

## Human migration and the environment

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Environmental factors have shaped human migration since the origin of *Homo sapiens*. Indeed, the relationship between migration and the environment has been at the core of population-environment studies. Further, fueled by contemporary concerns with the impacts of global climate change on human populations, substantial public and policy dialogue has inspired additional scholarship on the migration–environment connection. This collection of manuscripts has been crafted to add to the intellectual foundation underpinning that dialogue.

This issue of *Population & Environment* presents new research on the complex and layered links between human migration and the environment, examining the effects of environmental change on migration patterns as well as the impacts of migration dynamics on environmental conditions in sending and receiving regions.

Papers in this special issue address such topics from a number of different theoretical and methodological perspectives. The contributions also interrogate other important dimensions of this association such as those related to gender, ethnicity, and social, economic and cultural institutions. In addition, a variety of geographic settings and social contexts is represented, focusing on push and pull factors in sending and receiving areas through examination of both internal and international migration. We are convinced that contributions on internal migration represent a revitalizing view calling attention to the fact that, without denying the relevance of international movements, much environmental displacement takes place within countries. Further, we argue that more research attention must be paid

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to growing inequality in the access, use, and control of natural resources—topics integrated within these pages.

Across frameworks, dimensions and settings, the papers highlight differences but also similarities within the migration–environment association. The common threads within this diversity include consideration of mediating processes, the multiplicity of drivers, the influence of several intertwined factors on the final outcomes, and the different types of flows and counter-flows that comprise migration–environment systems.

In “*Environmental change and out-migration: evidence from Nepal*”, Massey, Axinn, and Ghimire use data from the Chitwan Valley Family Study (CVFS) and discrete time hazard models to test the connection between environmental change and out-migration in Nepal. They find that underlying causes of environmental migration are not only related to severe environmental degradation, as might be expected, but also to more gradual deterioration of living conditions. Perhaps even more importantly, migration also exhibits an association with *subjective perceptions* of the deterioration. Massey et al.’s results reveal that the effects of environmental change on migration are distinct for short- and long-distance moves, for women and men, and they also vary by ethnicity. Extending their findings to the “environmental refugees” discussion, the authors affirm that “environmental deterioration appears to promote local searches for organic inputs or alternative employment opportunities, not a desperate search for relief in distant lands.”

Parry, Day, Amaral, and Peres examine the determinants of rural settlements, including their environmental correlates and implications, in “*Drivers of rural exodus from Amazonian headwaters*.” This contribution adds important complexity to the discussions of colonization and deforestation in this biodiversity hotspot. The authors analyze the relative importance of public services provision and natural resources availability in determining rural settlement patterns along, and rural–urban migration from, eight rivers in road-less regions. Using data from settlement and household surveys combined with migration histories and motivations, the authors find that settlement size was smaller upstream showing at the same time a lack of basic services as education and healthcare. The high costs (economic, social, etc.) of living far from “civilization” appear the main reason for clustering around urban centers. In particular, a lack of school access is the main motivation for rural–urban migration and abandonment of remote settlements. The authors highlight the policy implications of their research for, for example, anti-poverty subsidies and payment for ecosystem services, concluding that transport costs required to receive payments in urban centers could encourage further depopulation of remote areas.

The contribution by Radel, Schmook, and McCandless, “*Environment, transnational labor migration and gender: case studies from southern Yucatán, Mexico and Vermont, USA*” focuses on answering the question: “What is the role of gender in shaping the relationship between transnational labor migration and the transformation or maintenance of the landscapes of both migrant-sending and receiving regions?” The authors compare and contrast these dimensions and their environmental consequences for a labor migrant-sending location of Mexico’s southern Yucatan with those for a labor migrant-receiving location in Vermont (USA), using quantitative and qualitative data from a diversity of sources. They show how, in the

circular migration system of men characteristic of southern Yucatán, gender rules designed to keep women out of the fields are bypassed in migrant households. In these households with absent males, women assume aspects of land management, including decision making and supervision of hired farm labor. In contrast, in Vermont, undocumented and mostly invisible Mexican male migration has been an important determinant in the conservation of an idealized pasture landscape based on dairy farms that function as tourism attractions.

Two papers address the direct and indirect effects of international migration on environmental conditions in sending areas and communities in the Highlands of Guatemala. Moran-Taylor and Taylor's study ("*Land and leña: linking transnational migration, natural resources, and the environment in Guatemala*") contributes important insights into the environmental implications of migration by examining how migrants' earnings, ideas, behavior and attitudes affect land use, land cover and firewood use in sending areas and indigenous communities. Using ethnographic research and household surveys, the authors find that investments in land for home building, pick-up trucks to help improve agricultural production, purchasing land for vegetable crops for local and foreign markets, and the use of inorganic pesticides and fertilizers, all alter cultural practices and beliefs directly linked to land and the environment. Remittances allow purchasing firewood, granting household members more time for other activities. For several reasons, firewood continues to be used in many migrant households despite their ability to completely transition to more efficient fuels like liquid propane gas (LPG).

In their paper on "*The effects of migrant remittances on population–environment dynamics in migrant origin areas: international migration, fertility, and consumption in highland Guatemala*", Davis and López-Carr focus on the impacts of international migration on the environment as mediated by increase in consumption and fertility decline. They show how migrants' remittances may alter consumption patterns within sending communities, while exposure to different cultural norms may alter other behaviors. Based on ethnographic research, participant observation and archival analysis, they find that near-term rises in consumption (attributed to remittances) are not counterbalanced by rapid declines in migrant household fertility (illustrating change in behavior). However, they argue that over time the environmental cost of consumption (to be felt mostly in other locations) may be mitigated at the community level through diffusion of contraception and family planning norms yielding lower family size.

Robson and Nayak's research brief (*Rural out-migration and resource-dependent communities in Mexico and India*) presents a comparative study of two distinct cultural and environmental contexts (Oaxaca-Mexico and Orissa-India) looking at the susceptibility and response of resource regimes to rural out-migration. Using ethnographic methods, the authors show that demographic, cultural, and environmental change brought about by out-migration can alter the configuration of institutions, capital, and social values. Such changes, they argue, impact the practices of traditional resource-dependent communities. Their findings point to transformative changes in the attributes that characterize the communal management regimes of these communities, irrespective of differences in geographical, cultural, and environmental contexts. In both study regions, mechanisms weakening

the ability of local communities to effectively manage their forest or lagoon resources are similar: 1. Migration draws labor away from, and increases the opportunity cost of, customary resource activities; 2. The management of communal resources and claims for use-rights are affected by a diminished territorial presence, substantial off-farm and off-lagoon mobility and (in the case of Oaxaca) the long-term absenteeism of village rights-holders; and 3. The rules and norms in place to regulate the appropriation of territorial resources become less and less relevant as fewer local people work in the countryside. In both settings, only a handful of the young people are contemplating a life working the fields or fishing the lagoon, and older residents are concerned about who will assume the future management responsibilities and ensure the continuance of long-standing resource activities.

Finally, seeking to contribute to the current debate on adaptation to climate change, Bardsley and Hugo present a conceptual framework for addressing migration as an adaptation strategy to climate change impacts in their paper *“Migration and climate change: examining thresholds of change to guide effective adaptation decision-making”*. They advance a proposal for defining and recognizing thresholds between linear and non-linear responses, and revise the proactive–reactive and migrant/refugee continuum elaborated in the mid-1990s adding the relevance of risk perception. Bardsley and Hugo suggest that after reaching some thresholds, migration might adopt a non-linear character. The authors define linear migration responses as those that follow established patterns or a relatively minor new path of human mobility; linear migration will not “surprise” policy or rapidly undermine institutional capacities to deal with change. In contrast, non-linear migration responses would indicate new migration patterns generally involving large numbers of people and/or drastic changes to current numbers. They apply their proposal to the analysis of future environmental change scenarios in Nepal and Thailand to illustrate how the approach can provide vital insights into potential risks to migration policy and governance. Bardsley and Hugo conclude with recommendations for several institutional arrangements that could help avoid future suffering to environmental migrants and maximize humanitarian outcomes.

We would like to end this introduction by thanking all the authors, reviewers, editorial staff, and especially Lori Hunter, the Editor-in-Chief of *Population and Environment*, for their impressive and generous support. The combined efforts have made the publication of this Special Issue on Human Migration and the Environment possible. We received more than 30 submissions and were required to make some very difficult decisions. Time restrictions also prevented inclusion of some very important contributions. Even so, we are firm in our belief that this important collection will advance the scientific and policy debate on this critically important contemporary challenge.