

Title: A complex social-ecological disaster: Environmentally induced forced migration

Authors: Andreas Reckemmer,^a Ashley O'Connor,^a Abha Rai,^b Jessica L. Decker Sparks,^a
Pranietha Mudliar,^a & James M. Shultz^b

Author Affiliations:

^a Graduate School of Social Work, University of Denver, CO, USA

^b School of Social Work, University of Georgia, Athens, GA, USA

^c Center for Disaster & Extreme Event Preparedness (DEEP Center), University of Miami
Miller School of Medicine, Miami, FL, USA

Corresponding Author: Dr. Andreas Reckemmer

Address: University of Denver, 2148 S. High St., Craig Hall Rm 463, Denver, CO, USA,
20209

Email: Andreas.Reckemmer@du.edu

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Abstract:

In the 21st century, global issues are increasingly characterized by inter-connectedness and complexity. Global environmental change, and climate change in particular, has become a powerful driver and catalyst of forced migration and internal displacement of people. Environmental migrants may far outnumber any other group of displaced people and refugees in the years to come. Deeper scientific integration, especially across the social sciences, is a prerequisite to tackle this issue.

Key Words: climate change, displacement of people, forced migration, global environmental change, governance, interdisciplinary

Introduction

In its preamble, the United Nations Convention to Combat Desertification¹ points to the significant impacts of desertification-induced forced displacement and migration on sustainable development. However, environmental migration still has not been recognized and acknowledged within the UN's official legal structures. For instance, in the Convention Relating to the Status of Refugees, environmental degradation and natural hazards are not a focus based on the narrow definition of refugees as people suffering the "well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion" (Art. 1).^{1,2} Moreover, the case of worsening environmental degradation leading to forced migration remained largely unaddressed in global governance until the mid-1980s when UNEP and El-Hinnawi³ first coined the term and concept of "environmental refugees."⁴ Today, there is abundant literature and evidence suggesting that environmentally induced forced migrants (or "environmental refugees") are a dramatically growing group of displaced people mostly migrating from rural areas to cities. Yet, these refugees are still not yet officially mentioned in the UN High Commissioner for Refugees (UNHCR) statistics, as they do not fulfill the formal criteria of the Geneva Convention. Moreover, they are neither mentioned in the statistics of the UN Populations Division⁵ nor in the annual World Refugee Survey.⁶ As they are not officially counted, only approximate estimates exist. In this century, they may surpass all other types of forced migrants including internally displaced persons and refugees.

Global Environmental Change and the Drylands

In the late 1980s, humans' ecological footprint finally exceeded Earth's bearing

capacity. This marked the first time in history when humans globally managed the ecosystem in an unsustainable way.⁷ During these past decades, increasing natural resource scarcity and overexploitation, in particular soil and freshwater, have become a severe problem amplified by an unprecedented population growth rate. As far as land degradation and desertification, affected countries can be classified into four different types, all showing different causes but comparable implications: (1) the heterogeneous group of developing countries showing rapid overexploitation of land due to growing populations, declining ecosystem services and unsustainable international trade patterns with little coping capacity; (2) the group of industrializing countries in Asia and Latin America with a vast expansion of food production and population growth, foremost in urban areas; (3) the group of fuel exporting countries, such as the OPEC, strongly affected by desertification phenomena; and (4) the Eastern European countries with chemically and agriculturally induced land degradation.

Yet the tropics and the drylands suffer most from these events. As Figure 1 illustrates, the Living Planet Index (LPI) of tropical grasslands, savannahs, and deserts has dropped by at least 58% since 1970, while temperate areas improved. This sharp drop means a 58% loss of the formerly existing individual species, which is the highest number of all observed ecosystems, with Earth's drylands being most affected.^{8,9}

[Insert Figure 1 here]

The Secretariat of the United Nations Convention to Combat Desertification (UNCCD) describes drylands as arid, semi-arid and dry sub-humid areas that are characterized by “low, infrequent, irregular and unpredictable precipitation; large variations between day and night-time temperatures; soil containing little organic matter and a lack of water; plants and animals adapted to climatic variables (drought-resistant, salt-tolerant, heat-resistant, and able to cope with a lack of water).¹⁰ Hyper arid areas, or

deserts, are typically not considered drylands. However, when land degradation occurs in dryland areas, this often creates desert-like conditions.

The Millennium Ecosystem Assessment (MEA) reported that, as of the early 21st century, 41% of the Earth's land areas are comprised of drylands and 10–20% of these areas are already degraded. These dryland areas are home to more than two billion people and approximately 1–6% of this population live in desertified areas, with many others at an increasing threat from further desertification.¹¹ Most of the planet's dryland residents live in developing countries below the poverty line and without adequate access to natural materials needed for survival.

Social Impacts of Climate Change, Land Degradation and Desertification

When land degradation and desertification occur in the world's dryland areas, the land's resilience to natural climatic variations is reduced, negatively affecting food production, contributing to famine, and clearly affecting the local socio-economic conditions. Desertification can trigger a vicious cycle of poverty, ecological degradation, and forced migration that may further lead to social unrest and/or conflict. Migration and urbanization may worsen living conditions by overcrowding, unemployment, environmental pollution, and the overstressing of natural and infrastructural resources. At the same time, social tension rises, and sometimes conflicts and crime occur in the mostly urban destination centers.¹²

The greatest vulnerability is ascribed to sub-Saharan and Central Asian drylands. For example, in three key regions of Africa – the Sahel, Horn of Africa, and Southeast Africa – severe droughts occur on average once every 30 years. These triple the number of people exposed to severe water scarcity at least once in every generation, leading to major food and health crises.¹³

Since people in the drylands are very dependent on functioning ecosystem services, their reduction hits them extremely hard. Normally, dryland inhabitants are used to hardship and have developed traditional coping mechanisms over centuries. When droughts,

over-cultivation and overgrazing lead to losses in yield, the traditional means of dealing with risk and crisis fail. This can cause a chain reaction: crop yields fall rapidly and animals die from lack of fodder, industries based on crop and animal products fail, unemployment rises and people get poorer, and a state of severe famine can ensue. When a land's productivity is being reduced, this automatically leads to a reduction in income and increases in malnutrition and other health risks. Together these effects result in serious threats that can cause increasing mortality rates. One of the biggest impacts, however, is forced migration.

Forced Migration as a Result from Environmental Change

It should be noted that today, most literature avoids using the term “environmental refugees,” given its political and legal implications. It seems to be more conducive to speak of environmentally induced forced migrants. It should be noted that this form of migration can also be an adaptive response to natural disasters and environmental change, which can lead to more resilient communities and social-ecological systems.² As a result, it is of great importance to differentiate between voluntary, planned migration or relocation, and forced migration (or displacement).¹⁴ The International Organization for Migration (IOM) defines environmentally induced migration as:

...persons or groups of persons who, predominantly for reasons of sudden or progressive change in the environment that adversely affects their lives or living conditions, are obliged to leave their habitual homes, or choose to do so, either temporarily or permanently, and who move either within their country or abroad.¹⁵

This concept includes ‘forced’ as well as ‘voluntary’ migration. Renaud et al. classify environment-related migration patterns according to the urgency of their situation by introducing a definition tree that distinguishes between environmental emergency migrants, environmentally forced migrants and environmentally motivated migrants.¹⁶

Reuveny argued that people are able to adapt to environmental changes in only two ways: they can stay and locally adapt to the changes, or they can leave the affected area.¹⁷

Which option they choose, he continues, depends on the severity of environmental degradation and on the society's socio-technical capabilities. In extreme situations, land degradation can remove the economic foundation of an entire community or society.

Experience from recent decades can be interpreted as showing that land degradation and desertification have been a major driving force behind the displacement of people.

As early as in 1990, the Intergovernmental Panel on Climate Change (IPCC) acknowledged that the greatest single impact of climate change could be on migration, affecting millions of people due to shoreline erosion, coastal flooding and agricultural disruption as noted in an IOM study.¹⁸ In the same report, Brown reported that various analysts have tried to put numbers on the growth of environmentally induced refugees with a common prediction of 200 million by 2050. Norman Meyers, a reputed scholar in the area of environmental migration, also cites this number of a possible 200 million displaced population due to climate change and disruptions of rainfall.¹⁹ This figure has become the accepted number and has been cited in respected publications from the IPCC and the Stern Review on the Economics of Climate Change.

This is a daunting figure; representing a 10-fold increase over today's entire documented refugee and internally displaced populations. To put the number in perspective it would mean that by 2050 one in every 45 people in the world will have been displaced by climate change. It would also exceed the current global migrant population.^{20,21}

However,

while the scientific argument for climate change is increasingly confident, the consequences of climate change for human population distribution are unclear and unpredictable. With so many other social, economic and environmental factors at work, establishing a linear, causative relationship between anthropogenic climate change and migration has, to date, been difficult.²²

At any rate, Myers' classic definition of environmental migrants is still widely accepted and used:

People who can no longer gain a secure livelihood in their erstwhile homelands because of drought, soil erosion, desertification, and other environmental problems. In their desperation, they feel they have no alternative but to seek sanctuary elsewhere, however hazardous the attempt. Not all of them have fled their countries; many are internally displaced. But all have abandoned their homelands on a semi-permanent if not permanent basis, having little hope of a foreseeable return.²³

There are many different phenomena of global environmental change that can trigger environmentally induced migration (whether voluntary or forced), such as climatic variability and changing precipitation patterns, floods and sea level rise, drought, land degradation and desertification, loss of biodiversity, erosion of ecosystem services and others. Climate change can be seen as having the strongest impact on environmental migration – often through its impact on terrestrial ecosystems, land and soil fertility and food security. Martin and Warner describe four paths by which climate change can affect human mobility patterns directly or combined with other factors: (1) changes in climate that contribute to drying trends over the course of many years that affect access to essential natural resources and negatively impact the sustainability of environment-related livelihoods including agriculture, forestry, fishing, etc.; (2) rising sea levels, desertification, permafrost melt and other climatic changes that make areas uninhabitable for human populations over time; (3) increased frequency and magnitude of natural disasters that destroy infrastructure and livelihoods, making the area uninhabitable; and (4) competition over diminishing necessary natural resources that may exacerbate pressures and contribute to conflict, causing forced migration.²⁴

Such events, combined with structural social and economic disparities, are a powerful driver in migratory movements toward wealthier, or at least more promising regions, with large urban centers being the most attracting destinations. “Rapid urbanization

is largely a function of rural poverty. Environmental shocks, such as drought and flooding, have accelerated this process, as has the failure of the rural development industry and state agricultural policies to stabilize populations in the countryside”.²⁵ The synchronous appearance of conflict, migration, and climate change does not happen by chance. Their linkages are clearly visible. Conflicts and environmental degradation in Africa forced migratory movement from poorer to relatively more prosperous regions. In the Sahel, desertification and cyclical famines triggered waves of environmentally displaced persons across different boundaries.^{26,27} The described environmental events are expected to appear even more often and with increased severity in tandem with ongoing global warming.^{28,29}

Understanding Complexity — the Need for a More Integrated Scientific Approach

Traditional approaches to studying and assessing drought, land degradation and desertification distinguish between the meteorological and the ecological dimensions of desertification (the biophysical factors) on one side, and the human and the social dimensions of desertification (the socioeconomic factors) on the other. Previous failures in fully recognizing and including the interdependencies of these dimensions in science and decision-making due to lack of inter- and transdisciplinarity (both within the social science domain and also between the social and the natural sciences) slowed progress toward the synthetic approaches needed to tackle the enormous problem of dryland degradation and its socio-ecological impacts.³⁰ In the past, this has hindered the scientific community’s attempt to present a truly comprehensive and interdisciplinary understanding and assessment of the causes and progression of desertification.^{31,32} For instance, attempts to study dryland degradation is plagued by definitional and conceptual disagreements.³³ Even with the broad research agenda of the Millennium Ecosystem Assessment, it still had to acknowledge wide gaps in the scientific understanding of desertification processes and their underlying causal factors.

With the ecosystem services concept,³ the Millennium Ecosystem Assessment highlighted an important and previously widely underestimated link between environmental degradation and human well-being. This led to answering the important question of how desertification leads to migration, which is through poverty. Dryland populations are disregarded by the rest of the world since they rank very low in terms of human well-being, economic prosperity and other relevant development indicators.³⁴ In its 2005 report, the UN Millennium Project places some emphasis on a healthy environment in order to effectively combat poverty:

Environmental sustainability is also essential to any effort to improve the well-being and health of the world's poorest people. A degraded environment has dramatic and harmful effects on health, education, gender equality, and economic development. People cannot work and study if they are frequently ill from drinking and bathing in polluted water or if they are malnourished because of soil erosion and desertification.³⁵

Simplistic scientific conceptualizations of migration triggered by environmental degradation can be arbitrary and misleading. "There are abundant typologies of 'environmental refugees' and 'environmental migrants', but little agreement on, or understanding of what these categories might really mean".³⁶ Even authors principally supporting the thesis of environmental refugees do note that there is indeed an urgent lack of theoretical and methodological clarification.³⁷ To some extent, this lack of scientific consensus is due to a lack of interdisciplinary and integrated research efforts. Recently, the need for a more interdisciplinary approach to research and the generation of decision support in the area of environmentally induced migration has been well understood and subsequently led to a number of new and innovative efforts. These efforts are characterized by an explicit call for input from a full array of scientific disciplines, including the natural and social sciences (and sometimes the humanities). The meta-model of social-ecological systems, including its conceptual framework has become the most influential and powerful underlying paradigm and is widely used in well-informed

policy frameworks, both at the multi-lateral and national level. Indeed, social- ecological systems thinking has been particularly useful in understanding land use, cover change dynamics, and the resulting impacts on human livelihoods, societies and ecosystem services. Figures 2 and 3 represent key examples for the application of such thinking in modeling the coupled nature, interconnections and feedback loops between social systems and local terrestrial ecosystems. On the right side of Figure 2, the social system dynamics and variables are represented. Coupled systems modeling requires a very strong input from a variety of social sciences and, even more importantly, a certain level of integration of their methodologies, theories and findings. The same holds true for Figure 3, a conceptual framework for social-ecological resilience.

[Insert Figure 2 here]

[Insert Figure 3 here]

Progress in these areas has been catalyzed and, to a large extent, framed by international research initiatives such as the Land Use and Cover Change Project (LUCC) and the Global Land Project (GLP), both co- sponsored by the International Geosphere-Biosphere Program (IGBP) and the International Human Dimensions Program (IHDP), and the Earth System Science Partnership (ESSP). Of great importance is the qualitative and quantitative increase in collaboration among the social sciences and substantive steps toward their epistemological and methodological integration. Social-ecological conceptual frameworks, models, and scenarios can only be as good as their key components are. In a complex systems environment, such as environmentally induced migration leading to social-ecological problems, better science and policy will to a large extent depend on the degree and quality of integrated social science elements within concepts and models. An in-depth look at Figure 3 makes this clear. Sometimes, the social sphere within social-ecological research and models on desertification and its

societal implications is represented as a “black box,” especially if and when such frameworks are predominantly natural science driven.

Major interdisciplinary efforts applying a complex systems lens have shown that the downward spiral of overpopulation, overgrazing, and related influences leading to desertification, including all side effects of exacerbated poverty and increased emigration, is not inevitable. As Figure 4 shows,³⁹ effective approaches exist to prevent desertification, increase biological productivity, and thus improve human well-being. Interestingly enough, the two sides also represent two partially competing scientific approaches; the ‘desertification paradigm’ and the ‘counter-paradigm’.⁴⁰ The left side represents the older and in some ways fatal desertification paradigm. It suggests that drylands are basically stable ecosystems that tend to collapse when human influence exceeds certain levels, and, most importantly, that few, if any, measures exist to prevent this downward spiral. In the more recently developed, interdisciplinary counter-paradigm, this view is only one of two possible outcomes. It first states that deserts are by themselves unstable and therefore highly vulnerable areas. This includes human influence on land degradation and its sometimes disastrous outcomes, but looks at it in the broader picture of natural droughts and anomalies which are still far from being fully understood. Following this counter-paradigm, it is also possible; but dependent on social dynamics, political decisions, and other governance factors; to avoid land degradation by using social-ecological management approaches (e.g., sustainable farming practices or integrated water system management). For instance, interdisciplinary research has been undertaken on the role of freshwater resources and drylands’ rehabilitation, on marginal drylands’ sustainable management, and on the prevention of land degradation through the combination of traditional knowledge and modern technologies.³⁹⁻⁴¹

[Insert Figure 4 here]

A large scale study showed that using sustainable agriculture practices on 12.6 million hectares (roughly 1% of the cultivated area in developing countries) helped increasing the average crop yield by 79%, and it improved water-use efficiency. Also the use of pesticides declined by 71% while crop yields grew by 42%.⁴² Such successes are best reached when informed by interdisciplinary research with strong input from various social sciences. To advance this, further research efforts and theories should intensify the emphasis on the role of policy, governance structures and formal institutions, international agreements, and International Political Economy. Moreover, innovative research on reforming international migration law is prerequisite. Risk modeling, risk economics, risk sociology, human and cultural anthropology, and the behavioral sciences all have important roles in future interdisciplinary work supporting advanced investigations in how to resolve the environmentally induced forced migration enigma. This cannot happen successfully without a certain level of epistemological and methodological integration across disciplines. As the social phenomenon at play is highly complex, the social systems components of an enhanced social-ecological research framework ought to mirror this and yield a better level of consilience.⁴³

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