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Constructing Environmental Security and Ecological Interdependence

Karen T. Litfin

Both the study and the practice of world politics have been afflicted, until recently, with a profound ecological myopia. The pursuit of military power was divorced from environmental protection to the point that whole ecosystems were laid waste in the name of national security. The "negative externalities" associated with the pursuit of wealth were considered negligible, or at least their spatial scope was thought to involve only local or national politics. In short, "environment" was the invisible and putatively stable backdrop against which international actors enacted their dramas of conflict and cooperation. To the extent that it was considered at all, nature was perceived as a source of state power, whether through geostrategic positioning or natural resource endowments. So long as nature appeared to be resilient, abundant, and immutable, the study and practice of international relations could proceed despite this blind spot. The assumptions that sustained this blind spot throughout the industrial era, however, are no longer tenable. As nature's productive and absorptive limits have become evident, all fields of social practice and analysis, including international relations, are being compelled to widen their vision.[1]

The progressive, yet still embryonic, "greening" of world politics since the 1970s scrambles conventional understandings of international relations. The relationship between coercive power and ecological problems, for instance, raises a host of issues that do not find a comfortable home in traditional international relations discourse. Ecological degradation, increasingly transnational in both its causes and solutions, typically involves a complex web of nonstate actors: industry, scientists, nongovernmental organizations (NGOs), and indigenous peoples. Thus, the greening of international relations has entailed a movement away from its traditional state-centric orientation.

A web of state and nonstate actors is involved not only in problem solving but also in problem definition or the social construction of problems. Although it would be reckless to deny that environmental problems have real physical referents and consequences, it is important to recognize that "problems" always presume a prior social process of recognition, prioritization, and some level of assent. The obvious material character of environmental problems often obscures their less obvious social character.

Social constructivism does not deny the importance of material factors but insists that actors operate on the basis of the meaning that those factors have for them. Constructivism is the view that the manner in which the material world shapes and is shaped by human action and interaction depends on dynamic normative and epistemic interpretations of the material world.[2] Environmental problems are simultaneously physical phenomena and social constructions. Ecologically speaking, for instance, the deaths of billions of microorganisms caused by each square foot of concrete pavement and the destruction of whale populations are both "problems." Yet only the latter has been defined as a global problem and subjected to international treaty restrictions.

International environmental problems have been constructed by some as new sources of conflict and by others as new opportunities for international cooperation. But regardless of whether environment is seen primarily as a source of conflict or as a source of cooperation, there is a disconcerting tendency among both practitioners and analysts to naturalize environmental problems. I maintain that an appreciation for the ways in which "environmental security" and "ecological interdependence" are socially constructed has important theoretical and policy implications.

I first offer a critique of the environmental security literature, suggesting that constructivism offers a useful antidote to the troubling penchant for reification and false universalization. I then apply some of these insights to conceptions of ecological interdependence. Whether environmental problems are seen as a source of conflict or as an impetus to cooperation, naturalizing them not only obscures the extent to which problems are socially constructed through intersubjective understandings but also predisposes analysts and practitioners to ignore their deeper social, economic, and political roots. Since long-term solutions will require a willingness to grapple with these deeper causes, this article aims to coax both the environmental security and the ecological interdependence literatures toward a more penetrating and reflective analysis. A range of possible scenarios for the future is explored, with some policy-relevant suggestions offered for how multilateral institutions and other international actors might move toward the more positive scenarios.

Environmental Security as an Ambiguous Symbol

From National Security to Environmental Security

Environmental security functions as "an ambiguous symbol" for a wide array of policy and analytical positions. The two core elements of traditional security discourse, the state and military defense, are decentered by trends in environmental politics. Moreover, the object of security, which is

ambiguous enough for traditional national security issues, is doubly so for environmental questions. Yet, rather than limiting security discourse to the domain of traditional military threats, we can usefully rehabilitate it to encompass environmental concerns—but only with a self-conscious effort to avoid the twin pitfalls of reification and universalization typically associated with security language. This move can be accomplished only on the basis of a critical constructivist reading of security that persistently asks: Whose security? What is to be secured?

Early in the Cold War era, Arnold Wolfers issued a prescient warning against formulaic calls for national security policy in a classic article entitled "'National Security' as an Ambiguous Symbol." Such calls, he claimed, "may not have any precise meaning at all. Thus, while appearing to offer guidance and a basis for broad consensus they may be permitting everyone to label whatever policy he [*sic*] favors with an attractive and possibly deceptive name."[3] Observing that the symbol was generally invoked to suggest the need for protection through military power, Wolfers argued that the logic of the security dilemma actually requires that national security policies take the intentions and interests of the adversary into consideration. He also pointed out that, although national security is typically assumed to be rooted in an objective referent, it entails both an objective dimension (the absence of real threats to core values) and a subjective dimension (the absence of fear that such values will be attacked).

Security language, as Wolfers disclosed, is a rhetorical device, and the pursuit of security has an inescapably intersubjective character. Thus, precisely because it functions as an ambiguous symbol, *environmental security* has attracted a remarkable array of proponents, ranging from environmentalists to Western military institutions. For some, ecological scarcities are important new sources of violent conflict within and between states. For elements of the defense establishment, environmental security provides both a new objective in the absence of the Soviet threat and an umbrella concept for the greening of military practices. For still others, environmental security is akin to more expansive notions of global or human security, bringing together the twin pursuit of development and sustainability. Finally, others promote an alternative biocentric approach as "the ultimate security," according to which species and ecosystems are preserved for their own sake.[4] One thing unites these diverse perspectives: a growing awareness that ecological factors are essential to world order.

Despite this common reference point, however, the ambiguity of environmental security is far greater than Cold War formulations. At least for the superpowers and their allies, such basic questions as what was to be secured, against which threat, and with what methods were relatively straightforward. For environmental security discourse, however, whose interests should be secured: those of the state, the global consuming class, humanity, or the biosphere? What is the threat: political instability, overpopulation,

overconsumption, uneven development, or nature itself? How should we, whoever "we" may be,[5] address the "threat": through self-defense, cooperation, or technological fixes?

Coercive Power, Environment, and the Military

Traditionally, security and order were about two things: the centrality of the sovereign state and its protection through military means. Given the dubious nature of these core premises, the proliferation of security discourses comes as no surprise. I argue at the end of this section, although with significant caveats, for a conception of environmental security that decenters both the state and coercive power.

One general trend in international relations, the declining utility of force, is particularly visible through an ecological lens. Discussions of balance-of-power politics, military hegemony, and gunboat diplomacy seem alien to international environmental problem solving. Military threats are strikingly irrelevant to efforts in persuading China not to exploit its high-sulfur coal reserves, for instance, or in convincing Brazil not to decimate its forests. Despite the few instances when military force has been applied to environmental problems, as in the Canadian-Spanish conflict over turbot fishing, diplomacy and cooperation have been far and away the dominant modes of problem solving and are likely to remain so in the future.

The irrelevance of coercive power to most ecological problems, however, does not dissolve the military/environment link. As Richard Matthew argues, if there are fewer situations in which force is an appropriate policy tool, then the traditional security community has two options: to expand its mandate or to accept the erosion of its resources.[6] The proliferation of military-related environmental security projects in the 1990s confirms that the first option has been the response of choice. The environment/security nexus has been institutionalized in the United States under the new office of the deputy under-secretary of defense for environmental security.[7] The intelligence community has also developed an environmental security program, working with scientists to use state-of-the-art spy satellites to gather data on environmental degradation.[8] Internationally, NATO has launched a pilot study to "assess security risks posed by environmental problems . . . and to devise an action plan to address them—with a strong emphasis on preventive actions."[9]

Yet critics have argued for the decoupling of environment and security, pointing out that the military's claim to environmental leadership is suspect at best and dangerous at worst.[10] The toxic legacy of the Cold War alone, which will endure well into the next century, casts doubt on the military as supplier of environmental security. Traditionally, military agencies have been more foe than friend to the environment, with the United States and the Soviet defense establishments earning the dubious status as the

world's worst polluters.[11] Some agencies are cleaning up their act. The Pentagon's environmental security office has overseen a 50 percent reduction in the U.S. military's toxic waste production, developed cooperative international military-to-military partnerships for nuclear and hazardous waste cleanup, and helped to promote compliance with international environmental treaties.[12] Yet at the current cleanup rate, U.S. military facilities will not comply with current environmental regulations until the middle of the next century.[13] These positive trends, therefore, do not authenticate the military as a guardian of environmental security.

Portraying environmental security in terms of "threats" is unhelpful for a number of reasons. Because environmental dangers do not fit well into the military's traditional threat-defense mechanism, casting them in this light may lead to serious misconceptions and misguided policy.[14] The institutionalization of environmental security within the military establishment also tends to reinforce the role of the state as the dominant provider and recipient of environmental security.[15] Given the central role of nonstate actors in addressing global environmental problems, this may be counterproductive. Despite the fact that industrialized countries are the world's primary environmental offenders, the environmental security literature also tends to focus disproportionate attention on developing countries, thereby reinforcing the "chaos-in-the periphery" bias that permeates Western discourse on international order.[16] Claims, for instance, that population growth in developing countries represents a "national security threat" to the United States because of its contribution to illegal immigration encourage an us-versus-them mentality that does not address the underlying economic and environmental roots of the problem.

Environment and Violent Conflict

This chaos-in-the-periphery bias characterizes the work of Thomas Homer-Dixon. He initially hypothesized four social effects of environmental degradation, leading to three types of "acute conflict." The primary sources of international instability in the model were developing countries, which are more vulnerable to environmentally caused violence. The four social effects were economic decline, reduced agricultural production, population displacement, and disruption of legitimized social relations. The three types of acute conflict were simple scarcity conflicts, group identity conflicts, and relative deprivation conflicts.[17] The main problem, however, is that the model exogenized the social, political, and economic causes of environmental damage, thereby naturalizing a spurious phenomenon labeled "environmentally induced violence."

The project's conclusions seek to address this objection by concluding that "environmental scarcity," which leads to violent conflict, is itself a combination of environmental change, population growth, and unequal

resource distribution.[18] Yet the empirical findings only support a more nuanced conclusion, since virtually every example—from the Senegal and Jordan River valleys to the Ganges-Bramaputra flood plain—highlights the pernicious impact of inequalities in wealth and access to natural resources. Environmental insecurity turns out to be a consequence of social structures rather than ecological degradation per se. Nor do the findings consider the relevant international institutions—for example, the various agreements India has made with Pakistan, Nepal, and Bangladesh to share river waters.

The findings, however, do support two important conclusions: that diffuse and persistent subnational violence is a more likely outcome than acute international violence and that environmental degradation can contribute to the delegitimation of the state. They also confirm a key insight of an ecological approach to international relations: strengthening the environmental component of conflict resolution can promote international stability. Although Homer-Dixon's work is problematic for its lack of insight into the root causes of both violent conflict and environmental degradation, it usefully decenters the state and fosters a conception of environmental security that is decoupled from traditional national security discourse.

Constructing Environmental Security

It may be tempting to jettison environmental security, but there are strong practical and epistemological reasons for not doing so. First, the two principal trends that have thrown the field of security studies into tumult—the declining utility of force and the growing salience of nonstate actors—are likely to persist. Alternative formulations of security will therefore continue to demand a hearing. Second, climate change, land degradation and desertification, the largest wave of species extinctions since the dinosaurs, and multifarious pollutants are real and growing sources of insecurity. Third, limiting security language to military threats cedes too much ground to the security traditionalists. If security is a discursive practice, then it can be constructed by a mulitiplicity of social actors. Security discourse can be rehabilitated to encompass environmental dangers, however, only if certain caveats are prudently observed. These have mostly to do with the twin dangers of bolstering a traditional state-centric threat-defense conception of security, and falling into an objectivism that ignores the socially constructed element of all security concerns.

To claim that environmental problems are social constructions is not to deny their physical character; to believe otherwise would be ecologically and politically irresponsible. One of the pitfalls of security language is the presumption that *security* signifies some reality with a concrete external referent. As Ole Wæver argues, rather than being a sign for an objective referent, security is most aptly understood as a speech act: "The

utterance itself is the act."[19] Although his critique could provide the basis for a more reflective conception of security as a socially constructed set of concerns, Wæver opposes an expanded notion of security, including the "securitization of the environment," on the grounds that "security is articulated only from a specific place, in an institutional voice, by elites."[20] In other words, only those concerned with classic state-centric threat-defense dynamics are entitled to perform security speech acts.

This reading not only ignores the fact that security speech acts are performed on a daily basis by an increasingly diffuse group of scholars and practitioners, but it also abdicates too much terrain to the security traditionalists. The state is not the sole subject of security, nor is coercive power the sole means of seeking it. If Cold War hawks could seize on the ambiguous symbol of national security, then contemporary analysts may also deploy the ambiguous symbol of environmental security. But to do so reflectively, without falling prey to the sorts of ideological excess that characterized Cold War security discourse, they must be conscious of how they construct their speech acts.

Security language has been characterized in terms of an objectivist epistemology. This concern is particularly relevant with respect to environmental security, which may require the authority of science to demonstrate the existence of "objective" threats.[21] Although scientific information is clearly of great importance in international agenda setting for environmental issues, it by no means provides an objective factual basis on which rational policy can be formulated. Knowledge and information are framed and interpreted in light of specific interests and contending discourses.[22] Even in the context of real material dangers, the invocation of environmental security threats is fundamentally about socially constructed risks.[23]

Wolfers observed long ago that the subjective dimension, the absence of fear, is at least as important to security language as the existence of material threats.[24] Likewise, "environmental scarcities" are not purely objective phenomena but are also socially constructed and culturally dependent. For instance, a person requires 4 to 6 liters of water per day to survive. On this basis, potable water is abundant in most places. Yet social scientists routinely define scarcity as less than 2,740 liters per person per day, based on consumption rates in advanced industrialized countries.[25] Likewise, invocations of environmental security tend to naturalize what are essentially social, political, and economic problems.[26] If the threat-defense mechanism is mapped onto a naturalized understanding of environmental problems, then the quest for security may portray nature as enemy to be controlled and conquered, a stance that itself may be at the root of the mounting global environmental crisis.

An associated pitfall is the tendency to paint environmental dangers in falsely universalizing terms. If security is a speech act, then its proponents

need to become self-conscious of the specific interests and cultural biases from which they speak. Calls for environmental security have entirely different policy implications depending on whether they come from Pacific islanders threatened with sea-level rise as a result of climate change, affluent urban dwellers suffocating from automotive emissions, or subsistence farmers without access to clean drinking water. Thus, if environmental security discourse is monopolized by those with an unreflective bias toward the advanced industrialized world, then it becomes an easy target for those in developing countries who are already wary of "environmental imperialism."[27]

A final cautionary note: unreflectively depicting environmental problems in security terms runs the risk of contributing to "a proliferating array of discourses of danger." As Michael Dillon maintains, security is neither a fact of nature nor a noun that names something, but a sociocultural aim.[28] Simon Dalby argues further that if "insecurity is not the problem, but rather the ontological condition of mortal human life, then the solution in terms of security, the assertion of control to ensure life, is ironically potentially a threat to life itself, that which is insecure in the first place."[29] The Cold War quest for security, whose toxic and radioactive legacy will perpetuate insecurity for decades to come, should offer a sobering lesson. More generally, the driving force behind global environmental degradation is the unrestrained pursuit of material security, suggesting that the shortsighted pursuit of security may perpetuate environmental insecurity.

These cautionary words, however, need not preclude development of a useful conception of environmental security. First, the environmental problems that are likely to deepen in the coming century present material dangers, not just discourses of danger, even if their meaning is socially constructed. To the extent that a widespread sense of danger persists, security language will find a voice, so every effort should be made to refine that language. Second, there is no prima facie reason for ceding the security terrain to those whose focus is the state's ability to wield coercive force. If current trends continue, then security discourses will migrate to other perceived dangers.

The greatest challenge in developing a useful ecological approach to security will be finding the willingness to recognize and act on the root causes of environmental insecurity. The consumption habits of the affluent, for instance, are possible only because their true ecological costs are externalized onto both future generations and far-flung "shadow ecologies" that serve as sources and sinks for the global economy.[30] Likewise, population growth in the Third World is fueled not only by deeply rooted gender inequality but also by the "primary producers' squeeze," itself a consequence of global economic dynamics.[31] A reflective conception of environmental security must take into account the socioeconomic complexity of both the material and intersubjective sources of insecurity.

In drawing out elements of a "human security" program, Michael Renner outlines an extensive agenda. His list includes strengthening civil society; building local-global finks; renewing commitment to environmental diplomacy; increasing the role of NGOs in environmental governance; reducing military budgets; increasing corporate transparency and accountability; and healing the deep social and economic inequities that breed environmental insecurity. With respect to the last factor, he suggests a number of positive directions, including a serious commitment to debt relief, land reform, and microloan programs for the urban and rural poor.[32] These commitments would build environmental security from the ground up. They also suggest that neither a state-centric nor an us-versus-them orientation will be helpful.

Ecological Interdependence and International Cooperation

The proliferation of environmental treaties since 1972 affirms that international cooperation has been essential in the pursuit of environmental security. Indeed, the clearest evidence for the ecological turn in world politics is the astonishing array of recent treaties on a host of environmental problems, including marine pollution, acid rain, stratospheric ozone depletion, loss of biodiversity, and the export of toxic waste to developing countries. Although the pace of treaty making has slowed somewhat since the peak in 1992, the ecological trend in international relations will inevitably continue as the twin engines of environmental destruction—population and consumption—move into high gear in the coming century. If recent history serves as a guide, this trend will engender greater cooperation rather than a heightened risk of violent conflict. But in order for that cooperation to move beyond Band-Aid measures, the tension between economic and ecological interdependence must be confronted more directly.

Two broad observations may be made about environmental cooperation to date. First, the ecological turn has been driven primarily by nonstate actors: scientists, NGOs, international organizations, and industries. Indeed, most proposals for improving the effectiveness of these efforts recommend formally expanding the role of nongovernmental interests in international environmental regimes in all phases of the treaty process, from negotiation to implementation and monitoring.[33] Second, international cooperation has, for the most part, been too little and too late. Although the planet's life-support systems and resource base are undoubtedly better off than they would have been in the absence of a quarter-century of international institution building, the general health of the planet has grown worse, not better, since the first UN environment conference in 1972.[34] Progress in some areas is better than in others. The ozone regime, for instance, proceeded rapidly from a nonbinding convention in 1985 to a

regulatory protocol in 1987 and three sets of treaty revisions by 1996. Yet, even in what represents the world's greatest achievement in environmental diplomacy, the ozone hole over Antarctica is not expected to close for nearly a hundred years, assuming full compliance.[35] On other pressing issues, such as biodiversity loss and climate change, virtually no progress has been made.[36]

Taken together, these two general observations—that international environmental cooperation to date has been catalyzed by nonstate actors but that it also has accomplished too little too late—spell out some implications for the future. First, if environmental institutions are to be rendered fit for the task at hand, then increasingly they must strike at the underlying causes. Second, if states and societies develop the collective will to address the deeper causes of ecological degradation, then the political institutions of the coming century may look quite different from those of today. Already, notions of responsibility and accountability are being integrated into practices of sovereignty, gradually displacing traditional norms of territorial exclusivity.[37] If taken to its logical conclusion, this trend could engender new forms of planetary identity. Hindering progress on both fronts, however, are economic practices as currently conceived.

Economic and Ecological Interdependence

Ecological and economic interdependence stand in an uneasy relationship to one another. On the one hand, both concepts stress interconnections and mutual vulnerabilities. Like ecosystems, the global economy is characterized by far-flung causal chains, such that, in John Muir's classic turn of phrase, "everything is hitched to everything else." On the other hand, the global economy confronts earth's species and life-support systems in a generally predatory mode. Ecological degradation, from tropical deforestation to ozone depletion to toxic waste trade, is a corollary of existing economic practices. An authentic environmental security agenda for the twenty-first century, therefore, must somehow harmonize economic and ecological interdependence. If taken seriously, this mandate, which is implicit in the term *sustainable development,* would entail radical consequences in all spheres of life.

Perhaps because economic practice is at the core of the problem, the greening of international political practice appears to be proceeding at a more rapid pace than the greening of the global economy.[38] Nature was discounted in modernity's economic calculations because it was assumed to be resilient and abundant as both source and sink. The annual expansion of gross national product is still widely viewed as the best indicator of economic progress—and perhaps progress in general, despite the availability of more ecologically inclusive indicators.[39] Growth is the core value informing all of the major international economic institutions: the

World Bank, the International Monetary Fund, and the World Trade Organization. To the extent that environmental considerations are incorporated into international economic institutions at all, as in the environmental side agreement of the North American Free Trade Agreement or the World Bank's Global Environmental Facility, their impact is minor. Thus, the road to a truly sustainable global economy is likely to be a long and difficult one. Rather than being acknowledged as the fundamental challenge it represents, the language of sustainability has been grafted onto the liberal international economic order, without any real transformation of economic practices. Even worse, affluence is sometimes recommended as the recipe for sustainability.[40] According to this reasoning, only the prosperous can afford the luxury of environmental integrity.

Consider, for instance, the widely read *Our Common Future*, which first popularized the notion of sustainable development. The report rightly recognizes poverty and environmental destruction as the two central problems facing humanity but then goes on to assert that both can be alleviated only through a fivefold increase in industrial production.[41] The contribution of poverty to ecological damage, primarily through population growth and poor agricultural practices, is highlighted, but the impact of consumption is virtually ignored. The proposed fivefold increase in industrial production will be facilitated by technological changes. Indeed, new products and production practices, including clean energy systems and environmentally benign methods of farming, can contribute to sustainable development.[42] The new field of industrial ecology is finding ways to reduce the traditional trade-off between ecological health and economic productivity.[43] But it is probably unrealistic to expect that sustainability will be achieved solely on the basis of technological fixes. Not only do some technological fixes, such as genetic engineering, entail major unforeseen social problems,[44] but an overreliance on technology may simply reinforce modernity's premise of unlimited growth. The marriage of ecological interdependence with liberal economics is likely, therefore, to be an unhappy and short-lived one.

One of the great unacknowledged difficulties is that ecological interdependence, like environmental security, is taken as an objective fact rather than a socially constructed phenomenon. Just as *security* is a speech act enunciated from a certain place in a particular voice, so too is *interdependence* a speech act. Although ecological interconnectedness has a biological basis, the language of interdependence too often masks real social inequalities and differences, generating such platitudinous phrases as "our common future." Yet the future in central Africa will look quite different from the future in Western Europe.[45] If interdependence language generates a false sense of mutuality, as the dependency theorists have rightly argued, then that same language applied to ecological issues in an unequal world can only compound the error.

Although interconnectedness is a physical feature of the planet's geosphere and biosphere, international ecological interdependence is socially constructed. The perception of ecological interdependence, for instance, can generate important opportunities for developing countries. As Marian Miller argues, developing countries seem to fare best in regime negotiations when the perception of interdependence is greatest, as it is for common property resources.[46] Because industrialized countries perceived interdependence to be high with respect to ozone depletion, developing countries were able to exact significant concessions—most important, the technology transfer fund—in exchange for their willingness to cooperate. A generalized increase in the perception of interdependence could have important implications for the creation of innovative North-South partnerships in the coming century.

Global climate change offers a potential arena for such a partnership, yet key states have so far failed to seize the opportunity. Although industrialized countries, with less than 20 percent of the world's population, emit 70 percent of all energy-related greenhouse gases, developing countries are expected to surpass them within a generation.[47] Rather than fostering partnership, key industrialized countries (most notably the United States) refuse to move beyond minuscule reductions until developing countries limit their emissions. Largely because of European pressure, the United States signed the Kyoto Protocol, requiring industrialized countries to reduce overall emissions by at least 5 percent below 1990 levels sometime between 2008 and 2012.[48] Even with U.S. ratification, which is in doubt, the 1997 Kyoto Protocol will do little to achieve the 60 percent reduction in greenhouse gas emissions that scientists believe is required to stabilize the world's climate.[49] Such an accomplishment will require not only major economic and technological changes but also a strong North-South partnership premised on a mutual perception of ecological interdependence. Failure to forge that partnership will only increase the long-term economic, political, and environmental costs.

Global Environmental Governance in the Twenty-First Century

This section explores two broad scenarios for global environmental governance. In the first, environmental change continues at a gradual pace, whereas in the second it occurs rapidly, precipitating a sense of crisis. In general, the prospects are much brighter under the first scenario; a wider range of creative policy options will present themselves, existing institutions can continue to evolve, and violent conflict will be less likely. In either case, the ecological turn in world politics that began in the latter part of this century will continue into the next. The primary question is whether

that turn will be socially and politically benign or harsh. Preventive policies that address the causes of environmental problems are therefore preferred on the basis that they will tend to avert the more catastrophic scenarios.

Because human activities have taken on geophysical proportions, we have produced a kind of ecological hermeneutical circle. Whether environmental change occurs at a gradual or precipitous pace depends on crucial human choices and will in turn affect how problems are socially constructed. In other words, our activities help to produce the physical conditions that will shape how environmental problems are constructed in the future.

Gradual Environmental Change

Assuming that environmental change proceeds gradually, we can anticipate several interrelated trends: a progressive strengthening of existing international institutions, the increasing transnationalization of environmental governance, and greater integration of environmental considerations into military, human rights, and development policies. One key to slowing the pace of environmental change is the early adoption of precautionary measures, no-regrets and other win-win policies, and responses that address the underlying causes of ecological degradation.

The broad assortment of international instruments developed since 1972 provides a basis for further institutionalization. Environmental agreements are open to revision on the basis of new information. Moreover, if countries are dissatisfied with the pace of reform, they may opt for unilateral action or they may band together to an alternative treaty, as did developing countries for toxic waste trade. Thus, at least some of the groundwork for future international environmental cooperation has been laid.

Yet two important caveats are in order. First, existing institutions for the most formidable problems are quite weak. The Biodiversity Convention adopted at Rio de Janeiro in 1992, for instance, includes no binding measures, and the Kyoto Protocol represents at best a symbolic first step toward addressing climate change. Second, international environmental agreements have historically accomplished too little, too late. International law is a notoriously slow and laborious process. Innovative responses that do not rely solely on international legal mechanisms should therefore be pursued, such as full-cost pricing—which would internalize environmental costs into the price of products—or an international labeling system designed to make producers more accountable for the ecological impact of their goods.[50]

Frustrated with the slow pace and mediocre effectiveness of international law, nonstate actors are increasingly assuming responsibility for moving the world toward sustainability. NGOs negotiated their own "treaties" at Rio; development NGOs more and more tie their work to sustainability;

municipal governments are making efforts to incorporate sustainability into local practices; and a greening of business practices has taken hold in pockets of the world. An emerging global civil society, comprising decentralized transnational networks of knowledge and action, has its roots in environmental concerns.[51] New local-global links being forged on the basis of information technology are likely to become a central component of global environmental governance.[52] Thus, environmental governance will not necessarily be centered in the state. Assuming that environmental change does not accelerate much beyond current rates, cooperation will most likely increase across all levels of social organization.

One important mechanism for slowing the pace of environmental change is the adoption of "no-regrets" policies that would make sense even in the absence of environmental threats—for example, increased reliance on clean and efficient energy sources.[53] Although no-regrets policies are typically discussed with regard to climate change, they should also be developed for other issues. Tropical deforestation, for instance, is not only ecologically devastating but also economically unsound in the long run; sustainable harvesting and ecotourism can offer viable alternatives that make sense for economic, and not just ecological, reasons. Some no-regrets policies offer multiple benefits: stemming the tide of tropical deforestation contributes to both conservation of biodiversity and stabilization of climate; decreasing coal use would have a positive impact not only on the global climate system but also on human health and acid precipitation.

Yet we must recognize that, for the most part, international environmental action has limped along from crisis to crisis—a disturbing pattern that bodes ill for the future. If states cannot find the political will to adopt policies that are proactive and directed to the root causes of global environmental degradation, then it is quite possible that the recent cascade of environmental problems will swell into a tidal wave in the coming century.

Catastrophic Environmental Change

Because international environmental problems can be addressed only through collective action, enhanced cooperation at all levels of social organization is the most likely scenario for the coming century. It is possible, however, that crises could develop as a result of environmental change that might ignite violent conflict or coercive responses. Homer-Dixon's general argument to this effect may not hold much water historically, but then again, the past may not be a good guide to the future on these questions. Although environmental cooperation is built on the premise of a commonality of interests, crisis situations could provoke us-versus-them responses in which certain states or classes attempt to shore up their interests against those of others. States rendered insecure by environmental crisis might respond in a variety of potentially unnerving ways.[54] Indeed,

some analysts predict that only highly centralized and authoritarian forms of governance could contend with the social disorder that would accompany large-scale ecological collapse.[55]

Since climate influences virtually every aspect of global ecology, climate instability is probably the single most likely source of catastrophic environmental change in the coming century. The impact on international social and political order could be tremendous. Scientists predict that global warming will increase the spread of infectious diseases and agricultural pests;[56] aggravate the loss of biodiversity;[57] greatly intensify weather extremes, including floods and droughts;[58] and lead to a global decline of food supply from land and water.[59] One consequence of global warming, rising sea levels, could impact hundreds of millions of people living on small islands and in low-lying coastal regions. The specter of millions of environmental refugees—particularly from the world's poorest countries, which are least equipped to adapt—could become a reality. Likewise, the social reverberations of catastrophic environmental change could exacerbate existing ethnic and class conflicts.

In international terms, the most obvious us-versus-them scenario would pit North against South. The strong anti-immigration sentiment that has already taken root in some Western countries would grow more virulent in a world populated by millions of environmental refugees. Put bluntly, if a world of ten billion people living an affluent lifestyle is not sustainable, then the affluent will have two choices: either to cut their consumption or to defend their consumption against incursions from others. Given the absence of a trend in the first direction, there is a real danger that environmental security in the next century could take on the more noxious us-versus-them tone of national security discourse during the Cold War. Rather than the integrity of ecosystems or the well-being of humanity becoming the objects to be secured, consumption would become the object of security. "Environmental security" would become a speech act uttered by the haves against the have-nots.

Policy Prescriptions: Pay Now or Pay Later

Future generations will bear a large chunk of the environmental costs of contemporary practices. A general perception persists that the costs of a serious worldwide movement in the direction of sustainability are simply too great to be borne by the present generation. Yet the world spends roughly $800 billion annually on military preparedness, a figure that suggests that conventional understandings of national security continue to prevail. At this point, the political will to reorient policy in the direction of a comprehensive approach to environmental security is largely absent.

We should also note that, because the attention of citizens and leaders alike is limited, efforts to address seemingly unrelated economic and

traditional security problems will have an important effect on environmental global governance. The outpouring of environmental concern in the late 1980s and early 1990s was not a response to greater ecological degradation during that period but was instead largely a function of the opening window of attention that accompanied the end of the Cold War. People preoccupied with violent conflict in the Balkans and the Middle East, financial crises in East Asia, and arms proliferation in Iraq and South Asia are unlikely to turn their attention to a creeping ecological catastrophe.

In the face of long-term environmental threats, actors at all levels of the policy process should work to keep these issues on their radar screens. With respect to institution building, the most pressing need is for meaningful progress on the two problems likely to have the most dramatic consequences in the coming century: climate change and biodiversity. In other areas of multilateral cooperation, the environmental component of policies and agreements should be strengthened. Moving beyond the symbolic politics typically associated with the language of sustainable development, genuine sustainability requires a more universal adoption of ecologically inclusive economic indicators and a more thoroughgoing integration of environmental considerations into economic and social development.

Besides taking aim at the underlying physical sources of environmental degradation, policymakers should take seriously the claim that language matters. When it comes to policy, environmental security and ecological interdependence have no natural referents. Rather, they are socially constructed from various vantage points. Whether environmental problems are constructed discursively as sources of conflict or opportunities for cooperation has significant practical implications for how they are addressed. Just as security language masks the questions of the subject and object of security, so does interdependence language risk painting a false picture of mutuality.

Given the inexorable character of the problems, the ecological trend in international relations that began in the final decades of the twentieth century is likely to accelerate. Whether this development will follow the current trend toward ever more extensive modes of cooperation or whether it devolves into more conflictual scenarios depends largely on the pace of environmental change and the degree to which the present generation is willing to make a serious commitment to sustainability. Some solutions will be relatively easy no-regrets policies. Others, like the greening of the global economy and addressing the social inequities that drive environmental degradation, will be more deeply challenging. Under the most optimistic scenario, the ecological shift in international relations could be part of a more general cultural shift that includes the greening of business, education, psychology, and religion and the emergence of a new form of planetary identity based on establishing harmonious intra- and interspecies relationships.[60] If the root causes of environmental degradation are not

addressed, then the degradation will only increase. The cost of sustainability may be great, but other options will be more costly. The costs can be postponed, but in the meantime, the interest accumulates.

Notes

Karen T. Litfin is assistant professor of political science at the University of Washington in Seattle. She is author of *Ozone Discourses: Science and Politics in Global Environmental Cooperation* (1994), and editor of *The Greening of Sovereignty in World Politics* (1998). Both books received honorable mention for the International Studies Association's Sprout Award for the best book on environmental issues.

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