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Understanding Environment, Conflict, and Cooperation

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Understanding Environment, Conflict, and Cooperation

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Preface

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Maintaining environmental quality and improving degraded environments are preconditions for achieving sustainable development and meeting the Millennium Development Goals. They are also crucially important for enhancing human well-being, including security. The United Nations Environment Programme (UNEP) has therefore been interested in promoting understanding of the relationship between environment and peace. In recent years, we have expanded this interest by assessing the impact of military conflict on resources and the environment through our Post-Conflict Assessment Unit in Geneva. This unit has undertaken assessments in Bosnia, Iraq, the Occupied Palestinian Territories, Afghanistan, and Liberia. UNEP's Regional Office for Europe in Geneva represents UNEP in a partnership that includes the Organization for Security and Cooperation in Europe (OSCE) and the United Nations Development Programme (UNDP) in environment and security studies in Central Asia and Southeastern Europe.

The present document represents UNEP's response to the growing worldwide interest in further exploring the environment and security nexus and the contribution of timely and credible assessments to conflict prevention. In our consultations in January 2004, governments identified as a priority the need for scientific assessments of the link between environment and conflict in order to promote conflict prevention and peace building. UNEP's mandate for this work is consistent with the broader UN goal of promoting peace and security, and follows from the Montevideo Programme III adopted by the Governing Council in 2001, in which UNEP was encouraged to promote "studies on the concept of security and the environment."

As an initial step in the new global initiative, UNEP's Division of Early Warning and Assessment (DEWA) organized a conference in conjunction with the Woodrow Wilson International Center for Scholars in Washington, D.C., on "Environment, Conflict, and Cooperation: Scoping Gaps and Opportunities for Research and Policy Agendas" in December 2003. Researchers and policymakers from a variety of disciplines and continents gathered to discuss what role UNEP can take to further the understanding of the relationship between environment and conflict. The chapters in this document were presented at the meeting, and then revised according to the subsequent discussion. UNEP intends to continue its work on environment and conflict prevention, and the chapters presented here help to establish a foundation for this future work.

Introduction

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Are environmental degradation and political instability inextricably linked or can cooperative action to share natural resources and preserve the environment solve the problem? The relationship between environmental degradation and political instability—whether it is insecurity or violent conflict—is poorly understood. Accordingly, policymakers' interventions do not reliably address these links. The international community (including the United Nations) increasingly recognizes that these gaps in our understanding also prevent us from developing cooperative mechanisms for peace building and conflict prevention. We need a more systematic assessment of the relationship between environment and security and a more careful consideration of the links among environmental degradation, natural resources, and development. Arising from discussions held at the Woodrow Wilson Center, *Understanding Environment, Conflict, and Cooperation* is the first step in a broader program to redress our inadequate understanding of these issues. This report identifies gaps and opportunities in environment, conflict, and cooperation research and policy, and is designed to promote collaboration within the UN family and with other organizations.

Throughout the world, natural resources are distributed unequally. In some cases, scarcity (of water, fish, forests, or arable land, for example) or abundance (of oil, diamonds, or other valuable resources) has contributed to violence within and between states. Environmental change may have a similar impact. For example, experts predict that climate change will increase the severity of floods and droughts, which may lead to mass migration, undercut state capacities, and exacerbate widespread poverty.[1] Environmental stresses, and the social phenomena they engender, have both direct and indirect ties to the global community's greatest challenges: poverty, terrorism, globalization, poor governance, and inequality.

UN Secretary General Kofi Annan highlighted the connection between environment and conflict in his September 2003 report on the prevention of armed conflict: "Lastly, in addressing the root causes of armed conflict, the United Nations system will need to devote greater attention to the potential threats posed by environmental problems." The Secretary General continued:

> [T]he implications of the scarcity of certain natural resources, of the mismanagement or depletion of natural resources and of the unequal access to natural resources as potential causes of conflicts need to be more systematically addressed by the United Nations system. The United Nations system should consider ways to build additional capacity to analyse and address potential threats of conflicts emanating from international natural resource disparities.[2]

The Secretary General's concern is shared by national governments, scientific institutions, and intergovernmental and nongovernmental organizations. In 2003, UNEP asked these groups to identify the most serious gaps in global environmental assessments as part of its Governing Council's efforts to strengthen UNEP's scientific

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[1]   See, for example, Schwartz, Peter & Doug Randall. (2003, October). *An abrupt climate change scenario and its implications for United States national security.* Retrieved 3 August 2004 from http://www.gbn.com/ArticleDisplayServlet.srv?aid=26231

[2]   United Nations. (2003, 12 September). *Interim report of the Secretary General on the prevention of armed conflict* (Report of the Secretary General on the Work of the Organization, A/58/365–S/2003/888 12 September 2003).

base. All four groups selected environment/conflict as one of the most important thematic areas lacking adequate coverage.[3]

UNEP is prepared to respond to these calls for action. Founded in 1972, UNEP has recognized the connection between environmental change and security for over thirty years. The organization helped convene the negotiations that led to the 1977 Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (known as the ENMOD Treaty), in response to the controversial use of defoliants in Southeast Asia in the 1970s.[4] Environmental security concerns featured prominently in *Our Common Future*, the report that set the agenda for the 1992 World Summit on Environment and Development in Rio de Janeiro.[5] UNEP has sponsored research by the world's leading peace institutes on environmental contributions to conflict and instability.[6] More recently, the organization conducted post-conflict environmental impact assessments in Iraq, Afghanistan, and Liberia, among others, and formed a partnership to identify environment and conflict hotspots in Central Asia and the Caucasus.[7]

With the cooperation of other divisions, UNEP's Division of Early Warning and Assessment (DEWA) is developing an "Environment and Conflict Prevention" initiative to coordinate and stimulate international efforts to promote conflict prevention, peace, and cooperation through activities, policies, and actions related to environmental protection, restoration, and resources. The initiative's first workshop, the "Environment, Conflict, and Cooperation" conference co-sponsored by the Woodrow Wilson's Environmental Change and Security Project, was designed to:

- Build on existing environment, peace, and conflict activities;
- Develop a cooperative framework for addressing rising tensions over resources and the environment;
- Facilitate capacity building and institutional cooperation on environmental issues; and
- Encourage the development and implementation of policies that support the equitable use of resources and the environment.

The workshop brought together thirty-two scholars and practitioners representing seventeen countries and numerous disciplines, including environmental science, political science, economics, geography, law, government, conflict prevention, sociology, international relations, anthropology, forestry, public administration, and history. They debated the gaps and opportunities in our understanding of the links among environment, conflict, and cooperation.

The chapters collected in this volume emerged from the workshop's discussions of analysis, institutional responses, and integrated assessment and early warning systems. Although they point to productive roles for UNEP/DEWA, the authors do not recommend specific steps for the organization. Instead, they outline the challenges and opportunities for all scholars and practitioners in the field, recommending transdisciplinary collaborations among the UN family, national governments, NGOs, research institutes, and civil society. In addition, brief articles throughout the publication provide specific examples of issues raised by the chapters.

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[3] The other thematic areas of most concern were poverty and environment, trade and environment, and ecosystem services; see pages 16-17 of UNEP's December 2003 *Draft report of additional questions on strengthening the scientific base of the United Nations Environment Programme* (UNEP/SI/IGC/INF/1). The results of the 2003 survey were presented at the Intergovernmental Consultation on Strengthening the Scientific Base of the United Nations Environment Programme, held 14-15 January 2004 (for more information, visit http://science.unep.org/).

[4] Available online at http://www.unog.ch/frames/disarm/distreat/environ.pdf

[5] World Commission on Environment and Development. (1987). *Our common future.* Oxford: Oxford University Press.

[6] For example, UNEP and the International Peace Research Institute, Oslo (PRIO) agreed in 1988 to carry out "Studies in Environmental Security" at PRIO. A joint UNEP/PRIO program on "Military Activities and the Human Environment" comprised empirical research projects that were largely conceived and implemented by PRIO.

[7] For more information on UNEP's partnership with UNDP and OSCE, see the brief article by Gianluca Rampolla on page 51 of this publication.

Chapter One, "Analyzing Environment, Cooperation, and Conflict" by Richard A. Matthew, Michael Brklacich, and Bryan McDonald, identifies ten steps to improve research:

- Situate problems in a broader context;
- Engage literature on conflict and cooperation;
- Conduct fine-grained, micro-level analysis;
- Improve analysis of the environmental effects of violent conflict;
- Test the claim that environmental conservation supports cooperation;
- Study the urban dimension;
- Clarify links between demography and environmental security;
- Advance the debate between scarcity and abundance theories;
- Develop analytical tools that can integrate knowledge about vulnerability and capacity; and
- Expand methodological tools to include qualitative methods and new visualization technologies.

The authors recommend five ways that analysis could bolster policymaking:

- Determine which conservation strategies promote cooperation;
- Integrate development and environmental policy;
- Incorporate environmental security into urban development and planning;
- Deepen understanding of environmental policies in post-conflict situations; and
- Rigorously assess the effectiveness and sustainability of policy interventions.

Chapter Two, "Institutionalizing Reponses to Environment, Cooperation, and Conflict" by Alexander Carius and Geoffrey D. Dabelko, describes institutions' relatively underdeveloped efforts to address environment and conflict. The authors find gaps at all levels (local, state, regional, international) that inhibit political responses and diminish the efficacy of programs. They recommend that institutions:

- Seek to bridge disciplinary borders between academia and policy;
- Reduce compartmentalization within national governments, civil society, international organizations, and donor agencies;
- Balance participation by elite-level and broad-based stakeholders, including the private and security sectors;
- Achieve the appropriate scope for interventions; and
- Improve how policies are communicated, perceived, and justified.

Finally, the authors propose that a dialogue on best practices and innovative institutional efforts will help researchers and policymakers move beyond reacting to symptoms of environment and security linkages and towards learning from interventions that bolster confidence and cooperation rather than instability.

Chapter Three, "Early Warning and Assessment of Environment, Conflict, and Cooperation" by Marc A. Levy and Patrick Philippe Meier, recommends that assessments and early warning systems integrate environmental variables more completely and effectively. While early warning of conflict, rather than early warning of significant environmental change, clearly extends beyond UNEP's mandate, dialogue with the early warning community will enable the environmental community to share input with (and receive information from) these larger assessment and early warning systems. The authors assert that the international system has little capacity to monitor and assess conflict and cooperation on environmental issues, because:

- There are few incentives to carry out high-quality assessments or monitoring exercises;
- The necessary data are not available; and
- There is not enough experimentation, testing, and innovation to develop new methodologies.

To address these deficiencies, the authors recommend:
- Setting core priorities concerning assessments and monitoring;
- Establishing clear incentives and lines of responsibility to produce appropriate data;
- Establishing clear financial bases for these activities; and
- Creating an information infrastructure to achieve economies of scale, to disseminate data and knowledge, and to bridge cross-scale divides.

In conclusion, this publication seeks to guide researchers and policymakers as they navigate the gaps in our understanding of the complex set of connections that tie environment, conflict, and cooperation. To unsnarl this tangled web, scholars and practitioners need empirical data, multi-level analysis, interdisciplinary cooperation, and integrated assessments. Together, we can build the tools that could help sever the bonds linking environmental conditions to violent conflict, while using mutual dependency on environmental resources as pathways to confidence building and cooperation.

CHAPTER ONE

Analyzing Environment, Conflict, and Cooperation

By Richard A. Matthew, Michael Brklacich, and Bryan McDonald

Z. Yi/UNEP/Still Pictures

Abstract

Richard A. Matthew, Michael Brklacich, and Bryan McDonald identify ten areas that have received insufficient attention from environment, conflict, and cooperation researchers:

- *Situating problems in a broader context;*
- *Engaging the literature on conflict and cooperation;*
- *Conducting fine-grained, micro-level analysis;*
- *Improving analysis of the environmental effects of violent conflict;*
- *Testing the claim that environmental conservation supports cooperation;*
- *Studying the urban dimension;*
- *Clarifying links between demography and environmental security;*
- *Advancing the debate between scarcity and abundance theories;*
- *Developing analytical tools that can integrate knowledge about vulnerability and capacity; and*
- *Expanding methodological tools to include qualitative methods and new visualization technologies.*

The authors recommend five ways that analysis could bolster policymaking:

- *Determine which conservation strategies promote cooperation;*
- *Integrate development and environmental policy;*
- *Incorporate environmental security into urban development and planning;*
- *Deepen understanding of environmental policies in post-conflict situations; and*
- *Rigorously assess the effectiveness and sustainability of policy interventions.*

Introduction

What are the gaps in the analysis of environment, conflict, and cooperation (ECC) linkages, and how can applied research fill them? This chapter identifies ten methodological, analytical, and substantive opportunities for future research, and five areas in which focused analysis could bolster policymaking.[8]

Gaps and Opportunities for Research

The study of the complex and dynamic relationships among environment, conflict, and cooperation originated in antiquity.[9] Yet, concerns about anthropogenic global environmental change are only a few decades old, and have strongly influenced research conducted in the last ten to fifteen years. Although this relatively new body of research has developed rapidly, it is still in a formative stage. We have identified ten areas that have received insufficient attention from ECC researchers and their critics.

1. Situating problems in broader contexts

Political scientists have dominated ECC research, and have mostly focused on national and subnational settings and time frames of less than ten years. Policymakers may find this limited scope more relevant, but ignoring regional dynamics and historical developments may reduce the explanatory power of such research. For example, in Northern Pakistan—beset by weak governance, rapid population growth, and widespread poverty—the forest cover declined significantly, contributing to conflict and vulnerability (Matthew, 2001). Conserving and reforesting the area, clarifying and protecting property rights, and generating sustainable livelihoods could immediately benefit the residents of Northern Pakistan. However, since the forest extends east into Afghanistan and west into India, its fate depends on events in all three countries, as demonstrated by the 1979 Soviet invasion of Afghanistan, which pushed refugees into Pakistan's forests. Also, by focusing on the recent past, ECC research neglects key historical events that can offer valuable insight into current problems. In this case, deforestation is not a new threat: during the colonial period, the British Raj established a forestry service and increased the pace of logging in Northern Pakistan. In short, expanding the spatial and temporal dimensions of this analysis reveals important structural connections that can deepen understanding and, perhaps, improve policy.

Broader analysis can also contextualize conflict and cooperation, thus addressing the common concern that contemporary ECC analysis is too linear. Instead of assuming that conflict always produces negative results, researchers should assess its historical role as an agent of change, and distinguish between gradations of conflict, ranging from passive and constructive to violent and destructive. Conflict can sometimes encourage new thinking and innovative problem solving. Linear analysis cannot capture the feedback loops that define the intertwined relationships between conflict and its context.

In addition, researchers should increase their efforts to integrate perspectives from multiple disciplines; political scientists and economists dominate ECC research, but geographers, sociologists, urban planners, and historians, among others, can offer valuable input. While geographers may not calculate a forest's market value, they could explain how the forest's physical characteristics affect the availability of its resources.

9   In *The Peloponnesian War*, for example, Thucydides discusses geography's effect on a state's propensity for war, and concludes that sea-based states (e.g., Athens) are more war-prone than land-based states (e.g., Sparta).

2. Systematically engaging literature on conflict and cooperation

ECC researchers have often resisted responding to the extensive literature on conflict that examines the causal roles played by human psychology, group identity, greed, fear, injustice, unchecked military power, misperceptions of power, global inequalities, and the absence of a global authority. Similarly, they have avoided addressing research on cooperation that considers such variables as the quality of available data, the number of participants, the processes used to manage free riders, the role of political entrepreneurs, the importance of iterative behaviors, and the impact of different contractual environments. Many ECC researchers reduce this complex world to a meta-variable (e.g., undifferentiated "social factors") that affects the relationship between the environment and conflict or cooperation. Critics point out that ECC researchers need to unpack this meta-variable. At the same time, most conflict and cooperation research does not seriously examine the role of environmental factors. Both approaches are equally naïve.

ECC researchers should review the literature on conflict and cooperation to identify relevant variables, and invite conflict and cooperation specialists to join ECC research teams. Workshops and conferences could bring the three communities together to discuss how to integrate theories of conflict and cooperation into ECC literature, and how theory and data from the environmental arena might contribute to research on conflict and cooperation.

3. Conducting fine-grained, micro-level (e.g., livelihood) analysis

In March 1999, the Global Environmental Change and Human Security Project (GECHS) at the University of California, Irvine (UCI) and the Woodrow Wilson Center's Environmental Change and Security Project co-sponsored a workshop on the next wave of environment and security research (Matthew & Dabelko, 2000). The workshop's participants emphasized the need for fine-grained, micro-level analysis that would clarify the precise nature of correlations revealed by quantitative analysis, and pinpoint variables and relationships that could be studied productively on a larger scale. Micro-level analysis could also reveal how individuals and groups cope with environmental change through adaptation, mitigation, and exit strategies.

A study currently underway by the International Union for the Conservation of Nature (IUCN), in collaboration with the International Institute for Sustainable Development (IISD), focuses on four communities in Bangladesh, India, Nepal, and Pakistan that are experiencing high levels of conflict. Using micro-level data gathered in the field, the study seeks to uncover the links among natural resources, livelihoods, access to resources, and violent conflict. Observations and interviews with local residents provide relational data to enrich quantitative analysis.

IUCN's activities highlight the value of field research: IUCN collaborated with IISD to produce an analysis of environment, conflict, and cooperation in Pakistan's North-West Frontier Province (Hanson, Matthew, & Aziz, 2000), which was followed by a more extensive project that assembled a research team to prepare a series of ECC case studies (Matthew, Halle, & Switzer, 2002). The sophisticated networks of local ECC researchers contributing to the IUCN projects have extensive on-the-ground knowledge of both environmental and social factors, and are also familiar with the paradigms developed by ECC researchers. With this growing transnational network, IUCN promises to move the field forward constructively, while linking micro needs to macro policy initiatives.

4. Improving analysis of the environmental effects of violent conflict

ECC literature has attempted to assess the extent of environmental damage caused by war and its preparations. For example, Arthur Westing (1972; 1976) has written extensively about the environmental effects of the war in Vietnam. Murray Feshbach (1995) has detailed the ecological disaster in the Soviet Union caused by the Cold War, and numerous scholars and journalists have claimed that the 1991 Gulf

War caused widespread environmental damage (e.g., El-Baz & Makharita, 1994). While such claims may seem intuitive, it is not clear that they are based on satisfactory evidence; researchers should avoid making strong allegations connecting war to environmental damage without providing empirical support. Researchers also need an evaluative framework that will enable comparisons between wars.

Jeff McNeely's work for IUCN suggests that, in some cases, war might be less destructive to the environment than peace (McNeely, 2000). Is it possible that the environmental effects of war are not always as severe as commonly assumed? What does this imply for conservation efforts during times of war, or for conservation's potential as a pacifying force? Researchers should carefully evaluate the environmental effects of past wars and develop the capability to rapidly assess and mitigate the impact of current conflicts. Recently, UNEP took an important step in this direction: UNEP's Post-Conflict Assessment Unit has reported on the environmental degradation related to conflicts in Afghanistan, Bosnia-Herzegovina, Liberia, Iraq, and other countries. These reports assess the impact of conflict on survivors' health and their relationship to their environments (Post-Conflict Assessment Unit, n.d.). UNEP should coordinate these efforts with other organizations to ensure comprehensive results, which could contribute significantly to discussions of war crimes, refugees, long-term health impacts, and post-war liability, rehabilitation, reconstruction, and development.

5. **Testing the claim that environmental conservation supports cooperation and stability, and examining its corollary**

    Recent work published by Ken Conca and Geoffrey Dabelko (2002), and by Richard Matthew, Mark Halle, and Jason Switzer (2002), portrays conservation and environmentally sustainable practices as relatively low-cost peace-building strategies. Conservation programs can provide tangible, diffuse, and immediate benefits; they can build on scientific data and therefore transcend ethnic, social, and political tensions; they can be phased in, keeping investment low while building trust and a sense of shared fate; and they can neutralize a source of conflict by preventing environmental degradation and resource scarcity.

    Or can they? While this relationship is conceptually attractive, it has yet to be confirmed through rigorous empirical research. If this approach proves to contribute to peace-building efforts, conservation will be a useful tool in the workshops of the world's peacemakers, and will give people yet another reason to support environmental organizations. To date, however, the results been uneven and preliminary, and it is premature to draw firm conclusions linking conservation and peace. Likewise, the establishment of peace parks has great conceptual appeal. However, researchers should carefully examine case studies to determine if this strategy could be successfully deployed in some of the world's hot spots.[10]

6. **Studying the urban dimensions of environment, conflict, and cooperation**

    Environmental security research has focused primarily on rural areas, as illustrated by the variables chosen to measure environmental impacts by prominent research projects like the Political Instability Task Force (formerly known as the State Failure Task Force). In the Task Force's Phase III findings, the global model of state failure uses variables such as land burden, cropland area, irrigated land, access to safe water, and damage due to drought to assess environmental impacts, most of which are geared toward rural conditions (Goldstone et al., 2003). While variables such as access to fresh water may be relevant to both rural and urban populations, there may be qualitative and quantitative differences between rural and urban water scarcity problems.

    This focus on rural areas is not surprising, given the historical interest in preserving unspoiled lands and conserving wildlife, and mid-twentieth century conceptions of global population patterns. Despite these

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[10]   See the brief article by Saleem H. Ali on page 34 for a discussion of the K-2 Peace Park proposal.

conceptions, over the course of the twentieth century, the Earth's population has become increasingly urbanized: a 2002 report by the United Nations Population Division (UNPD) suggests that by 2007, half of the world's population is expected to live in urban areas. UNPD (2002) expects urban areas to absorb almost all of the world's projected population increase through 2030, or 2 billion of a projected global population growth of 2.2 billion.

The rate of urbanization varies widely; while some already-urbanized areas will continue to experience steady growth, more rural areas in Africa and Asia are expected to urbanize rapidly. Most urban population growth will occur in cities with less than 500,000 inhabitants, not in megacities of millions. Researchers should focus not only on the overall impacts of urban growth on the environment, but also on the particular set of problems associated with rapid urbanization, such as decreased access to fresh water, lack of sanitation, new urban agriculture systems, and increased air pollution from rising transportation demands. This may require developing new indicators to track the quantity and quality of urban environmental conditions, including access to sanitation and water, level of waste per capita (especially in areas that import waste), and amount of open space per capita. Understanding how people interact with rural and urban environments will greatly improve environmental conflict and cooperation research.

Overall, these trends suggest that the research agenda shouldn't create a dichotomy between rural and urban environments but instead utilize a dynamic urban-rural continuum. Many development studies, such as those that have tracked remittances between urban and rural residents and analyzed the implications of these exchanges for human security, are positioned along this continuum (Leybourne, 2003). The continuum could also counteract the tendency to regard the edges of urban centers as marginal areas that do not respond to change, and might confirm the arguments of those who view them as highly dynamic regions that adapt to competition for scarce resources (Bryant et al., 2000).

7.   Clarifying links between demography and environmental security

The concepts of "population explosion" and "youth bulge" have been traditional entry points for understanding demographic and environmental security issues. In a population explosion, the demands for basic, life-sustaining commodities such as food, water, and shelter increasingly pressure environmental systems and deplete finite stores of natural resources. The youth bulge theory contends that developing countries with a large proportion of young men are more vulnerable to conflict, especially when they compete for a dwindling resource base. While these concepts form the backbone of the Malthusian perspective refined over the last two hundred years, recent demographic discussions have focused on inequities and globalization's effect on communities' interaction with their local environments. Notions such as "ecological footprints" (the impact of consumption on the environment) challenge the Malthusian worldview championed by Paul and Anne Ehrlich, Thomas Homer-Dixon, and Robert Kaplan.

Global population is now projected to level off at about nine billion people around the middle of this century. Population growth rates have declined due to continued urbanization, decreased reliance upon child labour, the prevalence of social safety nets, and increased female employment outside the home. It is now widely accepted that inequities have greater social and environmental effects than population growth; two key issues—demographic inequities and gender inequality—have garnered increasing attention within the debate. Data from the United Nations Development Programme indicate that the consumption rate of the wealthiest 20 percent of the population in the developed world is 66 times that of the poorest 20 percent (1998). Economic globalization may have widened this gap, and Northern tastes and demands, rather than population growth, may drive over-exploitation of environmental resources by the rural poor. Gender inequalities, such as undervaluing women's contribution to human livelihoods, lack of access to education, and violence against women (especially during armed conflict), are also important issues for demography–environmental security research to explore. In this light, ECC researchers should look beyond population trends to focus on these demographic inequities.

Demographic change research has devoted considerable attention to the idea that environmental scarcity is a key factor in motivating people to migrate. As environmental refugees move from depleted rural areas to cities and more abundant rural areas, they are sometimes compelled to cross cultural and national boundaries, where their sudden presence can trigger violence. Assessing the plight of displaced peoples is difficult, however, because there is no reliable data for establishing baselines and trends, let alone causal sequences and impacts; this gap should be addressed for humanitarian reasons, as well as ecological and intellectual ones.

8.   Advancing the debate between scarcity and abundance theorists

Günther Baechler (1998), Thomas Homer-Dixon (1999), and Michael Klare (2001), among other scholars, have strongly linked resource scarcity to violent conflict. They argue that population pressures, combined with natural resource scarcity, contribute to violence, especially in local or civil conflicts. Critics of this neo-Malthusian theory, such as Daniel Deudney (1990), suggest that fighting to obtain scarce resources is rarely rational, since there are cheaper solutions like conservation, trade, and substitution. Based on extensive empirical studies, other scholars, including Paul Collier and Anke Hoeffler (2002) and Indra de Soysa (2002), have countered that given certain social conditions, violent conflict is more likely if lootable resources are abundant.

Researchers must move beyond this either/or debate, because all of these arguments reflect real-world situations. In fact, it may be useful to integrate these theories to produce broader frameworks with greater explanatory power. For example, are abundant lootable resources more likely to lead to violent conflict under conditions of generalized scarcity, or vice versa? The Tanguar Haor wetland in northeast Bangladesh provides an abundance of fish during the rainy season and very little during the rest of the year. To survive, people store reserves when the fish are plentiful. Violence erupted after small groups used legal channels to monopolize the wetland during the dry season, when few people were there, and then continued this monopoly after migrants returned during the monsoon season. Perhaps the next phase of research into scarcity and abundance should integrate insights from both perspectives.

9.   Developing analytical tools that can integrate knowledge about vulnerability and coping capacity into conflict and cooperation research

Researchers have studied the vulnerabilities associated with environmental stress for at least 70 years; most of this work was sparked by attempts to reduce the social and economic costs of natural hazards like floods, earthquakes, and severe weather. The majority of this research focused on the characteristics of environmental stress, such as magnitude, frequency, and location relative to human populations. Efforts to control environmental stress have led to cooperation at levels ranging from local (e.g., watershed and flood control) to international (e.g., dams on cross-boundary rivers) (see Burton, Kates, & White, 1993). This early work attributed the causes of "natural disasters" solely to the environmental stress itself, with little or no consideration of any intervening factors (Peet & Thrift, 1989).Over the past two decades, vulnerability research has matured and expanded its focus to consider how social, economic, and political conditions converge to differentiate people's vulnerability to the same environmental stress (see Adger, 1999). Researchers increasingly recognize that social vulnerability is latent in human systems prior to the onset of an environmental stress; disaster occurs when the stress exceeds the coping capacity of the human system. Contemporary vulnerability research addresses the following questions:
*   What are the causes of the vulnerability?
*   What aspects of the human system are at risk?
*   What might be done to improve human security and thereby reduce vulnerability?

Despite the obvious application of vulnerability research to ECC issues, these two research streams have not intersected. Recent attempts to map hot spots (areas of rising vulnerabilities) have been dominated by efforts to compile and standardize data to identify accumulating environmental stresses. However,

researchers need to move beyond these mapping exercises and embed the causal relationship between environmental stress and human vulnerability into these assessments.

10. Expanding methodological tools

We raise two questions regarding methodological tools:

a) While quantitative data are essential to analysis, they often cannot tell the whole story. Is it possible to strengthen analysis with the type of qualitative information produced by sociologists, anthropologists, historians, and other social scientists?

This perennial academic debate asks if research questions should be divided into those that require quantitative methodologies (e.g., an analysis of voting behavior) and those that require qualitative ones (e.g., an ethnography of a tribe in Irian Jaya). Can these two approaches be fruitfully combined? Environmental research lends itself to both quantitative and qualitative approaches; combining large studies and fine-grained case analysis is most likely to reveal the complex relationships among environment, conflict, and cooperation. Although it may be possible to establish general rules, the unique social dimensions of each incident can only be adequately captured through case study analysis, which may be essential for formulating policy and intervention strategies. Quantitative analysis can reveal the extent to which population and poverty are related to ECC, while qualitative analysis can differentiate specific cases so that each situation can be addressed based on its geopolitical and historical dimensions. For example, even though both Colombia and Haiti suffer from population pressures, environmental degradation, and long-term violent conflict, the situations emerged from qualitatively different contexts.

In the social sciences, researchers have concluded that quantitative and qualitative methods are not polar opposites but rather complementary forms of inquiry. Qualitative research has helped develop community buy-in for conservation measures, thereby providing a strong foundation for cooperation, and ultimately, for improving human security.

b) How can existing data be used with new visualization technologies like geographic information systems (GIS) and terrain mapping? What are the implications of such technologies for data collection?

New technologies can help researchers achieve their goals of identifying and visualizing relational patterns. Many researchers have already embraced the possibilities offered by GIS, and have used it to combine data with two-dimensional maps to reveal various social and environmental patterns. Other researchers have used systems modeling techniques to identify and establish relationships.

Emerging technologies such as terrain mapping, immersive environments, and virtual reality can effectively transform data into meaningful images. Terrain mapping applications literally add depth to geographic information systems by allowing data to be mapped on the "Z axis" of a three-dimensional grid. Researchers can model a flood's dynamics to find the safest locations for new infrastructure projects, or forecast the location and depth of an earthquake's epicenter. While science and engineering projects often use immersive environments and virtual realities, ECC researchers have not fully utilized these technologies to model ecosystem dynamics or environmental change (Center for Visualization and Interactive Systems, 2003).

The growth of wireless communication networks enables researchers to collect and analyze data in new ways: for example, studies on teenage smoking have utilized personal digital assistants to track smoking-related behaviors at different points of the day. As wireless networks expand in many parts of the world, researchers have already begun to use data collection devices that self-report levels of air pollution, traffic flow, or soil moisture. Computer graphics could also impact the way information is

gathered and communicated; while video games are mostly used for entertainment, they could provide a new way to reach the growing number of game players worldwide, especially youth, making them innovative tools for education and data collection.

Using such technologies requires careful consideration. For example, to use the new terrain visualization systems, places must be represented by not only longitude and latitude coordinates (x and y) but also altitude or depth coordinates (z). While such a change may appear simple, the additional data will need more storage capacity and, when considered on a global scale, could require a significant investment of time and resources. Researchers must weigh the potential uses of such technologies carefully to ensure that they add value commensurate to their costs. Tools like GIS render complex theoretical notions and combine disparate information sources; however, they still attempt to mirror the real world within the confines of a theoretical context. While new technologies may assist in research tasks, no new methodological innovation, tool, or computer program can replace robust theorizing about the links among environment, conflict, and cooperation. Nonetheless, these technologies could find a number of useful applications in ECC research, from mapping disputed resource areas or spillover effects of environmental problems, to developing user-friendly interfaces that allow the visual communication of large amounts of data to non-experts.

Gaps and Opportunities for Policy Analysis

We have identified five areas in which focused analysis could bolster policymaking. We have purposefully set these issues and recommendations within a human security context, recognizing that the traditional security community continues to debate the merits of departing from military-based security concepts. We have adopted this stance for two reasons: first, within the global environmental change (GEC) community, issues of conflict and cooperation receive relatively little attention, and when they are considered, GEC researchers use simplified results from studies investigating environmental processes (e.g., resource depletion will increase competition and thereby increase the risk of violent conflict) rather than explicit studies of human behavior.

Second, GEC research approaches the study of human activities from technological, economic, and institutional perspectives. Therefore, GEC agendas do not routinely include underlying issues that create imbalances in consumption and power. Human security could broaden the GEC agenda and provide a policy-relevant context for understanding human vulnerabilities to environmental stresses. Certainly, determining which regions and populations are most sensitive to environmental stress could build a strong foundation for policies.

1. **Conservation policy can promote or deepen cooperation, but it can also promote conflict and insecurity; policy analysis should determine which strategies promote cooperation, and under what conditions they are likely to succeed**

   While some conservation measures have improved human security and promoted social stability, other conservation measures have protected nature while reducing human security and leading to violence and misery. For example, national parks are often located in remote areas that are not easily accessed or developed. In the developed world, creating such national parks can reduce tensions between environmentalists and potential developers, and also provide greater security to indigenous groups who may be granted privileged access to protected areas. In contrast, creating such national parks in a developing country may actually deprive people living at the subsistence level of their livelihoods or a critical buffer zone. Even land unsuitable for sustained use may be valuable during periods of scarcity (e.g., drought). It is important to analyze policy in terms of the effects it has—or could have—on cooperation and conflict.

2. **While there has been a great deal of discussion about sustainable development, environmental and development policies often move in their own directions**

The GEC community has focused much of its attention on understanding the effects of human activities on the earth's system and has irrefutably proved that biogeochemical degradation from anthropogenic sources is a major threat to ecological stability. However, the development community, including development banks, aid agencies, and development NGOs, has not participated in this research, mainly because it views GEC as a long-term process and therefore only incidentally important to its immediate agenda.

However, many development and aid agencies have embraced sustainable development, which is invariably presented as a process that must transcend social, economic, and political dimensions. Furthermore, these agencies are realizing that sustainable development policies must be tailored to capture regional and national capabilities and opportunities. This awareness could bring the GEC and development communities closer together, especially if both recognize that bolstering human security is a prerequisite for mitigating human-induced GEC and promoting sustainable development.

3. **Policy analysis of urban development and planning should incorporate an environmental security perspective**

Since much of the population growth in the coming decades will occur in urban areas, policies that seek to increase human and environmental security must contain elements that address issues particular to urban contexts. Such policies should aim to make growth more manageable and create cities that are both secure and livable. "Livability" has two major components: livelihoods and sustainability. A "livelihood" is a job that offers a living wage in close proximity to affordable housing and accessible services and amenities. Sustainability has three components: first, livelihood requirements must be met without degrading or destroying the city's environment. Second, cities must have a sustainable relationship with their outskirts, since cities in this increasingly globalized world often have large ecological footprints. Finally, ecological sustainability involves "intergenerational justice," in which current needs are met without compromising the ability of future generations to meet their needs in a sustainable way (Evans, 2002).

As environmental problems often cross boundaries, addressing an environmental problem in one urban area may involve different government agencies at local, state, and national levels. However, regional regimes to develop and communicate comprehensive plans can ensure that urban problems are not simply offloaded on someone else. Researchers should seek to improve their understanding of policy designs that encourage meaningful cooperation between citizens and multiple levels of government.

Urban growth, which is predicted to increase in the coming decades, can be managed to assuage environmental security concerns and satisfy the livability needs of a city's inhabitants. However, if managed poorly, it can increase stresses on ecological systems, exacerbate grievances between different populations in urban areas, and augment insecurity in both urban and rural areas.

4. **Conservation and environmental development policies in areas emerging from protracted periods of violence, such as Afghanistan, Southern Africa, and Iraq, require more analysis**

The original agenda for a 2003 meeting organized by the interim government of Afghanistan and UN-Habitat on the reconstruction of Kabul did not include a single reference to the environment. Conference organizers enthusiastically welcomed GECHS-UCI's offer to prepare a presentation on environmental security and the reconstruction of Kabul (Gaulin & Hokuki, 2002). The paper suggested that Kabul's successful reconstruction and pacification depended on meeting its needs for water, food, energy, and waste treatment in a sustainable way. Bringing together rival factions, building confidence in the government through elections and open media, investing in social infrastructure, creating jobs, and establishing satisfactory law enforcement capabilities are necessary for recovery, but these improvements alone are

insufficient. When social circumstances are challenging, however, environmental policy is commonly viewed as a luxury item easily cut from the reconstruction agenda. Policymakers must ask themselves: What environmental policies are fundamental and will help ensure the long-term success of post-conflict reconstruction?

5. **Policy analysis must rigorously assess the effectiveness and sustainability of policy interventions**
High-quality data, indicating which programs have produced ecologically and socially sustainable practices, are necessary to fully investigate the theory that sustainable development can enhance human security, encourage social cooperation, and reduce social violence.

Conclusion

The rapid growth of environment, conflict, and cooperation research has exposed serious gaps in the development of this nascent field. Scholars could guide its evolution by taking the following steps: situate problems in a broader context; engage the literature on conflict and cooperation; conduct fine-grained, micro-level analysis; improve analysis of war's environmental effects; test the claim that conservation supports cooperation; study the urban dimension; clarify links between demography and environmental security; advance the scarcity/abundance debate; integrate knowledge about vulnerability and coping capacity; and expand methodological tools to include qualitative methods and new visualization technologies. This expanded analysis could support better policymaking by determining which conservation strategies promote cooperation; integrating development and environmental policy; incorporating environmental security into urban development and planning; deepening understanding of environmental policies in post-conflict situations; and rigorously assessing the effectiveness and sustainability of policy interventions.

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Beyond Scarcity vs. Abundance: A Policy Research Agenda for Natural Resources and Conflict

By Nils Petter Gleditsch

Armed conflict is a product of motivation and opportunity. The classic model of the relationship between natural resources and conflict focuses on the struggle for scarce natural resources. More recently, researchers have come to view an abundance of natural resources as an equally, if not more, important factor, because it provides economic opportunity for the contending parties. At PRIO's Centre for the Study of Civil War, our current project seeks to integrate these two schools of thought in order to move forward on the theoretical and empirical level, and help develop viable policies that ensure that natural resources are a blessing, not a curse.

The neo-Malthusian model of scarcity-driven conflict envisions population pressures and a high level of resource consumption combining to overexploit, degrade, and deplete resources, leading to competition and eventually to violent conflict. Thomas Homer-Dixon (1999), a prominent advocate of this school of thought, asserts that environmental scarcity is more likely to provoke internal conflict than interstate war. However, scarcities in non-renewable resources, such as oil and minerals, figure prominently in theories of international conflict. Among renewable resources, an adequate supply of fresh water is widely believed to be a possible source of conflict, especially between two countries that share a river basin (Gleick, 1993). Others suggest that conflict over fresh water is more likely to occur at the subnational level than between states, and that rapid changes in water supply (or the institutional inability to cope with them) are more important than levels of scarcity to identifying "basins at risk" (Wolf, Yoffe, & Giordano, 2003).

In contrast to the scarcity model, "the resource curse" theory links resource wealth to negative economic and political effects such as slow growth, poor governance, weak institutions, and political instability, which are also likely to promote armed conflict. Abundant natural resources play a key role in theories of conflict that emphasize opportunity (also known as greed theories).

Recent studies have integrated scarcity and abundance theories, identifying grievance (or motivation) and greed (or opportunity) as the two main explanations for civil war, and concluding that greed has greater explanatory power than grievance (Collier & Hoeffler, 2002). However, conflicts can be hard to explain strictly on the basis of opportunity, and the distinction between motivation and opportunity is not always clear. Future inquiry should assume that both motives and opportunity play a role in generating and sustaining conflict, and that resource scarcity *as well as* abundance can generate conflict.

Due to resource distribution, local scarcity can coexist with global abundance. While theories of impending resource scarcity and a worldwide "population explosion" can no longer sustain doomsday scenarios, local scarcity conflicts are still possible. And if natural resource abundance leads to slow growth, it can create scarcity conflicts. In addition, the exploitation of natural resources will, in many cases, lead to environmental deterioration, which can fuel new scarcities.

How are resource conflicts—whether driven by scarcity or abundance—mediated by political and economic factors? We hypothesize that:
- Economic growth drives resource depletion (including environmental destruction) until accumulated wealth produces new technology and dictates a change in priorities;
- Politics, however, has a linear relationship: the more democratic a country, the less resource depletion (everything else being equal); and
- Conflict has a negative relationship to wealth (Collier et al., 2003; Hegre, 2000), while it has an inverted U-shaped relationship to democracy.[11]

The impact of economic and political factors on conflict driven by resource abundance has not been extensively investigated. The different fates of diamond-rich countries like Botswana and Sierra Leone may be attributable to geological differences (e.g., Sierra Leone's diamonds are found in river beds and thus more easily looted), but institutional differences, such as poor governance and corruption, are also likely to have played a role (Acemoglu, Johnson, & Robinson, 2001). We hypothesize that the greater the degree of democracy, the greater the ability of a country to handle natural resource abundance. In addition, harvesting natural resources is likely to affect the relative status of different ethnic groups: where resource distribution coincides with ethnic boundaries, a country may be particularly at risk of conflict.

Previous empirical studies on the effects of resource scarcity and abundance on conflict suffer from a number of weaknesses. Most suffer from serious data problems, and most are single case studies in which the investigator already knew there was armed conflict, thus making it impossible to draw any conclusions about causal effects. However, the World Bank, World Resources Institute, and others are generating more precise natural capital estimates for a wider set of countries at the subnational level. Also promising is the approach outlined by Lujala & Buhaug (2003) and by Gilmore & Lujala (2003) to develop new datasets on the spatial distribution of selected natural resources, including oil, minerals, opium poppies, and coca. The developers should focus on resources that are highly lootable (e.g., alluvial diamonds), or that expose the government to extortion (e.g., oil exploration and transportation facilities).

Analyzing the importance of natural resources in armed conflict, seeking effective early warning systems, and developing methods to peacefully resolve resource conflicts remain critical tasks for the international research and policy community. These efforts must cast a wide net to gather expertise that ranges beyond political science and economics to include geography, resource geology, geomatics, and demography, along with perspectives from both the global North and South.

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[11] Democracies and autocracies have fewer civil wars (Hegre, Ellingsen, Gates, & Gleditsch, 2001), although this relationship may also be influenced by economic factors (Collier et al., 2003, page 53). Democracies rarely—if ever—fight each other (Gleditsch & Hegre, 1997); autocracies also fight wars less often than politically mixed dyads (Peceny & Beer, 2002).

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Pastoral Conflict Resolution in the Horn of Africa

By Eva Ludi and Tobias Hagmann

As pastoral societies are integrated into the global economy and national state-building efforts, conflicts involving pastoral communities[12] have proliferated, raising concerns for observers across the world. New resource use patterns are changing the socio-ecological parameters that guided traditional conflict resolution methods, and governments, NGOs, and international organizations are struggling to fill the gap.

Violent conflicts in the Horn of Africa have continuously increased over the past two decades. While the specific locations of these confrontations change with the political climate, the borders of Ethiopia, Somalia, Sudan, Kenya, and Uganda are notoriously insecure, as these nation-states have a long history of international and internal conflict. Since the 1970s, the region has been flooded by small arms; pastoral communities in semi-arid areas, which have traditionally herded their livestock across the colonial borders of these states, are arming themselves with weapons brought in by the region's brisk trade in arms.

This border region's pastoral societies, such as the Karamojong, Somali, Boran, and the Nuer, are gradually entering the global economy. With the development of large-scale irrigation projects, mechanized farming, and national parks, new user groups have begun competing for land and water in these regions. Consequently, the natural resource stock is increasingly under pressure to serve the interests of multiple users. State policies and actors, however, often lack the capacity and legitimacy to mitigate these phenomena. In Ethiopia, the central government's agenda of decentralization ("ethnic federalism") adds fuel to local conflicts for political power, which is based on territorial representation.

Although pastoral societies have traditional procedures and rituals to resolve conflict, new resource use patterns are changing the socio-ecological parameters that guided these conflict resolution methods. Reciprocal grazing rights, mutual assistance in times of drought, and other customary cooperation methods among rival user groups are weakening, which increases vulnerability to conflict. Governmental and non-governmental agencies are now devising strategies to prevent and halt resource-based conflicts, which are often driven by a number of other factors, such as political competition, ethnic or clan rivalry, the definition of local and regional boundaries, and access to humanitarian aid and other material goods. The quest for effective peace-building strategies to overcome these pastoral conflicts thus demands short-term (actor-oriented) and long-term (institutional) solutions.

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[12] "Pastoral conflicts" are defined as violent conflicts carried out by or involving pastoral communities (i.e., groups that earn their livelihoods from livestock herding).

For several years, Swisspeace has been involved in environmental change, conflict, and cooperation in the Horn of Africa. Recently, Swisspeace embarked on a new research partnership project within the framework of the National Centre of Competence in Research (NCCR) North-South Research Partnerships for Mitigating Syndromes of Global Change.[13] The program seeks to improve understanding of different syndromes of global change, the pressures these syndromes and their causes exert on different resources (human, natural, economic), and the responses of different social groups and society as a whole.[14]

NCCR North-South's in-depth case study research shows that traditional conflict resolution procedures are highly institutionalized. However, their effectiveness depends on a number of variables, such as the internal coherence of local communities, the interests and interventions by the central government, and the degree to which actors disagree over land tenure. The analysis of violent land conflicts in the Somali region of Ethiopia, for example, demonstrates the strength of traditional dispute resolution based on blood compensation: a killer's relatives pay their blood debt to the aggrieved party in livestock and cash; local government officials monitor this process and formalize it through legally binding agreements signed by the conflict parties.[15] Yet eroding resource tenure, driven by increased crop husbandry and charcoal production, constantly undermines such conflict resolution mechanisms. The traditional pastoral context, which is characterized by an environment in constant flux, recognizes that property rights are shifting and negotiated, rather than being clearly defined. The two different systems of resource use rules and conflict resolution strategies—those rooted in traditional institutions and those introduced by state institutions—are often in disagreement, which can lead to violent conflict over natural resources. Reconciling the two value systems will require great effort. Exploring institutional mechanisms for differentiating property rights and negotiating platforms is thus essential to transforming conflict in pastoral areas of the Horn of Africa.

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13 The NCCR North-South program is implemented by the Swiss National Science Foundation and co-funded by the Swiss Agency for Development and Cooperation. For more information, see http://www.nccr-north-south.unibe.ch
14 Syndromes are specific clusters of core problems linked to globalization, global disparities, and processes of global change.
15 The Somali are spread over four to five nation-states in the Horn of Africa: Somalia, Djibouti, Ethiopia, Kenya, and Somaliland (whose independence is disputed).

CHAPTER TW0

Institutionalizing Responses to Environment, Conflict, and Cooperation

By Alexander Carius and Geoffrey D. Dabelko

Munyaradzi Chenje

Abstract

Alexander Carius and Geoffrey D. Dabelko find gaps at all levels of institutional responses to environment and conflict. They recommend that institutions:

- *Seek to bridge disciplinary borders between academia and policy;*
- *Reduce compartmentalization within national governments, civil society, international organizations, and donor agencies;*
- *Balance participation by elite-level and broad-based stakeholders, including the private and security sectors;*
- *Achieve the appropriate scope for interventions; and*
- *Improve how policies are communicated, perceived, and justified.*

Finally, the authors propose that a dialogue on best practices and innovative institutional efforts will help researchers and policymakers move beyond reacting to symptoms of environment and security linkages and towards learning from interventions that bolster confidence and cooperation rather than instability.

21

Introduction[16]

In 1992, the United Nations' *Agenda for Peace* mandated pursuing preventive diplomacy and strengthening the Secretariat's early-warning systems to detect dangers to international peace and security, including environmental threats. The agenda identified sustainable development and the environment as the foundations of a peaceful world, and outlined an institutional framework to foster peace and security through cooperation (United Nations, 1992).

Eleven years later, the Secretary General signaled his intention to consider a wide range of issues within the context of international security by assembling the High-Level Panel on Global Threats, Challenges, and Change. Secretary General Kofi Annan charged the panel with "examining the major threats and challenges the world faces in the broad field of peace and security, including economic and social issues insofar as they relate to peace and security" (United Nations, 2003).

But more than a decade after the *Agenda for Peace*, environmental and security institutions are not coordinating policies and programs or integrating environmental concerns into development, foreign, and security policy. This deficit may be surprising, since international attention has focused on conflict over natural resources and risks emanating from environmental decline since the 1970s.[17] In the last fifteen years, international organizations and national governments have commissioned state-of-the-art research to understand linkages between environment and conflict.[18] Some organizations initiated programs to improve stability by reducing environmental stress, fostering sustainable development, and promoting environmental cooperation, such as NATO's Partnership for Peace, the Organization for Security and Cooperation in Europe (OSCE), and the United Nations Development Programme (UNDP), which were accompanied by a host of national initiatives in Canada, Switzerland, Germany, the United States, Australia, Sweden, and the United Kingdom.

Yet most environment, conflict, and cooperation (ECC) efforts within major national and international institutions are still in their infancy. Sovereignty concerns (such as those that led the Group of 77 to reject proposals for rapid response teams of "Green Helmets" to fight environmental degradation) or the traditional separation between security and development institutions stymied prominent forums. Analysis of effective institutional responses is also embryonic. However, if policy interventions can ameliorate environmental conflict, then more dialogue (particularly between North and South) should enable political organizations to solve these problems.

Institutional analysis and programming have remained ad hoc and tentative, in part because ECC analysis has not convinced researchers and policymakers in the conflict community. Many believe that environmental issues are already covered by traditional conflict prevention research, policy, and programs; environmental

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[16] This paper was written in consultation with Dr. Alexander López, director of the Mesoamerican Center for Sustainable Development of Dry Tropics, Universidad Nacional de Costa Rica. Alexander López is co-director, with Alexander Carius and Geoffrey D. Dabelko, of the Environment, Development, and Sustainable Peace Initiative (see http://www. sustainable-peace.org).

[17] The Club of Rome's *The Limits to Growth* (Meadows et al., 1972) and the *Global 2000* report (Council on Environmental Quality & U.S. Department of State, 1981) called attention to these risks and an array of associated socioeconomic problems (population growth, urbanization, migration) over thirty years ago. In 1987, the World Commission for Environment and Development (WCED) expanded the concept of security: "The whole notion of security as traditionally understood—in terms of political and military threats to national sovereignty—must be expanded to include the growing impacts of environmental stress—locally, nationally, regionally, and globally" (1987, page 19). The commission concluded that "environmental stress can thus be an important part of the web of causality associated with any conflict and can in some cases be catalytic" (WCED, 1987, page 291).

[18] The institutions include UNEP in 1988, NATO's Committee on the Challenges of Modern Society (Lietzmann & Vest, 1999), and the OECD Development Assistance Committee in 1998 (Dabelko et al., 1998). UNEP and the International Peace Research Institute, Oslo (PRIO) agreed in 1988 to carry out "Studies in Environmental Security" at PRIO. A joint UNEP/PRIO program on "Military Activities and the Human Environment" comprised empirical research projects that were largely conceived and implemented by PRIO. From this initiative, PRIO developed a strong research focus on environment and security. Publications produced from this effort include Westing (1988, 1989) and Lodgaard et al. (1989).

activities do not appear to directly lessen violent conflict, and conflict prevention efforts already address critical intervening variables such as the rule of law, democratic society, and land rights. Systematic institutional progress requires convincing the conflict community that environment, conflict, and cooperation connections pose threats and offer opportunities.

ECC research and policy have focused primarily on causal linkages between the environment, natural resources, and acute violence, but have paid much less attention to institutional and political responses to these linkages and to the broader set of ECC connections, including cooperation. By concentrating on scarcity, abundance, and violence, ECC research has neglected opportunities to explore the environment as a pathway to cooperation, confidence building, and peace.[19] This chapter focuses on gaps in policies designed to dampen environmental causes of conflict and foster environmental pathways to confidence building and peace.[20] Drawing on examples from conflict and cooperation perspectives on the environment and natural resources, it identifies lessons learned from institutional responses, while suggesting directions for future work in research and policy.

Gaps and Opportunities for Institutional Responses

Institutional gaps hinder the development of integrated approaches to natural resource management, conflict prevention, and peace building, particularly gaps in coordination, participation, scope, and communication.

1. **Bridge disciplinary borders**

    Research on conflict and environmental policy is fragmented. Even though several global institutional mechanisms foster interdisciplinary and transdisciplinary research efforts, ECC studies still depend on disciplinary divisions and funding schemes that do not encourage interdisciplinary and transdisciplinary work.

    Second, scarce international funding for research projects makes it difficult for analysts from developing countries to join ongoing research efforts. Since experts from developing countries are often invited to join an initiative after it has begun, they are unable to help structure it from its inception. In addition, Northern academic theories and methodologies dominate much of the available ECC literature in the South.[21]

    Third, research remains the province of academic communities, even though government-funded programs and foundations try to communicate research results. However, linking academia and policymaking is not easy; it requires intermediate institutions that translate policy demands for scientific communities, and vice versa. For example, the International Water Cooperation Facility (IWCF) integrates water management research and policy to resolve conflict and build confidence, but its approach is mostly academic. Former Vice President Al Gore's State Failure Task Force was a notable exception to the rule; however, once it

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[19] At least three sets of ECC linkages distinguish between the roles environmental conditions can play as part of a problem (e.g., tension or violence) and part of a solution (e.g., targeted policy interventions). On the most basic level, environmental conditions may contribute to tension or violence, and addressing those environmental conditions can be part of the solution. A second type of conflict may also be related to environmental conditions, but its solution requires addressing non-environmental conditions, such as improving governance (rule of law), building capacity (infrastructure), and reducing vulnerability (poverty). In a third category, known as "environmental peacemaking," environmental conditions may not be related to the conflict, but shared environmental dependencies may provide a pathway to successfully reducing tensions. See Ali (2003) for a detailed discussion of these three points and the importance of distinguishing among them.

[20] This chapter utilizes March and Olsen's definition of political institutions as "collections of interrelated rules and routines that define appropriate action in terms of relations between roles and situations. The process involves determining what the situation is, what role is being fulfilled, and what the obligations of that role in the situation are" (1989, page 21).

[21] The Environment, Development, and Sustainable Peace Initiative, directed by Adelphi Research in Germany, the Woodrow Wilson Center in Washington, D.C., and the Universidad Nacional de Costa Rica, has attempted to bridge the gap between North and South.

was reconstituted as the Political Instability Task Force, it moved away from investigating environmental and demographic variables.

Policy integration across disciplinary borders needs to start at the research level and subsequently move into policy spheres.[22] Conflict prevention and peace building networks should be encouraged to facilitate interaction among stakeholders and foster a broader debate in the field.[23] These networks seek to bridge the gap between science and research, raise policymakers' awareness of linkages between environment and security, and facilitate dialogue through meetings, newsletters, expert workshops, and public hearings. Coordinating each initiative under an overall platform might help environment and development institutions and peace and conflict networks benefit from already-established links, and allow them to reach beyond their traditional constituencies to include institutions from the South.

2.   Coordinate policy and reduce compartmentalization

Compartmentalized policymaking significantly constrains the development of integrated strategies for conflict prevention and natural resource management at the national, civil, international, and donor levels.

National

National governments are heavily compartmentalized, with clear but distinct mandates for specific subjects. Expertise on environment, development, and conflict prevention and mitigation is often spread among several departments. The limitations are obvious: the bureaucracy is too burdened by heavy administrative tasks to implement innovative features or react quickly to emerging issues in politics and society. Crosscutting issues such as ECC linkages require flexible administrative structures, but the linkage between natural resource management and security is usually championed by a single person or a smaller unit outside the mainstream. Support for linking issues across units, departments, or ministries is limited by the lack of time and human resources.

Over the past decade, public authorities in many European countries have preferred to knowingly maintain the separation between conflict and the environment, even though this topic cuts across policy portfolios. Which will prevail—separation or integration? If environment and conflict linkages are mainly the purview of environmental policymakers, they will continue to garner only marginal resources and political prominence. As development issues, they could be subsumed into well-established dialogues on poverty, equity, capacity building, and institutional strengthening, thus marginalizing natural resource issues. But if environment and conflict linkages are framed primarily by foreign and security policymakers, they might garner greater political attention. Yet these connections can hardly be expected to compete with more proximate threats on the security agenda.[24]

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[22] Examples include the Environmental Change and Security Project at the Woodrow Wilson Center, Leif Ohlsson's regular newsletter and database on Environment and Development Challenges, and the recently published information platform on Envrionment, Natural Resources, and Conflict, by Adelphi Research and the German Federal Ministry of the Environment (see http://www.krium.de).

[23] Examples include the Conflict, Development and Peace Network in the United Kingdom, which seeks to reduce violent conflict and improve policies and practice in work carried out by NGOs, academic institutions, consultants, and government departments; the Working Group on Development and Peace (FriEnt), a German NGO network for crisis prevention and conflict management; and the German platform for civil conflict management (Plattform Zivile Konfliktbearbeitung).

[24] The 2002 World Summit on Sustainable Development (WSSD) missed the opportunity to integrate conflict and peace into the environment and development agenda. Due to heavy competition among government authorities, space on the agenda was limited; as a result, environment and conflict issues never secured a prominent place at the summit (Baechler, Taenzler, & Carius, 2003). An additional example of this bureaucratic compartmentalization is the low-level dispute between German authorities and institutions on the role of environmental and development policy in addressing poverty and environment linkages in German institutions.

Civil society

The structures of NGOs and research organizations are also compartmentalized, making it extremely difficult to bridge disciplinary gaps. While some peace activist groups are starting to address natural resource management issues, environmental NGOs hesitate to approach security issues beyond the well-established links like poverty and environment, or gender mainstreaming and environment. For the most part, environmental NGOs do not stray from their field of expertise; only a few have addressed newly emerging topics like ECC linkages. Similarly, most peace and conflict civil society groups focus on their core issues, such as peace building, post-conflict intervention, and poverty eradication, and often neglect environmental dimensions of these problems. In addition, major public and private donors typically fund only those projects and issues that correspond to their segmented priorities. Without pressure from active public interest groups, it is difficult to raise the policy profile of new and unconventional ideas like the security implications of environmental change.

International

Inter-institutional cooperation is difficult to achieve both nationally and internationally, given institutions' limited mandates and specific interests, such as regional focus or ownership. And even within a single policy area, such as environmental policy, responsibility for negotiating and implementing multilateral environmental agreements is spread among various government authorities and ministries. Although international organizations are aware of this gap, it remains under-analyzed. International organizations, including those within the UN family, often lack effective coordination. Confronting the complex web of causalities and pathways responsible for environmental conflicts (especially water conflicts) requires significant interagency cooperation.

UNEP, UNDP, and OSCE are cooperating to jointly address environmental risks in Southeastern Europe, the Southern Caucasus, and Central Asia, where water plays a key role in tension and conflict.[25] This collaboration brings together the organizations' unique expertise in assessment, training, and policy development, as well as combining environment, development, and security perspectives. In addition to its direct impact on the region, this joint effort provides an institutional framework to address complex environmental risks (Carius et al., 2003). But such inter-institutional efforts require significant commitment and time to raise awareness and develop programs.[26]

Donor agencies

That donor agencies suffer from compartmentalization might be surprising, since institutional strengthening, innovative approaches to public policy, and integrated policymaking are key priorities for donor assistance to developing countries. However, donor programs and activities often utilize isolated approaches without coordinating with other divisions within aid agencies and governments. In fact, there is little evidence—or effective models—of successful coordination between environment and conflict prevention units. In some cases, multiple funding programs with the same agency, such as those focusing on the Caspian Sea, are attempting to achieve the same goal but are not coordinating their efforts and thus work at cross-purposes (Blum, 2002).

Research on transboundary water cooperation demonstrates the need for greater coordination and cooperation among donor programs. Donor-funded technical assistance is often narrowly focused, regionally or topically, and rarely takes environmental, economic, and social issues into account. Western donor agencies' bilateral programs are supposed to be coordinated in the Organisation for Economic

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[25] For more information on this joint effort by UNEP, UNDP, and OSCE, see the brief article by Gianluca Rampolla on page 51.

[26] Another interesting international example is the European Union's Cardiff Strategy, which seeks to integrate environmental concerns into all EU policy areas. The General Affairs Council in charge of external and general European affairs published a strategy paper in 2001 that includes environmental security in the future of the EU's foreign and security policy.

Cooperation and Development's Development Assistance Committee (OECD DAC); however, donor agencies commonly follow their own institutional interests to the detriment of integrated efforts. Innovative collaborative mechanisms that pool funders' resources and enable stakeholders to participate in funding decisions (such as the Global Fund to Fight AIDS, Tuberculosis, and Malaria) remain out of reach in the ECC realm.

A second problem emerges when a donor agency tries to shift from the program to the project level: even when policy programs stress integrated approaches, they are not typically implemented at the project level.[27] Donor agencies continue to improve ways to integrate vulnerability and conflict assessments, despite their limited experience addressing ECC issues.

The U.S. Agency for International Development (USAID) is preparing briefing notes on natural resources and conflict for USAID mission staff that draw valuable lessons from case studies conducted by individual experts and academic institutions.[28] While accumulating knowledge from past experience is very common on the technical level (e.g., through best practices workshops), ECC policy does not yet utilize such learning mechanisms. In fact, there are only a few attempts within bilateral agencies and by multilateral donors to draw lessons from an aid agency's past experience. The World Bank's transboundary water team, a key facilitator in the Nile Basin Initiative (NBI), is a notable exception: lessons drawn from the NBI experience are proactively shared with other river basins.[29]

3. Balance elite-level and broad-based stakeholder negotiations

Public participation

Determining the correct level of stakeholder participation is a crucial step towards developing policies and assuring effective implementation. While widespread public participation is generally thought to lead to more legitimate and long-lasting agreements, fully participatory negotiations may be too unwieldy or contentious to produce any consensus. Some policymakers and academics argue that in certain situations, a small number of key decision-makers should negotiate in relative secrecy to increase the likelihood of success. The NBI, facilitated by the World Bank and UNDP, adopted this elite-driven model for its regular ministerial level negotiations. Shielded from the press, these negotiations successfully produced agreements, but critics maintain that limiting civil society's involvement in the process may undercut the agreements' durability and public acceptance in the long run. To address this gap, practitioners and stakeholders should determine the best combination of elite model negotiations and broad-based stakeholder participation for each case, drawing lessons from cross-regional comparisons.[30]

Formal and informal mechanisms—ad hoc working groups, formal stakeholder dialogues, and institutionalizing crosscutting issues—facilitate policy coordination. But these mechanisms have not yet integrated security considerations into environmental and development policy programs and strategies. Without an institutional structure that allows stakeholders to advocate for integrating security considerations into policy, policymakers will not be challenged to respond to this gap.

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[27] Although UNDP has championed integrating environment and conflict, they have yet to implement these principles at the project level. For example, their development program for Kyrgyzstan sought to contribute to the nation's capabilities for identifying conflict, early warning, and peace building in the Ferghana Valley. Surprisingly, UNDP did not include environmental aspects as crucial elements of the early warning system.

[28] To draft natural resources and conflict toolkits, USAID's Office of Conflict Management and Mitigation worked with a partnership of international research institutions: the Center for International Forestry Research (based in Indonesia), Germany's Adelphi Research, and the United States' Woodrow Wilson Center.

[29] See http://www.nilebasin.org

[30] For more information on stakeholder participation and the Nile Basin Initiative, see the brief article by Patricia Kameri-Mbote on page 36.

Private sector

The private sector's potential contributions to ECC dialogue have been underestimated, and are only now beginning to attract study. For example, a report published by International Alert, an NGO based in London, examined the role of transnational companies in conflict-prone zones (Banfield, Haufler, & Lilly, 2003), as did an international workshop hosted by the Protestant Academy in Loccum and Inwent-Capacity Building International in October 2003.[31] In addition, the German Federal Ministry for the Environment commissioned Adelphi Research to conduct a report on the private sector's capacity to address natural resource conflicts and promote peace, and to facilitate a dialogue with companies in Germany.[32]

However, these efforts have demonstrated the clear distinction between the private sector's engagement in environmental management and sustainable development on one hand, and conflict prevention and corporate social responsibility on the other. Accordingly, businesses have developed policies and methodologies to address environmental operating risks and reduce negative environmental impacts of their operations that are distinct from their efforts to protect their business operations from external security threats. Even though private companies are increasingly interested in improving their social responsibility and developing strategies to reduce the social impacts of their business operations, companies are only slowly recognizing the linkages between natural resource exploitation and security concerns (mainly in the extractive industries).

Therefore, it is critically important to involve the business sector in strategies that address environment and security linkages in developing countries, as they are often the biggest player in terms of money, impact, and influence. However, there is no regulatory framework that integrates these interests and policies, beyond such mechanisms as the UN Global Compact, corporate social responsibility guidelines, and voluntary codes of conduct.[33]

Security sector

Participation by security's traditional stakeholders—the intelligence community and the military—is also lacking. As the security sector's intellectual, technical, and strategic capacity to assess conflict evolves, its involvement in peace-building activities and programs raises the concerns of developing countries and Western civil action groups, who fear that military and defense forces will apply traditional means of conflict prevention and mitigation. In addition, civil groups located in developing countries that have recently emerged from the military's control are reluctant to support any initiative that might cede more power to the security sector. For example, public opinion in Latin America is extremely skeptical of the traditional role of the military, and it is unclear that the public will support the military's involvement in addressing transnational threats like the environment (Da Costa, 2001). It is challenging to involve these important stakeholders in the debate on environment and security and still prevent it from being militarized or creating sovereignty concerns in many developing countries.

4. Achieve the appropriate scope for interventions

Western governments have traditionally favored addressing environment and security issues by strengthening multilateral environmental agreements. But these agreements are limited to environmental problems, even though the scope has often been extended to include sustainability issues. Dispute resolution mechanisms can only address conflicts over the content and interpretation of these agreements' regulatory schemes; therefore, they cannot serve as a tool for broader confidence building or conflict

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[31] The "Ecology and Peace in Crisis-Prone Regions" conference discussed the specific role of the private sector in sustainable development and conflict prevention. The conference proceedings will be published by the Loccum Academy; see http://www.loccum.de/english/english.html

[32] For more information on Adelphi's projects, see http://www.adelphi-research.de/en/projects/item/0/52.html

[33] The UN Global Compact is an international initiative that seeks to bring companies together with UN agencies, labour, and civil society to support ten principles in the areas of human rights, labour, and the environment (see http://www.unglobalcompact.org).

prevention. The scope of multilateral and regional environmental agreements is often too large to address the environmental causes of conflicts or trigger environmental cooperation at the local level; such conventions are often criticized as an inappropriate way to reach affected communities and stakeholders on the ground. These tools appear woefully inadequate for livelihood conflicts and their connection to natural resources, a critical level of analysis (Baechler et al., 2002; Matthew et al., 2002; Najam, 2003). In contrast, smaller-scale environmental cooperation can reduce social gaps that often underlie causes of conflict in developing countries.[34]

The duration and magnitude of donor assistance and governmental intervention must match the program's needs to attain success. The NBI illustrates the need for strong financial commitments over a long period of time; the initiative used a holistic approach to river basin management and made a twenty-year commitment to facilitate negotiations. Robust, durable, and fully funded institutions are especially critical for developing countries; many good projects cease once the external financial support ends. Donor agencies have already started to shift from project funding to program development, focusing on integrated development over longer time spans. However, the relationship between natural resources and conflict has not been integrated into these efforts.

The German Technical Cooperation (GTZ) offers a promising approach to integrating conflict prevention in sector-specific programs: it conducts peace and conflict impact assessments across regions and subject areas, and has set up a conflict prevention unit that advises regional and sector-specific departments within the donor agency; however, these mechanisms do not currently include an environmental dimension. The Swiss Agency for Development and Cooperation (SDC) was the first donor agency to conduct Peace and Conflict Impact Assessments for natural resource projects. SDC is currently reviewing this tool, conducting workshops on lessons learned, and improving its methodology.[35]

5. Improve communication, perception, and data
Current ECC framing conventions can unintentionally exclude stakeholders
How ECC issues and policies are described and communicated affects their chances for success. Some ministries argue that they already know, especially in conflict prone areas, that technical cooperation can serve as a tool for confidence building and one should not frame such projects explicitly as conflict prevention or peace building efforts. Following this line of reasoning, donor agencies sometimes do not want to label their projects and programs as conflict prevention measures to avoid misunderstanding and enable project implementation to move beyond immediate security concerns.

How a problem is labeled often determines which sector will participate in its solution. For example, conceptualizing water stress in terms of conflict brings the security actors to the table and discourages key development partners. The shift from labeling water issues as conflicts to tools for cooperation was supported by scientists and policymakers at the 2003 Third World Water Forum in Kyoto. UNESCO and Green Cross International's Potential Conflict to Cooperation Potential (PCCP) project on water cooperation clearly indicates that political attention has shifted away from water conflicts (2003).

Local communities may also object to how ECC projects are labeled. For example, some communities may not like being defined as conflict-prone in order to receive development aid. This can be especially

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[34] The Friends of the Earth Middle East project Good Water Makes Good Neighbors seeks to lessen these gaps and increase understanding among Israeli, Palestinian, and Jordanian communities by facilitating partnerships among bordering communities that are mutually dependent on water and waste management (see http://www.foeme.org/main/water_neighbors.htm).

[35] The SDC has also successfully applied this method in Angola, the Great Lakes region, Ecuador, Macedonia, and in Central Asia. It is currently developing a standard methodology for development assistance programs based on its experience (see http://www.deza.admin.ch).

sensitive in developing countries that have recently experienced acute conflict, and which may not want to approach a problem through a conflict lens.

Differences between labels and results can hurt projects

Environmental cooperation (particularly on water issues) is often cited as a tool for confidence building, based on the assumption that environmental politics or water issues are less contentious than other issues like human rights, education, or language. However, in Central Asia, water cooperation is highly political; while water negotiations among the new states of the former Soviet Union helped them assert their sovereignty, it did not dramatically improve regional water coordination (Weinthal, 2002). Similarly, many think that peace parks, by providing a demilitarized buffer zone, are a promising tool for cross-border cooperation between former enemies.[36] However, recent research reveals that peace parks have produced many conflicts over biodiversity protection, economic activities, and user rights. In these cases, conservation cooperation and water negotiations are themselves the source of conflict.[37]

Sometimes environmental issues provide a path to reach larger peace and stability goals, even though environmental conditions do not improve. For example, an integrated risk assessment for Central Asia found that environmental cooperation efforts contributed to regional stability, but failed to solve the region's environmental problems (Carius et al., 2003; Sievers, 2002).[38]

Framing ECC linkages for policymakers

When asked about ECC issues, environmental policymakers stress limited financial resources, restricted mandates, little experience with peace building, and overburdened environmental politics. Foreign policymakers argue that natural resource scarcity and degradation are merely underlying factors, not proximate causes of conflict, and that they should not privilege environmental contributions. The development community feels that framework conditions determine whether environmental stress leads to conflict, and that ECC linkages are embedded in already existing policies. Therefore, ECC issues are often championed by those on the fringes of the environmental, foreign policy, and development communities, such as intermediate organizations or politically weaker units.

To push the ECC debate forward, we should frame it in a broader and well-established policy context. The ECC debate on climate change and security could be integrated into the policy framework for vulnerability and adaptation, enabling policymakers, civil society groups, and academic institutions to rely on well-established networks. Alternative contexts or frames include the concept of human security, human rights and environment, local livelihoods, and poverty eradication. As these issue linkages are already present on the development agenda, they could benefit from existing networks and funding schemes.

UNEP and other international organizations might help to overcome this communication deficit by conducting integrated vulnerability assessments to identify hot spots and issue linkages. When donor agencies develop projects, the impacts and results of these projects should be monitored and the lessons shared. Thus, UNEP and others should establish a system that monitors success and translates these results into political terms. But given that UNEP's mandate is limited to environmental issues, and bearing in mind the risk of reducing the debate to mainly environmental topics, UNEP would need to partner with other institutions, as in UNEP, UNDP, and OSCE's joint initiative (Carius et al., 2003).

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[36] See the brief article by Saleem H. Ali on page 34 for a discussion of the K-2 Peace Park proposal in India and Pakistan.
[37] For an overview on the limits of nature conservation as a tool for confidence building, see Carius (2003) and Schroeder-Wildberg (2003).
[38] See the brief article by Alexander López on page 48 on the Lempa River Basin's Trifinio Plan.

Lack of legitimate data makes it difficult to convince policymakers and motivate political will

While many vulnerability assessments have been carried out on a global, regional, national, domestic and even local level,[39] most of these efforts focus on the global scale, and several have been criticized for neglecting specific regional and local information. UNEP, UNDP, and OSCE's joint initiative clearly demonstrates the problem of data legitimacy: data generation is highly contested, emerging from various consultative processes, rules, and routines, including intergovernmental negotiations (as in the case of the indicators for UNDP's annual *Human Development Report)*. This deficit can be addressed by using broader consultative processes that involve governments, NGOs, and multilateral and bilateral aid agencies; such broadly accepted assessments enable stakeholders to prepare appropriate policies and programs.[40] For example, data generation and legitimacy is a crucial issue in transboundary water management and can only be achieved through stakeholder involvement (Turton, 2003; Turton and Henwood, 2002). The process of determining data standards is itself a step along the pathway to using environmental issues as a confidence-building tool.

Methodologies and technologies that improve data sharing, especially between Northern and Southern researchers, would help policy development. In addition, cross-boundary data sharing between Southern researchers and policymakers could lead to increased cooperation and confidence building, as it would reduce suspicion among states.

Integrating Environment, Conflict, Cooperation, and Peace

The previous sections outlined gaps and opportunities in institutional responses to ECC linkages. As we continue to analyze the relationship between environment and conflict, moving away from an exclusive focus on resource scarcity as a source of conflict, and towards using environmental cooperation efforts to promote peace and stability, institutional coordination becomes increasingly important.

To benefit from the dynamic dialogue between academic institutions and policymakers, we need to integrate research programs across disciplinary borders, leading to greater coherence among the environmental, development, and peace and conflict research communities. In addition, we should facilitate mechanisms and institutions to bridge the gap between academic communities and policymakers. The ECC debate goes beyond single-issue approaches and requires broader communication platforms and ways to learn from past experiences. Accumulating knowledge from practical project implementation would help shape research efforts to meet political and societal needs.

Regional and transboundary efforts for environmental cooperation, especially in conflict-prone areas, are only beginning and cannot yet be deemed successes. They require long-term project cycles and careful assessments of their interaction with parallel political and social processes and institutions. Most importantly, we must determine which mechanisms effectively prevent conflict. So far, we know little about the level and type of participation, the shape of institutions, the degree of coordination, and the conditions under which technical cooperation becomes political cooperation and produces high levels of trust and confidence.

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[39] This includes the GLASS model to assess water crises, the U.S. government's Political Instability Task Force (http://www.cidcm.umd.edu/inscr/stfail/), Swisspeace's FAST Project (http://www.swisspeace.org/fast/default.htm), the World Water Assessment Programme (http://www.unesco.org/water/wwap/), and the Forum on Early Warning and Early Response (http://www.fewer.org/).

[40] Innovative approaches to generating, sharing, and interpreting data have been introduced by Swisspeace in several conflict-related projects in the Horn of Africa and on the Blue Nile, including an academic exchange program. See the brief article by Eva Ludi and Tobias Hagmann on page 19 for more information on Swisspeace's research program in the Horn of Africa.

Focusing on environmental cooperation within states and across borders can generate insights from existing cases, as demonstrated by the rich case studies produced by the PCCP project (2003). We also must ask the right questions in the right context: which measures have proven to be successful in the past or in other issue areas? What factors make institutions successful and what elements make them durable? What are the common features of unsuccessful institutions or institutional responses? Which social groups need to be strengthened? Which institutions should be established? How can we promote fairness when building institutions? As these questions are not specific to ECC linkages, the portfolio of potential interventions is rather broad, including environmental, social, political, economic, and security measures. Developing toolkits for incorporating environmental cooperation into conflict prevention would therefore include a set of specific questions and mechanisms to monitor progress and assess the dynamics of ECC processes.

Institutional efforts to address environment and security linkages are crucial to developing effective and appropriate mitigation and preventive strategies. Yet researchers' understandings and policymakers' interventions remain weak. To promote the design and implementation of effective institutional frameworks, researchers, policymakers, and civil society should initiate a broader, more practical dialogue on best practices and on transferring innovative institutional efforts. Researchers in particular must turn their attention from determining causal linkages to assessing the effectiveness of institutional interventions. Policymakers must move beyond reacting to symptoms of environment and security linkages and learn from institutional interventions that bolster confidence and cooperation rather than instability.

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The K-2-Siachen Peace Park: Moving from Concept to Reality

By Saleem H. Ali

Christian Lambrechts

For the past several years, various constituencies in South Asia and beyond have been following a vision of environmental cooperation and attempting to establish a jointly managed conservation area or "peace park" in the Karakoram mountains, which divide the hostile nations of India and Pakistan. Researchers, mountaineers, and conservationists have joined forces to promote this concept to make this magnificent region safe for geographers, tourists, and snow leopards, despite the ever-present threat of conflict. But most intriguingly, the K-2 Peace Park may help bring peace to its neighbors by providing a mechanism for resolving conflict.

Peace parks—more formally called transboundary conservation areas for peace and cooperation—use efforts to conserve the environment as a neutral way to build peace between neighboring countries. The idea can be traced back to the time-tested tradition of post-war memorials aimed at healing wounds between adversaries. However, most existing peace parks are located between parties that are not actually fighting, such as the many peace parks located on the U.S.-Canadian border. A more ambitious project in the Cordillera del Condor region between Ecuador and Peru, an area in dispute for decades, has witnessed a great reduction in conflict, arguably as a result of overtures from both sides during the peace park process. However, direct causality is questionable, as the conservation zones were not established as they were initially negotiated.

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The K-2 Peace Park, while unlikely to bring peace to India and Pakistan by itself, may be a catalyzing variable that hastens the peace-building process and makes it more durable. To that end, the project continues to push forward, by bringing the proposal to policymakers and attempting to overcome some of the concept's physical constraints and political hurdles. For example, what role would the militaries play? As absolute demilitarization is unrealistic in this case, the project is considering encouraging the militaries to act as rangers and help manage the park, which would allay fears about security and allow the two armies to work together for a constructive purpose.

Another issue facing the project is delineating the park's border, which would have to be undertaken in phases to develop trust between the countries. Visitor access, too, poses a problem: do tourists visiting the park need visas to both countries? More realistically, visitors from either India or Pakistan could be allowed to enter the peace park on their entry visas from either country, but would not be permitted to cross over the park's boundary into the other country.

To begin the process, both countries must overcome their institutional inertia and sign an agreement in principle. In 2004, a unified grassroots campaign, combined with a strategic push from influential groups, will seek to usher in the fiftieth anniversary of the first ascent of K-2 with a small step towards peace. For more information, please visit http://www.k2peacepark.org

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Stakeholder Participation and Transboundary Waters: The Nile Basin Initiative

By Patricia Kameri-Mbote

Inger Andersen

Transboundary waters (watercourses that traverse different states) are challenging to manage. States' interests differ according to their national requirements, and the needs of groups of people within those states can also diverge. These conflicting interests could lead to violence, which could be avoided if states and other basin users cooperatively manage the resource. The Nile Basin Initiative (NBI), which brings together the countries that share the basin, offers some unique lessons on the role of stakeholder participation in encouraging cooperation and preventing conflict.

About 160 million people depend on the Nile Basin, which covers an area of about three million square kilometres in ten countries (Ethiopia, Eritrea, Egypt, Sudan, Kenya, Uganda, Tanzania, the Democratic Republic of Congo, Rwanda, and Burundi). Relationships between these countries have traditionally suffered from mutual recriminations, regional conflict, drought, and other problems. Formally established in 1999, NBI brought them together to develop the resources of the Nile for the benefit of all, or, according to its vision statement, "to achieve sustainable socioeconomic development through equitable utilization of, and benefit from the common Nile basin water resources."[41]

The NBI has established a two-part program to develop the basin in a sustainable and equitable way. First, the Shared Vision Programme helps create an enabling environment for addressing issues such as regional power markets, water resource planning, confidence building and stakeholder participation, socioeconomic

41   For more information, see http://www.nilebasin.org

development, and benefit sharing. Secondly, the Subsidiary Action Programme involves two specific groups of riparian countries: the Eastern Nile Subsidiary Action Programme (ENSAP), covering Ethiopia, Eritrea, Egypt, and Sudan, and the Nile Equatorial Lakes Subsidiary Action Programme (NELSAP), which represents Sudan, Egypt, Burundi, Rwanda, Uganda, Tanzania, Kenya, and the Democratic Republic of Congo. These subsidiary action programmes intervene at the inter-basin level to reduce poverty, foster economic development, and increase opportunities for cooperation between riparian countries.

The NBI was developed at a very high political level; building a cooperative framework in a multi-state environment is a fragile process, easily threatened by mistrust, so only national governments were directly involved in the NBI's development. However, since the inhabitants of a river basin play a critical role in the success of any internationally negotiated management arrangement, interstate negotiations should also include stakeholders beyond the national governments. Basin users' competing needs should be managed by using local level mechanisms and nationally devised principles, and by eliminating legal and policy conflicts between different states. The Nile Basin Discourse, established by a group of civil society organizations across the basin, seeks to do this by:

- Promoting a broad-based, open dialogue on development in the Nile Basin;
- Developing a database of stakeholders;
- Facilitating interaction between stakeholders;
- Catalyzing national discourses in the 10 riparian countries;
- Creating space for national discourse on the status of people dependent on the Nile; and
- Capturing the voices of all stakeholders at national and subnational levels, especially local residents, community-based organizations, and others concerned with poverty, food security, economic and social human rights, and the threats posed by accelerating environmental degradation.

Increasing stakeholder participation through the Nile Basin Discourse will improve the NBI's effectiveness, but establishing the discourse has not been easy. Governments are still wary of engaging civil society due to the fragile state of cooperation in the basin. Open stakeholder participation raises significant questions; for example, given the open nature of the dialogue and the diverse entities involved, how does one establish an agenda that is not dominated by the interests of powerful groups?

In conclusion, stakeholder participation in the management of transboundary water must be examined in the context of procedural rights, such as those outlined in Principle 10 of the Rio Declaration:

- Access to information by all;
- Public participation in decision-making;
- Freedom of association; and
- Access to justice.

Engendering stakeholder participation in transboundary water management is not a smooth process; it is essentially political and easily captured by interest groups. A management regime must endeavour to engage all stakeholders equally—however expensive that may be—to guarantee success.

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CHAPTER THREE

Early Warning and Assessment of Environment, Conflict, and Cooperation

By Marc A. Levy and Patrick Philippe Meier

D. Riva/UNEP/Still Pictures

Abstract

Marc Levy and Patrick Philippe Meier recommend that assessments and early warning systems integrate environmental variables more completely and effectively. The authors assert that the international system has little capacity to monitor and assess conflict and cooperation on environmental issues because:

- *There are few incentives to carry out high-quality assessments or monitoring exercises;*
- *The necessary data are not available; and*
- *There is not enough experimentation, testing, and innovation to develop new methodologies.*

To address these deficiencies, the authors recommend:
- *Setting core priorities concerning assessments and monitoring;*
- *Establishing clear incentives and lines of responsibility to produce appropriate data;*
- *Establishing clear financial bases for these activities; and*
- *Creating an information infrastructure to achieve economies of scale, to disseminate data and knowledge, and to bridge cross-scale divides.*

Introduction

To build peace, confidence, and cooperation around environmental issues, we must monitor and assess environmental data in a timely manner. Although the last decade's efforts to develop this field generated only limited data, we are poised on the threshold of an era that is potentially far more productive. Monitoring, integrated assessment, and early warning systems, if properly supported, funded, and formulated, could vastly improve our understanding of the linkages among environment, conflict, and cooperation, and thus help us prevent violence.

In this chapter, we differentiate among three interrelated functions: "monitoring" collects data and information (and sometimes creates indicators) used to evaluate, diagnose, and triage environmental issues. "Integrated assessment" uses empirical observations and mathematical models to support decision-making across environmental and socioeconomic domains; for example, an analysis of vulnerability to climate change would be an integrated assessment. "Early warning" activities seek to rapidly identify critical situations and cooperative opportunities to facilitate early response; for example, the USAID-funded Famine Early Warning System Network (FEWS NET) provides early warning and vulnerability information on emerging or evolving food security issues in Africa. While these functions often blend together in practice, each step requires increased information and analysis:
- Monitoring requires regular observations in limited domains.
- Integrated assessment incorporates data across different domains and uses cutting-edge analytical techniques.
- Early warning assesses advanced data and analysis in a challenging, fast-paced timeframe.

We investigated a range of monitoring, integrated assessment, and early warning efforts—some focus on conflict, others are primarily environmental in scope, and a few examine the interactions between environment and conflict. We found:
1) At the broadest level, the international system's capacity to monitor and assess confidence building, cooperation, and peacemaking based on environmental issues is low. Most policies are only loosely connected to empirically grounded assessments, and most actions pay scant attention to monitoring or empirically based evaluation.
2) Therefore, cooperative measures are underfunded and resources aimed at building cooperation are not effectively allocated.
3) The international system lacks three factors essential to improving monitoring and integrated assessments:
   - Incentives: Very few actors have the appropriate incentives to carry out high-quality assessments or monitoring exercises.
   - Data: The data necessary to assess and monitor cooperative measures are not available.
   - Methods: Understanding environmental-political linkages requires new methodologies, which must be developed through innovation, experimentation, and testing.

To correct these deficiencies, we recommend the following steps:
- Set core priorities and identify the types of assessments to support and actions to monitor;
- Establish clear lines of responsibility and incentives to produce appropriate data;
- Establish clear financial bases for these activities; and

- Create an information infrastructure to achieve economies of scale, disseminate data and knowledge, and bridge cross-scale divides.

Gaps and Opportunities in Early Warning and Assessment

1. Capacity is too low

The international community has identified a wide range of environmental socio-political phenomena to tackle; Table 1 lists questions that monitoring, assessment, and early warning systems need to address for each action.

Table 1: Monitoring, assessment, and early warning needs

Action	Assessment	Early Warning	Monitoring
Mitigate and respond to climate change and climate vulnerability	What are the expected impacts of climate change? What actions are most suitable?	Where are groups most vulnerable?	Where is vulnerability increasing or decreasing?
Conserve biological diversity	Where is biodiversity especially rich? What actions will best conserve it?	Where are the "hotspots"?	How are pressures changing? Where is biodiversity being protected?
Manage freshwater resources more effectively	Which areas have the greatest potential for conflict over water resources?	When and where will access to clean water be restricted by drought, poor quality, or inequitable distribution?	Who is effectively managing water quality, quantity, and access problems, and how?
Promote sustainable use of natural resources such as forests, fisheries, arable land, and minerals	Where are use patterns sustainable? What actions will encourage sustainable use?	Where are resources likely to "crash"?	Is natural resource use becoming more or less sustainable?
Achieve the Millennium Development Goals, which span a range of human and environmental phenomena including hunger, poverty, and health	What role do environmental factors play in efforts to achieve goals to reduce poverty, improve health, and ensure access to water?	Are there places in danger of ecocatastrophe, as happened to the Aral Sea?	Where are goals being achieved? What efforts are being implemented?
Reduce vulnerability to natural disasters	What role do environmental conditions play in the risk of natural disasters?	Which places are experiencing conditions that make them especially vulnerable over the short term?	Where is vulnerability increasing or decreasing?

These actions, drawn from the top of the human-environment agenda, could involve hundreds of billions of dollars in investments and potential benefits. However, for the most part, the ability of the international system to meet monitoring, assessment, and early warning needs remains quite low.

Over the past decade, several billion dollars in bilateral and multilateral aid has been spent on environmental activities, yet the results are scarcely monitored. Monitoring overwhelmingly concentrates on procedural or contractual outcomes, like expenditures and accounting; currently, major donor organizations do not have adequate data to draw firm conclusions about the social or environmental consequences of the actions they have financed. The Global Environmental Facility's (GEF) *Second Overall Performance Study*, for example, blamed a lack of baseline data and other shortcomings for its inability to draw robust conclusions about the impact of GEF's projects on the environment (2001). Even though most aid is

linked formally or informally to multilateral environmental agreements, one study concluded that "nearly every international environmental agreement lacks a formal mechanism for rigorous monitoring of compliance" (Victor, 1999, pages 152-153).

Assessments are also inadequate: assessments of climate change vulnerability remain fragmented, unspecific, and imprecise; biodiversity conservation assessments are similarly ad hoc. Global natural resource assessments rely on thin evidence and focus on arbitrarily narrow formulations; for example, forest assessments are often fixated on measuring the forest cover's relative size, and neglect changes in livelihoods or the cover's effects on water, soil, and other resources. The 2003 *World Water Development Report* referred to quantitative assessments of global water resources only in passing (UNESCO, 2003).[42]

Early warning systems are also behind the times: many more environmental crises have occurred than have been successfully anticipated. Although FEWS NET's food security system is an exception, there have not been any sustained efforts to link environmental early warning to conflict early warning, in spite of the significant attention paid to the linkages over the past 15 years (O'Brien, 2002).

2. Low capacity contributes to poor decisions

The international system's inability to meet these needs has a number of pernicious effects. First, it is partly responsible for the international community's poor track record in environmental decision-making; with some exceptions, the intergovernmental system failed to capitalize on the high level of interest in the early 1990s. There are no meaningful international regulations or action plans for addressing climate change or protecting biodiversity, and global natural resource stocks are declining dramatically in the absence of significant international mitigation. Although the contentious politics of climate change, biodiversity protection, and natural resource conservation account for the slow pace, we believe that feeble data and assessment efforts are also significantly responsible.

For example, many of the Kyoto Protocol's exploitable weaknesses spring from inadequate assessment efforts, especially those that span biophysical and socioeconomic domains. The Intergovernmental Panel on Climate Change, the body that oversaw the primary assessment supporting the Kyoto process, delivered very little usable knowledge to guide negotiations; in the end, the Kyoto Protocol was based almost entirely on diplomatic improvisation and political horse-trading. Better assessment could have foreseen and possibly prevented many of the problems that emerged during implementation.[43] For example, negotiators did not foresee the problems associated with Russian "hot air," nor did they appreciate the complexities of including multiple greenhouse gases and both sinks and sources within Kyoto's ambit.

The late arrival of vulnerability and adaptation to the negotiating table in Kyoto was partially due to weak monitoring and assessment processes: the Kyoto protocol focuses on reducing emissions because emissions are monitored, but fails to address vulnerability and adaptation because such phenomena have not been monitored and assessment methods are weak compared to physical models of climate change.

Like the Kyoto process, the slow progress of global biodiversity conservation is also related to the paucity of usable knowledge. How should global biodiversity be measured? Where is it most threatened, and what are the impacts on human well-being? What actions should the international community pursue to protect biodiversity, and what specific modifications would make these efforts most effective under different circumstances? There is no international consensus on the answers to these questions, and as a result, global decision-making is easily derailed.

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[42] The report's references to the Transboundary Freshwater Disputes Database are a notable exception.
[43] For example, the Clean Development Mechanism's monitoring framework was not adequately discussed prior to implementation.

The strange fate of environmental issues in the Millennium Development Goals (MDGs) process illustrates the problems created by the absence of good data and assessment processes. The MDGs are a set of 8 consensus goals and 18 associated targets that are intended to guide global efforts to achieve sustainable development (United Nations Development Programme [UNDP], 2003). Although most of the MDGs have clear quantitative targets (e.g., halving the proportion of people living on less than $1 per day, or eliminating gender disparity in primary and secondary education), the environmental targets are a strange brew; for example, there are three targets listed under the goal "ensure environmental sustainability":

- Integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources;
- Halve by 2015 the proportion of people without sustainable access to safe drinking water; and
- Achieve by 2020 a significant improvement in the lives of at least 100 million slum dwellers.

Considering that thirty years have passed since 1972's UN Conference on the Human Environment in Stockholm, these goals are extremely unimpressive. The first target cannot be fully measured (although UNDP's *Human Development Report* identifies some indicators for this goal). The third is not closely tied to the environmental agenda and defies rational tracking: as long as the lives of 100 million slum dwellers improve over a 20-year period, the target is met; the lives of the other 700 million slum dwellers could worsen, or the total number of slum dwellers could increase to two billion, and the target would still be met. This vacuous target defies monitoring and fails to guide decision-making.

Only the second environmental target, to provide safe drinking water, is comparable in form and spirit to the other targets. While there is at least one meaningful environmental target in the MDGs, there are no high-quality programs monitoring this goal, and resting the weight of the entire global environmental agenda on a single water indicator is problematic, to say the least.

This is a great irony; the global environmental community, which pushed to mainstream sustainable development, has finally witnessed victory in the form of the MDGs. However, in the course of this transformation, the environmentalists' agenda has faded into the background. Assessment and monitoring infrastructure in the environmental arena has been neglected so greatly that it is simply inadequate to the task. In comparison, poverty, health, and education are measured much more thoroughly, and support a decision-making style that is grounded in quantitative target setting, outcome-oriented planning, and performance-based reviews. Inadequate monitoring and assessment negatively affect environmental policies by:

- Discouraging actors from investing in corrective or ameliorative measures, because they lack the ability to measure results;
- Forcing environmental issues to take a back seat to other issues with stronger monitoring and assessment capacities;
- Limiting the ability of decision-makers to consider the effects of environmental conditions upon other sectors, such as poverty and health, because there are no straightforward ways to link the comparatively data-rich analyses in many other sectors with the anecdotal, scattered data in the environmental domain; and
- Limiting the ability to set priorities across environmental issues, to diagnose consequences, or to chart effective responses.

3. Why is this?

We can characterize the current state of affairs as an "ignorance trap," held in place by three reinforcing factors: incentives, empirical baselines, and methods.

Incentives

Environmental decision-making, and decision-making concerning the linkages between environmental and socioeconomic dynamics, are highly pluralistic, extremely multilateral (involving large numbers of states and coalitions), and highly transnational (involving governmental, non-governmental, corporate, and international organizations). On one hand, this style of decision-making has generated many benefits over the past thirty years; it has provided skilled policy entrepreneurs with room to maneuver and the flexibility to shape winning coalitions. It has permitted experts and activists to seize opportunities and rapidly mobilize concern when conditions are ripe. But on the other hand, this style of decision-making does not facilitate the steady accumulation of infrastructure, knowledge, and best practices needed to undergird the increasingly sophisticated and far-reaching efforts found in the sustainable development agenda.

Environmental decision-making is unable to generate information and assessment infrastructure because it lacks the large, well-funded organizations that are capable of internalizing the costs associated with providing public goods. No international environmental actor has the appropriate incentives to adequately monitor trends and conditions, track progress, or build assessment capacity, and as a result, environmental monitoring is an ad hoc pastiche of efforts, assembled on the cheap, and lacks consistent measures over time and strong connections to decision-making processes.[44]

Empirical baselines

To assess vulnerability to future climate change, researchers need baseline data on current vulnerability patterns. To monitor improvements in urban sanitation, policymakers need baseline data on current levels of urban sanitation. However, the landscape of relevant baseline data is depressingly barren, and plans to build an empirically grounded analytical foundation are often abandoned or scaled back in the face of the missing data.

Hamstrung by the lack of relevant baseline data, researchers cannot support quantitatively oriented decision-making procedures, so they fail to invest in data creation efforts, and successive evaluations conclude that they do not have enough data from which to start.[45] As time goes on, the gap between what is needed and what is available grows, and accentuates the difficulty in integrating the environment into assessments of conflict, poverty, health, and other issues.

Methods

Finally, assessment methods have advanced unevenly over the past decade, and research and experiments must be intensified to determine appropriate methods, identify new breakthroughs, and to explore options for interactions across temporal and spatial scales. Scholars have not developed new methods, because the data to test them are inadequate. Only recently, major global collections of household survey data were sufficiently geo-referenced to integrate them with data at other scales. In addition, despite the great interest it attracted, the "Environmental Kuznets Curve" hypothesis has failed to result in any major advances because relevant data are sparse and of dubious quality.

4. Quick fixes will not work

The lack of appropriate incentives and empirical baseline studies, coupled with underdeveloped methods, accounts for the discrete and often limited evolution of early warning mechanisms. These obstacles present distinct challenges that quick fixes will not remedy. First, we need to set clear priorities for monitoring,

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[44] In contrast, the benefits of monitoring, assessment, and early warning of financial conditions are valuable enough to be internalized by individual actors, and therefore a great deal of activity is tracked across multiple scales and domains (see International Monetary Fund, 2002).

[45] Only two of the several hundred data sets considered for inclusion in the Environmental Sustainability Index met the most basic criteria (having a baseline year with regular, consistent updates): CO_2 emissions and energy consumption (Levy, 2002).

assessments, and early warning efforts that should address specific decision-making needs, ranked in terms of priorities.[46]

Next, to ameliorate the incentive problem, the global community should assign responsibility: the most practical model would combine "lead country" models (a single country provides the bulk of the capacity because it serves its own interest), multilateral models (a group of countries pool resources), and centralized agency models (a single international organization works on behalf of the international system).[47] Of these, the multilateral model is most prone to breakdown, especially in meeting the need for continuity. A solid financial basis for activities performed by international organizations or groups of countries is essential. In retrospect, UNEP's early mandate to monitor environmental conditions delivered disappointing results in large part because of the lack of financial support (Downie & Levy, 1999). Creating and regularly updating baseline datasets requires secure, long-term funding. The dramatic advances in monitoring and assessment capacity within the European Union and its neighboring countries following the creation of the European Environment Agency demonstrate the importance of institutional support.

Finally, the information infrastructure needs to be modernized. Obstacles block integration across functional domains and geographic scales; data are proprietary and inconsistently stored, documented, and formatted; and information is inefficiently shared. Some obstacles will remain regardless of the efforts to remove them, and dataholders will continue to have strong incentives to reduce access, but appropriate commitments and investments could spur significant progress.[48]

Early warning case study: FAST and CEWARN

The limitations in the global community's ability to monitor and assess environmental conditions contribute to the disappointing track record of environmental conflict warning systems. In spite of NATO and the U.S. Department of Defense's great interest in environmental security in the 1990s, none of the concomitant efforts to build early warning systems bore fruit (Matthew, 2002). For example, the U.S. government's State Failure Task Force (now known as the Political Instability Task Force), a group of U.S. academics working with unclassified data and operating with a significant budget, was unable to identify any methods for linking environment or natural resource phenomena to patterns of political conflict (Esty et al., 1998; Goldstone et al., 2000). To its credit, the Task Force's models predicted political breakdowns 80 percent of the time, and Phase II demonstrated that deforestation and soil degradation were associated with higher infant mortality rates, but it was forced to abandon its initial hopes of modeling environment-conflict links.

More recent efforts have paid careful attention to decision-making needs, invested in data collection, and experimented with new methods to exploit the availability of new environmental data. FAST (Early Analysis of Tensions and Fact-Finding), which is operated by Swisspeace in 23 countries, systematically monitors and assesses the causes of conflict and peace, coding any political, social, economic, or environmental

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[46] Monitoring based on decision-making needs should devote greater attention to measuring phenomena relevant to policy targets (of which there are currently almost none) and to measuring systemic attributes rather than discrete stocks and flows (for example, critical thresholds or poverty-environment linkages).

[47] Examples of efforts following the lead country model include Norway's acid rain assessments, which are utilized throughout Europe; U.S.-funded famine early warning systems used by multiple donor countries; Canadian models of global Persistent Organic Pollutants (POP) emissions; and Global ISO14001 certifications tracked by the German Umweltbundesamt. In these cases, the investing countries concluded that their benefits justify the costs. The recently completed Global Land Cover 2000 process illustrates the multilateral model, as governments, think tanks, and international organizations pooled their efforts to classify land cover. The World Meteorological Organization's weather monitoring efforts represent an example of a centralized international agency process.

[48] For example, there is no consistent way to identify subnational administrative units within countries, which has hindered efforts to integrate such data. The World Health Organization is organizing a multilateral effort to establish standards and to set spatial boundaries to permit integrating geographic data, but the pace of this effort is disappointingly slow due to the lack of adequate resources.

event that affects the escalation or de-escalation of subnational, national, or international conflict. Therefore, FAST not only tracks violent events, but also those that ease tension or build peace through cooperative behavior. FAST uses 186 event types, covering human security and civil rights, crime and internal security, conflicts and violent actions, domestic politics, and social and political change, along with natural resources, environmental degradation, infrastructure, migration, ethnicity, and religion. FAST established Local Information Networks consisting of local analysts (Field Monitors and Country Coordinators) to generate observations that are analyzed using integrated Event Data Analysis. Although other efforts monitor and classify event data in this fashion, we believe that FAST is the only one that has successfully tracked natural resource conflicts.

FAST developed CEWARN (Conflict Early Warning and Response Mechanism) to provide early warning of conflicts in the Horn of Africa; CEWARN uses FAST's methodology to monitor (and prevent) pastoral conflicts across border areas in Eastern Africa (Mwaûra & Schmeidl, 2002).[49] Since beginning operations in July 2003, CEWARN has correctly forecasted and prevented a violent raid in Northern Uganda: a country coordinator passed information gathered by the field monitor to CEWARN analysts, who in turn alerted the local district commissioner. Integrating data and analysis of environmental and conflict dynamics could generate useful early warning outputs in other parts of the region, such as in Somalia, which suffers from a continuing low-intensity conflict and deforestation and flooding related to the charcoal trade.[50]

Integrating monitoring more tightly across environmental and sociopolitical domains could improve early warning systems in Somalia, drawing on such sources of useful data as FEWS NET, FAST, and the Food Security Assessment Unit (FSAU) of the Food and Agriculture Organization, which collects environmental, agricultural, and health data on Somalia.[51] Along with the information collected by the UN's seven field security offices in Somalia, data from these monitoring mechanisms could be fed into FAST's flexible methodology. Merging coded weather and food security data from FEWS NET and FSAU with FAST's political, economic, and social indicators of conflict and cooperation would produce an integrated early warning system combining sophisticated remote-sensing data with highly developed social event data.

This fusion of political, economic, social, and environmental data would produce a more effective understanding of the dynamic between environmental factors, scarce resources, and conflict, and could monitor the increasing tensions over resources and the environment, particularly in southern Somalia. It could also monitor the relationship between human and physical capital in the Somali conflict, thus enabling UN development agencies to evaluate entry points for preventive action on a near-real time basis, and it could draw on reliable and comprehensive analyses to identify vulnerable communities, thus providing credible early warnings and entry points for economic peace building. In addition, an integrated network could provide a stronger focus on local capacity building by working more closely with local staff.

How do we establish such a system? We could start by cataloguing operational conflict early warning systems, identifying those that use environmental data, and verifying if such information is available in the appropriate format and the correct frequency. UNEP could offer expert guidance on how to improve or augment existing environmental information systems, and could consider investing in information systems to address unmet needs. The divide between environment and conflict experts remains wide, and methods

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[49] Also see Forum on Early Warning and Response's "Conflict Early Warning and Response Mechanism (CEWARN) Project" at http://www.fewer.org/intergov/igad/main.htm and Protocol on the Establishment of a Conflict Early Warning and Response Mechanism for IGAD Member States, dated 9 January 2002, at http://www.iss.co.za/AF/RegOrg/unity_to_union/pdfs/igad/Protocol.pdf

[50] This section is based on research, interviews, and analysis performed by Patrick Meier in Nairobi from May-August 2003.

[51] FSAU collects and researches information on the following indicators, which are logged into the FSAU database in Nairobi each month: crop data, market price information, food aid, rainfall, pasture, livestock, coping mechanisms, displacement, migration, health, and security. Trends are analyzed by district and provide essential information for early warning.

and datasets intended to unite them are still crude; for example, conflict modelers continue to rely on the Global Assessment of Human-induced Soil Degradation (GLASOD) dataset even though the soil science community has discredited it.[52] Although environmental data remains the weak link in global assessment efforts, some collections of environmental data could be useful to existing conflict early warning systems; information on climatic anomalies is especially promising.

Conclusion

We have argued that environment-conflict early warning systems need more data and information from the international system, and without it they are vulnerable to deficiencies in monitoring and integrated assessment of environment-conflict dynamics. These deficiencies prevent decision-makers from gaining a useful understanding of trends, patterns, and diagnoses.

We have also argued that such deficiencies could be corrected, as demonstrated by the example of integrated early warning in East Africa and the Horn. We conclude that useful assessment and early warning systems require the following building blocks:
1)   Clearly articulate phenomena of interest, with explicit links to decision-making;
2)   Identify data and methodological requirements for assessments and warnings;
3)   Invest in data creation and methodological development to fill gaps; and
4)   Financially support these activities on an ongoing, sustainable basis.

Because environmental change is relevant to high-priority global policy goals, such as poverty reduction, public health, and conflict prevention, investments in environmental information systems could pay off in clearly useful ways; however, if such investments are ruled out because of organizational timidity or fiscal miserliness, we will fail to capitalize on the opportunity to improve our understanding of the linkages between environment, conflict, and cooperation.

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[52]   See Stalley (2003) for a recent use of the GLASOD data; see Niemeijer and Mazzucato (2002) for an explanation of GLASOD's shortcomings.

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UNDERSTANDING ENVIRONMENT, CONFLICT, AND COOPERATION

Brief article

Environmental Conflicts and Regional Cooperation in the Lempa River Basin: The Role of the Trifinio Plan

By Alexander López

Can a regional regime, established to address economic and environmental problems in a transboundary river basin, foster cooperation and regional integration? In Central America's Lempa River Basin, which includes parts of Guatemala, Honduras, and El Salvador, the Trifinio Plan addresses cross-border environmental problems and reduces political tensions, while respecting national boundaries. As the only transboundary area in Central America with an institutional framework, the Trifinio region is a perfect laboratory for studying regional integration. The basin drained by the Lempa River is the most environmentally damaged in Central America; it suffers from high levels of deforestation, land degradation due to overuse and urban expansion, watershed deterioration, and water pollution. The three riparian nations are highly interdependent: 56 percent of the basin is in El Salvador, 30 percent in Honduras, and 14 percent in Guatemala. Approximately 4.1 million people—nearly 17 percent of the combined population of the three countries—live in the basin.

However, El Salvador is much more dependent on the river than its neighbors: the basin covers 49 percent of the country, while only 4.9 percent of Honduras and 2.3 percent of Guatemala lie within the region. Hydroelectric dams on the Lempa generate 37 percent of El Salvador's electricity, and the river provides 72 percent of the country's superficial water and supports its agricultural sector, which has the lowest endowment of fresh water in Central America (U.S. Agency for International Development & Comisión Centroamericana de Ambiente y Desarrollo, 2001). In addition, 90 percent of El Salvador's surface area in the river basin lies downstream from Guatemala and Honduras, and is highly subject to damage from upstream activities such as soil erosion, pollution, and solid waste dumping (Hernández & Rodríguez, 2002). Honduras and Guatemala possess a wider variety of water resources, and are therefore less interested in maintaining the basin's water quality. This combination of geography, dependency, and environmental damage could lead to conflict over the basin's water resources, which could also be exacerbated by the occasionally contentious relationship between El Salvador and Honduras.

How do the three riparians avoid conflict? Arising from efforts to end Central America's epidemic of civil war, the Trifinio Plan sought to create a generation of peace by addressing the root causes of conflict: social and economic isolation (OEA-IICA, 1992). The Trifinio Plan was designed to encourage development in an ecologically diverse region that is critical to the health of the Lempa River watershed. Along with aid from the international community, the plan has dramatically reduced the level of violence and directly contributed to regional peace.

The Trifinio Plan played a major role in building confidence between countries, as it provided a platform for high-level, post-conflict dialogue and strengthened cooperation among border communities. As it evolved, the Trifinio Plan became a mechanism for conflict resolution; high-level coordination among governments allowed them to identify and eliminate latent sources of conflict. For instance, within the framework of the Trifinio Plan, governments have collaborated with the commission responsible for delineating the borders between El Salvador and Honduras.[53] Under the plan's umbrella, the two governments made great strides towards a demarcation settlement.

In addition to increasing coordination and communication between the three governments, the Trifinio Plan led to a higher level of integration among the border communities. While local communities are already linked economically and socially, the Trifinio Plan deepened their ties and formalized their existing relationships. Today, many social services are provided to the people of the Trifinio region regardless of their nationality. This integration also has economic benefits: the governments' new, simplified customs rules and free border passage for local people are likely to increase tourism and local commerce.

The Trifinio Plan has successfully addressed deforestation in the region: since the plan's inception, more than six million fruit trees and coffee-shading plants have been planted, as well as 4,900 hectares of forest species to be used for firewood, lumber, and river basin protection. The plan's reforestation programs provided technical assistance to 2,000 peasant families in the region and enlisted local manpower to create forest nurseries, promote forest protection, improve training and maintenance, and develop supervision and control programs (Comisión Trinacional del Plan Trifinio, 1999).[54]

Despite its achievements, the Trifinio Plan is not without its shortcomings; most significantly, it failed to seek local input in its early phases. Rather than consulting with local communities, government coordinators used a top-down approach to define the plan's initial priorities and actions. The governments need to encourage higher levels of local organization and participation, since the plan's social sustainability depends on the public's active support and involvement. The Trifinio Plan has also failed to provide a complete program for the region's sustainable development; instead, it has focused primarily on resource conservation. The governments have not adequately addressed urban pollution and expansion; they must recognize the linkages between urban and rural environments and develop appropriate management strategies to encourage sustainable development.

Finally, the governments have failed to improve the management of the basin's hydrological resources. The Lempa River remains severely degraded by sediment, agricultural runoff, and solid and liquid waste. Those relying on the river for drinking water need improved watershed management strategies. While the new plan for managing the upper part of the basin includes integral water management, it is not clear if it will diminish upstream pollution and reduce negative impacts on downstream resources.

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[53] The border conflict between Honduras and El Salvador, over an area known as Los Bolsones, is one of the few unsolved border conflicts in Central America. This dispute led to a war in 1969, and has continued to be controversial since then.

[54] Investment in these programs totaled approximately US$2.16 million.

In summary, the Trifinio Plan has increased regional integration by institutionalizing transboundary cooperation between Guatemala, El Salvador, and Honduras at the highest level. At the local level, the Trifinio Plan has strengthened existing relationships through shared services and economic ties. Although the Trifinio Plan has contributed to regional integration and conflict prevention, it has two noteworthy shortcomings: first, the plan did not involve all the stakeholders in the basin, and second, it has not completely confronted the problem of environmental degradation. While the plan has restored some forest cover, it has poorly managed the basin's water resources, as evidenced by increased levels of pollutants and environmental degradation throughout the basin. The new management program for the upper Lempa River Basin could improve the river's water quality and simultaneously promote sustainable development, but it will require powerful leadership. With proper guidance, the new program has a good chance of reversing damage to the river and creating a better life for the people who depend on it.

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Transforming Risks into Cooperation: Introducing the Environment and Security Initiative

By Gianluca Rampolla

Radioactive, chemical and biological hazards in Central Asia

Former nuclear test site. Large portion of surrounding areas contaminated.

Nuclear power plant
Power reactor
Active / Closed

Research reactor
Active / Closed

Important environmental impact on the surrounding areas

Uranium mining and milling facility. Radioactive waste related to exploitation

Closed uranium mine

Chemical and biological research center or production plants being dismantled

Radioactive waste storage site generally poorly maintained, and alleged to pose a significant risk to health and environment

Old radioactive waste site (early 20th century)

Fuel production

Non-radioactive waste site (mercury, antimony)

Area of high seismic risk

PHILIPPE REKACEWICZ, UNEP/GRID ARENDAL, MAY 2003

Environmental stress rarely leads directly to violent conflict; rather, it is one strand within a complex web of causality, intertwined with a series of socioeconomic problems such as population growth, poverty, forced mass migration, hunger and starvation, political instability, and ethno-political tensions. Acknowledging the multifaceted character of environmental conflicts, three organizations with different mandates, expertise, and networks—the Organization for Security and Cooperation in Europe (OSCE), United Nations Environment Programme (UNEP), and United Nations Development Programme (UNDP)—joined together to form the Environment and Security Initiative (ENVSEC).

By providing a framework for cooperation on cross-border environmental issues, ENVSEC seeks to promote peace and stability. It builds on the combined strength of the lead organizations' expertise, experience, and field presence to perform three key functions:

- Assessing vulnerability and monitoring environment and security linkages;
- Building capacity and developing institutions; and
- Developing, implementing, and advocating integration of environmental security concerns and priorities in international and national policymaking.

ENVSEC focuses on two sets of issues: environmental sources of stress between communities, regions, or countries; and tools and approaches that can be used to bring about or strengthen cooperation and good governance, address environmental problems, and avoid conflict.

The pilot phase of the initiative assessed environmental threats in Central Asia and Southeastern Europe;[55] the Southern Caucasus and Eastern Europe will be added in 2004. ENVSEC uses a regional approach because many potential sources of environmental conflict can only be approached within their regional context. In addition, transboundary cooperation can contribute to peace building. For example, in post-conflict settings, joint efforts to clean up contaminated sites and restore natural spaces may revitalize both the environment and trust among peoples and nations.

Consulting with local stakeholders, including representatives from government, civil society, and academia, a team from UNEP mapped areas of environmental stress, and superimposed socioeconomic, population, health, and ethnic data to produce compelling cartographic representations of potentially vulnerable regions. These maps, which were presented simultaneously via video feed at the OSCE Economic Forum/Senior Council in Prague and the Kiev Environment for Europe ministerial meeting in May 2003, pinpointed areas of concern (hotspots), raised awareness of the regions' environmental issues, and identified key issues for further action and careful monitoring.

ENVSEC Assessment: Central Asia

ENVSEC's assessment of Central Asia found that the region suffers from serious levels of soil degradation, soil salinization, desertification, and erosion, along with a high level of hazardous waste. With the collapse of the Soviet system and the end of agricultural subsidies, rural poverty increased rapidly, driving farmers to seek quick returns through unsustainable practices that degraded the soil. All five countries neglected their water canals, drainage networks, and irrigation schemes in the 1990s. In the foothills of mountainous Tajikistan, excess irrigation saturates the poorly drained soil, raising the water table and increasing the salinity of the soil in low-lying areas. In Uzbekistan, 50 percent of the irrigated land is considered to be saline; downstream areas have saline concentrations of up to 95 percent, especially in Karakalpakstan. As much as 90 percent of the region's crops, most of which are thirsty cotton, are irrigated. Cotton's mono-cultivation also contributes to soil degradation and severely reduces biodiversity.

A significant amount of the region is affected by desertification, ranging from 66 percent in Kazakhstan to 97.7 percent in Tajikistan. By diverting four-fifths of the water feeding the Aral Sea, irrigation has reduced the sea's volume by 80 percent. Uncovered sea and riverbeds are exposed to wind erosion, which carries dust contaminated with pesticides and other chemicals over vast distances, affecting crops and causing respiratory diseases. In the mountainous areas of Kyrgyzstan and Tajikistan, erosion due to deforestation (from cattle grazing and firewood harvesting) has increased the likelihood of landslides.

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[55] The pilot phase included the countries of the former federal Yugoslavia, Albania, Romania, and Bulgaria in Southeastern Europe, and Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan in Central Asia.

The Road Ahead: Three Pillars

Over the next three years, ENVSEC will pursue activities clustered around three pillars:

- Assessing and monitoring vulnerability;
- Developing and implementing policies; and
- Building capacity of national and local authorities, civil society, academia, and the mass media.

To assess and monitor vulnerability, ENVSEC will develop indicators, set up an integrated database, and establish a long-term monitoring system. Regional stakeholder dialogues will concentrate on sharing information, exchanging data, networking knowledge, and monitoring early warning indicators. The initiative will concentrate on specific regional, national, or local hotspots that deserve specific attention, such as the Aral Sea, the Ferghana Valley, Aktau, and the Axe Tselinny-Semei-Oksemen.

To build capacity, ENVSEC plans to strengthen governmental institutions' ability to develop appropriate mandates and operations to address environmental threats to security, as well as legal and policy frameworks. Equally important, ENVSEC plans to build civil society's capacity to foster democratic participation, mobilize social action, and disseminate information. For example, ENVSEC has initiated a programme called "Awareness Raising and Public Participation in Decision-Making through Improved Access to Information and Environmental Education," which seeks to provide high-quality, up-to-date information to environmental decision-makers and stakeholders, promote public participation and environmental education by supporting environmental journalism, and improve the exchange of environmental information between government agencies and the general public. This project is currently underway in Central Asia and the Southern Caucasus, but may be extended to cover Eastern Europe and Southeastern Europe at a later stage.

Developing a coherent governance structure that allows governments to address environment and security linkages requires policy integration. Risk/conflict assessments should be included in national development plans, multilateral environmental agreements, sustainability impact assessments, national and regional environmental policy programs, and public health and agricultural plans. Similarly, sustainable resource management practices and transboundary environmental cooperation efforts should be integrated into conflict prevention and peace-building strategies.

ENVSEC plans to develop regional, national, and subnational projects that strengthen social and institutional capacities to address threats to human security that are triggered or accelerated by environmental stress. These projects must meet the following criteria:

- Foster sustainable development and/or environmental cooperation as components of conflict prevention and peace development;
- Be conceptualized and implemented in cooperation with local partners and preferably involve more than one of the initiative's lead agencies; and
- Address issues and needs revealed in the assessment exercise (i.e., those identified by stakeholders, national action plans, existing processes, and endogenous capacities) and preferably have a component related to capacity building/institutional development and policy development/ implementation.

ENVSEC could be replicated elsewhere, if the right combination of partner organizations could be convened for the effort. ENVSEC's success depends on the close cooperation of its three international organizations with mandates to link security, environmental, and social issues.

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