

Connecting planetary health, climate change, and migration



Climate change is increasingly understood to be an important driver of migration and displacement worldwide, although the magnitude of such population movements remains disputed.¹⁻³ Improving the health of migrants and reducing adverse health outcomes related to migration are also growing concerns globally. Current crises related to migration and displacement, whether in the Horn of Africa or the Mediterranean, highlight the different challenges related to migrants' health, especially in humanitarian emergencies.⁴

Planetary health, as a new discipline, was created to safeguard human health in the Anthropocene epoch.⁵ It revolves around a new interdisciplinary and transdisciplinary approach that seeks to explore the effects of environmental change on human health. Planetary health focuses in particular on two dimensions: the first situates human health within human systems, looking at the threats faced by our species such as pandemics or climate change; the second concentrates on the natural systems within which our species evolve and looks at the health and diversity of the biosphere.⁶

Although migrants' health and climate-induced migration are known to be major challenges at present, few attempts have been made to consider the complex associations that unite climate change, migration, and health in an integrated three-pronged nexus. Therefore, we propose a basic explanatory framework that highlights the linkages between these three dimensions and seeks to encourage debate, and new research, about how planetary health is concerned with, and within, this three-pronged nexus (figure).

Climate change is known to affect populations' health (pathway A; figure).^{7,8} Most of this influence is through direct exposures such as heatwaves or extreme weather events, although less direct impacts arise from disruptions to environmental, ecological, and social systems. Issues such as proliferation of new or resistant strains of pathogens are also an unwelcome scenario. The indirect impacts arising from environmental, ecological and social systems will affect human health through changes in food yields, freshwater flows and quality, stability of infectious disease patterns, air quality, social cohesion, and family income and livelihoods.

Indeed, climate change could threaten food security through reductions in agricultural and fishery yields.

This effect is particularly alarming in regions that are already facing food insecurity such as in sub-Saharan Africa and south Asia.⁹ Moreover, the occurrence of flooding or drought cycles as well as hotter summers in some regions are likely to increase risks to agricultural productivity. Climate change will also impact the geographical range, seasonality, and incidence of various infectious diseases, such as malaria, diarrhoeal diseases, and cholera.^{10,11}

These impacts, especially extreme weather events, sea-level rise, soil degradation, and food and water scarcity are strongly associated with migration (pathway B; figure).² In some cases migration will be a strategy of last resort, with people left with no other choice as a result of loss of habitable land, extreme health risks, or deteriorating livelihoods. In this case, displacement might increase the risks of adverse health outcomes, in particular for vulnerable groups such as children and the elderly, as well as those who are already suffering from (chronic) illnesses (pathway C; figure).

Migration can also be a voluntary choice, although forced migration and voluntary migration are not two discrete categories, but rather the two ends of a continuum.¹² Migration is not automatically an indicator of vulnerability; it can also be an adaptive

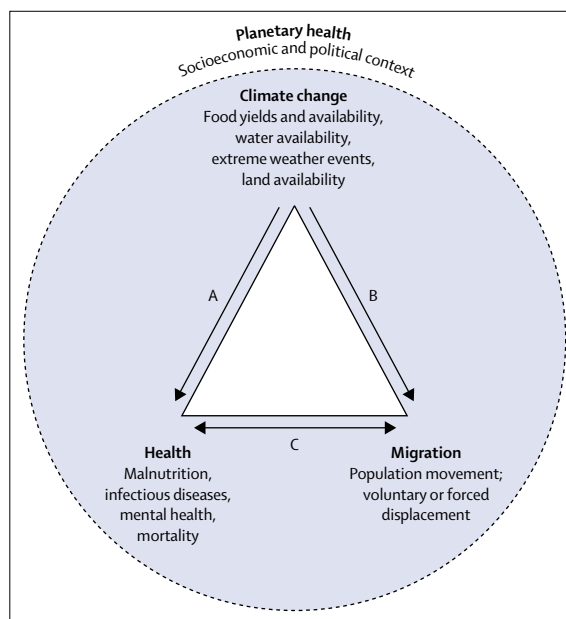


Figure: Basic explanatory framework of the associations between climate change, migration, and health

response to cope with the effects of climate change,¹³ and not just in low-income countries. Moving to a new location might avoid the hazards from extreme weather events and damaged physical environment, improve health suffering from undernutrition or freshwater shortages, and eventually enhance access to health care (pathway C). Migration, in this case, can improve human security and constitute a form of health-seeking behaviour. However, as is the case with refugees, many of the regions that receive migrants prompted to move by climate change are located in developing countries, where public health resources are lacking or inadequate. Thus, the health risks associated with climate-related migration are becoming a key issue and also a source of disability, morbidity, and loss of life.

Scholarly communities working on climate change, migration, and health have not yet coalesced to bring together their data, methods, and expertise. Without a framework to connect the three issues, research agendas are likely to expand in different directions and policy responses to develop in an inconsistent fashion. Planetary health demands new coalitions and partnerships across many different disciplines to meet the pervasive knowledge failures.⁶ Together, climate change and migration will have a multiplying effect on health that we should not ignore. It is now time to address these three dimensions together, rather than two at a time. This approach will require the design of joint research agendas, methods, and projects across scholarly communities. The concept of planetary health can prove a very welcome instrument to achieve such connections, and inform meaningful and consistent policy responses.

**Stefanie Schütte, François Gemenne, Muhammad Zaman, Antoine Flahault, Anneliese Depoux*

Centre Virchow-Villermé, Université Sorbonne Paris Cité, Paris, France (SS, AF, AD); The Hugo Observatory, Université de Liège, Liège, Belgium (FG); Sciences Po, Université Sorbonne Paris Cité, Paris, France (FG); Howard Hughes Medical Institute, Boston University, Boston, MA, USA (MZ); Institute of Global Health, Faculty of Medicine, University of Geneva, Geneva, Switzerland (AF); and Groupe de Recherches Interdisciplinaires sur les Processus d'Information et de Communication (EA 1498), Université Paris Sorbonne Cité—Celsa, Paris, France (AD) stefanie.schutte@parisdescartes.fr

We declare no competing interests.

Copyright © The Author(s). Published by Elsevier Ltd. This is an Open Access article under the CC BY license.

- 1 Ionesco D, Mokhnacheva D, Gemenne F. The atlas of environmental migration. London: Routledge, 2016.
- 2 Foresight. Migration and global environmental change. Final project report. London: The Government Office for Science, 2011.
- 3 Gemenne F. Why the numbers don't add up: a review of estimates and predictions of people displaced by environmental changes. *Glob Environ Change* 2011; **21**: 541–49.
- 4 Gostin LO, Roberts AE. Forced migration: the human face of a health crisis. *JAMA* 2015; **314**: 2125–26.
- 5 Horton R, Beaglehole R, Bonita R, Raeburn J, McKee M, Wall S. From public to planetary health: a manifesto. *Lancet* 2014; **383**: 847.
- 6 Horton R, Lo S. Planetary health: a new science for exceptional action. *Lancet* 2015; **386**: 1921–22.
- 7 Patz JA, Campbell-Lendrum D, Holloway T, Foley JA. Impact of regional climate change on human health. *Nature* 2005; **438**: 310.
- 8 McMichael AJ, Woodruff RE, Hales S. Climate change and human health: present and future risks. *Lancet* 2006; **367**: 859–69.
- 9 Lobell DB, Burke MB, Tebaldi C, Mastrandrea MD, Falcon WP, Naylor RL. Prioritizing climate change adaptation needs for food security in 2030. *Science* 2008; **31**: 607–10.
- 10 Jones KE, Patel NG, Levy MA, Storeygard A, Balk D, Gittleman JL, Daszak P. Global trends in emerging infectious diseases. *Nature* 2008; **451**: 990–93.
- 11 Semenza JC, Menne B. Climate change and infectious diseases in Europe. *Lancet Infect Dis* 2009; **9**: 365–75.
- 12 Hugo G. Environmental concerns and international migration. *Int Migr Rev* 1996; **30**: 105–31.
- 13 Black R, Bennett SRG, Thomas SM, Beddington JR. Migration as adaptation. *Nature* 2011; **478**: 447–49.