Chapter 1
Introduction: Environment, Migration, and Inequality—A Complex Dynamic

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Abstract Migration is one of many ways by which people have adapted, and will continue to adapt, to the rapid environmental changes of the Anthropocene. Scholarship on environmental migration has evolved from atheoretical push–pull descriptions of *environmental refugees* toward increasingly systematic investigations of how migration emerges from complex interplays of cultural, economic, social, *and* environmental processes. In recent years, environmental migration has often been conceptualized in relationship to human vulnerability to environmental change more generally (especially climate change) and human security. A next stage in the evolution of this scholarship is emerging, in which scholars are examining in greater detail the relationship between environmental migration, socio-economic inequality, and the capability of people to pursue their chosen livelihoods. This chapter traces these stages in the evolution of environmental migration scholarship, and presents a generic model of how social and economic inequality can be both a stimulus for environmental migration and a consequence of it. A short case study of the migration outcomes of Hurricane Katrina is presented to illustrate the workings of the model. An overview of the subsequent chapters of the book is provided, showing how each advances our understanding of the relationship of environmental migration and inequality through new conceptual, empirical, methodological, legal, and/or policy insights.

Keywords Environmental migration scholarship · Migration and inequality · Anthropocene migration · Adaptive migration · Hurricane Katrina

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1.1 Environment, Migration, and Social Inequality as Interconnected Processes

It is well established that environmental events and conditions influence human migration and mobility (McLeman 2014). Migration responses to environmental changes are increasingly regarded as strategies to improve the life chances of groups, families, and individuals (Black et al. 2011). Yet life chances are not evenly distributed within or across societies, and this uneven distribution contributes to greater social inequality. Experience shows that migration-based adaptation strategies do not always alter the larger picture of social inequalities for the better; in some instances they may exacerbate existing inequalities and generate new ones. Furthermore, in any given example of environmental migration, some groups or individuals may achieve improved life chances while others do not. In other words, environmental change, social inequality, and adaptive migration are interconnected, dynamic processes. In the volume you are about to read, a group of leading and emerging scholars from around the world offer their evidence-based insights into the relationship between environment, migration, and social inequality. In doing so, they build on an expanding body of scholarly literature and contribute to a public policy discussion that has taken on growing importance in recent years, as scientists, policymakers, and the general public grapple with the implications of anthropogenic climate change.

1.2 Adapting to the Anthropocene

It is worth asking how we came to this point in time when a discussion of the relationship between social inequality, environment, and migration warrants its own scholarly volume. Let us start with the basic elements of the relationship between the environment and migration. The physical environment sets the boundaries of the human habitat on Earth and creates conditions that make settlements and livelihoods potentially viable at particular locations (McLeman 2014). Over the course of millennia, the human species has adapted biologically and through social, cultural, and technological innovation to take increasing advantage of resources and conditions within that habitat. Population densities have become great where the availability of resources and the climate are most favourable (e.g., river deltas in Asia) and remain low in areas where resources are scarce, climate is harsh, and an enormous amount of social, cultural, and technological adaptation is needed to survive (e.g., the Arctic, the margins of deserts). Yet the environment is not static. It is continuously changing at global, regional, and local levels. Some changes unfold over long periods of time (e.g., glacial and inter-glacial periods) while others occur suddenly (e.g., earthquakes or volcanic eruptions). Some changes are driven by natural processes of biology, geomorphology, geology, or energy transfers. Other changes—especially in the past

century—are driven by human activity (e.g., deforestation, pollution, and greenhouse gas emissions). The dynamic interaction between a continuously changing environment and a continuously adapting human population is thus the most elemental level at which the diffusion of the human species and the resulting settlement, migration, and mobility patterns have been shaped over the course of our time on this planet.

Physical scientists have coined the term *Anthropocene* to describe a new epoch in which human activity has become the predominant force in reshaping the face of the Earth (Steffen et al. 2007). This epoch began in the 1800s with the advent of industrialization and mechanization, and the use of fossil fuels as our primary source of energy. The ongoing explosion in the size of the global human population and the concurrent expansion of economic activity have placed tremendous pressure on natural systems and ushered in an era of human-induced global environmental change. This change has been unfolding, and continues to unfold, in two ways:

- as an accumulation of local and regional changes such as forest cover removal, soil erosion, shoreline modifications, chemical pollution, coral reef damage, and biodiversity losses that collectively undermine the functioning of the global physical environment
- as systemic alterations to the functioning of global physical processes, through activities such as the release of substances that deplete stratospheric ozone, the discharge of micro-plastic pollution into the oceans, and the release of climate-altering greenhouse gases (Meyer and Turner 2002)

The impacts of these environmental changes are experienced at all levels—local to global—and have implications for all aspects of the human condition: our health, our economic well-being, our social structures, and so forth. Further, the rate and intensity of such changes are accelerating, which means that the scale of the adaptation challenges with which we are confronted is also rising (Hackmann et al. 2014).

The most far-reaching environmental challenge of the anthropocene epoch is climate change. We have known for almost two centuries that temperatures at the Earth's surface are influenced by trace gases in the atmosphere. Jean-Baptiste Fourier (1878 [English translation]) made the first such hypothesis in the 1820s; English engineer John Tyndall's experiments in the 1860s demonstrated the relative heat-absorptive capacity of various atmospheric gases; and by the end of the 19th century, Swedish physicist Arrhenius (1896) offered the first mathematical calculations of carbon dioxide's forcing effects on ground temperatures. Once the necessary technology (e.g., instrumentation, satellites, computer power) became available to measure, observe, and forecast the relationship between atmosphere and climate, 20th century scholars realized that anthropogenic emissions of carbon dioxide, methane, and other greenhouse gases (GHGs) were fundamentally altering the Earth's climate (for a more comprehensive history, consult Black et al. 2013). In 1988, physical scientists, environmental activists, and multilateral environmental organizations successfully persuaded the world's policymakers to task the

World Meteorological Organization and the UN Environment Programme with establishing the Intergovernmental Panel on Climate Change (IPCC). The role of the IPCC was (and continues to be) to provide policymakers with periodic updates on the scientific knowledge about the physical processes of anthropogenic climate change, the options for reducing GHG emissions, and the potential impacts of climate change and possibilities for adapting to them.

The IPCC's first report, issued in 1990, informed the drafting of the United Nations Framework Convention on Climate Change (UNFCCC) in 1992. Through the convention, most of the world's national governments agreed to track GHG emissions, take steps to avoid a dangerous level of GHG accumulation in the atmosphere, and help vulnerable countries adapt to the impacts of climate change. Each year since, signatories to the UNFCCC have met to negotiate strategies for implementing GHG emission reductions (known in UNFCCC parlance as *mitigation*) and for reducing the vulnerability of states and regions most highly exposed to the adverse impacts of climate change. This has led to an impressive array of international accords and initiatives including the Kyoto Protocol to reduce emissions from industrialized nations; a variety of technology transfer and cooperative emission-reduction agreements funded through the Global Environment Facility; the REDD program that seeks to Reduce Emissions from Deforestation and forest Degradation; and the Cancun Agreements that seek to channel adaptation assistance and clean development funds to the world's most vulnerable populations.

The scale and scope of international public policy in response to climate change is nothing short of remarkable and unprecedented. No other environmental challenge has ever received such concerted, lengthy, and well-funded attention from the world's governments. Yet in spite of this, global GHG emissions have continued to rise and in 2014 reached the threshold at which most scientists agree the accumulation becomes *dangerous* in UNFCCC language [400 parts per million (ppm) CO_2 equivalent].[1] This same year, researchers reported that the massive West Antarctic ice sheet had begun to irreversibly collapse (Joughin et al. 2014) and will eventually raise sea levels by two metres in addition to the increase already occurring due to the thermal expansion of ocean water.[2] If we are fortunate, the full effects of the collapse of Antarctic ice will not be realized for several more centuries. If we are not fortunate, the collapse could occur within the next two centuries —an uncomfortably short time in which to adapt to such a tremendous change.

Barring an unforeseen breakthrough in energy technologies and/or an *all-in* global initiative to slash GHG emissions so abruptly and quickly that the short-term economic consequences would be staggering, the imminent impacts of climate change on human well-being will be far-reaching and will exceed in economic cost any environmental challenge we have collectively faced to date. In the Arctic, the physical manifestations of anthropogenic climate change are already visible in the

[1]Some scientists suggest 350 ppm is the actual threshold for dangerous climate change (Hansen et al. 2008), in which case we passed the danger point in the 1990s.

[2]Mean sea levels are presently rising at a rate of approximately 3 mm per year (IPCC 2013).

form of receding ice on land and sea. As a consequence, northern communities are being forced to adapt through technological investments such as relocating critical infrastructure, and behavioural changes such as shifting hunting and fishing patterns (Ford and Pearce 2010). As sea levels continue to rise, many smaller northern communities are reaching the point where the costs of staying in place are becoming prohibitive, and the communities may eventually need to be abandoned entirely (Huntington et al. 2012). But this is just the thin edge of the wedge. The global physical impacts of climate change—including the intensification of storms, floods, droughts, and similar events that already displace people and affect migration patterns—will inevitably become manifest in more populated regions. We are poised to enter an era of settlement abandonment and consequent migration on a scale not seen in centuries, indeed millennia (McLeman 2011).

1.3 Need for Research on the Role of Migration in Adaptation

Adaptation to the consequences of climate change is receiving greater attention from scholars and policymakers, as it must. Thorough and systematic investigations of migration—as an outcome of and a contributor to adaptation processes—are needed. Despite there being a long and well-established body of migration scholarship dating back in western countries to Ravenstein (1889), migration scholars have been relative latecomers to the study of environmental migration generally and to climate-related migration specifically. The first wave of environmental migration scholarship that emerged in the 1980s was driven primarily by natural scientists for the benefit of policymakers. These scientists sought to make descriptive and conceptual links between forced migration and environmental changes (not only climate change but also land degradation, deforestation, fisheries decline, biodiversity loss, and water scarcity), and to quantify the potential for large-scale population displacements. The resulting *environmental refugee* paradigm, elucidated by El-Hinnawi (1985), led to forecasts of hundreds of millions of people becoming involuntarily displaced by mid-21st century and was embraced by researchers and policymakers interested in the implications of environmental change for international and regional political security (Myers 1989, 1993; Homer-Dixon 1991).

The atheoretical nature of the environmental-refugee paradigm and its push-pull/stimulus-response assumptions were soon criticized by social scientists for its simplistic understanding of migration causality (Hartmann 1998). Scholars working within the IPCC's vulnerability and adaptation reporting process (known as Working Group II) flagged the need to develop more theoretically grounded, empirically reliable knowledge of the relationship between climate and migration (Adger et al. 2007).

1.4 Migration Causality in the Context of Vulnerability and Adaptation

For much of the last decade, migration as it occurs in the context of climate change and other global environmental changes has been conceptualized and understood in the context of vulnerability and adaptation (McLeman and Smit 2006; Black et al. 2011). The term *vulnerability* as it is used in climate-change research and IPCC reporting has its origins in political-ecology approaches to the study of natural hazards (e.g., Burton et al. 1978; Hewitt 1983; Blaikie and Brookfield 1987) and was strongly influenced by Sen's (1977) entitlement approach to the study of famine (see Adger 2006 for a more detailed history). In its simplest conceptualization, vulnerability refers to the potential for loss or harm and is a function of the nature of the physical risks to which a population is exposed, its inherent sensitivity to those risks (e.g., agricultural communities being inherently sensitive to drought), and its capacity to adapt (Smit and Wandel 2006).

When framed in the context of vulnerability, migration becomes part of the wider suite of potential responses by which populations vulnerable to particular climate-change impacts might adapt (McLeman and Smit 2006). Of course, the actual nature of the relationship between environment and migration is much broader than this. Environmental migration can occur for many reasons other than vulnerability, such as the attraction of migrants to specific environmental amenities. Further, by focusing on migration within the context of vulnerability and adaptation processes, the agency of actors (migrants, potential migrants, and non-migrants) can easily be obscured or overlooked. Environmental migration research has therefore benefitted from the growing attention it has received from scholars in the fields of sociology, geography, development studies, demography, and refugee law. These academics observe that many questions and debates that have long challenged our understanding of migration behaviour and social behaviour more generally—such as questions of structure, agency, inequality, and power—must be addressed, if we are to better understand environmental migration and provide reliable advice to policymakers. This is seen in the findings and recommendations of concerted environmental migration research initiatives of recent years, such as the EU-funded EACH-FOR project, the CARE International-sponsored *Where the Rain Falls* project, and the British Government Office for Science's Foresight study of migration and global environmental change.[3] In a previous volume of scholarship that arose from a European Science Foundation conference, editors of the present volume and other migration scholars deconstructed the existing policy-oriented discourse around

[3]The website addresses for these projects are: EACH-FOR: http://www.ehs.unu.edu/article/read/each-for; Where the Rain Falls: http://whereterainfalls.org; Foresight: https://www.gov.uk/government/collections/migration-and-global-environmental-change.

environmental migration. They found a clear need to consider not only questions of vulnerability and adaptation, but to also recognize that environmental migration is inherently linked with unequal distribution of life chances between and within societies, and that the interplay of human agency, capabilities, and rights must also be explored (Faist and Schade 2013).

1.5 Linking Environmental Migration to the *Vital Core* of Human Security

In the 2014 report of IPCC Working Group II, discussion of mobility and migration takes up a significant part of a chapter dedicated to questions of human security, the latter being defined as "…a condition that exists when the vital core of human lives is protected, and when people have the freedom and capacity to live with dignity" (IPCC 2014, Chap. 12, p. 759). The *vital core* consists of "…the universal and culturally specific, material and non-material elements necessary for people to act on behalf of their interests" (ibid.). Recall that the IPCC does not conduct original research but is tasked with summarizing the latest research developments. By casting migration and mobility in the context of human security, the IPCC is reorienting the study of the environment-migration nexus. This approach is more consistent with the current trend for research which is grounded in social science that explicitly considers livelihoods, entitlements, and rights in the formation of vulnerability. One of the IPCC's key conclusions is that vulnerability is inversely correlated with mobility, implying that freedom of mobility is situated at the *vital core* of human security. We will return to this point later, as it is an important consideration in other chapters that deal with questions of mobility, migration, and rights in a time of rapid environmental change.

The IPCC's (2014) analysis of migration maintains many elements of past hazard-oriented/vulnerability adaptation-response approaches. This can be seen in the descriptions and analyses of the causal linkages between environmental changes and migration. However, the IPCC also emphasizes the multiple causes of environmental migration—that it arises from complex interactions of cultural, economic, environmental, social, and political processes—and that the inability to migrate out of harm's way may constitute as great a concern in terms of future climate adaptation. These latter two observations reflect closely the findings of the Foresight project (2011) and are consistent with basic understandings in migration research that there is a huge discrepancy between potential migrants on the one hand and actual migrants on the other (Faist 2000). The IPCC also observes that most people adversely affected by environmental events do not migrate but seek to cope and adapt in other ways (generally categorized as in situ coping strategies

or adaptations), even when inhabiting areas at considerable risk.[4] Unless it is already an inherent part of households' regular livelihood strategies, migration tends to be an adaptation of last (or close to last) resort, and those who do end up moving, voluntarily or involuntarily, tend to remain within their home countries (what is generally referred to as internal migration). This is consistent with empirical studies of international environmental migration (Obokata et al. 2014) and, more importantly, is yet another reminder that standard migration research—its questions, theories, and findings—offers considerable insights into the nexus of environmental change and human mobility.

The underlying non-environmental factors that distinguish migrants from non-migrants, and situations that give rise to environmental migration from those that do not are identified by the IPCC as "…social differentiation in access to the resources necessary to migrate influences migration outcomes" (IPCC 2014, Chap. 12, p. 12). In some instances, this means that particular groups, households or individuals within a given population might wish to migrate when faced with adverse environmental conditions but lack the ability to do so. This reflects the concerns about *trapped* populations whose vulnerability increases when they cannot relocate from areas that are inherently risky, without outside assistance (Black et al. 2012). In other instances, and here the IPCC relies heavily on the example of displacement and resettlement patterns in New Orleans following Hurricane Katrina, structural socio-economic differences within a population that have been created along lines of poverty, culture, and race may prevent marginalized people from remaining in (or returning to) their homes and force them to relocate elsewhere (Fussell et al. 2010; Groen and Polivka 2010). The IPCC also observes gender differences in the displacement and migration outcomes following extreme events. They additionally note that those who do migrate away from environmental hazards may be worse off having taken on debt to finance their migration and/or by migrating to locations where social vulnerability is even greater, such as urban slums. Although it does not explicitly do so, the IPCC is moving beyond a simple vulnerability-based interpretation of climate-related migration toward one that emphasizes capability.

What we see is the IPCC grappling with a complicated, dialectic relationship that researchers are actively trying to understand better—the role of social inequality (and its various dimensions of resources, status, power, etc.) as a cause and an outcome of environmental migration. We know through numerous past studies that environmental and socio-economic processes interact with one another in complex ways. Within these interactions lie differences and heterogeneities that vary from one place and population to the next and become manifest along lines of wealth, education, age, gender, citizenship, and cultural norms, to name a few. Depending on the nature of the environmental event or condition and the socio-economic dynamics in play at a particular time or place, different types of inequalities may heighten vulnerability, moderate it, and/or

[4]It is worth noting that scholars distinguish between coping strategies or mechanisms that are reactive in nature and are enacted to maintain or recover basic human needs, and adaptations that may be reactive or proactive but in either case entail some degree of looking beyond immediate basic needs.

affect the ability of those exposed to decide whether to migrate (or not). Identifying the types or categories of inequality that are most relevant and the particular circumstances under which they become relevant is an important area for research if we are to better understand environmental-migration dynamics. But this in itself is insufficient because inequalities within any given population or society do not materialize out of thin air. Attention must also be paid to the mechanisms that produce (and perpetuate) inequality and limit people's capabilities if we are to (1) craft proactive public policies and programs to reduce vulnerability to environmental risks (that is, to reinforce the *vital core* of human security), and (2) reduce the likelihood of environmentally related forced displacements and distress migrations—the least desirable forms of environmental migration.

Before describing the contributions this volume makes to enhancing our understanding of these issues, it is worth reviewing some examples of what scholars elsewhere have said on the subject.

1.6 Inequality, Capability, Vulnerability, and Environmental Migration

Time after time, whenever tropical cyclones, floods, droughts, and other extreme environmental events have occurred, it has been visibly and statistically obvious that particular groups of people are more vulnerable than others. During the severe droughts of the 1930s on North America's Great Plains, it was the landless, rural poor who suffered the most (McLeman et al. 2008) and whose faces appear in the iconic images of the Dust Bowl captured by US Farm Security Administration photographers (Fig. 1.1). This pattern repeats itself today even when droughts strike culturally, socially, and economically different countries such as Iran, Kenya, and India (Keshavarz et al. 2013; Eriksen and Lind 2009; Deshingkar et al. 2008). But landlessness and poverty are not the only factors that distinguish those who are disproportionately vulnerable to environmental extremes. Global statistics kept since the 1980s show that women are eight times more likely to be killed in natural disaster events compared with men (Neumayer and Plümper 2007). When a cyclone struck Bangladesh in 1991, five times as many young women were killed compared with young men (Aguilar 2004, see also Chap. 9 for further details). When one recalls media coverage of New Orleans following Hurricane Katrina, it is hard to forget the images of thousands of desperate people huddled in the Superdome football stadium, most of them poor, most of them African-American, waiting for government assistance that was slow and chaotic in arriving. Time and again, factors such as poverty, landlessness, gender, age, and membership in a racial, ethnic, or cultural minority are the key indicators of those who are more vulnerable to environmental events and conditions.

Yet, as shown in the many recent studies of environmental migration cited in this chapter and in our previous volume (Faist and Schade 2013), the most vulnerable people are not necessarily those most likely to participate in migration. Or, when

Fig. 1.1 Dust Bowl refugees by the roadside near Bakersfield, California, 1935 Image by Dorothea Lange. US Library of Congress Prints and Photographs Online Catalogue, reproduction number LC-DIG-fsa-8b26859. Public domain image http://www.loc.gov/pictures/item/fsa1998017873/PP/

they do, their migration patterns and behaviour are often distinct from other groups. Clearly there is a disconnect between the degree of harm caused by extreme environmental events and the migration patterns observed after the event. The poorest of the poor typically did not migrate away from the Dust Bowl states; they were more likely to be trapped in poverty and remain in their home state or region (McLeman et al. 2008). Many rural, landless households in India, Iran, and Kenya see members migrate away in search of work during droughts, leaving behind other household members to suffer through the hardship. And some of the poorest households send no migrants at all (Deshingkar et al. 2008; Keshavarz et al. 2013; Eriksen and Lind 2009). Although inequality, vulnerability, and environmental migration are undoubtedly connected, it is not a straight-line connection where A + B = C. We cannot say unequivocally that inequality + vulnerability leads to environmental migration. Other factors intervene.

What is often found in empirical case studies of environmental migration (including examples cited in this text) is that people at the bottom of the socio-economic spectrum, who are society's most vulnerable, often have few migration options. Their capability—in terms of having both resources to undertake migration and the freedom or agency to choose their preferred migration (or non-migration) outcome—is limited by inequalities generated by social, economic, cultural, and political/institutional processes over which they have little influence. The relationship between inequality, vulnerability, and migration possibilities is illustrated in Fig. 1.2, which is based in part on the model of environmental migration produced in Foresight (2011). The interactions of cultural, economic, social, political, and institutional processes (a) produce distributions of

wealth, resources, and agency within a given population (b). In a society where there are inequalities, particular groups get pushed to the bottom of the spectrum in large numbers. The potential to experience loss or harm from a given environmental event or conditions (i.e., vulnerability) is directly and positively related to a household's access to resources (Adger 2006; IPCC 2014). And those with the least access to resources often live in the most exposed areas and/or have the least capacity to cope or adapt, thus giving us the vulnerability spectrum (c), which closely resembles spectrum b. From environmental migration literature, we know that the spectrum of migration possibilities (d) is also directly and positively influenced by spectrum b. Those at the lowest end of the migration agency spectrum d may have little or no possibility of migrating and have the potential to become *trapped* populations. Those who are not trapped but have limited capabilities may have few possible migration options and these options may be undesirable because they could leave them less well-off. Conversely, those at the top of spectrum d may have any number of migration options. But for them, the marginal benefits of migration are compared with much wider in situ adaptations. This means the potential benefits of migration will have a much greater range than for those with more modest capabilities. In Fig. 1.2e shows a Kuznets-curve-type range of

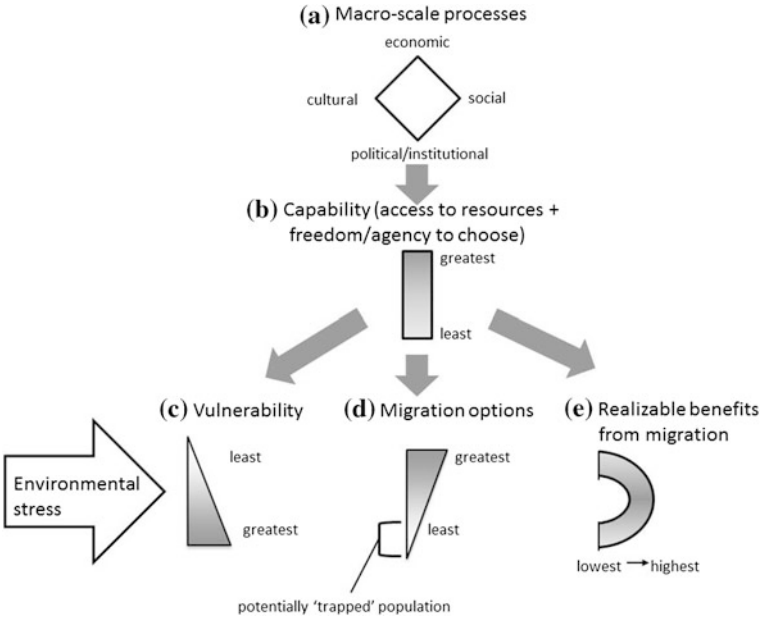

Fig. 1.2 Generic representation of the relationship between inequality, vulnerability, and environmental migration. *Source* Authors. Note that Fig. 1.2 is a highly generic and simplified representation of processes where complexity dominates. It should not be seen as static or deterministic. Its purpose is to illustrate that when societal processes in part *a* place certain groups disproportionately at the lowest end of spectrum B, environmental migration outcomes for those groups do not necessarily mirror their actual vulnerability

potentially realizable benefits or returns to migration which, in this case, reflects a population where those with the greatest capabilities are better off adapting to environmental stress through ways that do not entail migration—which was the outcome of both the Dust Bowl and the Hurricane Katrina examples.

1.7 Inequality and Environmental Migration: Lessons from Hurricane Katrina

Hurricane Katrina is a particularly good example of the interplay between inequality, vulnerability, and environmental migration. The migration outcomes in New Orleans following Katrina reflect multiple dimensions of inequality, including poverty, land tenure, gender, race/ethnicity, age, and citizenship. Katrina was a storm in 2005 that killed an estimated 1800 people and caused US$125 billion in damage along the U.S. Gulf of Mexico coast (Brunkard et al. 2008; Melton et al. 2009). The New Orleans metropolitan area, which lay directly in the path of the storm, saw a half-million residents evacuate or become involuntarily displaced from their homes when protective levees (Fig. 1.3) and pumps failed in the face of heavy rains and a large storm surge (Elliott and Pais 2006). Some neighbourhoods were

Fig. 1.3 Mississippi river levee at Algiers, Louisiana, directly opposite New Orleans *Photo* R. McLeman

flooded to a depth of 4 m, and it was 40 days after the storm before the city was finally drained. The days immediately before and after the storm were chaotic (Melton et al. 2009; Jonkman et al. 2009). While 70 % of the population obeyed the mandatory evacuation order, tens of thousands did not (or could not) evacuate and became trapped (Elliott and Pais 2006; Nigg et al. 2006). Most of those who were able to evacuate using their own resources remained within the state of Louisiana, going either to suburban communities or to Baton Rouge, the state capital and second largest city (Frey et al. 2007). Others evacuated to urban centres in nearby states. These destinations were selected usually because evacuees had family networks or social connections they could draw upon for temporary support. Those who were trapped in New Orleans and had to rely on disorganized government authorities for evacuation assistance were bussed to neighbouring states. Most were first taken to a football stadium in Houston and, when this became full, authorities began transporting people to Dallas, San Antonio, and farther afield.

In the aftermath of the storm as the city recovered, not everyone who was evacuated returned. The population of New Orleans was smaller in 2014 than it was in early 2005 before the storm (Fig. 1.4). It also became socially, economically, demographically, and racially very different after the storm. The neighbourhoods of New Orleans that experienced the highest rates of permanent out-migration were those with:

- the highest percentages of people living in poverty
- the fewest key services (schools, medical clinics, shops, etc.)
- high housing densities
- high percentages of elderly residents
- high percentages of households with dependent children and/or people needing nursing assistance (Myers et al. 2008)

Neighbourhoods with these characteristics were not randomly distributed across the city. They were found in areas that were highly exposed to flooding. Many of

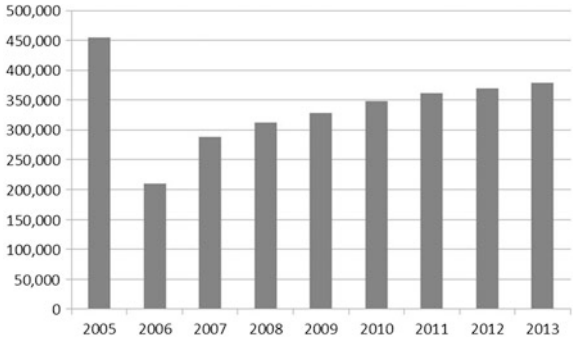

Fig. 1.4 Population of New Orleans (Orleans Parish) pre- and post-Hurricane Katrina. *Note* Population counts are done annually on July 1. Katrina struck in August 2005 (www.census.gov)

these neighbourhoods sprang up when the U.S. government built new levees after Hurricane Betsy in 1965. Before then, these locations were seen to be too low-lying and flood-prone to be safe (Kates et al. 2006). Some of these areas were without electricity and municipal water for over a year after Katrina. Unsurprisingly, return to such neighbourhoods was much slower and rates of housing abandonment were high. These neighbourhoods were also disproportionately populated by African Americans and minorities. This race-based underpinning of socio-economic inequality became apparent in evacuation statistics and return rates. Ninety percent of those who needed government evacuation assistance and were consequently scattered to Houston's football stadium and beyond, where they had no social networks, were low-income African Americans (Brodie et al. 2006). While nearly 60 % of white residents had returned to the city by 2009, only 40 % of black residents had returned (Groen and Polivka 2010). Inequality was exacerbated by the post-Katrina housing markets. After the storm, the city was left with 100,000 fewer habitable housing units, causing rents to soar and making it very difficult for low-income families to return (Vigdor 2008). Those who owned their own homes were more likely to return than those who had been renting (assuming those homes were still habitable). Here again, racial inequalities became apparent, as homes owned by white families tended to be in locations that suffered less damage than those owned by other racial groups (Fussell et al. 2010).

Yet there is more to the story than a simple narrative of race-based, spatially institutionalized poverty that determined who left New Orleans permanently and who came back. Access to social networks and the social capital that flows along them were important influences on return rates to New Orleans. In a detailed study of hard-hit neighbourhoods in the east end of New Orleans, Li et al. (2010) found that return rates were especially low for African-American households headed by women. They traced this to the relatively weak social networks of these households and their consequent heavy reliance on meagre government assistance. Their experience contrasted sharply with that of the east end's small Vietnamese population that, prior to Katrina, was disproportionately poor and completely disconnected from the city's political power structures. This community successfully leveraged its social capital through non-governmental institutions like churches and social connections with the Vietnamese diaspora in other U.S. states. They self-organized their evacuation and re-established themselves as a community quickly after the storm. In this way, they maintained a strong population and in the process increased their political and socio-economic influence within the city (Airriess et al. 2007; Li et al. 2010). The Vietnamese experience shows that access to informal socio-economic resources can, under the right circumstances, offset a lack of access to formal power structures and institutional resources and provide even a disempowered community greater agency in choosing its fate in terms of migration or non-migration.

After Katrina, New Orleans saw an influx of new migrants of Latin American origin, many of them young men without legal permanent-resident status (Fussell 2009). The rebuilding of the city created many jobs in the construction industry, and in their haste to rebuild the city as quickly as possible, authorities turned a blind eye

to the hiring of illegal workers and the wages paid to them. The city has since become an important destination for undocumented Latino migrants to the U.S. This has created a new community of low-income people that find themselves socially and economically marginalized in New Orleans, but who come because local labour-market conditions provide better economic prospects than other U.S. destinations. The Latino influx occurred at a time when low-income African Americans were struggling to find employment and when affordable housing was already scarce. This clearly demonstrates how the government authorities' willingness to tolerate institutionalized poverty and social inequality remains unchanged.

This short summary of post-Katrina migration patterns shows that, if we wish to better identify the influences of inequality in the patterns and outcomes that environmental migration may take, we need to pay attention to how inequalities are embedded in formal institutional arrangements. Examples of places to look could be in land-tenure arrangements and housing markets, or labour markets and how they are regulated (or not). Inequalities along lines of gender, age, and health (e.g., households with infirm dependents) can have a significant influence on the capability of households to adapt and place severe constraints on their mobility and migration agency. Further, we must recognize that not only can inequality influence environmental migration, it can also be a product or outcome of environmental migration. Environmental migration can reveal new concerns about citizenship (i.e., state-based recognition of who is *legal*), power(-lessness), and who can access or influence formal institutions and who cannot.

1.8 The Contributions of This Book to Existing Knowledge

The chapters that follow provide a cross-section of the current state of research as it relates to the inter-connections between inequality, capabilities, and environmental migration. The authors also point to a number of promising research directions that have yet to be pursued. Some of the chapters draw on empirical research in countries where acute environmental challenges have influenced migration patterns. These include Bangladesh, China, Ghana, Burkina Faso, Turkey, Haiti, and Mexico. In each case, the authors document how various types of inequalities emerge from societal processes (i.e., economic, political, social, and/or cultural processes) and how these in turn influence the capabilities of individuals, households, and communities, and their migration agency and mobility options, and, ultimately, shape the migration patterns that emerge in times of environmental stress or hardship. The methods used by the authors vary from highly qualitative to highly quantitative depending on the local contexts and the particular research questions being pursued.

Elsewhere in the book, authors who have worked in Bangladesh and sub-Saharan Africa reflect on conceptual and methodological considerations—specifically, gender and translocality—which researchers may wish to consider when working in this

field. The book also considers broader political and policy-making considerations of environmental migration and inequality, looking at questions of statelessness and the implications of how we define environmental migrants.

Although the empirical studies in the book showcase a variety of geographical regions and methodological approaches, common themes emerge as authors disentangle the connections between inequality, capabilities, and migration outcomes in environmentally stressed areas. Overarching themes include findings that environmental migration outcomes are strongly influenced by households' capabilities, that migration has implications for future vulnerability and capabilities, and that institutionalized inequalities must be addressed if capabilities and adaptive capacity are to be enhanced.

Etzold and colleagues describe how the livelihoods and food security of rural households in northern Bangladesh are heavily influenced by the variability of rainfall quantity and timing. There is an easily observable pattern of seasonal migration in and out of rural areas that coincides with the *monga* period, when household food supplies are at their lowest. Participation in this seasonal migration is not driven solely by climatic factors, but is strongly influenced by local patterns of social inequality and food insecurity as well as large-scale structural economic disparities across Bangladesh.

Rademachaer-Schultz and Schraven look at seasonal migration in the dry-land region of northern Ghana. There, people used to migrate during the dry season when food was scarce and their labour was not needed. Lately, the timing of out-migration has shifted to the rainy periods, especially among poorer and vulnerable households. These migrants are lured by opportunities in small-scale, informal mining elsewhere in the country. However, this results in reduced farm productivity and increased risk of food scarcity for those left behind should the migrant not remit sufficient funds to offset the absence of his or her labour. The consequences of this shift in the timing of seasonal migration include a rapid devaluation of subsistence agriculture in northern Ghana and a considerable redistribution of capabilities and vulnerability.

Lasailly-Jacob and Payraut also describe environmental migration in West Africa. In their case, they look not at drought or dryness but at how heavy rain events can trigger floods and consequent migration in Burkina Faso. Among many things, they find that those who were displaced by floods in the capital city have been far more visible to government authorities and the media—and consequently have received greater assistance—than the displaced residents of rural areas and smaller cities. The latter find themselves with less capability to cope with future risks (environmental or otherwise) and often with little choice but to resettle in locations that are as exposed or even more exposed to environmental risks than where they lived previously. The invisibility of the most vulnerable people to institutions and authorities that might assist them to develop their capabilities is an important consideration.

This notion of invisibility appears again in the chapter by Tan and colleagues. In China's densely populated Yangtze River delta, they found that the poorest segments of the population are especially vulnerable to environmental risks

(in this case, the impacts of climate change) due to their lack of access to state-provided employment, housing, health services, and education. Often these are recent migrants from rural areas who, unaware of how to access such benefits and having little or no influence over or access to institutional decision-makers compared with better-established residents, find themselves in positions of increasing vulnerability. Given the state's strong political and economic control in China, the authors conclude the onus falls on the government to develop programs to address not simply economic disparities within the region—which have been the focus to date—but also address the wider inequalities in terms of social status and power that presently flourish.

The role institutions play in addressing (or failing to address) the underlying inequalities that create environmental vulnerability and migration takes us next to Turkey's Konya plain region. Lelandais describes the Turkish government policies on drought, desertification, and agriculture which tend to ignore the entrenched structure of the region's farm economy, where wealth and power is controlled by a small number of large landowners. The knowledge of local authorities is often ignored by distant federal agencies that insist on micro-managing efforts to combat drought and desertification. As a result, policies and programs rarely trickle down to meet the needs of the large number of farmers who work small holdings and lack the necessary means to invest in irrigation systems to help them adapt to a drying climate. Consequently, increasing numbers of farmers migrate to work as wage labourers in urban centres or as greenhouse workers in the Antalya region, which, like the case of northern Ghana, has implications for the capabilities of the community members they leave behind.

The Turkish case describes how environmental processes and social inequalities influence internal migration patterns. By contrast, Mezdour and colleagues trace the environmental influences on international migration from Haiti to Canada. The authors tease out a complicated set of events that begin with the collapse of rural livelihoods due to endemic deforestation and erosion, and lead to large numbers of the rural population migrating into cities where sanitation, air quality, housing, and food security are already poor. As slums grow and urban ecological conditions deteriorate, it creates additional impetus for educated and skilled urbanites—who are not themselves directly exposed to the environmental hazards of deforestation—to seek greener pastures overseas in countries such as Canada.

The importance of migrant networks, and access to them, is further developed by Kerstin Schmidt who uses empirical data collected from the Mexican states of Zacatecas and Veracruz. There, Schmidt finds that access to migration networks is far from universal and is instead heavily influenced by economic resources, the local cultural context, individual preferences, and the age and gender of would-be migrants. Under the negative impacts expected to result from climate change, some people might wish to migrate elsewhere but would be unable to do so for lack of access to existing migrant networks. Others, who might have such access, have never sought it out, having no interest in migrating elsewhere, and are unlikely to migrate even if climate change exacerbates the hardships they experience.

The chapters in the first section of the book demonstrate a variety of methodological options for pursuing research into the relationship between inequality and environmental migration. In the second part of the book, we encounter chapters where the authors have reflected in greater detail on particular dimensions of that relationship. Returning to the case of Bangladesh, Ackerly explores further the question of the *invisibility* of the most vulnerable, who often suffer worst when environmental hardships occur. She points out that the inequalities and injustices that characterize the lives of the most vulnerable are *hidden in plain sight*, cloaked by a swirl of social, economic, and political dynamics. Introducing the *3Fs*—familiarity, frequency, and fragmentation—she outlines a methodological agenda for future research that incorporates analysis of environmentally exacerbated social inequalities across multiple scales.

Greiner and Sakdapolrak also draw attention to the under-theorized and depoliticized ways in which environmental migration is too often discussed. It has been common among researchers, policymakers, media, and the wider public to see environmental migration as an emergency response of desperate people, fleeing a location at risk with no prospects of return. Based on their extensive empirical research, the authors point out that migration patterns can be circular over time and geography, and that migration events are not socially discrete events—there are continuous feedback interactions between migrants and non-migrants, origin and destination, and with other sectors of economy and society. The authors describe how a political ecology of translocal relations can assist researchers to generate a more nuanced understanding of how inequality, environmental factors, and migration play out in dynamic fashion.

In the final section of the book, our authors challenge us to think about the larger implications of what environmental migration is, and what it means to be (or be labelled) an environmental migrant. One important consideration is statelessness. Statelessness and the inevitable lack of mobility rights that typically accompany it are a basic form of global inequality. The UNHCR estimates there are presently 10 million stateless people worldwide. Fornalé and colleagues reflect on the situation of small island states threatened by rising sea levels and ask how the international community might assist to protect populations affected by environmental changes. They find that international law lacks any clear measures or guidance on what to do if/when people become stateless because their state ceases to be physically habitable. International law is similarly silent on what rights of migration or mobility people have, if any, if they must relocate to another state for environmental reasons.

Mayer draws us back and asks a fundamental question: What do we mean when we talk about *environmental migration*. If we, the international community, are going to offer assistance and protection to environmental migrants and/or create new legal and governance mechanisms to do so, exactly who are targeting? Mayer notes that in the face of challenging environmental conditions, it may not necessarily be those who migrate (or are considering migration) who are most in need of assistance. Further, are people who migrate for environmental reasons more or as deserving of the international community's attention compared with people who

migrate for other reasons? The author calls for greater rational reflection on questions of how we categorize people and their motivations; the implications of the categories we create; and how creating migration and mobility rights is only one step toward developing the capacities of people who are most exposed to the impacts of environmental degradation and change.

The chapters in this book provide a rich sampling of recent work that encourages greater attention to the ways in which inequality influences environmental migration. This volume is far from being the final word on the subject. Rather, we suggest it offers a useful departure point for future research and policy reflections. In the conclusion, we will look at the directions scholarship will likely take in coming years. We are pleased to offer an afterword by political scientist Chloé Vlassopoulos, in which she considers many of these research challenges based on her experience leading the EXCLIM project that studied management options for populations displaced by extreme climate events. We hope that you, the reader, enjoy what now follows, and that it stimulates you to make your own contributions to this rapidly evolving, increasingly important subject.

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