



Editorial

Migration and global environmental change[☆]

Migration is an important social, economic and cultural phenomenon that somehow has been overlooked in the field of human dimensions of environmental change. In an inter-connected and mobile world, migration would seem to be an increasingly important response to stress, shock and uncertainty. Indeed, there is a current renewal of interest in both the role of environmental change in migration, and in the policy, legal and governance challenges of the movement of people within and across national borders. This renewed interest goes beyond the concerns that social and natural sciences have previously been somewhat determinist on the role of the environment, or even the climate, in shaping human history (McIntosh et al., 2000; Hulme, 2009).

An interdisciplinary and comprehensive understanding of economics, politics, identity, risk and the embedded history of migration in any specific place is therefore critical to the core questions of migration and environmental change. In this special issue we focus particularly on the factors which drive migration and the extent to which these are influenced by changing environments and risks. Together, they provide evidence to support the notion that migration influenced by environmental change cannot be separated from migration associated with a range of other drivers. The papers also provide important evidence on the likely nature of migration influenced by environmental change into the future, including in a number of specific regions of the world.

In October 2011, the UK's Foresight Programme published a major review of the interactions between global environmental change and migration (Foresight Migration and Global Environmental Change, 2011), looking forward first to 2030 and then out to 2060. This special issue of *Global Environmental Change* is a series of papers commissioned to provide part of the evidence base for the Foresight review.

The first paper in the special issue (Black et al., 2011) introduces a framework for conceptualising and analysing the linkages between environmental change and migration. This framework identifies environmental drivers as just one of a suite of five categories of driver alongside economic, political, demographic, and social drivers. Environmental change can affect directly the environmental influences on migration, but can also indirectly affect migration through the other drivers, particularly economic and political. The essence of the framework is that the effects of

environmental change on migration will be determined by the characteristics of all five drivers, mediated through socially, politically and economically-determined barriers and facilitators to movement.

The academic and policy literature on environmental change and migration makes frequent reference to estimates of numbers of “environmental refugees” (Myers, 2002) or “environmental migrants” (Morton et al., 2008; Feng et al., 2010). Yet all the papers in this special issue all demonstrate that it is in practice both difficult and conceptually challenging to identify single causes of migration – particularly environmental causes – as dominant. Reflecting this difficulty, Gemene (2011) provides an extensive critique of existing estimates and predictions of the global numbers of people displaced by environmental changes. Assessments of the potential magnitude of the effect of environmental change on migration are typically based on identifying “exposed” populations, but empirical evidence – much reviewed in the papers in this special issue and incorporated within the conceptual framework in Black et al. (2011) – shows that decisions have many causes and are shaped through individual agency.

Lilleor and van den Broeck (2011) review the evidence for the effect of climatic change, and specifically variability of rainfall and temperature, on two of the key economic drivers of migration – income differentials and income variability in origin areas. They point out that although several studies have shown associations between rainfall and migration, none identify the channel through which climate affects migration. In turn, limited evidence on the relationship between climate change and income drivers provides an insufficient basis at present for estimates of future migration. Hugo (2011) gives an overview of the demographic drivers of migration, and highlights the spatial coincidence between many areas of rapid demographic change and climate change “hot spots”. Nonetheless, the review concludes that demographic drivers of migration rarely work in isolation from other drivers, including economic drivers. A similar conclusion is drawn by Raleigh (2011), who reviews the extent to which conflict patterns affect the volume, direction and types of migration. Raleigh suggests that exposure to increasing environmental variation and disruption has the potential to affect the ability of communities to respond to threats – including conflict – but primarily through its effect on livelihoods and poverty.

Drawing on this notion of interconnected drivers of migration, the paper by Kniveton et al. (2011) develops a specific agent-based model to simulate migration flows in Burkina Faso in response to the interactions between economic, demographic, social and climate change. Whilst the model suggests that under all scenarios of the future, migration will be greater under conditions of reduced

[☆] While the Government Office for Science commissioned this review, the views are those of the author's, are independent of government, and do not constitute Government policy.

rainfall, there are important interactions between rainfall and demographic change that influence the scale of outmigration. In contrast, Findlay (2011) concentrates on the factors likely to favour certain destinations for migrants, arguing that movement in relation to environmental change is most likely to be of short distance, although decisions about destinations are likely to be strongly influenced by social networks. Findlay also highlights the policy challenges posed by immobility.

Seto (2011), Parnell and Walawege (2011), de Haas (2011) and Fielding (2011) review the drivers of migration in specific geographic circumstances, focusing on mega-delta cities in Asia and Africa, sub-Saharan cities, the Mediterranean and internal migration within the UK respectively. In each case, patterns and characteristics of migration are determined by specific interactions between different drivers, but with some important differences. Growth in cities in mega-deltas in Asia in particular, for example, is very strongly driven by migration, and is drawing many additional people to places that are if anything more, rather than less vulnerable to global environmental change. In contrast, natural population growth is a much more significant driver of growth in many dryland sub-Saharan cities. Nonetheless, key issues exist around the management of tensions and conflict in growing African cities, with migrants often marginalised and as a result implicated in existing conflicts. McLeman (2011) reviews the specific case of settlement abandonment, constructing a typology to summarise the role of environmental and non-environmental drivers.

The papers in this special issue make a significant contribution to the development of our understanding of the relationship between global environmental change and migration, not least through drawing together evidence from a very wide range of disciplines involved with both environmental change and migration. It is also hoped that they will provoke further analysis in particular regions and circumstances that applies the framework developed here to understand more fully the specific relationships between different migration drivers, and the types of migration flows that might result in different scenarios of the future.

References

- Black, R., et al., 2011. The effect of environmental change on human migration. *Global Environmental Change* 21, S3–S11.
- de Haas, H., 2011. Mediterranean migration futures: patterns, drivers and scenarios. *Global Environmental Change* 21, S59–S69.
- Feng, S., Krueger, A.B., Oppenheimer, M., 2010. Linkages among climate change, crop yields and Mexico-US cross-border migration. *Proceedings of the National Academy of Sciences* www.pnas.org/cgi/doi/10.1073/pnas.1002632107.

- Fielding, A., 2011. The impacts of environmental change on UK internal migration. *Global Environmental Change* 21, S121–S130.
- Findlay, A., 2011. Migrant destinations in an era of global environmental change. *Global Environmental Change* 21, S50–S58.
- Foresight Migration and Global Environmental Change, 2011. Final Project Report. The Government Office for Science, London.
- Gemene, F., 2011. Why the numbers don't add up: a review of estimates and predictions of people displaced by environmental changes. *Global Environmental Change* 21, S41–S49.
- Hugo, G.J., 2011. Future demographic change and its interactions with migration and climate change. *Global Environmental Change* 21, S21–S33.
- Hulme, M., 2009. *Why we Disagree about Climate Change*. Cambridge University Press, Cambridge.
- Kniveton, D., Smith, C.D., Wood, S., 2011. Agent-based model simulations of future changes in migration flows for Burkina Faso. *Global Environmental Change* 21, S34–S40.
- Lilleor, H.B., van den Broeck, K., 2011. Drivers of migration and climate change in LDCs. *Global Environmental Change* 21, S70–S81.
- McIntosh, R.J., Tainter, J.A., McIntosh, S.K. (Eds.), 2000. *The Way the Wind Blows: Climate, History, and Human Action*. Columbia University Press, New York.
- McLeman, R., 2011. Settlement abandonment in the context of global environmental change. *Global Environmental Change* 21, S108–S120.
- Morton, A., Boncour, P., Laczo, F., 2008. Human security policy challenges. *Forced Migration Review* 31, 5–7.
- Myers, N., 2002. Environmental refugees: a growing phenomenon of the 21st century. *Philosophical Transactions of the Royal Society B* 357, 609–613.
- Parnell, S., Walawege, R., 2011. Sub-Saharan African urbanisation and global environmental change. *Global Environmental Change* 21, S12–S20.
- Raleigh, C.A., 2011. The search for safety: the effects of conflict, poverty and ecological influences on migration in the developing world. *Global Environmental Change* 21, S82–S93.
- Seto, K.C., 2011. Exploring the dynamics of migration to mega-delta cities in Asia and Africa: contemporary drivers and future scenarios. *Global Environmental Change* 21, S94–S107.

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