Global Environmental Change and Human Security

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Global Environmental Change and Human Security: An Introduction

Jon Barnett, Richard A. Matthew, and Karen L. O'Brien

Introduction

Throughout most of human history, the constraints imposed by local environmental conditions and their natural variability were powerful determinants of the security of individuals and societies: animals, droughts, floods, frosts, pathogens, storms, and other environmental perturbations were significant causes of mortality, morbidity, and social disruption. In today's modern societies, technology, trade, industrialization, the use of fossil fuels, occupational specialization, and higher levels of social organization have all weakened the constraints that local environments place on human security. Since the Industrial Revolution and the consolidation of the modern trading nation-state, there have been thousandfold increases in the production of goods and the use of energy, and hundred-fold increases in international trade in goods and services. Over the same period, the global population has increased from one billion to over six billion people, and most people now live longer, consume more, and are better educated than in previous generations.

Yet the risks that environmental change poses to human security have not been eliminated. The scale of consumption and pollution in modern, high-energy societies has caused large decreases in primary forest cover; biodiversity losses; depletion of fish stocks; land degradation; water pollution and scarcity; coastal and marine degradation; the contamination of people, plants, and animals by chemicals and radioactive substances; and climate change and sea-level rise. These environmental changes are "global" because they are ubiquitous and because some pollutants such as greenhouse gases and radioactive wastes have global consequences (Turner et al. 1990). They are also "global" inasmuch as their origins lie in the consumption of resources in markets that are often very distant

from the sites of resource extraction. For example, the wealthiest 20 percent of the world's population consumes 84 percent of all paper, consumes 45 percent of all meat and fish, and owns 87 percent of the world's vehicles (UNDP 1998); and the United States and the European Union countries emitted 52.4 percent of all CO2 between 1900–1999 (Baumert and Kete 2001). "Global" in this sense does not mean that responsibility for environmental change is shared equally among all people, or that the impacts of these changes are uniformly distributed among all places. Instead, *global* refers to the linkages between environmental changes and social consequences across distant places, groups, and time horizons (UNEP 1997).

Across the world, the prospects for human security are deeply affected by local and global processes of environmental change. The objective of this volume is to examine this complex relationship at different scales, across different issues, and in different places on the planet. Our general argument is that global environmental change poses new and in some cases unprecedented threats to human security. The complex links between processes of environmental change and their outcomes across both space and time add a new dimension to the concept of human security—a dimension that raises important questions about both equity and sustainability. As the chapters in this book demonstrate, global environmental change challenges human security in ways that transcend the North-South binary and the "rich-poor" dichotomy. Environmental change reveals the connections—as well as the frictions—between the security of individuals and communities and the security and sustainability of ecosystems and species, including humanity. The point that is underscored throughout this volume is that global environmental change is inherently a question about the capacity to respond to new challenges and to reconcile the growing disparities that undermine human security.

In this chapter we trace the evolution of recent thinking about the relationship between people, the environment, and security. We introduce the three key themes that are the concern of this book. First, we explain the transition from concerns about security to concerns about human security, which is a move that deepens and broadens both security studies and development studies. Human security intersects with the issue of environmental change to create new sets of issues concerning sustainable development (albeit issues that have been raised earlier to some extent by "Global Ecology" thinkers [Sachs 1993]). We then introduce the literature that links environmental change with human security and violent

conflict. Finally, we explain the ways in which global environmental change poses risks to human security, and we discuss the implications of exploring global environmental change with a human security discourse. In this chapter we also present the Global Environmental Change and Human Security (GECHS) project's definition of human security, and we discuss how a human security orientation to environmental change can contribute to initiatives such as the Millennium Development Goals (MDGs).

Security and Human Security

The broad field that is known as environmental security studies emerges from the intersection of two powerful political concerns—for security and for the environment. As both are important policy arenas, so too are both important areas for scholarship. Both, however, are highly contested policy arenas, and both are ambiguous concepts. Thus, the intersection of environment and security gives rise to a number of interpretations of what environmental security means. In this section we discuss the competing meanings of security.

The concept of security in general refers to freedom from the risk of loss or damage to a thing that is important to survival and well-being. It can have both broad and narrow application, and it can apply to a limited set of objects to be secured, or to a deeper array of interconnected elements in a social system. In its shallowest and narrowest form, which is also its most influential and widespread interpretation, security refers to the security of the nation-state from attack from armed forces. It is largely in the name of this most narrow of interpretations of security that the governments of the world spent US\$1.339 trillion on their military readiness in 2007—an amount equivalent to 2.5 percent of global GDP, or \$202 for every person on the planet (Stålenheim, Perdomo, and Sköns 2008).

However, scholars from within the field of international relations, and, to a lesser extent, foreign policymakers, increasingly recognize that there are a wider range of risks to the sovereign integrity of the state than just that of military invasion. Richard Ullman (1983), for example, has defined a national security threat as anything that can quickly degrade the quality of life of the inhabitants of a state, or that narrows the choices available to people and organizations within the state (Westing 1976; Stewart and Fitzgerald 2000). On the basis of this logic, various

other risks to national security—sometimes called "unconventional" security issues—have been identified, including the risk of reduced supply of energy resources (energy security), recessions triggered by intentional or inadvertent changes in global markets (economic security), and drug trafficking (which gives rise to the "war on drugs"). It is in this context of broadening the security agenda that environmental change came to be seen as a security issue (environmental security). Often, however, what is being secured through the identification of these nonmilitary risks is the institutions of the state, including the military and the state itself, who appropriate these concerns to justify their relevance (Campbell 1992; Klein 1997). Broadening security in this way, then, does not necessarily change the object to be secured, which under most interpretations remains the state.

Indeed, because security is a "speech act" that raises the profile of a problem to be of paramount importance to whoever constructs the discourse, broadening the range of security risks without explicitly identifying a referent object that is not the state most often operationalizes state monopolization of responses to meet the new security challenges. This is what is implied in the idea of "securitization": once a risk is labeled a security issue, its status changes from a problem that is able to be dealt with through mainstream institutions to one requiring extraordinary measures (Waever 1995, 55). When the state identifies something as a security issue, it often implies that the state has the option of addressing it in a manner commensurate with the way it would address a war—that is, with extraordinary allocations of resources, and with some lassitude with respect to the normal checks on state behavior. This was the move that the early environmentalists such as Lester Brown (1977) sought to effect by labeling environmental changes as risks to national security, and it is the move that environmentalists now seek to effect by labeling climate change a security issue, which may seemingly allow the state to bypass democratic barriers to action and massively reduce emissions (e.g., Dilley 2000; WGBU 2007). This is a very important aspect of the use of security: it justifies drastic and potentially unaccountable action, and in so doing it may lead to counterproductive outcomes.

The adverse outcomes of securitization are particularly relevant to our concern in this book with environmental change and human security. It has long been argued that early and uncritical interpretations of environmental security led to state monopolization of the issue and continued justification for the need for counterproductive institutions such as

armed forces (Deudney 1990; Renner 1991; Dalby 1992; Barnett 2001; Floyd 2007). However, as we argue later, in identifying environmental change as a human security issue, the possibility of counterproductive outcomes arising from state monopolization is minimized.

In part because of the way in which securitization of an issue can lead to a concentration of power in the hands of the state, national security, regardless of the risks to it, does not necessarily translate into enhanced security for people. Indeed, in countries where democracy is absent or deficient, national security may mean very high levels of insecurity for people: if they are perceived to be risks to the state, they may be detained, forcibly removed, assaulted, or killed; if they are not important to the state by virtue of their inability to pay taxes or rents, or because their dissent can in no way challenge the state, they may simply be ignored, and so be deprived of entitlements that others in their country enjoy. Indeed, even in democratic countries the security of some individuals may be sacrificed for the imperative of maintaining national security, as civil libertarians have argued in response to counterterrorism measures such as the USA Patriot Act in the United States in the wake of the September 11 attacks in New York.

Recognition that national security does not necessarily equate to better lives for most people gave rise to the concept of human security, which, as it originated from within international relations, served to critique the effects of national security on human well-being (Booth 1991). The human security perspective also tied in with the growing recognition that the end of the cold war, advances in communication technologies, increasing economic interdependence, and environmental change, among other factors, meant that the meaning and practice of "security" was becoming increasingly elusive (Walker 1987). These changes gave rise to the question: Whose security? This question alone undermines the hegemonic discourse of security as "national security" by opening space to consider alternative meanings and referents of security, as well as alternative strategies for achieving security. Decentralizing security away from states in this way, and focusing on the myriad local, national, global, and "glocal" (Rosenau 1990) interactions that create security and insecurity, invites consideration of the way some people's security occurs at the expense of others (Booth 1991). It also invites consideration of the many processes that can undermine security, including poverty, energy shortages, trade imbalances, environmental changes, and changes in access to food. Security has thus become more pluralized in

this way, moving away from states and an emphasis on military force and war, and toward people and the multitudinous risks they must manage. As such, human security has increasingly become a general concept of social science (Shaw 1993).

However, there remains within international relations a continuum of positions on human security. There is resistance from some within the mainstream security community, who consider ideas such as human security to be distractions from the imperative of national security (Walt 1991). There are those, such as MacFarlane and Foong Khong (2006), who argue that human security should be narrowly restricted to threats to a person's physical integrity, which is the dominant concern of the Canadian approach to human security (Axworthy 1997). Others, such as Thomas (2001), see it as being far broader, including the things necessary for meaningful participation in community life. At its broadest point, human security as framed from within international relations is a very different idea—one that is much deeper and broader than that of the mainstream concern for national security against the risk of armed invasion. At this broadest and deepest extent, human security from an international relations perspective becomes indistinguishable from the way it is used within development studies, where human security synthesizes concerns for basic needs, human development, and human rights (Gasper 2005).

This intellectual convergence is not surprising given that, at the same time that critical security studies was using the human referent to critique national security, a parallel development on human security was emerging within development theory and practice. In fact, the concept of human security came to prominence through the 1994 Human Development Report, which defined human security as a "concern with human life and dignity" (UNDP 1994, 22), and which adopted a comprehensive approach by identifying economic, food, health, environmental, personal, community, and political components to human security. The orientation is therefore firmly on human beings, and, in this early formulation, on basic needs ("human life") as well as psychosocial elements of being ("dignity"). Through the use of the word security, this and later formulations of human security also pointed to the need for the things that are important to human life and dignity to be maintained despite sudden and incremental changes in the social and environmental milieu that determine (and so may undermine) their provision.

There have been a wide range of definitions of human security since the 1994 Human Development Report. Notable among these is the international Commission on Human Security's definition of human security as "to protect the vital core of all human lives in ways that enhance human freedoms and human fulfilment," and which encompasses "human rights, good governance, access to education and health care...the freedom of future generations to inherit a healthy natural environment" (2003, 4). This definition continues the focus on human dignity ("fulfilment") and builds on Amartya Sen's (1999) groundbreaking work on the importance of freedoms to human development (Sen was a key figure in the commission). Sen argues that development is not so much something that can be done to others, but is instead something that people do for themselves given sufficient "economic opportunities, political liberties, social powers, and the enabling conditions of good health, basic education, and the encouragement and cultivation of initiatives" (1999, 4). These opportunities are, in Sen's words, "freedoms," and it is freedom, he argues, that should be both the means (how to attain) as well as the ends (the goal) of development. The idea of a "vital core" in the commission's definition recognizes that there are many different kinds of valued lives within a population, and seeks to avoid the problem of value homogenization that arises when prescribing a universal policy goal such as "increasing income."

A very important and distinctive contribution of human security is that it securitizes (makes a priority of) what individuals themselves see as their paramount concerns, and so pluralizes the meaning of security and opens up space for alternative security practices. It adds to the concept of human development, which is itself a refinement of the crude idea of "welfare" as used in public policy, by referring to stability in the provision of freedom and opportunities, by focusing on immediate concerns such as basic needs and peace, and by directing attention toward the most vulnerable (Gasper and Truong 2005).

So, the concept of human security, and the larger discourse that is associated with it, unites a number of disparate strands of thought that have become increasingly influential in the international policy community. Human security is a powerful "boundary object" in that it facilitates interfaces between diverse and often otherwise disconnected intellectual and policy communities (St. Clair 2004). As Gasper (2005) argues, human security has forged a confluence of various groups within

the field of development studies and policy, who now also interface with some sections of the security research and policy communities. It therefore helps to bridge a number of the interests of the UN system (Paris 2001). Further, as environmental change is linked to human security, it also opens up new points of connection between policy communities concerned with foreign affairs, development, and sustainable development and environmental change. This is a very important and distinctive contribution of a human security perspective on environmental change: it brings together and offers the prospect of better understanding leading to more coordinated action among otherwise disparate policy communities. This book seeks to consolidate the interconnections and promote better understanding among these diverse research and policy concerns.

Environmental Change and Violent Conflict

The matrix of problems that require securing against, and referent objects to be secured, gives rise to a number of different meanings of environmental security. In this book we focus on the two most prominent of these: the ways in which environmental change may induce violent conflicts, and the ways in which environmental change undermines human security. There are other, more peripheral subfields of environmental security studies, including the risks human activity poses to ecosystems (sometimes called ecological security), the role of armed forces in environmental management, and the way environmental change poses nonmilitary threats to national security (see Barnett 2001). However, we focus on the conflict dimensions because our primary normative concern is for the security of individuals, and violent conflict is a powerful cause of human insecurity, which may be influenced in some way by environmental change. Further, the majority of the research on environmental security, and most of its policy manifestations, are concerned with the issue of environmentally induced conflicts. We focus on the human security dimension because this is, at least to the editors and most authors of this book, the primary reason for concern about environmental change—that is, because it puts at risk people's basic needs, human rights, and things that they value in order to lead dignified lives. This bottom-line reason for concern is not adequately recognized in research and policy concerning environmental change, security, and development. In this section we introduce the issue of environmental change and violent conflict. In the following section, we discuss environmental change as an issue of human security.

There is a long tradition of concern over the relationship among humans, the environment, and the potential for conflict. Over two hundred years ago, Thomas Malthus (1798) wrote *An Essay on the Principle of Population*, in which he argued "that the power of population is indefinitely greater than the power of the earth to produce subsistence for man." The imbalance between human needs and food availability, Malthus predicted, would lead to famine, disease, and war. Writing 150 years later, Fairfield Osborn (1948, 200–201) reiterated this concern: "When will it be openly recognized that one of the principal causes of the aggressive attitudes of individual nations and of much of the present discord among groups of nations is traceable to diminishing productive lands and to increasing population pressures?" As the scale of global change has increased since Malthus's time, the link between environment change and conflict has gained more attention.

Since the late 1960s, the idea that environmental change is a cause of violent conflict has become increasingly popular in academic and policy circles. However, the relationship between environmental change and conflict has been a major theme of security studies only since 1989 when at least ten articles on the subject were published. The year 1989 was significant in both international security and global environmental politics. It was the year the Berlin Wall fell, creating a "vertigo" in international security studies and policy in which conventional understandings of security were no longer so obviously politically relevant (O Tuathail 1996). It was also two years after the publication of the influential World Commission on Environment and Development's report Our Common Future, when planning for the landmark 1992 United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro was well under way. This led to a flood of information about climate change, biodiversity loss, deforestation, and land degradation, with much of it channeled into preparatory studies and reports. These initiatives resulted in considerable political and societal attention to issues of environmental change in the early 1990s.

This confluence of moments in global security and environmental politics perhaps explains the sudden swell in writing about environmental security and in particular about environmental causes of violent conflicts (Dalby 1992; Deudney and Matthew 1999; Matthew 2002). The Malthusian perspective, enriched by the Canadian scholar Thomas

Homer-Dixon (1999) and others, became a significant part of this rethinking exercise and quickly attracted government and foundation interest. Flush with new resources, the subfield of environmental conflicts expanded rapidly.

Determining the relative contribution of environmental factors in generating violent conflicts is difficult. Clearly, the insecurities to which environmental stress contributes often have long social and political histories. In places such as Cambodia, Indonesia, Nepal, Pakistan, Liberia, and Rwanda, for example, conflict is grounded in patterns of insecurity based on longstanding political and economic practices of exclusion and exploitation, which reshaped the natural environment (see, e.g., Matthew and Upreti 2007). The new and more virulent forms of environmental degradation characteristic of the twentieth century have arguably aggravated practices of violence and insecurity that have long histories.

Throughout human history social factors have interacted with population growth and environmental change to generate conflict. The statistical work of Paul Collier and Anke Hoeffler (2000), that of Wenche Hauge and Tanja Ellingsen (1998), and the State Failure Task Force Report: Phase II Findings (State Failure Task Force 1999), suggests a typical scenario that is highly conflict prone: it includes an economy dependent on a lucrative natural resource (gold or oil rather than water or biodiversity) to which access can be controlled; a fractious ethnic cleavage that the dominant group has been unable to resolve; low education and high infant mortality rates; inadequate dispute resolution mechanisms and corrupt governance institutions; a history of violent conflict; and a diaspora community of angry emigrants and refugees forced to leave and willing to back one side in a civil war. The work of Thomas Homer-Dixon (1999; Homer-Dixon and Blitt 1998) makes a very similar argument but focuses instead on the adverse social effects of scarcity of resources linked in very immediate ways to satisfying basic needs, such as water, cropland, and pasture.

Violent conflict is most likely where a range of motivations converge to persuade sufficiently large numbers of people that a resort to violence is justified, profitable, inevitable, or transformational. The general point for all researchers linking the environment and conflict is that environmental stress of one kind or another will figure in some, but not all, of these motivations, and hence it will be an elusive but at times significant element of the causal network that generates conflict.

Of course, as extensive research on conflict makes clear, the outcome of any cluster of variables is never assured. Why this is the case is explained, at least partially, by those environmental security researchers who study the capacity of communities at all scales to adjust and adapt to many forms of stress, including those related to environmental change. Both the simplified, Malthusian-inspired, scarcity-conflict story and the resource curse story tend to downplay and, in some cases, explicitly deny this capacity (Homer-Dixon 1999). But recent human history identifies few Easter Islands-states confronted with severe environmental stress that have collapsed into violence and subsequently disappeared -and many Rwandas-states confronted with severe environmental stress that have experienced great violence and then begun to recover. In fact, many of the cases used to demonstrate the validity of the scarcity-conflict thesis are not nearly as straightforward as has been suggested. Much recent research has pointed to the environment as a source of cooperation and peace, rather than a source of conflict and war. For example, Wolf et al. (2006) point out that international cooperation around water has a long and successful history, with water serving as a greater pathway to peace than to conflict in international river basins.

There has also emerged an alternative approach to studying environmental conflicts that is firmly grounded in longstanding environmentsociety studies conducted by geographers, anthropologists, and sociologists that is now sometimes called "political ecology." This work offers detailed, contextualized, and more nuanced insights into environmental problems and violence. The importance of unequal outcomes of social and environmental changes is highlighted in a number of these case studies. For example, inadequate distribution of the returns from resource extraction activities has been a factor in violence in West Kalimantan (Peluso and Harwell 2001) and the Niger Delta (Mochizuki 2004; Watts 2001). In his analysis of land invasions in a district of Chiapas, Bobrow-Swain (2001) shows that declining agricultural production caused by economic and political forces (rather than environmental scarcity), and the unequal distribution of returns from production, was an important factor in land conflicts. Timura (2001) also shows that unequal access to economic and political resources was an important factor in the Zapatista rebellion, the "Guinea Fowl" war in Ghana, and conflict in Para, Brazil. Suliman (1999) compares the different responses of people in the Fur and Boran regions to drought and shows that land rights was an important variable in determining whether drought results in violent or peaceful outcomes, as well as the role of leaders and institutions for resource sharing.

There is a discernable message in these studies that individual and group's perceptions of the distribution of material and social power is important in the generation of violence. For example, groups may respond to a perception that other groups are faring better or may be threatening, and act to get their share, or to defend themselves in ways that make violent outcomes more likely. The role of leaders in generating or mitigating these cycles of antipathy is critical (David 1997). This emphasis on perceptions contrasts with the somewhat more functionalist accounts of the earlier studies that suggest that material changes translate directly into observable social actions.

These studies are contributing to a more nuanced understanding of the connections between environment and violence. In none of them is "environmental scarcity" seen to be a simple causal factor in conflict. Instead, a range of economic, political, and cultural processes that structure both material and institutional forms of power are seen to be more important than scarcity per se. Their insights do not give rise to a generalized model in the manner of Homer-Dixon's results (1999), but may instead be seen as a reflection of the plurality of responses to environmental change and the plurality of ways in which violent conflict arises. One theme that does, however, emerge repeatedly from these studies is that equity, as well as perceptions of equity, do matter when it comes to environmental security.

Clearly the relationships between environmental change and violent conflict are complex, and simple theoretical models and assertions that promise high levels of generalizability are inevitably lightening rods for controversy and critique. What a survey of the literature of the past two decades does make clear is the myriad ways in which various dimensions of this relationship affect the security of individuals and groups. Resource scarcities are more likely to force the poor to migrate into marginal environments or across cultural or political boundaries into spaces where they are unwelcome. During a violent conflict, government or rebel forces may seek to fund their efforts—or enrich themselves—by monopolizing and overexploiting natural resources, with the poor forced into servitude, caught in the crossfire, or left with a toxic legacy. Military activity itself can cause great damage as soldiers set up camps and draw down local resources, plant mines that are left behind along with other

munitions, build tunnels and other infrastructure, or seek to expose their adversaries by burning or cutting forest cover. And for years after a violent conflict has formally ended, the poor may find themselves forced to survive in dangerous or impoverished natural environments. All of these examples link the environmental security literature to human security.

Global Environmental Change and Human Security

The expansion of research on environmental security, along with the rise of human security as both a concept and a discourse, has created a wide opening for interrogation of the links between global environmental change and human security. Surprisingly, there has been very little direct attention to this area of research. While there has been some discussion on the relationship between climate change and conflict (Myers 1993; Gleick 1994; Barnett 2001), and on the relationship between biodiversity conservation and violence (Matthew 2002, 2004; Matthew, Halle, and Switzer 2002), there has been little emphasis on the broader implications of global environmental change for human security, including how increased human security can potentially mitigate environmental change. Perhaps more surprising is the absence, until quite recently, of global environmental change on international human security agendas. Priority topics for human security research and policy have traditionally included human rights; HIV/AIDS and health; gender and security; terrorism; armed conflict; armies, paramilitaries, and non-state armed groups; humanitarian intervention; conflict resolution and peacemaking; small arms, light weapons, and landmines; and poverty and people-centered development. Yet, despite growing international concern about climate change, biodiversity loss, and other environmental changes, these issues are only beginning to be recognized as priority areas for human security research.

There are several explanations as to why the relationship between global environmental change and human security has been overlooked or underestimated, and we focus here on two. The first is that global environmental change has been largely framed as an issue of science, with a focus on understanding the large-scale processes of the earth system, and not its outcomes on peoples' needs, rights, and values (O'Brien and Leichenko 2000; O'Brien 2006). The identification of global-scale environmental changes has long been the domain of earth system scientists who focus on the interactions between large-scale geosphere-biosphere

systems and the natural and human-induced changes in them. This research has been invaluable in identifying global- and regional-scale environmental changes such as ozone depletion, climate change, and biodiversity loss, and increasingly it is identifying the cascading effects of these macrochanges on smaller biophysical systems and phenomenon such as the coastal zone, water resources, agriculture, and species distribution. The sequence of assessment is along an assumed and often linear chain of causality: from the bench sciences through to the biological and earth sciences, ending with the social sciences (and at that largely with economics); and correspondingly from global to regional and finally to more local scales of assessment (Proctor 1998; Redclift 1998; Taylor and Buttel 1992). The emphasis remains on the higher-order and larger scales of this assessment sequence. There remains very little effort—as may be measured in terms of funding, personnel, or publications—to examine what these changes in turn mean for local social systems and for individuals and communities who will be differentially affected by them (Demeritt 2001; Shackley et al. 1998). Instead, much effort is directed toward resolving the uncertainties in the science of environmental change, arguably at the expense of focusing on the social drivers that are known to generate both environmental change and vulnerability to environmental change.

The second explanation is that there has been a tendency to downplay issues of development, equity, ethics, power relations, and social justice in global change research, prioritizing instead a general, aggregated notion of welfare. Although social drivers of change are well recognized in global environmental change research, analyses have historically tended to focus on the absolute numbers of people and on talks of amorphous and aggregated social categories such as "humanity," "society," "Africa," "small islands," and so on. Consequently, the potential contributions of social sciences to global change research have been undervalued, despite the fact that global environmental change is a social problem as much as it is a natural system phenomenon. Almost all environmental change problems are the by-products of modern development practices and the social disparities they produce. For example, climate change is caused by the emissions of gases from fossil fuel use and land use changes; forests are cleared to meet the demand for paper, timber, and new land for agriculture and grazing; biodiversity is lost through land clearing for agriculture and infrastructure; rivers are dammed and diverted to control flooding, for hydropower and to secure the supply of water to irrigators; coasts and reefs are modified to support human settlements and are then polluted or destroyed by those settlements; fisheries are depleted by more intense applications of more efficient fishing techniques; and land is degraded by unsustainable farming practices.

Global environmental change is thus an inherently social problem, and one that has the potential to undermine human security—namely, the needs, rights, and values of people and communities. Human insecurity from environmental change is a function of many social processes that cause some people to be more sensitive and less able to prepare for and respond to sudden and incremental environmental changes. People who are most dependent on natural resources and ecosystem services for their livelihoods are often the most sensitive to environmental change (Adger 1999, 2003; Blaikie et al. 1994; Bohle, Downing, and Watts 1994). For example, in terms of needs, a change in soil moisture can undermine nutrition in subsistence farming households, a decline in fish abundance can undermine nutrition and income for fishers, and a decline in surface or groundwater quality can undermine maternal and child health in communities without reticulated water supply. Just as important as sensitivity is people's capacity to anticipate, plan for, and adapt to environmental changes. These response strategies are functions of various social factors, including institutions, information, health, education, and access to food and nutrition, money and resources, and social support networks. Underlying many of these determinants of adaptive capacity is the effectiveness of the state. States that consciously or unconsciously, actively (through violence) or passively (through denial of entitlements), discriminate against social groups on the basis of political opposition, class, ethnicity, and/or location create vulnerable groups.

Many of the factors that influence adaptive capacity have been impacted by globalization processes, which in many cases have reduced the capacity of individuals, communities, and institutions to respond to stressors and shocks linked to environmental change (McGrew and Poku 2007; Leichenko and O'Brien 2008). The changing context in which global environmental change is experienced suggests that greater attention should be paid to how human security changes through time, and particularly the dynamics of vulnerability in the context of multiple processes of change. It is, for example, increasingly important to monitor how human security is affected by both financial and environmental shocks, and to assess what this means for the environment (Leichenko and O'Brien 2008).

The dynamic factors that influence sensitivity and adaptive capacity mean that human security from environmental change is by no means equally distributed. There are differences in the human security of people within every scale of analysis: between regions, countries, cities, villages, and households. In many cases the differences can be explained by the dependence on natural resources and ecosystem services, coupled with the degree of social power in relation to economic, political, and cultural processes (Matthew 2005). However, global environmental changes also introduce new threats that potentially influence the security of much wider and diverse groups of people. Sea level rise, a higher frequency or magnitude of storms and extreme weather, the melting of glaciers, the spread of invasive species, and changes in water quality and availability are likely to threaten human security in new and unexpected ways. The impacts of the Chicago and Paris heat waves on elderly citizens in 1995 and 2003, for example, revealed some of the new challenges posed by global environmental change, as well as the importance of addressing the underlying causes of vulnerability (Leichenko and O'Brien 2008).

Against this background, we define human security as something that is achieved when and where individuals and communities have the options necessary to end, mitigate, or adapt to threats to their human, environmental, and social rights; have the capacity and freedom to exercise these options; and actively participate in pursuing these options (GECHS 1999). In other words, human security is a variable condition where people and communities have the capacity to manage stresses to their needs, rights, and values. When people do not have enough options to avoid or to adapt to environmental change such that their needs, rights, and values are likely to be undermined, then they can be said to be environmentally insecure.

This definition gives attention to values and recognizes that human security concerns both needs and rights. The characterization of human security as "variable" highlights the ways in which it varies over space and across time: not all people are equally secure, and people are not equally secure throughout the course of their lifetimes. This points to the need for analysis of the asymmetries and interdependencies in human security strategies such that the security of some can come at the expense of others, and to the possibility that in both ethical and practical terms strategies for human security may ultimately only be successful if they do not generate insecurity elsewhere or for later generations (see Booth 1999). Further, "variable" suggests that human security is not about

static lives, but about flourishing lives where people pursue their legitimate aspirations for a good life, pointing to the nature of human security as a *process* toward self-articulated goals.

The GECHS definition of human security also explicitly includes communities, and not just individuals. This is of course implied in other definitions, but explicit mention of communities is nevertheless important, as in many cultures the collective social group is of more value than the individual, and decisions and strategies are determined by the group, in the interests of the group, rather than by individuals. It is somewhat ethnocentric to assume, as Western social science often does, that the individual is the most important element of a society. A focus on "the capacity to manage stresses" builds on the capabilities-and-freedoms approach of Sen (1999), in that it considers people and communities not as passive victims, but as agents of their own human security, whose actions to manage stresses to their needs, rights, and values are most effective given certain freedoms and opportunities. Sen (1999) lists five important freedoms: economic opportunities, political freedoms, social opportunities, transparency guarantees, and protective security. One can add to this list freedom from direct violence, and the equitable allocation of freedoms within and between generations as important additional freedoms that enhance people and communities' capacities to make and maintain their lives in the face of social and environmental changes (Barnett 2008).

The GECHS definition also offers a slightly different articulation of what the UNDP referred to as "human life and dignity" and what the Commission on Human Security referred to as the "vital core." The GECHS definition considers needs, rights, and values as a means to highlight the need for some stability in the provision of the basic needs required to function as an equal member of a society, the fundamental rights to which people are entitled, and the unique things that people and communities value for themselves. In doing so, the definition (like Sen [1999] and the Commission on Human Security) seeks to avoid prescribing in much detail what is good for people and communities. However, it does acknowledge that there are basic needs such as access to nutritious food and clean drinking water, and basic rights such as the freedom from personal injury and forced migration, that are essential to every life.

The GECHS definition of human security is consistent with a larger discourse on human security that includes prioritizing the well-being of

people and communities ahead of states; analytical integration of multiple drivers of human security; an insistence on basic human needs, rights, and responsibilities; and a concern for justice. It is also consistent with the idea that human security is what people themselves see as important in that human security in terms of environmental change is about identifying and responding to the outcomes that matter most to those who are exposed to it, which means that researchers and decision makers should listen to the voices of the vulnerable. This is not to say that there are not universal values at risk (such as the right to clean water and food), or that what the vulnerable identify as their priority concerns are necessarily well informed or without guile, but it is to say that their articulations of needs, rights, and values cannot be ignored if responses to environmental change are to be effective.

A human security perspective on environmental change does in effect securitize environmental change inasmuch as it does raise the profile of some risks over others. Yet this is unlikely to lead to the kinds of counterproductive outcomes that come from securitization by the state; indeed it points to a role for the state in mitigating the drivers of environmental change and in facilitating responses to minimize insecurities (Barnett 2001). There is a significant difference, then, between securitization constructed by the state, and securitization constructed by individuals. Securitization to prioritize individual and community needs, rights, and values at risk from environmental change also engages diverse policy communities, including those concerned with development policies, sustainable development policy, human rights, and foreign policy. Thus the meaning of "human security" is not left to the traditional purveyors of security and is instead continually negotiated in ways that are far less likely to justify the strengthening of the state at the expense of human security.

Despite the inclusion of environment as one of the UNDP's (1994) seven components of human security, there has thus far been little interface between this expanded human security community and the global environmental change research and policy community—including those within the UN system. The United Nations has been pushing for more interaction between the global environmental change and human security communities (Matthew 2008), and many of the current and planned initiatives are described by Dodds and Pippard (2005). Although both human security and environmental considerations are central to the

MDGs, there is no explicit recognition of the implications of global environmental change for these goals. For example, efforts and initiatives to eradicate extreme poverty and hunger are likely to be negatively affected by climate change, as many of the people that are most vulnerable to climate variability and change are already poor and hungry. Likewise, efforts to reduce child mortality; combat HIV/AIDS, malaria, and other diseases; and promote gender equality are likely to be affected—and potentially offset—by global environmental change. The one MDG that addresses the environment (goal 7: ensure environmental sustainability) does not consider the challenges posed by environmental change. Consequently, there is substantial potential for global environmental change and human security research to contribute to a wide range of other human security concerns (Matthew and Gaulin 2002).

As many chapters in his book demonstrate, global environmental change poses real risks to human security: it undermines access to basic needs such as productive soils, clean water, and food; it puts at risk enshrined human, civil, and political human rights such as to the means of subsistence, property, and nationality; it can undermine the provision of economic and social opportunities required to foster human security; and in these and other ways it can undermine people's ability to pursue the kinds of lives they value. It may also be an indirect factor in the generation of violent conflicts. Just as human security has a much larger role to play in global environmental change research, global environmental change is of central importance to human security assessment and policy.

Objectives and Structure of This Volume

This volume brings together perspectives and research findings that have emerged from the Global Environmental Change and Human Security Project since its start in 1999. It is intended for scholars and decision makers concerned with the implications of environmental change for people, the implications of environmental change for peace, and the ways in which sustainable development can enhance human security and peace. It aims to consolidate the connections among and the dialogue across these groups.

The book is structured according to the three interweaving themes that emerge from the literature on the interconnections between environmental change and human security. Part II contains four chapters about global environmental change and human insecurity. These chapters explain the ways in which environmental change undermines human security. The chapters offer frameworks for analyzing the connections, discussions of specific risks such as changing exposure to diseases arising form environmental change, discussions of specific places such as urban slum areas, and cases of specific events such as Hurricane Katrina.

Given that environmental change poses risks to human security, as established in part II, the two chapters in part III then go on to examine the interconnections between environmental change, human security, and peace and conflict. They present a framework for analysis, a review of the evidence about the links between environmental change and violent conflict, and a case study.

The seven chapters in part IV of the book are focused on the interconnections between sustainable development and human security. These include frameworks for analyzing the connections between environmental change and development, discussion of crosscutting issues such as gender and population, examination of the interactions between development and environmental security, and a case study from Central America.

Brief Summaries of Chapters

The chapters in part II, "Global Environmental Change and Human Insecurity," are united by a concern for the ways in which environmental change both creates and exacerbates the insecurities experienced by people around the world. From climate change to disease to the growth of slums, the authors show that, although environmental change and disaster have always been a threat, recent environmental changes have created unprecedented global challenges to social stability, health, and material life (O'Brien et al. 2005).

In chapter 2, "Human Security, Vulnerability, and Global Environmental Change," Mike Brklacich, May Chazan, and Hans-Georg Bohle provide a framework for evaluating the ways global environmental change makes some human populations increasingly vulnerable to both personal and society-wide disasters even while it creates new opportunities for others. The authors argue that vulnerability and insecurity are underlying conditions for all human communities; global environmental change is only one external threat; and consideration of exposure to risks needs to be balanced against assessments of the capacity to respond to threats.

In chapter 3, "Global Health and Human Security: Addressing Impacts from Globalization and Environmental Change," Bryan McDonald posits that an increasingly networked world—where infected individuals can cross oceans in a matter of hours and food supplies (one of the primary modes of disease distribution, after humans themselves) are shipped around the globe—has raised the stakes for pandemics and other potentially disastrous disease effects. Global environmental change, McDonald argues, exacerbates the problems of disease. It is, in the framework of Brklacich, Chazan, and Bohle, a further stressor on communities already suffering from an HIV/AIDS epidemic or strained under the toll of chronic and persistent diseases such as waterborne parasites, malaria, or even influenza.

In chapter 4, "The Vulnerability of Urban Slum Dwellers to Global Environmental Change," Laura Little and Chris Cocklin examine the relationships between urbanization and environmental change. As the world nears the end of a period of massive urbanization—a period that began during the second Industrial Revolution of the nineteenth century and that will almost certainly end with the vast majority of humanity living in cities in almost every country in the world—Little and Cocklin focus on the way environmental change will exacerbate the insecurities already experienced by the urban poor, largely because of their restricted access to entitlements necessary for them to adapt—an approach that is informed by the development-oriented understanding of human security discussed earlier in this chapter. Little and Cocklin detail those aspects of slum dwellers' lives that will be most affected by environmental change, from rising transportation and housing costs to the inaccessibility of necessary government services. Solutions for the complex material effects of environmental change on this vulnerable population, the authors assert, will only be found by examining the underlying political and economic barriers that limit the opportunities of slum dwellers to act to improve their lives.

In chapter 5, "Environmental Change, Disasters, and Vulnerability: The Case of Hurricane Katrina and New Orleans," Victoria Basolo historicizes and contextualizes the events of August 2005, asserting that both environmental and urban policy failures made New Orleans and many of its people vulnerable to disaster. Basolo asserts that while human development and in some cases mismanagement of the natural environment set the stage for the Katrina disaster, it was government and individual lack of preparedness that led to the hurricane's destructive

results, which so viscerally unmasked the social inequalities of New Orleans. This chapter continues a theme developed in the earlier chapters: that it is not so much exposure to environmental risks that causes disaster, but rather the inherent vulnerabilities arising from social and political and economic processes.

In part III, "Global Environmental Change, Conflict, and Cooperation," two chapters address the relationship between human security, the environment, and violence.

In chapter 6, "Environmental Change, Human Security, and Violent Conflict," Jon Barnett and W. Neil Adger build on the arguments of earlier authors that environmental change negatively impacts human security, and then argue that this human *insecurity* can under certain circumstances increase the risk of violent conflict. They examine the multiple ways that human insecurity exacerbated by environmental change can create or enhance the conditions for violent conflict, which include by decreasing the opportunity costs to individuals of joining armed groups and by decreasing state capacity to peacefully manage conflict. They argue for detailed analysis of conflict risk factors at the local level and for careful analysis of the role of institutions at various scales in preventing conflict.

In chapter 7, "Environmental Change and Human Security in Nepal," Richard A. Matthew and Bishnu Raj Upreti illustrate the relationship between environmental change and conflict through a case study of Nepal's decade-long civil war. Such a case-based approach offers an alternative to research from peace studies that seeks generalizable findings based on statistical data. Matthew and Upreti argue that environmental stress has been a primary cause of the violent conflict in Nepal, in particular pointing to demographic trends and land pressures. They warn that it is unlikely that the conflict will be resolved without addressing demographic and environmental conditions.

In part IV the chapters on "Human Security and Sustainable Development" apply many of the lessons from research and policy on sustainable development to the more particular problem of human insecurity created and exacerbated by environmental change.

In chapter 8, "Global Environmental Change, Equity, and Human Security," Karen L. O'Brien and Robin M. Leichenko highlight equity issues surrounding both mitigation of and adaptation to global environmental change. They argue that these equity dimensions must be com-

prehensively addressed if enhanced human security is an objective. Equity-based responses to global environmental change address the many processes and factors that influence vulnerability and adaptive capacity and recognize that environmental change is not simply a North-South issue, but one that cuts across national boundaries and needs to be addressed comprehensively, at different scales and units of analysis.

In chapter 9, "Approaches to Enhancing Human Security," Marvin S. Soroos examines potential responses to global environmental change. By learning from earlier generations' efforts to respond to and manage environmental change, Soroos argues that the best responses will be anticipatory, not reactive. Most important, Soroos emphasizes, societies and states with the capacity to prepare for and confront environmental change must, in the interest of greater stability, aid those societies with less capacity, or risk further threats to stability and security. This issue of common but differentiated responsibility is a principle of the agreements (such as the UN Climate Change Convention) signed at the United Nations Conference on Environment and Development, and it remains highly relevant to environmental security.

In chapter 10, "Rethinking the Role of Population in Human Security," Betsy Hartmann questions the persistent Western belief in a coming Malthusian crisis, where population outstrips global resources. This emphasis on population control and the dangers of overpopulation, Hartmann argues, have misdirected policies and reinforced stereotypes of an explosive and burgeoning Third World population—an imagination of the developing world that critical development scholars have long sought to contest. Transposed on top of concern for environmental change, this demographic pessimism leads to defensive policies that anticipate that, with massive environmental change, overpopulated Third World countries will threaten the security of more affluent regions. Hartmann systematically critiques this assumption and the misguided implications for policy that flow from it.

In chapter 11, "Women, Global Environmental Change, and Human Security," Heather Goldsworthy explores the impact that global environmental change will have on the security of women. Consistent with many approaches to gender and development, Goldsworthy argues that women are uniquely vulnerable to environmental change as well as to policies that attempt to curb that change, from restrictions on use of land to draconian measures to reduce population. Goldsworthy points

us to the enormous potential women have been shown to hold in regard to preserving and protecting natural resources, and suggests a genderbased approach to environmental security.

In chapter 12, "Human Security as a Prerequisite for Development," Kwasi Nsiah-Gyabaah outlines the many ways that human security issues interleave with sustainable development issues. He argues that reducing poverty, preventing conflicts, and controlling environmental change are not only fundamental tenets of the human security agenda but are also important precursors to sustainable development. As the ideas of human security have bloomed and spread, Nsiah-Gyabaah emphasizes the importance of strengthened international communication and collaboration to articulate and implement policies that support both human security and sustainable development.

In chapter 13, "Free to Squander? Democracy and Sustainable Development, 1975–2000," Indra de Soysa, Jennifer Bailey, and Eric Neumayer take Nsiah-Gyabaah's relationship between development and human security one step further to specifically examine the relationship of those issues to the emergence of democracy. Asserting that sustainable economic development is not just about growth but instead about how a society uses resources to protect its current and future populations against disaster and deprivation, the authors conclude that higher levels of democracy are related to higher development as democracies tend to invest more in their populations. This in turn reduced vulnerability to environmental change, and so human security is enhanced by democracy.

In chapter 14, "Environmental Transborder Cooperation in Latin America: Challenges to the Westphalia Order," Alexander López investigates how the internationalization of environmental problems—as well as their solutions—has manifested itself in the use and management of two regional resources in Latin America, the Mesoamerican Biological Corridor and the Plata Basin. The state cooperation over management of these resources, López argues, stands as a challenge to the notions of national sovereignty enshrined in the Westphalia order. Environmental concerns that transcend state boundaries, such as the two López examines, have increasingly impressed on state leaders the benefits of state cooperation in resource management. López concludes that state sovereignty and this kind of cooperation actually do not threaten one another but instead strengthen the security of both, as well as reduce the risks that environmental change poses to people who might otherwise be

vulnerable to the twin effects of environmental degradation and border disputes.

Finally, in chapter 15, "Charting the Next Generation of Global Environmental Change and Human Security Research," Jon Barnett, Richard A. Matthew, and Karen L. O'Brien lay out future directions of research in the human security implications of environmental change.

The chapters in this book cover diverse topics and present different and sometimes contrasting viewpoints on environmental change and human security. Nevertheless, they raise two important points. First, global environmental change is adding impetus to the realization that traditional understandings of security are limited and are an inadequate basis for making policy: they make it clear that to varying degrees environmental change is a risk to citizens of states, to states themselves, and to peace. Second, they show that global environmental change is raising new and unavoidable questions of equity and sustainability, which already underlie every aspect of human security. The chapters call for enhanced attention to the ways that different societies are organized and function, including their technologies, economies, systems of governance, and material and social cultures, and to the ways these shape the repertoire of habits, skills, and styles that people use to act in the world (Swidler 1986). From this more detailed understanding of social order can arise deeper insights into why some societies consume more and pollute more, and how pathways to social change that result in more secure, equitable, and sustainable societies may be achieved. Finally, the chapters call for a greater focus on the distributional effects of environmental change, and the effects of skewed distributions of goods and services on vulnerability to environmental change. They call for greater integration of the security, development, and sustainable development research and policy communities, which have for too long been too distinct.

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