate change migration literature specifically, or environmental refugee literature more generally, one routinely finds that the research is underlain by facile "push-pull" explanations of migration behaviour and that the empirical foundation is thin (McLeman and Smit 2006b). Many of the exciting developments in migration and demographic research made in recent years have been slow to percolate into climate change scholarship. This is not entirely surprising; academic disciplines, like government departments, are silos whose occupants do not always communicate very well with the occupants of neighbouring silos. Also, the climate change research silo has tended to be populated by large numbers of natural scientists whose backgrounds in demographic and human migration science may be limited.

In my own relatively brief research career, I have focused on developing theoretically grounded empirical research on human migration behaviour, targeted at the climate change and environmental security research communities and the policy-makers who draw upon their expertise. I have been particularly interested by events in living memory where climatic conditions have played a contributory role in stimulating migration (the 1930s Dust Bowl migration in the United States, for example), seeing such events as analogues from which to learn about the complex interrelationship of environmental conditions, human well-being and household migration behaviour

(McLeman 2006). I am also interested in how demographic change in rural areas due to out-migration of young, skilled workers affects the capacity of those who remain behind to adapt to changing climatic conditions. My particular concern is for those who live in geographically isolated or marginal areas and for communities in developing nations, who are vulnerable to the risks associated with climate change but enjoy none of the benefits of the west's unmitigated fossil fuel-based production and consumption.

As much as we might like to wish it away, anthropogenic climate change and environmental degradation are poised to become overriding influences on migration patterns in coming decades. The impacts of climate change are being felt right now, and not just in the Arctic and developing countries. I am currently wrapping up a research project in an area of eastern Ontario, between Ottawa and Toronto, where rapid changes in climatic conditions are already being experienced.[4] Such changes are having observable impacts on the economic and social well-being of the local population. Small businesses that depend on winter tourism for revenues are hurting due to milder, less snowy winters, while increased frequency of localized extreme windstorms leads to increased property damage, power failures and risk of personal injury. These and other local changes in climatic conditions are real, not hypothetical, and they undermine the future potential of the small communities of the region. These communities already see many of their brightest young people migrate to urban centres in search of higher education and better job opportunities; I fear, as do they, that the negative impacts of climate change will further erode the quality of life in the area and exacerbate this out-migration.

In writing this article, my goal was to provide readers who have expertise in human migration behaviour, demography and related fields a taste of some of the issues being discussed in the climate change research community and that might interest them. I hope this article might encourage such readers and young migration scholars still developing their future research programs to engage with the climate change research community in the future. Your expertise is much needed. There is any number of insights and discoveries waiting to be made. There is much hubris to be dispelled, much clarity to be brought to critical debates about how climate change will influence human migration patterns. You will have the ear of policy-makers in Europe (immediately) and in North America (inevitably). These are convenient truths.

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Notes

[1] The international body of scientists that reports to the world's policy-makers on ongoing development in climate change science.

[2] Headed by former World Bank chief economist Nicholas Stern.

[3] For further discussion see Brown, Hammill and McLeman (2007).

[4] Project website: <www.addington.uottawa.ca>.