

## From “Primitive Migration” to “Climate Refugees”: The Curious Fate of the Natural Environment in Migration Studies

Etienne Piguet

*Institute of Geography, University of Neuchâtel*

Beginning with Friedrich Ratzel, the founders of migration studies all mentioned the natural environment as an important determinant of human mobility. As migration theories grew in coherence and complexity over the course of the twentieth century, however, environmental considerations generally disappeared from explanations of displacement. They would reappear in a largely unconnected discourse stressing the threat of future waves of “environmental migrants” in the end-of-the-century context of climate change anxiety. This alarmist stance was heavily criticized by several migration scholars during the same period of time as a corpus of empirical studies emerged that reconsidered the possible impact of the environment on migration. The purpose of this article is to analyze the intellectual history of this swing of the pendulum. The first part examines the rationale for the temporary disappearance of the environment from migration studies, as this major shift has not yet been fully or systematically studied. The second part considers the renewal of interest in environmental migration. Finally, the last part argues that although a solid body of new research documents the contemporary migration–environment nexus, additional work is needed to reembed the environment more firmly within migration theories, taking into account the increased focus on the nature–society nexus, which has recently expanded in geography. *Key Words:* *climate change, environment, environmental migration, migration theory, refugees.*

从弗里德里希·拉索开始，迁移研究的创始人提到自然环境是个人流动性的重要决定因素。然而，随着迁移理论在二十世纪的历史过程中连贯和复杂地增长，环境的考虑总的来说在位移的解释中消失了。它们将在本世纪末的气候变化的焦虑背景下，在很大程度上在无关的强调“环境移民”的未来浪潮的威胁性话语中重新出现。当一些重新考虑环境对迁移的可能影响的实证研究出现时，这一危言耸听的立场被同一时期的一些移民学者严厉批评。这篇文章的目的是分析这个思想史的摆动过程。第一部分探讨环境从迁移研究的临时消失的理由，因为这一重大的转变尚未被完全地或系统地研究。第二部分考虑环境迁移兴趣的回头。最后，在最后一部分指出，虽然新的研究实体记录了当代迁移和环境之间的关系，考虑到最近在地理学中被扩展的自然和社会的关系，还需要额外的工作来把环境重新嵌入到迁移理论内。*关键词：* *气候变化，环境，环境迁移，迁移理论，难民。*

Comenzando con Ratzel, todos los fundadores de los estudios sobre migración mencionaron el entorno natural como un determinante importante de la movilidad humana. Sin embargo, a medida que las teorías de la migración crecieron en coherencia y complejidad en el curso del siglo XX, las consideraciones ambientales generalmente desaparecieron de las explicaciones sobre el desplazamiento. Ellas reaparecerían en un discurso en gran medida desconectado que destacaba la amenaza de futuras oleadas de “migrantes ambientales” dentro del contexto de ansiedad por el cambio climático, a finales del siglo. Esta postura alarmista fue duramente criticada por varios estudiosos de la migración durante ese mismo período a medida que emergió un cuerpo de estudios empíricos que reconsideraron el posible impacto del medio ambiente sobre la migración. El propósito de este artículo es analizar la historia intelectual de esta vuelta del péndulo. La primera parte está dedicada a examinar la racionalidad de la desaparición temporal del medio ambiente en los estudios de migración, por cuanto este cambio mayor todavía no ha sido estudiado ni completa ni sistemáticamente. La segunda parte considera la renovación del interés en la migración ambiental. Finalmente, la última parte sostiene que aunque hay un sólido cuerpo de nueva investigación que documenta el nexo contemporáneo migración-medio ambiente, se necesita más trabajo para reincorporar con mayor firmeza el medio ambiente dentro de las teorías de la migración, tomando en cuenta la creciente focalización del nexo naturaleza-sociedad, que se ha expandido últimamente en geografía. *Palabras clave:* *cambio climático, medio ambiente, migración ambiental, teoría de la migración, refugiados.*

The story I would like to tell is one of a strange disappearance and a sudden reappearance. It starts with the disappearance of the natural environment as a central factor for explaining displacement in migration theories. It continues with its double reappearance, both in the figure of the environmental refugee, who has become the “human face of climate change,” and in the corpus of empirical research developed with the aim of reassessing the impact of the natural environment on migration.

In reconstructing this intellectual history, I intend to establish a basis for reembedding the natural environment within migration studies. I want to look at it not in a deterministic way, as a singular and external driver of the movement of people, but rather as the complex product of interactions between nature and society. This attempt to place the environment within migration studies builds on several existing works, but I identify three important weaknesses in these efforts. First, previous works tend to focus on the recent emergence of the debate on environmental migration without analyzing its previous disappearance (Saunders 2000; Piguet 2010b; Gemenne 2011a). Second, they often privilege general issues of population change, development, and population policies rather than migration (O’Neill, MacKellar, and Lutz 2001). Third, some studies provide a general synthesis not focused on the evolution of the debate or its rationale and only include “nonnatural” phenomena such as industrial hazards (Hugo 1996; Hunter 2005; Gill 2010).

## Disappearance

### A Central Dimension in the Work of the Pioneers of Migration Studies

As noted by Harvey (1996), the word *environment* “necessarily means such different things to different people, that in aggregate it encompasses quite literally everything there is” (117). If, to begin with, we apply a narrow and rather simplistic definition of the environment as encompassing all things occurring naturally on Earth, we will quickly notice that environmental drivers such as climate and soil fertility feature prominently in the first attempts by geographers to systematize knowledge about migration.

This is the logical consequence of the “naturalistic subject” that geography was in its origins (Castree 2005, 57) and of the deterministic paradigm within which it developed at the end of the nineteenth century, follow-

ing the lead of Ratzel. The role of the natural environment in migration is central, although in a fairly implicit way, to Ratzel’s (1882) *Anthropogeographie*,<sup>1</sup> which, as noted by Durkheim at the time, lays the foundations for a general theory of migration (Durkheim 1899).

In this matter, the writings of the naturalist and geographer Moritz Wagner, author of a book entitled *The Darwinian Theory and the Law of the Migration of Organisms* (Wagner 1873), were a significant influence for Ratzel. Wagner does not deal with human migration but with plants and animals, and his theory is more sympathetic to Lamarck than to Darwin. Nonetheless, one can guess that a statement like “The competition of all beings for space, food, and reproduction, or the ‘struggle for life,’ . . . gives the first impulse to migration” (75) had a strong impact on Ratzel, who referred to Wagner in the *Anthropogeographie* as his highly respected, fatherly friend.

For Livingstone (1992), “Ratzel’s *Anthropogeographie* can best be read as an attempt to situate the new science of human geography within the naturalistic framework of Wagner’s *Migrationsgesetz*, which he portrayed as the [most] fundamental law of world history” (199).<sup>2</sup> Ratzel’s disciple, the American geographer Ellen Churchill Semple, meanwhile, dedicated a whole chapter of her book *Influences of Geographic Environment* (Semple 1911) to “The movement of people” (105–65). She stated, “The search for better land, milder climate and easier conditions of living starts many a movement of people which, in view of their purpose, necessarily leads them into an environment sharply contrasted to their original habitat” (143).

Ravenstein—no doubt the most prominent figure in migration studies at its beginning stages—was one of the many to attempt to identify climatic zones favorable to the establishments of European colonists. Following a similar idea, he argued for the paramount importance of the natural environment to movements of populations (Ravenstein 1891). A few years earlier, Ravenstein had made the first explicit attempt to theorize migration, stating a series of “migration laws” based on the observation of internal migration within the United Kingdom and international migration among nineteen countries around the world. In that context, Ravenstein mentioned an unpleasant climate as having produced and still producing currents of migration. He avoided taking an overly simplistic environmental determinist stance, however, by mentioning many other drivers of migration, such as bad or oppressive laws, heavy taxation, uncongenial social surroundings, compulsion, and economic motivations (1889).

A similar emphasis on the influence of the physical environment on human migration is to be found in the work of the most famous figure of environmental determinism in geography, Ellsworth Huntington. In the context of his general project of highlighting the geographic basis of human history (Huntington 1922), Huntington is probably the first to describe what would today be considered “climate change migration.” Studying the Lop area, in Eastern China, Huntington noted that

During the first epoch [1830–1840] the Lop basin suffered severely from drought. The villages of Dumuka, Ponak, and others were abandoned for lack of water; and new villages were founded higher upstream. Distress of the same sort prevailed in other places, and large numbers of people moved to new sites. . . . The movements of this time are unquestionably due to climate. (1907, 373)

More generally, his emphasis on the centrality of environmental drivers in history led Huntington (1907) to argue that, at the dawn of the Roman Empire, the great “barbarian” invasions of Europe were due to climate change in Eastern Asia and to the fact that “Europe, after its long period of blighting cold, was becoming warm and habitable, and the migrants pressed into it, horde after horde” (383).

Developing a fairly different theoretical framework that, unlike that of natural determinists, stressed the importance of cooperation and mutual aid in evolution, the geographer Piotr Kropotkin—now considered a precursor to political ecology (Robbins 2004)—also considered environmental pressure a central push factor in emigration (Kropotkin 1902).<sup>3</sup> In Kropotkin’s view, emigration, by animals and humans, was indeed an alternative to the “war of each against all” prophesied by simplistic evolutionists as a possible reaction to insufficient resources. He saw a third, preferred option in mutual cooperation (Dugger 1984). This last example confirms that, at the end of the nineteenth century, in spite of epistemological differences, the early attempts at theorizing migration agreed on a central role for the natural environment.

### The Eclipse of the Environment

Despite the historical premises just outlined, nearly all traces of the environment as an explanatory factor for migration disappeared from the growing body of research on migration over the course of the twentieth century. Landmarks of migration studies such as *Human Migration and the Future* by Gregory (1928; although

Gregory was himself a natural scientist), *Human Migration* by Taft (1936), and *Economics of Migration* by Isaac (1947) do not even mention environmental factors as causes of migration. Stouffer’s (1940) “intervening opportunities” approach and Zelinsky’s (1971) attempt to theorize the history of human mobility through the concept of “mobility transition” similarly overlook the environment. Ravenstein’s distant follower Lee mentions the natural environment in passing while listing push and pull factors in his famous 1966 paper—“a good climate is attractive and a bad climate is repulsive to nearly everyone” (Lee 1966, 50). It does not figure in the migration models developed by neoclassical economists (Harris and Todaro 1970), however, nor in the “gravity” and “ecological”<sup>4</sup> models developed during the 1970s (Sly and Tayman 1977), nor in neo-Marxist theories of migration (Nikolinakos 1975).

The behaviorist current that developed in geography during the 1960s had a significant interest in migration (Wolpert 1965). Its theoretical framework considered the decision to migrate as the result of stressors affecting individuals up to a certain threshold, beyond which they led to relocation. Indeed, behavioral geographers made common use of the term *environment*, but they used it to cover economic conditions, governmental policies, and transportation infrastructure much more than natural characteristics such as climate. In the end, natural phenomena were only marginally considered in the behaviorist approach to migration. The same broad use of environment can be identified in the pioneer study that applied a general systems theory framework to the study of internal migration (Mabogunje 1970).

The disregard of environmental factors is further evidenced by the fact that none of the numerous syntheses of migration studies and theories published from the end of the 1970s until very recently mention any link between the natural environment and migration<sup>5</sup> (Ritchey 1976; De Jong and Gardner 1981; Zolberg 1989). The same can be said of publications attempting to outline emerging trends, formulate new theories, or broaden the disciplinary scope of migration theory (Cohen 1995; Hammar et al. 1997; Massey et al. 1998; Brettell and Hollifield 2007).

This historical overview confirms the observation that migration studies lost sight of the natural environment during the twentieth century. As stated by Bilsborrow (2009), “Contextual factors have been much discussed but little studied in relation to the causes of migration, with environmental conditions in origin areas hardly studied at all” (125). The pressing question, then, is why?

## The Reasons Behind the Disappearance

There seem to be four main reasons for migration studies' decreasing interest in the natural environment over the last century:

- The Western idea that progress implies a decreasing impact of nature on human fate.
- The demise of determinism.
- The rise of an economic paradigm in migration theory.
- The constitution of the specific field of refugee studies around a political paradigm.

Many social theorists have stressed that Western thought developed with a conceptual dichotomy between nature and society, leading to the conviction that there is an inverse relationship between modernity and the impact of the natural environment on human actions (Sluyter 2003). To put it differently, as Beck did recently, modern society “increasingly develops outside nature” (Beck 2010, 177) and the history of mankind is the history of the conquest of nature (Glacken 1967). This idea is clearly put forward in relation to human migration in Petersen’s (1958) classic *Typology of Migration* and can be traced back to the work of the nineteenth-century anthropologist Grote (1877) on the peopling of America. For Petersen (1958), migration resulting from environmental factors (“ecological push”) is indeed the first form of migration in history due to man’s inability to cope with natural forces. It should be called “primitive migration” (259), however, because the influence of the environment on migration tends to decline to insignificance as humans gradually gain mastery over nature through technological progress.

The second and related factor leading to the demise of environmental considerations in migration studies is the vigorous rejection of natural determinism that characterizes twentieth-century social sciences. One reason for this rejection lies, of course, in the decoupling of nature and society that I have just mentioned. For Sluyter (2003, 816), “environmental determinism became anathema” because “as the nature/society dichotomy strengthened, it dictated that scientific disciplines have an explanatory intellectual core focused on nature OR society.” Another reason, probably even more important, is the naïvete of the monocausal explanations offered by determinism and its propensity to legitimize a shamelessly racist conception of the world and a natural hierarchy of development to justify colo-

rial oppression. Both Semple and Huntington were especially criticized for considering climate as a main determinant for a racial sorting of mankind (Livingstone 1992). During the first half of the twentieth century, the neo-Lamarckian geopolitical determinism pioneered by Haushofer and his followers—a radicalization and political instrumentalization of the Ratzelian idea that states compete, fight, and evolve the way that organisms do in their natural environment—was also criticized as highly problematic pseudoscience (Bowman 1942). It was then largely cast out from the academy for having served as an intellectual resource for National Socialism (O’Tuathail 1996).

Despite the demise of determinism, one could, of course, argue that in geography, more than in other disciplines, environmental considerations long retained a certain explanatory power (Livingstone 1992). For example, possibilists like Vidal de la Blache and the *Ecole Française de Géographie* insisted on the limited margin of freedom granted to mankind by nature despite the fact that a given natural environment can be witness to the development of many different sociocultural adaptations (Vidal de la Blache 1922). Nevertheless, as noted by Castree, on the eve of World War II, geographers had become suspicious of making causal links between environment and society. Many simply chose not to study the environment–society relationship at all and to specialize in either human or physical geography (Castree 2005),<sup>6</sup> whereas others, following the influential work of Sauer, largely reversed the direction of the causality to focus on the way that culture progressively affected natural landscapes. During the second half of the twentieth century, the quantitative revolution promulgated by the “New Geography” on the one hand and by neo-Marxist geography and the subsequent school of thought on the other effectively eliminated the last remnants of environmental explanation in geographical theory. According to Castree (2005, 81), “Marxist geography helped to expunge nature from human geography during the 1970s . . . [and] so did behavioral and humanistic geography,” with obvious implications for the study of migration.

The third explanation for the decline of environmental considerations is the growing dominance of an economic paradigm in migration studies. The idea that economic motivations drive migration behavior can be traced back to Ravenstein himself. He considered that “none of [the] currents [of migration] can compare in volume with that which arises from the desire inherent in most men to better themselves in material respects” (Ravenstein 1889, 286).

Whether influenced by a structuralist (Castles and Kosack 1973) or a neoclassical (Harris and Todaro 1970) point of view, economic theories of migration clearly assumed a dominant role during the last quarter of the twentieth century and pushed aside other explanations, be they political, cultural, or environmental. To be fair, it must be conceded that the neoclassical theories do not naïvely and completely ignore noneconomic considerations. Those other dimensions become subsumed, in a certain sense, in the economic explanations, in that they become part of a vector of variables that translates into differences of wage productivity or rent between regions and countries. To put it concretely, a bad climate or threatening natural hazards that might act as repulsive factors will also depress the level of rents and force employers to pay higher wages to retain the workforce. This adaptation will lead to an increase in the attractiveness of the area and—according to this school of thought—to an optimal distribution of populations. Hunter (2005, 277) offered a table of the “placement” of environmental hazards in classic migration theories that illustrates this point.

The environmental component is even more present, although still implicit, in the new economics of migration (Stark and Bloom 1985). This school of thought has developed a specific interest in the collective handling, within households in rural societies, of risk factors such as drought and bad weather. Strategies of diversification regarding such risks are considered paramount in explaining emigration but are driven by probabilistic calculations about future wages. Although these theories can thus be said to take environmental push and pull factors indirectly into account, neither directly discusses nor empirically addresses these phenomena and their specific impact on migration.

A fourth explanation for the absence of environmental considerations in end-of-the-century migration studies specifically concerns the development of what was initially labeled refugee studies, a field more often identified nowadays as forced migration studies and that developed, during the 1980s, to a large extent independently from mainstream migration studies (Black 1993, 2001b; Black and Robinson 1993; Chimni 1998). The label of forced migration could very well have also covered displacements due to environmental push factors, but the fact is that these have been largely absent from the field. This delineation is well exemplified in the editorial introduction to the 2007 special issue of *Refugee Survey Quarterly* entitled “Researching Refugees: Lessons, Challenges and Ways Forward,” which fails to include environmental push factors in

its otherwise broad outline of forced migration studies (Bakewell 2007). The explanation for this lies in the strong link that exists between refugee studies and the constitution of the “refugee” category in international law. In that context, it is the political dimension that, beginning with the 1951 United Nations Convention, shaped a conceptual frame of reference that excluded the natural environment as a cause of refugee flight. Mentioning only the “well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion” (United Nations High Commissioner for Refugees, article 1, §A, 2), the United Nations Convention typically excludes environmental motives. Forced migration studies are thereby confined within a political paradigm in which, as formulated by Marx (1990, 200), “states make refugees.”

A noteworthy exception to the dominant political paradigm in forced migration studies is the work of Richmond, one of the few scholars who can be considered a theoretician of forced migration. As early as the beginning of the 1990s, he included environmental variables in his explanatory framework along with social, economic, political, and technological ones and underlined both the difficulties in defining, identifying, and counting this group of displaced people and the necessity to intensify research (Richmond 1994). This pioneering work, however, did not suffice to establish the field within migration studies.

Taken together, the four factors that I have just reviewed appear to explain the abandonment of the natural environment within migration studies rather well. Before considering how the natural environment has recently made a spectacular—although controversial—comeback, let me mention one interesting exception to the historical development described here.

### Natural Assets as Pull Factors

The economics of amenities and migration constitute one specific field of migration studies where the environment has been considered as retaining a certain explanatory power, most often as a pull rather than as a push factor. Initiated by the work of Ullman, this current of research focuses mainly on internal migration. According to Ullman (1954), internal migration within the United States is, to a growing extent, explained by “pleasant” climate and other favorable aspects of the environment. Indeed, if one remembers that the push factor related to poverty had often been considered paramount in previous studies of migration,

Ullman can be considered a post-economic-scarcity theoretician. In the optimistic context of the early 1950s in the United States, Ullman forecasted that “for the first time in the world’s history pleasant living conditions—amenities—instead of more narrowly defined economic advantages are becoming the sparks that generate significant population increase. . . . The new frontier of America is thus a frontier of comfort, in contrast with the traditional frontier of hardship” (119). In this sense, Ullman replaces the third argument (dominance of an economic paradigm) for not including environment in migration studies.

In the years since Ullman’s forecast, several empirical investigations have confirmed the pull effect of the climate—if not the disappearance of economic factors—on migration (Greenwood 1969; Svart 1976; Graves 1980). Researchers in the area of amenities and migration, however, have rarely attempted to broaden their scope of investigation or to isolate the natural environment as a pull factor. It is in a different context that it has made a comeback within the migration agenda.

## Reappearance

The disappearance of the environment from migration studies over the course of the twentieth century was to be followed by a resurgence. In the second half of the 1980s the publication of three reports, one by the United Nations Environmental Program (UNEP), one by the Worldwatch Institute, and one by the Intergovernmental Panel on Climate Change (IPCC; El-Hinnawi 1985; Jacobson 1988; IPCC 1990), played an important role in reconnecting migration and the environment on a global scale. The UNEP report brought the term *environmental refugee* to the fore, and the IPCC report very explicitly forecast that “[Global warming] could initiate large migrations of people, leading over a number of years to severe disruptions of settlement patterns and social instability in some areas” (IPCC 1990, 20). A first series of scientific debates, international conferences, and publications followed (Appleyard 1992; Lassailly-Jacob and Zmolek 1992; Suhrke 1994). It was only fifteen years later, however, that the fear of environmentally motivated mass migration gained full visibility as the IPCC forecast reappeared in Sir Nicholas Stern’s review of the economic consequences of global warming: “Greater resource scarcity, desertification, risks of droughts and floods, and rising sea levels could drive many millions of people to migrate” (Stern 2007, 128). These concerns had a tremendous impact. They led to alarming reports by major nongovern-

mental organizations (Christian Aid 2007; Friends of the Earth 2007; Jakobeit and Methmann 2007), were addressed by prominent policymakers (UN Secretary-General 2009), and made for innumerable headlines in the media (Gemenne 2011a). Seven complementary lines of explanation can be suggested to explain this renewed interest. Several of them (1, 2, 6, and 7 that follow) signal a reversal of the evolutions that explained the disappearance of the environment from migration theories in the first place, whereas others (3, 4, and 5) involve new trends. Looked at another way, some (1, 2, and 3) are related to the reemergence of environmental migration in mainly nonscientific discourse, whereas others (4, 5, 6, and 7) are more specifically connected to academic research.

1. The progressive rise of environmental concerns in Western societies, pioneered by early warnings such as Vogt’s (1948) *Road to Survival*—which was incidentally the first to mention the issue of ecological migration—and leading to the reframing of the environment as a central issue in the “global risk society” (Beck 2009).
2. The increasing number of environmental hazards documented on a global level and apparently leading to cases of mass displacement (Hunter 2005). This also cast doubts on the “primitive” character of environmental migration and on the Promethean dream that nature’s impact on the fate of humanity might be decreasing with development and progress.
3. Growing anxieties regarding climate change, which has become a “key category [of concern] of the twenty-first century” for the international community (Urry 2011, 24). Unlike abstract physical indicators such as temperature or humidity, migrants embodied a peril in the making and soon became “iconic markers” of climate change, alongside the Amazon rainforest and polar bears. “The human faces of climate change,” as they were called by the chair of the IPCC,<sup>7</sup> thus provided an “engaging simplification” (Li 2002) as well as a powerful advocacy tool for environmentalists and other actors (McNamara 2007; Gemenne 2011a).
4. The very politics of climate science. Over a span of twenty years, climate science experienced a “triumphant rise to political saliency” (Hulme 2009a, 137; Bolin 2007), thus attracting the attention of social scientists to climate change and its social consequences, migration being one of the most obvious. This general trend toward an opening

of climate change research to the social sciences is reflected in the evolution of the IPCC reports from 1990 through the 2014 project. It led to the coining of the term *climate refugee* in addition to the already existing term *environmental refugee* (Biermann and Boas 2010).

5. The security framework that was set up after 11 September 2001, which interacted to an increasing degree with both migration studies (Lazaridis 2011) and climate change studies (Barnett 2003; O. Brown 2008; White 2011). This interaction contributed to the framing of the link between environment and migration as a threat to “climate security” (MacGregor 2009; Elliott 2010) and to a connection between migration and the geopolitics of climate change (Hulme 2008a; Gemenne 2009). This was illustrated in a report by the Center for Naval Analysis on security and climate change stating, “The greatest concern will be [the] movement of asylum seekers and refugees who due to ecological devastation become settlers” (CNA’s Military Advisory Board 2007, 18) and in the United Nations Security Council’s first debate on the impacts of climate change, on 17 April 2007, where the fear of migration took a prominent place (McNamara 2007; Somerville 2011).
6. The emergence of a disinhibited reading of the impact of the natural environment on human societies. We can see this kind of reading, first, in the works of prominent figures (qualified by critics as neoenvironmental determinists) such as Diamond and Sachs (Radcliffe et al. 2010), the latter incidentally warning the world to “Prepare for a torrent of forced migration” due to environmental changes (Sachs 2007). Such a reading also emerges in the convergence, due to the growing salience of migrant remittances in rural development (Tacoli 2011), between research on sustainable livelihoods in rural areas (Ellis and Freeman 2005)—which had long taken the natural environment as a central concern—and migration studies.
7. The thinning of the demarcation line between refugee studies and mainstream migration studies (Bakewell 2007) and the growing emergence of an academic interest, first in forced migration in general (Chimni 2009) and then in mixed migration (Van Hear, Brubaker, and Bessa 2009). Overall, this implied a shift within refugee studies away from the political paradigm mentioned in the first part of this article (Black 1998).

And yet, despite this new evolution, the environment remained marginal in mainstream migration studies, which were still largely determined by an economic paradigm. Indeed, high-profile migration scholars largely took the role of skeptics (Gemenne 2011a) or “minimalists” (Suhrke 1994) in what developed into a debate between them and “alarmists” or “maximalists.” Simultaneously, a corpus of empirical research developed along what I call a pragmatic line. Let us now quickly summarize these three tendencies.

### The Alarmist Discourse

During the 1990s, Oxford environmental scientist Norman Myers personified, to a great extent, the most alarmist forecasts regarding environmental migration (Myers 1993). He stated that “the issue of environmental refugees . . . promises to rank as one of the foremost human crises of our times” (Myers 1997, 175). His projection of 150 million environmental refugees by the end of the twenty-first century, later upgraded to 200 million (Myers 2002), had a tremendous impact and still appears in media and advocacy campaigns (Gemenne 2011b).

The alarmist discourse continues to follow these assumptions and is often characterized by the use of aggregate numbers of future migrants and by hydrological metaphors of submersion such as *torrents*, *streams*, *tides*, and *waves* of migrants (Gill 2010; Turton 2003). It often emanates from activists—Christian Aid’s (2007) famous “human tide” or the picture book *Climate Refugees* by the Collectif Argos (2010)—but also from authors who are at the intersection of advocacy groups and the academy. Examples include Kolmannskog’s (2008) report for the Norwegian Refugee Council entitled “Future Floods of Refugees,” L. Brown’s (2011) book chapter “Environmental Refugees: The Rising Tide,” or the United Nations University’s report “In Search of Shelter” (Warner et al. 2009). Several publications in peer-reviewed scientific journals or books also adopt a more-or-less-pronounced alarmist stance (Westing 1992; Bates 2002; Biermann and Boas 2010; McLeman 2011). Bogardi and Warner’s (2009) commentary in *Nature* announced “Here Comes the Flood.” Reuveny and Moore (2009) recently wrote that “[a]s climate change continues, environmental degradation will rise in some areas, promoting out-migration. Migrants will most likely come from LDCs [less-developed countries]; . . . as a result, there may be more legal and illegal attempts to enter DCs [developed countries], which may ultimately lose control over incoming migration” (476).

According to the alarmist stance, migration is not only a consequence of environmental degradation but represents a catastrophe in itself. Migration is thus seen as a proof of the necessity to act against climate change. This explains why the concept of the environmental refugee has quickly made its way into what Saunders (2000) called the “environmental orthodoxy” despite the fact that it was, from the beginning, strongly criticized by several skeptical scholars from the field of migration studies.

### The Skeptics’ Reply

The term *environmental refugee* has been severely criticized for about fifteen years now, two landmark publications being a paper by anthropologist Gaim Kibreab (1997) and a paper by geographer Richard Black (2001a). Both of these publications denounced the shaky empirical character and sloppy nature of most work on environmental refugees and brought to the fore the problem arising from positing a unidirectional link between environmental change and migration. This criticism was echoed in a more moderate tone by Castles (2002), for whom “[t]he term environmental refugee is simplistic, one-sided and misleading. It implies a mono-causality which very rarely exists in practice. . . . [Environmental and natural factors] are part of a complex pattern of multiple causality, in which [they] are closely linked to economic, social and political ones” (5).

Another serious criticism leveled at the alarmists from the very beginning is that, by invoking the specter of a flood of migrants toward rich countries, they legitimize the closed-border policies of Western governments that are already hostile to refugees. Twenty years ago, McGregor (1993) wrote:

In so far as the term environmental refugee conflates the idea of disaster victim and refugee, its use brings with it the danger that the key features of refugee protection could be undermined and the lowest common denominator adopted. Because “environmental” can imply a sphere outside politics, use of the term environmental refugee may encourage receiving states to treat the term in the same way as economic migrants to reduce their responsibility to protect and assist. (162)

Researchers from the Global South have been especially sensitive to this risk of overplaying the hand of nature and downplaying the role of policies or politics (Kibreab 1997). Such thinking has ultimately contributed to a “myth of difference” between contemporary refugees from the south (viewed as economic

or environmental refugees) and past refugees from the (Communist) north who were initially targeted by the international refugee regime and epitomized the image of (real) political refugees (Chimni 1998). This point was later broadened by feminist scientists, who criticized the “climate security” discourse as denying the duty of Western countries to assist the victims of climate change (MacGregor 2009, 127).

According to the skeptics, the alarmists’ neodeterminism leads them to see a worsening of the environmental situation as mechanically leading to displacements, without any consideration of local particularities, history, or culture. Hugo (2008) has labeled this flaw the “tendency to equate populations at risk with population displacement” (31). Alarmist researchers tend to concentrate their analyses on measuring the amplitude of the degradations and claiming the necessity of new legal instruments to protect environmental migrants (Byravan and Rajan 2006; Biermann and Boas 2010), without discussing the nature or complexity of the links between the socio-environmental evolutions and migration itself. The skeptics add that migration should not be seen as a tragedy in itself but that, on the contrary, it can form part of a proactive adaptation strategy that should be encouraged (Bilsborrow 1992; Thornton and Manasfi 2010).

### The Pragmatic Stance

A modest but significant body of research has accumulated in the last ten years that, without any claim or ambition to numerically forecast flows of migrants, questions the role and weight of environmental factors in already-occurring displacements and attempts to build scenarios for the future. The most recent and ambitious project in this vein is certainly the Foresight report (Foresight 2011; see also Black et al. 2011). I briefly summarize the main results of this line of inquiry here according to a typology of empirical studies suggested by Piguet (2010b; Piguet, Pécoud, and de Guchteneire 2011).

Based on different types of environmental indicators such as rain, drought, floods, or tropical cyclones and other indicators such as socioeconomic situation or demography, a first type of study uses quantitative methods to isolate the impact of the environment on emigration. This is done at the country level, for example, in three recent papers (Affi and Warner 2008; Collier and Hoeffler 2011; Smith, Bastin, and Chewings 2011) and in numerous other studies at the regional level.<sup>8</sup> The degree of correlation varies greatly across



these works, but environmental variables always appear as only one driving force of migration among others, obviously confirming the multicausality brought to the fore by skeptics. No correlation at all has been found up until now when the analysis was specifically focused on asylum requests lodged in Europe rather than total migration (Neumayer 2005), which is a very important point, considering that alarmists have often seen asylum as the channel through which migration pressure would most likely be conveyed.

A second approach aims to consider processes on the level of individuals or households by collecting data on past or current migration, environmental pressure, and socioeconomic context through large surveys. One of the most cited studies using this approach was conducted in rural Mali before and after a series of droughts (Findley 1994). The results document no increase in international emigration but, rather, shorter cycle migration from food-short to food-surplus zones. Studies using similar methods in Bangladesh (Paul 2005), Ecuador (Gray 2009), El Salvador (Halliday 2006), Nicaragua (Carvajal and Pereira 2008), Burkina Faso (Henry, Schoumaker, and Beauchemin 2004), Ethiopia (Ezra and Kiros 2001), and Nepal (Massey, Axinn, and Ghimire 2007; Shrestha and Bhandari 2007; Bohra-Mishra and Massey 2011) or using time-series analysis in Mexico (Kniveton et al. 2008) also emphasize the complexity and indirectness of the linkages between migration and environmental variables. Most studies show that, if environmental conditions play a role, they are more significant for local and internal mobility than they are for international or long-distance migration.

Finally, qualitative methods have constituted by far the most widely used research design in recent years, among other places in the context of the European Union research program “Environmental Change and Forced Migration Scenarios (EACH-FOR)” (Jäger et al. 2009). These studies use either interviews or small-sample questionnaires among inhabitants of threatened areas, contacts with privileged informants, or, in some cases, source literature on historical analogues (Arenstam Gibbons and Nicholls 2006; McLeman and Smit 2006; McLeman et al. 2008). Most case studies strongly support the multicausality thesis.

Despite the contributions of the empirical studies just reviewed, many authors have noted that the amount of systematic research into the links between migration and the environment within the fields of geography (Gill 2010) and of migration studies in general (Laczko and Aghazarm 2009; Tacoli 2009; Piguet 2010a, 2010b)

remains limited. Although there is renewed interest, the research still suffers from a good deal of definitional vagueness regarding the concepts employed, the underlying mechanisms involved, the number of persons affected, and the time frame and geographical scales concerned.

As Hugo (2008) pointed out, “there needs to be a quantum improvement in the knowledge base on the interrelationships between environment and migration. This means better conceptualization and measurement as well as more detailed cross-disciplinary research” (49). A central thesis of this article is that these insufficiencies in the research are attributable to the long eclipse of the environment within mainstream migration studies and its reappearance through the back door in the work of alarmist environmental scientists. As noted by Massey, Axinn, and Ghimire (2007), in none of the disciplines of the social sciences did “environmental conditions figure as salient determinants of migration decision-making,” while at the same time “many environmentalists take as an article of faith that population growth, environmental deterioration, and out-migration are fundamentally interrelated” (3). The extended analysis of the history of geographically inflected studies of migration undertaken in this article shows that it is not sufficient to simply blame environmentalists for their oversimplified vision of migration. Rather, it is up to migration scholars—and perhaps especially the nature–society geographers among them because of their frequent engagement with complex, recursive human–environment interactions (Zimmerer 2010)—to attempt to reembed environmental factors into their own theoretical framework while avoiding naive neodeterminism.

## Conclusion: Reembedding the Environment in Migration Theories

In overview, the arc of migration studies in geography and related fields has shown that, on the eve of World War II, these specialists become suspicious of making causal links between environment and society. Human geography was indeed confronted with a progressive denaturalization, which continued into the second half of the twentieth century and had obvious consequences for migration studies, where geographers had always played a central role (Robinson 1996). In an opposite move, on the other hand, geography then experienced a striking rediscovery of “nature,” no longer conceived of as an external determinant of the fate of societies but rather as a constantly evolving social and

ecological product that is coproduced in myriad forms (Zimmerer 2010). This “de-naturalizing (re)turn to Nature” (Castree 2005, 92; Radcliffe et al. 2010) has had limited echoes so far in migration studies (Gill 2010). In addition, no connection seems to have been made between mainstream migration studies and natural hazard research despite the nondeterministic turn that this last field took in the second half of the twentieth century (Castree 2005). Cultural and then political ecology have been similarly ignored by migration studies (Robbins 2004). In my view, making such a connection could resolve the dilemma of how to account for the environmental component of population displacements without overemphasizing this factor as a monocausal *deus ex machina*. Seen this way, we can consider the environment as one factor behind the social processes of migration, albeit one that interacts with many others, including power relations, class structures, economic inequalities, colonial legacies, cultural and religious specificities, political organization, and gender relations.<sup>9</sup> As with all of these other dimensions, we should see the environment not as external to societies but as the product both of objectively measurable physical changes and of the subjective ways in which societies make sense of these changes (Demeritt 2001; Hulme 2008b, 2009b; Adger et al. 2009; Wisner 2010).

Looking backward, denaturalizing the impact of the environment on migration could lead to a fruitful reconsideration of “environmentally led” migration episodes in past human history. Even Petersen’s plot of “primitive migration”—the idea that the further back one looks in human history or the further “down” at so-called less developed societies, the more the environment is an autonomous determinant of human mobility—could be called into question. For example, the thesis that the medieval climate optimum, which lasted from the eighth to the thirteenth centuries, explains the colonization of Greenland by the Vikings while their inability to adapt to the Little Ice Age that followed led to their collapse (Diamond 2005) is being convincingly challenged in its monocausality. Recent in-depth archaeological investigation reveals the complex human–nature arrangements at play (Dugmore et al. 2009). In the same vein, we can reinterpret the famine that occurred in French-ruled Sahel in 1911 and caused innumerable (and unnumbered) displacements and deaths. It can be understood not so much as a consequence solely of the lack of rain but as, instead, a result of the drought’s deadly coincidence with the shift in tax collection imposed by the colonial power, from in-kind tax collection (crops) to cash tax collection (in

French francs), which largely destroyed the traditional local coping mechanisms for drought (Afifi 2011).

Looking forward, denaturalizing the environment could also help us to (re)interpret current processes related to environmental hazards and to forecast future developments regarding migration and climate change. This was already made clear after Hurricane Katrina when researchers showed that the disaster, along with the subsequent population displacements, had much more to do with social and political causes than with narrowly natural ones (Hartman and Squires 2006; Gutmann and Field 2010). Even such generally accepted cases of unavoidable future climate-driven migration as the Pacific Islands or Bangladesh deserve such a reinterpretation. In Tuvalu, for example, a nation seen by many as on the verge of a massive exodus (Bogardi and Warner 2009), more nuanced studies show that cultural interactions between religious beliefs and the understanding of climate change significantly mediate the way people perceive—and actually reject—the idea of emigrating (Mortreux and Barnett 2009; Gemenne 2010). In Bangladesh (Findlay and Geddes 2011), as well as in the Andes (Valdivia et al. 2010), two areas considered to be acutely affected by climate change, environmental degradation has been shown to interact in a complex way with other factors in shaping livelihood and migration strategies. It intervenes as a contingent additional burden in the context of preexisting cultures of mobility where the population affected are not passive victims but purposive actors, with “different areas having different knowledge of migration opportunities, with differing assessments being made regarding the desirability of moving” (Findlay and Geddes 2011, 150).

As the concept of the environmental migrant popped up in the 1980s and 1990s in the environmental sciences, with a definitely deterministic and simplistic flavor, mainstream migration studies were prone to largely ignore or dismiss it. Such disregard is no longer an option in the present context of climate change uncertainties and renewed “environment talk” (Radcliffe et al. 2010). Due to its anthropogenic component and to its obviously social implications, climate change constitutes a blatant illustration of the embeddedness of natural processes within social, political, and cultural ones. It developed without taking the natural environment into account. The conceptual framework of migration theories, which already deals with complex networks of causality among economic, cultural, and political processes at various scales (Brettell and Hollifield 2007; Castles and Miller 2009), seems well prepared to welcome back the natural environment as one

among numerous interacting factors that shape people's decisions and needs to move. It should not be considered in a deterministic way, as a singular and external driver, but rather as the product of complex interactions between nature and society.

## Notes

1. The impact of the environment remains implicit in Ratzel due to the very general character of his theory and to the use of the much broader concept of "soil" (*Boden*). When he uses more concrete language, especially in his *Political Geography*, Ratzel (1903) brings other explanatory factors for displacement to the fore, especially the growth of population and the competition for space between different populations, without explicit links to environmental pressures. He nevertheless notes that natural barriers and obstacles can slow down mobility.
2. The general idea of linking the evolution of the environment to the evolution of populations goes farther back, to Malthus (1798), although he only mentions migrations incidentally. As Saunders (2000) convincingly shows, many of the publications that have brought concepts such as environmental refugees to the fore are indeed still Malthusian in their emphasis on the population-resources nexus as the root cause of forced migration.
3. The same could be written about the pioneering empirical research of Boas on Eskimo migration, in which he adopted a nondeterministic approach to geography (Boas 1887).
4. The word *ecological* is not used here with its usual contemporary meaning but indicates that the unit of analysis is not an individual but a group of people, usually corresponding to a geographical area. The term *environment* used in this context has nothing to do with the natural characteristics of the area but refers to population variables such as the density of habitation, the ethnic composition of neighborhoods, and so on.
5. In the case of De Jong and Fawcett (1981), the word *environment* is only mentioned in the context of amenities migration, to which I return later.
6. The way in which the climate as an environmental phenomenon has been disregarded by geographers in general illustrates this process quite well: "Embarrassed in the first half of the twentieth century by the naive determinists, geographers became increasingly happy to leave climate well alone. Distancing themselves from the idea, climate was left first to the physical geographers, who in turn handed it over to the meteorologists who most recently have been usurped by the Earth system scientists" (Hulme 2008b, 10).
7. Interview in the film *Climate Refugees* by Michael Nash.
8. The same type of analysis was performed between Mexican municipalities (2009), between Mexican provinces and the United States (2003), in sub-Saharan Africa (2008), in Ghana (Van der Geest, Vrieling, and Dietz 2010; Van der Geest 2011), in Western Africa (Black 1998), in Burkina Faso (2003), in India (2001), and among developing countries (Barrios, Bertinelli, and Strobl 2006; Reuveny and Moore 2009).

9. See Tacoli (2009) and Neumayer and Plümper (2007) on that specific aspect.

## References

- Adger, W., S. Dessai, M. Goulden, M. Hulme, I. Lorenzoni, D. Nelson, L. Naess, J. Wolf, and A. Wreford. 2009. Are there social limits to adaptation to climate change? *Climatic Change* 93 (3): 335–54.
- Affi, T. 2011. Economic or environmental migration? The push factors in Niger. *International Migration* 49 (S1): 95–124.
- Affi, T., and K. Warner. 2008. The impact of environmental degradation on migrations flows across countries. Working Paper 5, United Nations University, Institute for Environment and Human Security, Bonn, Germany.
- Appleyard, R. T. 1992. Conference report: Migration and the environment. *International Migration* 30 (2): 225–28.
- Arenstam Gibbons, S. J., and R. J. Nicholls. 2006. Island abandonment and sea-level rise: An historical analog from the Chesapeake Bay, USA. *Global Environmental Change* 16 (1): 40–47.
- Bakewell, O. 2007. Editorial introduction: Researching refugees: Lessons from the past, current challenges and future directions. *Refugee Survey Quarterly* 26 (3): 6–14.
- Barnett, J. 2003. Security and climate change. *Global Environmental Change* 13 (1): 7–17.
- Barrios, S., L. Bertinelli, and E. Strobl. 2006. Climatic change and rural-urban migration: The case of sub-Saharan Africa. *Journal of Urban Economics* 60 (3): 357–71.
- Bates, D. C. 2002. Environmental refugees? Classifying human migrations caused by environmental change. *Population and Environment* 23 (5): 465–77.
- Beck, U. 2009. *World at risk*. Cambridge, UK: Polity Press.
- . 2010. Remapping social inequalities in an age of climate change: For a cosmopolitan renewal of sociology. *Global Networks* 10:165–81.
- Biermann, F., and I. Boas. 2010. Preparing for a warmer world—Towards a global governance system to protect climate refugees. *Global Environmental Politics* 10 (1): 60–88.
- Bilsborrow, R. E. 1992. Rural poverty, migration, and environment in developing countries: Three case studies. World Bank Policy Research Working Paper 1017, The World Bank, Washington, DC.
- . 2009. Collecting data on the migration-environment nexus. In *Migration, environment and climate change: Assessing the evidence*, ed. F. Laczko and C. Aghazarm, 115–96. Geneva: International Organization for Migration.
- Black, R. 1993. Geography and refugees: Current issues. In *Geography and refugees*, ed. R. Black and V. Robinson, 3–13. London: Belhaven.
- . 1998. *Refugees, environment and development*. London: Longman.
- . 2001a. Environmental refugees: Myth or reality? New Issues in Refugee Research, United Nations High Commissioner for Refugees (UNHCR), Research Paper 34, UNHCR, Genève, Switzerland.
- . 2001b. Fifty years of refugee studies: From theory to policy. *International Migration Review* 35 (1): 55–76.

- Black, R., S. R. G. Bennett, S. M. Thomas, and J. R. Beddington. 2011. Climate change: Migration as adaptation. *Nature* 478 (7370): 447–49.
- Black, R., and V. Robinson. 1993. *Geography and refugees*. London: Belhaven.
- Boas, F. 1887. The study of geography. *Science* 9:137–41.
- Bogardi, J., and K. Warner. 2009. Here comes the flood. *Nature Report Climate Change* 3 (January): 9–11.
- Bohra-Mishra, P., and D. S. Massey. 2011. Environmental degradation and out-migration: New evidence from Nepal. In *Migration and climate change*, ed. E. Pigué, A. Pécoud, and P. de Guchteneire, 74–101. Cambridge, UK: Cambridge University Press.
- Bolin, B. 2007. *A history of the science and politics of climate change: The role of the Intergovernmental Panel on Climate Change*. Cambridge, UK: Cambridge University Press.
- Bowman, I. 1942. Geography vs. geopolitics. *Geographical Review* 32 (4): 646–58.
- Brettell, C. B., and J. F. Hollifield, eds. 2007. *Migration theory: Talking across disciplines*. London and New York: Routledge.
- Brown, L. 2011. *World on the edge*. London: Earthscan.
- Brown, O. 2008. *Migration and climate change*. Geneva: International Organization for Migration.
- Byravan, S., and S. C. Rajan. 2006. Providing new homes for climate change exiles. *Climate Policy* 6:247–52.
- Carvajal, L., and I. Pereira. 2008. Evidence on the link between migration, climate disasters, and human development. Paper presented at the International Conference on Environment, Forced Migration and Social Vulnerability, Bonn, Germany.
- Castles, S. 2002. Environmental change and forced migration: Making sense of the debate. New Issues in Refugee Research, United Nations High Commissioner for Refugees (UNHCR) Research Paper 70, UNHCR, Genève, Switzerland.
- Castles, S., and G. Kosack. 1973. *Immigrant workers and class structure in Western Europe*. Oxford, UK: Oxford University Press.
- Castles, S., and M. J. Miller. 2009. *The age of migration: International population movements in the modern world*. Houndmills, UK: Palgrave Macmillan.
- Castree, N. 2005. *Nature*. London and New York: Routledge.
- Chimni, B. S. 1998. The geopolitics of refugee studies: A view from the South. *Journal of Refugee Studies* 11 (4): 350–74.
- . 2009. The birth of a “discipline”: From refugee to forced migration studies. *Journal of Refugee Studies* 22 (1): 11–29.
- Christian Aid. 2007. *Human tide: The real migration crisis*. London: Christian Aid.
- Climate refugees*. Directed by M. Nash. <http://www.climate-refugees.com> (last accessed 21 June 2012).
- CNA’s Military Advisory Board. 2007. *National security and the threat of climate change*. Alexandria, CA: Center for Naval Analyses.
- Cohen, R. 1995. Emerging trends. In *The Cambridge survey of world migration*, ed. R. Cohen, 507–60. Cambridge, UK: Cambridge University Press.
- Collectif Argos. 2010. *Climate refugees*. Boston: MIT Press.
- Collier, P., and A. Hoeffler. 2011. *Quantitative analysis of determinants of international migration*. London: Government Office for Science UK.
- De Jong, G. F., and J. T. Fawcett. 1981. Motivations for migration: An assessment and a value-expectancy research model. In *Migration decision making: Multidisciplinary approaches to microlevel studies in developed and developing countries*, ed. G. F. De Jong and R. W. Gardner, 13–58. New York: Pergamon.
- De Jong, G. F., and R. W. Gardner, eds. 1981. *Migration decision making: Multidisciplinary approaches to microlevel studies in developed and developing countries*. New York: Pergamon.
- Demeritt, D. 2001. The construction of global warming and the politics of science. *Annals of the Association of American Geographers* 91 (2): 307–37.
- Diamond, J. M. 2005. *Collapse*. New York: Viking.
- Dugger, W. M. 1984. Veblen and Kropotkin on human evolution. *Journal of Economic Issues* 18 (4): 971–85.
- Dugmore, A. J., C. Keller, T. H. McGovern, A. F. Casley, and S. Konrad. 2009. Norse Greenland settlement and limits to adaptation. In *Adapting to climate change: Thresholds, values, governance*, ed. W. N. Adger, I. Lorenzoni, and K. L. O’Brien, 96–113. Cambridge, UK: Cambridge University Press.
- Durkheim, E. 1899. Friederich Ratzel: Anthropogéographie: Un compte-rendu [Anthropogeography: A review]. *L’Année Sociologique* 1898–1899 3:3–9.
- El-Hinnawi, E. 1985. *Environmental refugees*. Nairobi, Kenya: United Nations Environmental Program.
- Elliott, L. 2010. Climate migrations and climate migrants: What threat, whose security? In *Climate change and displacement*, ed. J. McAdam, 176–90. Oxford, UK: Hart.
- Ellis, F., and H. A. Freeman, eds. 2005. *Rural livelihoods and poverty reduction policies*. London and New York: Routledge.
- Ezra, M., and G.-E. Kiros. 2001. Rural out-migration in the drought prone areas of Ethiopia: A multi-level analysis. *International Migration Review* 35 (3): 749–71.
- Findlay, A., and A. Geddes. 2011. Critical views on the relationship between climate change and migration: Some insights from the experience of Bangladesh. In *Migration and climate change*, ed. E. Pigué, A. Pécoud, and P. de Guchteneire, 138–59. Cambridge, UK: Cambridge University Press.
- Findley, S. E. 1994. Does drought increase migration? A study of migration from rural Mali during the 1983–85 drought. *International Migration Review* 28 (3): 539–53.
- Foresight. 2011. *Migration and global environmental change—Future challenges and opportunities*. London: Government Office for Science.
- Friends of the Earth. 2007. *Citizen’s guide to climate refugee*. Fitzroy, Australia: FoE Australia.
- Gemenne, F. 2009. *Géopolitique du changement climatique* [Geopolitics of climate change]. Paris: Armand Colin.
- . 2010. Tuvalu, un laboratoire du changement climatique? [Tuvalu, a laboratory of climate change?]. *Tiers Monde* 4 (204): 89–107.
- . 2011a. How they became the human face of climate change. Research and policy interactions in the birth of the “environmental migration” concept. In *Migration and climate change*, ed. E. Pigué, A. Pécoud, and P. de Guchteneire, 225–59. Cambridge, UK: Cambridge University Press.

- . 2011b. Why the numbers don't add up: A review of estimates and predictions of people displaced by environmental changes. *Global Environmental Change* 21S:S41–S49.
- Gill, N. 2010. "Environmental refugees": Key debates and the contributions of geographers. *Geography Compass* 4 (7): 861–71.
- Glacken, C. J. 1967. *Traces on the Rhodian shore—Nature and culture in Western thought from ancient times to the end of the eighteenth century*. Berkeley: University of California Press.
- Graves, P. E. 1980. Migration and climate. *Journal of Regional Science* 20 (2): 227–37.
- Gray, C. L. 2009. Environment, land, and rural out-migration in the southern Ecuadorian Andes. *World Development* 37 (2): 457–68.
- Greenwood, M. J. 1969. An analysis of the determinants of geographic labor mobility in the United States. *Review of Economics and Statistics* 51:189–94.
- Gregory, J. W. 1928. *Human migration and the future—A study of the causes, effects and control of emigration*. London: Seeley, Service and Co.
- Grote, A. R. 1877. On the peopling of America. *The American Naturalist* 11:221–26.
- Gutmann, M., and V. Field. 2010. Katrina in historical context: Environment and migration in the U.S. *Population and Environment* 31 (1): 3–19.
- Halliday, T. J. 2006. Migration, risk and liquidity constraints in El Salvador. *Economic Development and Cultural Change* 54 (4): 893–925.
- Hammar, T., G. Brochmann, K. Tamas, and T. Faist, eds. 1997. *International migration, immobility and development: Multidisciplinary perspectives*. Oxford, UK: Berg.
- Harris, J., and M. P. Todaro. 1970. Migration, unemployment and development: A two-sector analysis. *American Economic Review* 60 (1): 126–42.
- Hartman, C., and G. D. Squires, eds. 2006. *There is no such thing as a natural disaster: Race, class, and Hurricane Katrina*. London and New York: Routledge.
- Harvey, D. 1996. *Justice, nature and the geography of difference*. Oxford, UK: Blackwell.
- Henry, S., B. Schoumaker, and C. Beauchemin. 2004. The impact of rainfall on the first out-migration: A multi-level event-history analysis in Burkina Faso. *Population and Environment* 25 (5): 423–60.
- Hugo, G. 1996. Environmental concerns and international migration. *International Migration Review* 30 (1): 105–31.
- . 2008. *Migration, development and environment*. Geneva: International Organization for Migration.
- Hulme, M. 2008a. Climate refugees: Cause for a new agreement? *Environment* (November–December). <http://www.environmentmagazine.org/Archives/Back%20Issues/November-December%202008/hulme-full.html> (last accessed 20 June 2012).
- . 2008b. Geographical work at the boundaries of climate change. *Transactions of the Institute of British Geographers* 33 (1): 5–11.
- . 2009a. Author's response: Book review symposium: Hulme M. (2009). Why we disagree about climate change. *Progress in Human Geography* 35 (1): 136–38.
- . 2009b. *Why we disagree about climate change*. Cambridge, UK: Cambridge University Press.
- Hunter, L. M. 2005. Migration and environmental hazard. *Population and Environment* 26 (4): 273–302.
- Huntington, E. 1907. *The pulse of Asia: A journey in Central Asia illustrating the geographic basis of history*. Boston: Houghton Mifflin.
- . 1922. *Civilization and climate*. New Haven, CT: Yale University Press.
- International Panel on Climate Change (IPCC). 1990. *Climate change: The IPCC impacts assessment*. Geneva: World Meteorological Organization—United Nations Environment Programme.
- Isaac, J. 1947. *Economics of migration*. New York: Oxford University Press.
- Jacobson, J. 1988. Environmental refugees: A yardstick for habitability. Worldwatch Paper 86, Worldwatch, Washington, DC.
- Jäger, J., J. Frühmann, S. Grünberger, and A. Vag. 2009. EACH-FOR: Environmental change and forced migration scenarios: Synthesis report. EU Project, Environmental Change and Forced Migration. [http://www.each-for.eu/documents/EACH-FOR\\_synthesis\\_Report\\_090515.pdf](http://www.each-for.eu/documents/EACH-FOR_synthesis_Report_090515.pdf) (last accessed 20 June 2012).
- Jakobeit, C., and C. Methmann. 2007. *Klimaflüchtlinge* [Climate refugees]. Hamburg, Germany: Greenpeace.
- Kibreab, G. 1997. Environmental causes and impact of refugee movements: A critique of current debate. *Disasters* 21 (1): 20–38.
- Kniveton, D., K. Schmidt-Verkerk, C. Smith, and R. Black. 2008. *Climate change and migration: Improving methodologies to estimate flows*. Geneva: International Organization for Migration.
- Kolmannskog, V. O. 2008. *Future floods of refugees: A comment on climate change, conflict and forced migration*. Oslo: Norwegian Refugee Council.
- Kropotkin, P. 1902. *Mutual aid: A factor of evolution*. London: William Heinemann.
- Laczo, F., and C. Aghazarm, eds. 2009. *Migration, environment and climate change: Assessing the evidence*. Geneva: International Organization for Migration.
- Lassailly-Jacob, V., and M. Zmolek. 1992. Environmental refugees. *Refuge (Canada's Periodical on Refugees)* 12 (1): 1–4.
- Lazaridis, G., ed. 2011. *Security, insecurity and migration in Europe*. London: Ashgate.
- Lee, E. 1966. A theory of migration. *Demography* 48 (3): 47–57.
- Li, T. M. 2002. Engaging simplifications: Community-based resource management, market processes and state agendas in Upland Southeast Asia. *World Development* 30 (2): 265–83.
- Livingstone, D. N. 1992. *The geographical tradition*. Oxford, UK: Blackwell.
- Mabogunje, A. L. 1970. Systems approach to a theory of rural–urban migration. *Geographical Analysis* 2 (1): 1–18.
- MacGregor, S. 2009. A stranger silence still: The need for feminist social research on climate change. *The Sociological Review* 57:124–40.
- Malthus, T. R. 1798. *An essay on the principle of population*. London: Johnson.
- Marx, E. 1990. The social world of refugees: A conceptual framework. *Journal of Refugee Studies* 3 (3): 189–203.
- Massey, D. S., J. Arango, G. Hugo, A. Kouaouci, A. Pellegrino, and J. E. Taylor. 1998. *Worlds in motion:*

- Understanding international migration at the end of the millennium.* Oxford, UK: Clarendon.
- Massey, D. S., W. G. Axinn, and D. J. Ghimire. 2007. Environmental change and out-migration: Evidence from Nepal. Population Studies Center Research Report 07–615, Population Studies Center, University of Michigan, Ann Arbor, MI.
- McGregor, J. 1993. Refugees and the environment. In *Geography and refugees: Patterns and processes of change*, ed. R. Black and V. Robinson, 157–70. London: Belhaven.
- McLeman, R. 2011. *Climate change, migration and critical international security considerations.* Geneva: International Organization for Migration.
- McLeman, R., D. Mayo, E. Strebeck, and B. Smit. 2008. Drought adaptation in rural eastern Oklahoma in the 1930s: Lessons for climate change adaptation research. *Mitigation and Adaptation Strategies for Global Change* 13 (4): 379–400.
- McLeman, R., and B. Smit. 2006. Migration as an adaptation to climate change. *Climatic Change* 76 (1–2): 31–53.
- McNamara, K. 2007. Conceptualizing discourses on environmental refugees at the United Nations. *Population and Environment* 29 (1): 12–24.
- Mortreux, C., and J. Barnett. 2009. Climate change, migration and adaptation in Funafuti, Tuvalu. *Global Environmental Change* 19 (1): 105–12.
- Myers, N. 1993. Environmental refugees in a globally warmed world. *Bioscience* 43:752–61.
- . 1997. Environmental refugees. *Population and Environment* 19 (2): 167–82.
- . 2002. Environmental refugees: A growing phenomenon of the 21st century. *Philosophical Transactions: Biological Sciences* 357 (1420): 609–13.
- Neumayer, E. 2005. Bogus refugees? The determinants of asylum migration to Western Europe. *International Studies Quarterly* 49 (3): 389–410.
- Neumayer, E., and T. Plümper. 2007. The gendered nature of natural disasters: The impact of catastrophic events on the gender gap in life expectancy 1981–2002. *Annals of the Association of American Geographers* 97 (3): 551–66.
- Nikolinakos, M. 1975. Notes towards a general theory of migration in late capitalism. *Race and Class* 17 (1): 5–17.
- O'Neill, B. C., F. L. MacKellar, and W. Lutz, eds. 2001. *Population and climate change.* Cambridge, UK: Cambridge University Press.
- O'Tuathail, G. 1996. *Critical geopolitics: The politics of writing global space.* London and New York: Routledge.
- Paul, B. K. 2005. Evidence against disaster-induced migration: The 2004 tornado in north-central Bangladesh. *Disasters* 29 (4): 370–85.
- Petersen, W. 1958. A general typology of migration. *American Sociological Review* 23 (3): 256–66.
- Piguat, E. 2010a. Climate and migration: A synthesis. In *Environment, forced migration and social vulnerability*, ed. T. Afifi and J. Jäger, 73–86. Bonn, Germany: Springer.
- . 2010b. Linking climate change, environmental degradation and migration: A methodological overview. *Wiley Interdisciplinary Reviews: Climate Change* 1 (4): 517–24.
- Piguat, E., A. Pécoud, and P. de Guchteneire, eds. 2011. *Migration and climate change.* Cambridge, UK: Cambridge University Press.
- Radcliffe, S. A., E. E. Watson, I. Simmons, F. Fernández-Armesto, and A. Sluyter. 2010. Environmentalist thinking and/in geography. *Progress in Human Geography* 34 (1): 98–116.
- Ratzel, F. 1882. *Anthropogeographie* [Anthropogeography]. Stuttgart, Germany: J. Engelhorn.
- . 1903. *Politische geographie* [Political geography]. Munich, Germany: Oldenbourg.
- Ravenstein, E. G. 1889. The laws of migration. *Journal of the Royal Statistical Society* 52 (2): 241–305.
- . 1891. Lands of the globe still available for European settlement. *Proceedings of the Royal Geographic Society* 13:27–35.
- Reuveny, R., and W. H. Moore. 2009. Does environmental degradation influence migration? Emigration to developed countries in the late 1980s and 1990s. *Social Science Quarterly* 90:461–79.
- Richmond, A. H. 1994. *Global apartheid: Refugees, racism, and the new world order.* New York: Oxford University Press.
- Ritchey, N. 1976. Explanations of migration. *Annual Review of Sociology* 2:363–404.
- Robbins, P. 2004. *Political ecology.* London: Blackwell.
- Robinson, V., ed. 1996. *Geography and migration.* Cheltenham, UK: E. Elgar.
- Sachs, J. 2007. Climate change refugees: As global warming tightens the availability of water, prepare for a torrent of forced migrations. *Scientific American* June 1. <http://www.scientificamerican.com/article.cfm?id=climate-change-refugees-extended> (last accessed 20 June 2012).
- Saunders, P. L. 2000. Environmental refugees: The origins of a construct. In *Political ecology: Science, myth and power*, ed. P. Stott and S. Sullivan, 218–46. London: Arnold.
- Semple, E. C. 1911. *Influences of geographic environment.* New York: Holt.
- Shrestha, S., and P. Bhandari. 2007. Environmental security and labor migration in Nepal. *Population and Environment* 29 (1): 25–38.
- Sluyter, A. 2003. Neo-environmental determinism, intellectual damage control, and nature/society science. *Antipode* 35 (4): 813–17.
- Sly, D. F., and J. Tayman. 1977. Ecological approach to migration reexamined. *American Sociological Review* 42 (5): 783–95.
- Smith, M. S., G. Bastin, and V. Chewings. 2011. *Environmental and non-environmental drivers of migration from global drylands.* London: Government Office for Science UK.
- Somerville, W. 2011. *Environmental migration governance: Debate in the European Union.* London: Government Office for Science UK.
- Stark, O., and D. E. Bloom. 1985. The new economics of labor migration. *American Economic Review* 75: 173–78.
- Stern, N. 2007. *The economics of climate change.* Cambridge, UK: Cambridge University Press
- Stouffer, S. 1940. Intervening opportunities: A theory relating mobility and distance. *American Sociological Review* 5 (6): 845–67.
- Suhrke, A. 1994. Environmental degradation and population flows. *Journal of International Affairs* 47:473–96.
- Svart, L. 1976. Environmental preference migration: A review. *Geographical Review* 66 (3): 314–30.

- Tacoli, C. 2009. Crisis or adaptation? Migration and climate change in a context of high mobility. *Environment and Urbanization* 21 (2): 513–25.
- . 2011. *The links between environmental change and migration: A livelihoods approach*. London: Government Office for Science UK.
- Taft, D. J. 1936. *Human migration: A study of international movements*. New York: Ronald Press.
- Thornton, T. F., and N. Manasfi. 2010. Adaptation genuine and spurious: Demystifying adaptation processes in relation to climate change. *Environment and Society: Advances in Research* 1 (1): 132–55.
- Turton, D. 2003. Conceptualising forced migration. Refugee Studies Centre Working Papers Series 13, Oxford University, Oxford, UK.
- Ullman, E. L. 1954. Amenities as a factor in regional growth. *Geographical Review* 44 (1): 119–32.
- United Nations High Commissioner for Refugees (UNHCR). Convention and protocol relating to the status of refugees. <http://www.unhcr.org/3b66c2aa10.html> (last accessed 21 June 2012).
- UN Secretary-General. 2009. Climate change and its possible security implication: Report to the general assembly, sixty-fourth session. United Nations A/64/350, United Nations, New York.
- Urry, J. 2011. *Climate change and society*. Cambridge, UK: Polity Press.
- Valdivia, C., A. Seth, J. L. Gilles, M. Garcia, E. Jimenez, J. Cusicanqui, F. Navia, and E. Yucra. 2010. Adapting to climate change in Andean ecosystems: Landscapes, capitals, and perceptions shaping rural livelihood strategies and linking knowledge systems. *Annals of the Association of American Geographers* 100 (4): 818–34.
- Van der Geest, K. 2011. North–south migration in Ghana: What role for the environment? *International Migration* 49 (S1): 69–94.
- Van der Geest, K., A. Vrieling, and T. Dietz. 2010. Migration and environment in Ghana: A cross-district analysis of human mobility and vegetation dynamics. *Environment and Urbanization* 22 (1): 107–23.
- Van Hear, N., R. Brubaker, and T. Bessa. 2009. Managing mobility for human development: The growing salience of mixed migration. Human Development Research Paper 2009/20, United Nations Development Programme, Rome, Italy.
- Vidal de la Blache, P. 1922. *Principes de géographie humaine* [Principles of human geography]. Paris: Armand Colin.
- Vogt, W. 1948. *Road to survival*. New York: William Sloane.
- Wagner, M. 1873. *The Darwinian theory and the law of the migration of organisms*. London: E. Stanford.
- Warner, K., C. Ehrhart, A. de Sherbinin, S. Adamo, and T. Chai-Onn. 2009. *In search of shelter: Mapping the effects of climate change on human migration and displacement*. CARE/CIESIN/UNHCR/UNU-EHS/World Bank. Genève, Switzerland: United Nations University, Institute for Environment and Human Security.
- Westing, A. H. 1992. Environmental refugees: A growing category of displaced persons. *Environmental Conservation* 19 (3): 201–07.
- White, G. 2011. *Climate change and migration: Security and borders in a warming world*. Oxford, UK: Oxford University Press.
- Wisner, B. 2010. Climate change and cultural diversity. *International Social Science Journal* 61 (199): 131–40.
- Wolpert, J. 1965. Behavioral aspects of the decision to migrate. *Papers of the Regional Science Association* 15 (1): 159–69.
- Zelinsky, W. 1971. The hypothesis of the mobility transition. *Geographical Review* 61:219–49.
- Zimmerer, K. S. 2010. Retrospective on nature–society geography: Tracing trajectories (1911–2010) and reflecting on translations. *Annals of the Association of American Geographers* 100 (5): 1076–94.
- Zolberg, A. R. 1989. The next waves: Migration theory for a changing world. *International Migration Review* 23 (3): 403–30.