Environmental Refugees? Classifying Human Migrations Caused by Environmental Change

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What distinguishes environmental refugees from other refugees—or other migrants? Are all environmental refugees alike? This essay develops a classification to begin to answer these questions and facilitate future policies and research on environmental refugees. Environmental refugees may have considerable control over the decision to migrate, but this varies by the type of environmental disruption. The origin, intention, and duration of environmental disruptions shape the type of refugee. Refugees from disasters and expropriations have limited control over whether environmental changes will produce migration. Gradual degradation allows "environmental emigrants" to determine how they will respond to environmental change.

KEY WORDS: environmental refugee; environment; refugee; migration; emigration.

Just over ten years ago, the executive director of the United Nations Environmental Programme (UNEP) reported that "as many as 50 million people could become environmental refugees" if the world did not act to support sustainable development (Tolba, 1989, p. 25). Since this time, advocacy groups and social scientists have produced a burgeoning literature about this category of migrants. Norman Myers, the most prolific writer on this topic, estimates that environmental refugees will soon become the largest group of involuntary migrants (Myers, 1997; Myers, 1995). Whether or not Myers' assertion is true, the concept of "environmental refugee" remains somewhat vague. What situations have created these population

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flows? What distinguishes environmental refugees from other refugees—or other migrants? Are all environmental refugees alike?

Social scientists who study environmental refugees have produced several valuable reviews of this existing literature (O'Lear, 1997; Hugo, 1996; Ramlogan, 1996; Perout, 1995; Suhrke, 1994; Westing, 1992). These reviews have more or less uncritically preserved the concept of environmental refugee developed by the United National Environmental Programme (UNEP) in 1985. UNEP defined environmental refugees in a manner consistent with the humanitarian mission of their agency rather than using more analytic criteria. UNEP researcher Essam El-Hinnawi first defined environmental refugees as:

> those people who have been forced to leave their traditional habitat, temporarily or permanently, because of a marked environmental disruption (natural and/or triggered by people) that jeopardized their existence and/or seriously affected the quality of their life [sic]. By 'environmental disruption' in this definition is meant any physical, chemical, and/or biological changes in the ecosystem (or resource base) that render it, temporarily or permanently, unsuitable to support human life. (El-Hinnawi, 1985, p. 4)

El-Hinnawi did not provide generic criteria distinguishing environmental refugees from other types of migrants, nor did he specify differences between types of environmental refugees. His definition makes no distinction between refugees who flee volcanic eruptions and those who gradually leave their homes as soil quality declines. So many people can be classified under the umbrella of "environmental refugee" that critics question the usefulness of the concept. Critics note three other key problems in the current literature on environmental refugees, itemized by Trolldalen (cited in Perout, 1995). First, studies of environmental refugees demonstrate a strong regional bias, with considerable amounts of work done in some parts of the world—namely Africa and Asia—and virtually none in others. Second, detailed case studies of conditions that produce environmental refugees are rare. Third, scholars inclined toward international law, security concerns, and broader questions of migration resist the use of term "refugee." These weaknesses all arise, at least in part, from the uncritical acceptance of El-Hinnawi's vague conceptualization of environmental refugees.

The remainder of this essay problematizes the concept "environmental refugee." Three qualitatively different situations generate migrants that fit El-Hinnawi's broad definition. By distinguishing these situations, this classi-

fication draws out similarities among all environmental refugees and provides clear criteria for identifying distinct types of migrants motivated by changes in the environment. This allows for the reclassification of existing literature that begins to address the concerns noted by Trolldalen above. Moreover, this classification facilitates the expansion of the study of environmental refugees into much larger literatures on disasters, land use, and voluntary migration.

MIGRANTS OR REFUGEES? A QUESTION OF CONTROL OVER DECISIONS

Degrading environments affect human migration, but this may results from external compulsion or decisions made by migrants. The decision to relocate, usually made at the individual or household level, characterizes *voluntary* migration. Voluntary migrants have a variety of motives; the most common involves the desire for economic improvement. Other migrants are forced or compelled to relocate by external forces. These are known as *refugees*. In international law and by international standards, refugees are defined by the 1951 United Nations *Convention on Refugees* and its 1967 Amendment as people with "a well founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion." Migrants who meet the criteria set forth in these documents are called Convention refugees, while all others are considered voluntary migrants.

The distinction between voluntary migrants and refugees offers some theoretical power to differentiate between migrants. However, many important migratory flows are not easy to categorize as one or the other. Conceptually sandwiched between voluntary migrants and refugees are those compelled by deficiencies in the local social, economic, or environmental context. For example, refugee flows usually contain *anticipatory refugees*. These people recognize that their local situation will eventually deteriorate and have the ability to relocate before they are forced to do so (Kunz, 1973). Eventually, the remaining population—consisting of people who failed to recognize the change and those who lacked the means to leave earlier—is expelled.

Many migrants cannot demonstrate direct expulsion or even strong social compulsion to relocate, but they do frequently make decisions based on a curtailed set of options. The term "refugee" may be thus applied to migrants simply compelled by external constraints. Compulsion may vary

from moderate to intense, with the difference partially contingent on subjective assessments.

The decision to migrate is better conceptualized as a continuum (see Figure 1). People who have absolutely no control over their relocation represent the right-hand end of the continuum, designated as "involuntary." Moving to the left across the continuum are people with more control over the decision to migrate. At the far left of the continuum, voluntary migrants include only those who maintain control over every decision in the migration process. Such a continuum overcomes the debate over legalistic definitions of refugees and allows for a broad range of constraints on the decision-making process.

Hugo (1996) proposed just such a continuum in reference to environmental refugees. Environmental disruptions produce a broad range of constraints on human activities. Some changes directly expel populations, while others damage local economic opportunities. Hugo placed migrations from environmental disasters at the involuntary end of the continuum. Migration that results from the gradual deterioration of the environment falls further toward the voluntary end. Classifying environmental refugees as a continuum eliminates legal concerns about the definition of "refugee," even while providing a systematic means to compare different migration flows. This continuum underlies the classification of environmental refugees presented in following sections.

CLASSIFYING ENVIRONMENTAL REFUGEES

After accepting a continuum of agency in migration, the most fundamental step towards improving the study of environmental refugees is to identify and define who—if anyone—could be classified as such. A working definition of environmental refugees includes *people who migrate from their usual residence due to changes in their ambient non-human environment*. This definition remains necessarily vague in order to incorporate the

INVOLUNTARY	COMPELLED	VOLUNTARY
ENVIRONMENTAL REFUGEE	ENVIRONMENTAL EMIGRANT	MIGRANT

FIGURE 1. Continuum of control over migration decisions in situations of environmental change.

two most important features of environmental refugees: the transformation of the environment to one less suitable for human occupation and the acknowledgment that this causes migration.

In his 1985 report, El-Hinnawi described three major types of environmental refugees: 1) those temporarily dislocated due to disasters, whether natural or anthropogenic; 2) those permanently displaced due to drastic environmental changes, such as the construction of dams; and 3) those who migrate based on the gradual deterioration of environmental conditions. As an additional but smaller category, he included those people who were displaced by the destruction of their environment as an act of warfare. El-Hinnawi gave rough descriptions but established no generic criteria for distinguishing one type of environmental refugee from another. The literature that developed after this seminal report has retained El-Hinnawi's vague system of classification. To rectify this problem, the current project distinguishes environmental refugees based on criteria related to the characteristics of the environmental disruption: its origin (natural or technological), its duration (acute or gradual), and whether migration was an planned outcome of the disruption (intentional or not).

The migration streams resulting from these disruptions can be distinguished by three categories of disruptions: disasters, expropriations, and deterioration (see Figure 2). First, disaster refugees originate in acute events that are not designed to produce migration. These may be divided between those events caused by natural events and those caused by technological accidents. Second, expropriation refugees result from acute anthropogenic disruptions in the environment that intentionally dislocate target populations. These may be further divided into two groups based on whether the disruptive event was caused by economic development or warfare. Third, deterioration refugees migrate as a result of gradual, anthropogenic changes in their environments that were not intended to produce migrants. Deterioration refugees tend to come from ecosystems that have gradually degraded to a point where people cannot survive on the local resource base. This type of refugee may be analytically separated into sub-groups by the source of the degradation in terms of pollution and depletion.

Environmental Refugees Due to Disasters

Acute disruptions in the environment that cause unplanned human migration constitute "disasters" in the classification presented here. In general, disruptions of this sort produce short-term refugees from a geographically limited area. Disasters can be either natural or anthropogenic, although the line between the two can blur, producing "unnatural" disasters.

	Disaster An unintended, catastrophic event triggers human migration		**Expropriation** The willful destruction of environment renders it unfit for human habitation		**Deterioration** An incremental deterioration of the environment compels migration as constraints to human survival increase	
Sub-Category	**Natural**	**Technological**	**Development**	**Ecocide**	**Pollution**	**Depletion**
Origin	Natural	Anthropogenic	Anthropogenic	Anthropogenic	Anthropogenic	Anthropogenic
Intention of Migration	Unintentional	Unintentional	Intentional	Intentional	Unintentional	Unintentional
Duration	Acute	Acute	Acute	Acute	Gradual	Gradual
General Example	Volcano	Meltdown	Dam Building	Defoliation	Global Warming	Deforestation
Real-World Example	Montserrat	US-TMI	China-3G	Vietnam	Bangladesh	Ecuador-Amazon
Est. Number Displaced	7,000	144,000	1.3 million	7 million*	15 million	115,000

FIGURE 2. Classification of environmental refugees with examples from text.

*Reflects all types refugees as a result of warfare 1967–1973.
Sources: Montserrat: Monastersky 1997:101; US-TMI: Miller 1991:423; China: Lou 2000: 23; Vietnam: Glassman 1992:28; Bangladesh: Myers 1993a:754; Ecuador: Bates 2000: 25

Natural disasters are differentiated from other disasters because of a significant difference in origin. These disasters include hurricanes, floods, tornadoes, earthquakes or any other weather or geological event that renders a place previously inhabited by humans unfit for habitation, either permanently or temporarily. A good example of a natural disaster that produced refugees was the 1995–8 eruptions of the Soufriere Hills Volcano on the Caribbean island of Montserrat. These eruptions forced 7000 residents to evacuate (Monastersky, 1997). This acute event—assuming that volcanoes have no hidden agendas—is associated with unintentional migration.

Technological disasters are entirely anthropogenic but like natural disasters, they are temporally acute and unintentionally produce migration. This group includes the evacuation of 144,000 people from central Pennsylvania after the release of a radioactive cloud from the Three Mile Island Nuclear Power Station in 1979 (Miller, 1991, p. 423). Unlike natural disasters, technological disasters result more from human choices about technologies than from events caused by natural conditions (Perrow, 1984).

Not all disasters fall neatly into the categories of "natural" or "technological." Jacobson (1988) draws attention to those disasters that result from an interaction of anthropogenic and natural disruptions in the environment. She prefers to refer to these events as unnatural disasters: "normal events whose effects are exacerbated by human activities" (Jacobson, 1988, p. 16). As an illustrative example, Pérez-Lugo (1999) examines a case in which the residents of Tortugo, Puerto Rico, were displaced by flooding. The residents of Tortugo had settled on the banks of a small stream before the community was engulfed by the urban sprawl of San Juan. Adjacent development channeled storm run-off to this stream and redirected its course through a small culvert. During even light rains, the culvert became jammed with garbage and water volume increased behind it. When the water finally forced its way through, it swept through Tortugo, reaching levels higher than residents had ever seen before. Eventually, the residents of Tortugo moved away after the community was deemed too dangerous for their habitation (Pérez-Lugo, personal communication). In this case, the flood was caused by natural rainfall, but amplified to a dangerous level by human development. This sort of "unnatural disaster" resembles both technological and natural disasters, and could be interpreted as an amalgamation of the two.

Environmental Refugees Due to Expropriation of Environment

The second category of environmental refugees involves the permanent displacement of people whose habitat is appropriated for land use

incompatible with their continued residence. Such refugees are usually permanently relocated, sometimes with aid from the group expropriating their land. This situation results from an anthropogenic, acute (or at least temporally discrete) expropriation of an ecosystem that intentionally dislocates a target population. Two extremely different situations produce this type of displacement: economic development and warfare.

People forced to leave their residences as land is appropriated for the development constitute the first sub-type of expropriation refugees. The classic example of development refugees occurs when areas are flooded for the construction of hydroelectric dams. In China, the Three Gorges Dam has already displaced around 850,000 people and threatens to displace upwards of 1.3 million people by 2009 (Lou, 2000). The Chinese government has offered some relocation assistance to legal residents of the region, but not to illegal residents (Whitney, 1992; Zmolek, 1992). Another type of refugee from development projects involves the displacement of indigenous groups as modern land use expands into their territories (O'Connor, 1997; Bevis, 1995; Kane, 1995; Perout, 1995; Westing, 1994; Hubbel and Rajesh, 1992; Sahabat Alam Malaysia, 1992; Westing, 1992; Foresta, 1991). Penetration roads into tropical rainforests have received much international attention for disturbing and displacing indigenous groups. Other land uses—including protected areas, timber concessions, and mining—have similar effects. Among these latter situations, the displacement of people in the name of conservation has generated significant international concern (cf. Peluso, 1993). Protected areas without human habitation reflects a modern construction of "natural areas," and people displaced to establish them resemble other populations displaced for modernization.

Warfare generates a distinct type of people displaced by expropriation. Ecocide is the intentional destruction of human environments in order to strategically relocate a target population during a period of war. The most notorious case involves the massive displacement of rural Vietnamese following the use of defoliants by the United States in the 1960s and 1970s. The application of herbicides, including Agent Orange, destroyed crops and forest resources, compelling rural people to migrate to cities to survive (Glassman, 1992). Similar attempts to force migration by destroying the environment occurred during the Salvadoran Civil War. Government troops used land mines and bombed fields to undermine agricultural production and force rural people from their land and into cities or refugee camps (Bates, 1996; Danner, 1993). Land mines in Kurdish regions of Iraq likewise discouraged agricultural activities, especially when placed near wells and roads (Rogge, 1992).

Environmental Refugees Due to Deterioration of Environment

The third type of environmental refugee involves people affected by the gradual deterioration caused by anthropogenic alteration of their environment. Migration that stems from deterioration is not planned, even though the disruption of the environment may be quite deliberate. The connections between gradual environmental change and migration are rarely direct. Instead, the effects of deterioration filter through the local economy. The poor are normally most vulnerable to environmental degradation and migration resulting from it. They are more likely to live in marginal ecosystems and make more direct demands on their immediate environments. They are also least likely to be able to forgo immediate returns from the environment for the sake of long-term conservation measures.

People from deteriorating environments have some room to negotiation when, where, and how they migrate. Consequently, they share an almost universal lack of recognition as refugees. The term "environmental emigrant" better describes this type of environmental refugee, as it recognizes the complexity of migration decisions in this situation. Disaster and expropriation refugees have limited control over whether environmental changes will produce migration. In contrast, environmental emigrants determine how they respond to environmental change. Only in situations where deterioration progresses to a point where a disaster—what Jacobson (1988) might call an "unnatural" one—occurs, are these people recognized as refugees. Nonetheless, studies of migrants compelled by gradual deterioration of their environments have dominated the environmental refugee literature (Black, 1998; Black & Sessay, 1997; Myers, 1997; Douglas, 1996; Hugo, 1996; Ramlogan, 1996; Myers, 1995; Suhrke, 1994; Westing, 1994; Millikan, 1992; Otunnu, 1992; Mathews, 1989; El-Hinnawi, 1985).

Migrant control over the migration process explains why, unlike other environmental refugees, environmental emigration occurs in irregular patterns. Often, individual members of households migrate first in a pattern that approximates what Shrestha (1989) called dispatch migration. Households dispatch individual members to take advantage of distant opportunities, without requiring the relocation of the entire household. Early in the development of migratory structures, migrants select nearby destinations and leave for short periods of time. The movement of entire households is expected to be an action of last resort. This pattern is consistent with environmental emigrants. Young men are often the first to leave deteriorating areas in search of work. Even when entire households do move, they usually relocate within their own countries (El-Hinnawi, 1985).

The anthropogenic deterioration of an ecosystem may be caused by either pollution or depletion (Schnaiberg & Gould, 1994). Direct additions stem from the release of toxic substances into the environment that gradually impairs human health or the ability of residents to sustain their quality of life. Until recently, the concentration of industrial pollution in developed regions of the world made contamination most likely to occur there. The most famous case involved the evacuation of residents in the Love Canal area of Niagara Falls, NY (Gibbs, 1982). As further examples, Jacobson (1988) cites the relocation of 1,390 families in 42 communities in the United States after the Environment Protection Agency determined their proximity to abandoned toxic waste sites. The Black Triangle in Eastern Europe (Southern Poland, Northern Czech Republic, and Southeastern portion of former East Germany) has absorbed so much contamination from industrial pollutants that large areas are no longer considered suitable for human habitation (Perout, 1995). Expansive regions of the former Soviet Union are in a similar situation (Rybizki, 1992). The Mississippi River petrochemical corridor in Louisiana has become so contaminated that both the government and private polluters offered buy-outs and relocation packages to residents (Bullard, 1994).

According to projections by the United Nations Environmental Programme and ecologist Norman Myers, most of the migration stemming from human additions to the environment will take place in the future, involving between 50 and 150 million people (Myers, 1993a; Tolba, 1989). The gradual degradation of the atmosphere by additional carbon dioxide and other greenhouse gasses may cause sea levels to rise as much as a one meter by the middle of the next century (Myers, 1997; Myers, 1995; Myers, 1993a; Myers, 1993b;). Rising waters will displace people in low-lying coastal areas. Myers estimates 15 million such refugees by 2050 in Bangladesh alone (1993a: 754). Bangladesh has already experienced catastrophic losses predicted by such models (Harrison, 1993; Islam, 1992).

Deterioration may also result from the gradual removal of some part of the ecosystem. As depletion worsens, the people who depend on this resource have to search for some way to compensate. For example, farmers may practice agriculture that depletes soil fertility at a rate that exceeds the ability of the soil to replenish itself. As harvests decline, these farmers must find other ways to produce food or income. Depletions may concern only a single species in a given environment or degradation of the ecosystem as a whole. This process is demonstrated in places where intensive agriculture has expanded into inappropriate environments, such as deserts and tropical rainforests. In one colonist community in Amazonian Ecuador, people responded to environmental deterioration linked to deforestation with inter-

national migration. Although indigenous peoples are less likely to pursue foreign migration strategies, if other communities follow this migration pattern, over 100,000 environmental emigrants may relocate from Ecuador's Amazonian countryside (Bates, 2000).

CONCLUSION

The small but rapidly growing literature on migration caused by environmental change requires a theoretical frame in which to integrate specific case studies. This paper has proposed a classification scheme, allowing for comparisons based on the characteristics of the causes of migration. These causes can be divided into three broad categories: disasters, expropriations, and deteriorations. The migration streams that result from these disruptions can be designated according to these sub-types of disruptions. These categories may be sub-divided by relevant characteristics of each type of disruption. The most controversial type of environmental refugee flees gradual, anthropogenic degradation. Environmental changes affect migration decisions only after being filtered through the local economic context. This indirect causal process explains the difficulty of treating this type of environmental refugees like those that flee more direct environmental changes.

Growing concerns about the state of the environment require social scientists to improve the concepts with which we describe and analyze the relationship between the environment and human processes like migration. The classification presented above allows researchers and policy makers to specify similarities and differences between these population flows, without using faulty or controversial concepts. This classification also allows novel parallels to be drawn between dislocations. For example, the removal of residents for the creation of national parks is surprisingly similar to displacement caused by dam construction, and both of these share certain characteristics with strategic ecocide. By refining how environmental refugees are conceptualized and by recognizing similarities and differences between refugee populations, researchers and policy makers can more clearly identify underlying causes and offer more helpful ideas to prevent and relieve the growing numbers of people displaced by environmental change.

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