Conserving the Peace: Resources, Livelihoods and Security

Edited by:
Richard Matthew
Mark Halle
Jason Switzer

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International Institute for Sustainable Development

The International Institute for Sustainable Development contributes to sustainable development by advancing policy recommendations on international trade and investment, economic policy, climate change, measurement and indicators, and natural resources management. By using Internet communications, we report on international negotiations and broker knowledge gained through collaborative projects with global partners, resulting in more rigorous research, capacity building in developing countries and better dialogue between North and South.

IISD's vision is better living for all—sustainably. Its mission is to champion innovation, enabling societies to live sustainably. IISD receives operating grant support from the Government of Canada, provided through the Canadian International Development Agency (CIDA) and Environment Canada, as well as the Province of Manitoba. The institute receives project funding from the Government of Canada, the Province of Manitoba, other national governments, United Nations agencies, foundations and the private sector. IISD is registered as a charitable organization in Canada and has 501(c)(3) status in the United States.

Environmental Security Team: Foreign and Commonwealth Office

Environmental pressures destabilize nations and regions. They can displace waves of environmental refugees from their homes. Increasing competition for water, fisheries and productive land will increase the risks. The Environmental Security Team seeks to identify the environmental factors that could contribute to increased political tension or future conflict, and neutralize them through preventive diplomacy, as well as promoting ways of repairing damage.

The team is helping to co-ordinate U.K. efforts, through the Organization for Security and Co-operation in Europe (OSCE) and the European Union, to reduce tension over water in Central Asia. It is working with Nigeria to bring environmental managers from the Niger Delta, a region of high environmental stress, for training in the U.K. With other Government Departments, it is helping Russia deal with the nuclear contamination caused by submarine nuclear reactors in the North West, under the £84 million cross cutting programme recently announced by the Treasury. And it has contributed to efforts by the United Nations Environment Programme to assess and deal with the environmental consequences of conflict in the Balkans.

IUCN

IUCN – The World Conservation Union was founded in 1948 and brings together states, government agencies and a wide range of NGOs in a unique worldwide partnership. As a Union, IUCN seeks to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable.

Through its six Commissions, IUCN draws together over 10,000 expert volunteers in project teams and action groups, focusing in particular on species and biodiversity conservation and the management of habitats and natural resources.

CEESP

CEESP, the IUCN Commission on Environmental, Economic and Social Policy, is an inter-disciplinary network of professionals whose mission is to act as a source of advice on the environmental, economic, social and cultural factors that affect natural resources and biological diversity and to provide guidance and support towards effective policies and practices in environmental conservation and sustainable development.

Acknowledgements

Chair's Preface

We present this book to the world at a time when international relations are being convulsed by a war on terrorism. Issues of conflict and security are once again at the top of the policy agenda, if indeed they ever left. While the vast consequences of this latest conflict figure prominently in such discussions, the underlying forces of poverty, inequity and unmet expectations as causes are being widely acknowledged as well. These forces drive, and are at least in part driven by, environmental change and degradation in many parts of the world. Indeed, recent events underscore how important these relationships are to preventing instability and conflict.

In February of 2000, a group of prominent researchers and practitioners from the fields of natural resource management, insurance and policy-making were brought together by IUCN and IISD. The mission of this Task Force was to identify areas where conservationists could contribute to peace, and make a compelling argument to that community about how the links between environment, conflict and disaster are relevant to their efforts. Inevitably, tackling these problems extends much further than our modest effort, but we felt it important to build a bridge between the security community and that of natural resource management.

Through two meetings of the Task Force and presentations to the international community at the World Conservation Congress in Amman, Jordan, in 2000, we encountered remarkable receptiveness to our efforts. "Environmental security" was the unofficial motto at the Congress in Jordan, underscored by rising instability in the Middle East. Linking conservation to peoples' social and economic security—as Queen Noor of Jordan urged us to do in her opening statement to the Congress—will hopefully make conservation more relevant to the lives of a wider public.

We left Jordan convinced that these links do matter, that they are as relevant today as they were when we first sought to elaborate on them in the report of the World Commission on Environment and Development in 1987.

Understanding the links between "environment" and "security" has proven to be a challenging and fruitful exercise for researchers and policy-makers over the past several decades. Although we learned from the debates in own our Task Force of the difficulties in pinning down the exact nature of the relationship between these two seemingly elusive concepts, we know that in the midst of the ambiguity there is in fact a vital and powerful insight awaiting, not unlike the notion of sustainable development.

Marvin Sooros put it well in 1994, stating:

> The usefulness of these abstract concepts is not in conveying a precise meaning, which would render them intellectually barren,

but in the discussions and indeed the controversies that they provoke, which lead to new insights and perspectives. Coining of the phrase "environmental security" has prompted a re-examination of the essence of security, thus enriching debate on social priorities and resource allocations (320).[1]

This volume seeks to further the debate through a collection of case studies from a diverse group of experts who explore the links between natural resource management and social stability and peace, focusing on their implications for peoples' livelihoods. By looking at a range of topics and events, such as forest fires in Indonesia; the turbot fishery dispute between Canada and Spain; violent conflict in Rwanda; and the impacts of Hurricane Mitch in Central America, the authors present a compelling case for using conservation as a tool for enhancing security and building lasting peace.

Rather than relegating environmental management activities to the periphery of political discussions, these activities should be recognized as viable measures for addressing some of the environmental sources of vulnerability and conflict. Not content with a review of the literature, our task force sought to initiate a process of translating the concepts from the environment and security field into recommendations for policy-makers and conservationists.

As the Chair of the IISD/IUCN Task Force on Environment and Security, and on behalf of its distinguished members, I am hopeful that through your own reading of our work here, you will find the basis for ground-level action to protect and enhance the environmental basis for security.

Mohammed Sahnoun
Chair, IISD/IUCN Task Force on Environment and Security
March 1, 2002

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1. M. Sooros, "Global change, environmental security and the prisoner's dilemma," *Journal of Peace Research*, 31 (3) (1994), p. 320.

IISD/IUCN Task Force on Environment and Security

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Preface by the United Kingdom Foreign and Commonwealth Office

In the space of a very few months, conflict prevention and resolution have become the central questions on the desks of ministers and civil servants. Yet the nature of the conflicts we face today differs fundamentally from the competition between nations that shook the world six decades ago. Today's conflicts are largely internal to countries, yet the implications can touch even the main streets of the world's financial centres. Addressing economic inequities and injustices, and ensuring that all sectors of society are playing a role that supports peace, are today as important for international security as diplomacy and military force.

The Foreign and Commonwealth Office is very pleased to have cooperated with the IISD/IUCN Task Force on Environment and Security in producing this volume. For some time the U.K. government has been aware that the mismanagement and competition over valuable resources can lead to social and political tension between and within nation states, in some cases contributing to violent conflict. Such tension and conflict can destabilize nations and regions, and displace waves of environmental refugees from their homes. While the causes of these problems are complex and oftentimes context-specific, access, control and use of natural resources such as freshwater, fisheries and productive land, are increasingly recognized as contributing to socio-political tension. This relationship is likely to intensify as a result of climate change and population growth.

The Foreign and Commonwealth Office has established an Environmental Security Team specifically to tackle these problems. The team works closely with U.K. posts abroad, as well as other U.K. government departments, international governments and organizations, and NGOs. Its main objective is to identify the environmental causes of political tension, and neutralize them through preventive diplomacy that promotes cooperation. It is also supporting ways of ensuring that military activity does not have a harmful effect on the environment, and helping to repair the environmental damage caused by conflict situations.

A vital part of our work is defining the most important environmental security issues facing the world community and proposing possible solutions. With this in mind, we co-hosted a Conference on Environment and Security at Wilton Park in March 2001, which involved a varied group of experts from around the world. John Battle, then Minister of State at the Foreign and Commonwealth Office, set out the U.K. government's current thinking and proposed a new approach to tackling environmental security. He suggested that the international community should aim to promote improved environmental security as a tool for conflict prevention;

seek regional solutions; encourage improved co-ordination among all relevant agencies; and harness innovation and new technology in the effort.[2]

This publication is an important contribution to such an effort. We welcome the attention it pays to the link between the environment and livelihoods, as environmental problems are more likely to result in tension or conflict if they affect the capacity of communities to generate a sustainable income. Anybody who reads the accounts of poor resource management in Pakistan, conflicts over forest resources in Indonesia or the contribution of environmental scarcity to the conflict in Rwanda, will have little doubt that sustainable environmental management is a fundamental prerequisite for a peaceful society, and that peace is a prerequisite for a more equitable and environmentally-sound development. Moreover, the case studies also help to indicate where the danger of conflict is greatest, and where action by the international community—in particular the conservation community—is most urgently needed.

This last point is vital for the Foreign and Commonwealth Office. A lot of very interesting and useful academic research has been produced on the links between environmental pressures and conflict, either through case studies or more theoretical analysis. The challenge for our government— and others around the world—is to decide how to respond to these problems.

Part of the solution lies in answering questions such as, how can we best encourage dialogue between opposing parties? How can environmental cooperation help to build confidence in regions under stress? How can long-term strategies be implemented that reduce the risk of environmental problems, and their resultant social and political consequences? And how can conservationists—actors not traditionally considered centrally relevant to security—play a positive role in fostering more peaceful and secure societies? I am pleased that these, and other issues are raised and to some extent tackled by this publication. In this way, the insights and analysis provided by experts in this field can help to inform appropriate, targeted responses by the international community.

Foreign and Commonwealth Office
March 1, 2002

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2.   The full text is available at: http://www.fco.gov.uk/environment

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Boxes, Figures and Tables

Environment and Security Briefs

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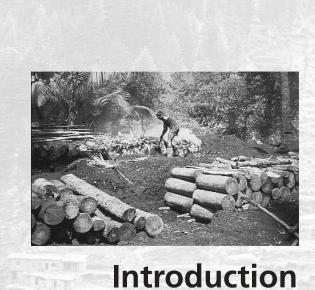
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Introduction

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Richard A. Matthew is Associate Professor of International Relations and Environmental Politics in the Schools of Social Ecology and Social Science at the University of California at Irvine (UCI), and Director of the Global Environmental Change and Human Security (GECHS) Research Office at UCI. He has published articles on environmental issues, ethics in international affairs and international organization. Recent works include an edited volume entitled *Contested Ground: Security and Conflict in the New Environmental Politics* (1999) and *Dichotomy of power: Nation versus State in World Politics* (2002).

Jason Switzer

Jason Switzer is a Project Officer for IISD's Environment and Security initiative. A licensed mediator trained at the Harvard Mediation Program, he has worked on negotiated public consensus-building processes for the World Commission on Dams, for the hazardous waste clean-up of a major military base in the United States, and for the design of earthquake risk management plans in developing country cities. He has several professional publications in the field of Business and Sustainable Development, including two articles for the *Journal of Environmental Quality Management* and a chapter in *ISO 14000: Case Studies and Practical Experiences*, edited by Dr. Ruth Hillary (2000).

Mark Halle

Mark Halle directs IISD's Trade and Investment program and founded its European office in Geneva, Switzerland. He serves as a Senior Advisor to IUCN – The World Conservation Union and the International Institute for Environment and Development (IIED). He worked in the Policy Planning Office of the United Nations Environment Programme (UNEP) in Nairobi and Geneva from 1975 to 1980, and the conservation division of the World Wildlife Fund International from 1980 to 1983 before joining IUCN, where he remained until 1998, successively directing the field operations, fund development and global policy divisions.

A Growing Threat?

"It is time to understand the environment for what it is: *the* national security issue of the early twenty-first century." With these provocative words, journalist Robert Kaplan made an apocalyptic prediction of the shape of things to come.[3] The future he foresaw was one of "disease, overpopulation, unprovoked crime, scarcity of resources, refugee migrations, the increasing erosion of nation-states and international borders, and the empowerment of private armies, security firms, and international drug cartels."

The trends from which Kaplan extrapolated are not encouraging. While today a global nuclear war seems unlikely, over 85 per cent of major wars in the 1990s were fought inside national borders and nearly all took place in developing countries.[4] Insecurity is particularly on the rise in poorer countries, with the last decade of the millennium seeing widespread civil violence in 15 of the world's 20 least developed nations.[5] Civilians are at the greatest risk from contemporary wars, with over 1,400 non-combatants dying each day in the 1990s as a result. And today's local insurgencies can even have global impacts, striking the main streets of the world's financial and political centres.[6]

Why is this happening? An extensive body of research points to the interaction of weak and corrupt political institutions, rapid population growth, sudden impoverishment and growing availability of small arms. Angry, unemployed and marginalized people around the world can acquire unprecedented firepower, and can threaten the stability of governments and regions.

Looming in the background of many of these hot spots, placing massive pressure on societies and especially on their poorest members, is a juggernaut of environmental problems—land scarcity, deforestation, and polluted and overexploited water supplies. While the traditional fuel of ethnic and religious rivalries, economic motivations and personal ambitions still drive violence, these familiar sources of conflict are being amplified by environmental stresses.[7]

Familiar sources of conflict are being amplified by environmental stresses.

Under such conditions, societies can quickly find themselves trapped in a cycle that repeatedly channels scarce resources into managing crises and their consequences, rather than into development. Critical needs take precedence over considerations for the long-term. In short, civil conflict is inimical to sustainable development. Indeed, it is itself encouraged by unsustainable development.

About This Book

The world invested nearly US$30 billion in humanitarian assistance during the 1990s,[8] largely for response to and recovery from conflict, leaving aside the enormous military and social costs of these wars. Over the same period, nearly 35 million people were displaced by violence and disaster.[9] The cost of humanitarian assistance, which represented 1.7 per cent of international development funds from 1987 to 1989, grew steadily through the early 1990s to 8.4 per cent in 1994. Emergency assistance had become the largest single component (12.91 per cent) of aid to least-developed countries by 1995.[10] Reading the signs, it is evident that the funds available for prevention are increasingly being diverted towards reaction.

This book seeks to answer the following question: Could investment in environmental conservation—more sustainable and equitable management and use of natural resources—offset funds now spent on peacekeeping and humanitarian relief by attacking the roots of conflict and violence, rather than waiting to address their consequences?

Could investment in environmental conservation offset funds now spent on peacekeeping and humanitarian relief?

We believe so. Our thesis is that environmental mismanagement and resource scarcity, alone or in conjunction with other forces, can have such a destabilizing impact on communities and societies that they may experience high levels of insecurity and even succumb to violence and conflict. One implication is that better resource management practices might contribute to peace and stability, conditions that are, in turn, essential for development and social justice. A second is that planned conservation of biodiversity can and often should continue during times of conflict and particularly in post-conflict reconstruction. Last, conservation practices may provide a basis for bringing parties who have been or are engaged in conflict together to begin the process of peace building around common environmental concerns.

The contributors to this book develop variations of these insights through a series of detailed case studies taking in a broad sweep of issues and countries. These cases are written by authors whose intimate knowledge and credibility come from firsthand experience on the ground.

The general conclusion is that conservation practices hold great promise for reducing the likelihood of conflict, especially when they are linked to the provision of sustainable livelihoods. Moreover, conservation practices can help reduce the vulnerability of communities to costly natural disasters.

In addition to the particular relevance of this work to the practice of conservation, this volume is somewhat unusual in the environment and security literature in that its authors are predominantly based in the developing world, where they have many decades of experience with environmental and security issues. The lack of analysis coming from developing country practitioners has frequently been cited as a weakness in the literature underpinning the field of environment and security.

Interspersed with the cases in this book are 14 brief summaries of critical issues at the nexus between environment and security. What is the nature of the threat to human societies posed by invasive species? What are the links between refugees and the environment? To what extent are environmental extremists—eco-terrorists—prepared to harm people to protect the environment? Particular examples of resource-related conflicts—within and between countries—are set against tools conservationists might use to reduce insecurity or to operate in times of war.

Many of the tools we present—promoting environmental consciousness among sub-state armed groups, forging international partnerships to manage transboundary river systems and establishing alternative non-violent dispute settlement mechanisms—have the potential for broader application than is the case today.

The concluding chapter draws together the insights from the Task Force deliberations, the cases and boxes, to formulate a set of clear-headed recommendations for how a better understanding of the links between people and the natural systems upon which they depend for their livelihoods can be harnessed to promote peace.

In this introductory chapter we set out the terrain of environment and security, and provide a compass for steering through it. The past decade has witnessed a heated and yet unresolved debate among academics, with most researchers concluding that environmental change is only one stress among many affecting conflict and security, and that its precise role in the chain of causation is hard to specify. In the section that follows this one, we unpack this debate and show that in spite of the uncertainty plaguing all investigations into the causes of violence and conflict, an expanding group of security analysts, academics and field personnel, is convinced that the connections between environment and security are real and command preventative action.[11]

We then introduce the Task Force and institutions behind this book. Rather than wading into a battle over the degree to which environmental factors contribute to conflict and insecurity, this book seeks to fill an important gap between the research community and those people on the frontlines of natural resource management, while informing conflict-resolution and peace-

building practitioners of the results. The Task Force architects come from the field of resource management and conservation, and believe that understanding social and economic forces is as essential to the preservation of biodiversity as knowledge of natural systems. Critically, the Task Force seeks to bridge the gap dividing the academic study of these links, and the practices of conservationists, managers and development professionals in the field.

With this in mind, the Task Force's model for the links between environment and security is presented, focused on security at the level of "local communities." People, particularly the poor, depend on natural resources for their livelihoods. When their resource base is affected, either by gradual degradation or depletion, or by the sudden shock of war, migration, disaster or seizure of property, they experience a loss of welfare. Their strategies for coping with the loss, whether by reducing demand, migrating, seizing other resources, innovating or trading with others, can lead to conflict or deepen vulnerability to disaster. Because of this intimate link between natural resources and people, better natural resource management means more secure communities, in terms of peace as well as protection from harm.

Following this discussion, the cases are briefly summarized and placed in context. We conclude this introduction with some observations on the particular relevance of the links between environment and security to the conservation community.

A Brief History of Inquiry into Environment and Security

Does environment cause conflict? Debate on this issue has been unfolding over the past 30 years.[12] At least since the middle of the twentieth century, researchers and policy-makers have mulled over the possible linkages between the natural environment and national security. In the 1970s, for example, important studies were undertaken on the environmental impacts of war and the preparation for war, motivated by the use of defoliants in Vietnam and by concern over the ecological effects of nuclear weapons.[13] At about the same time, responding to the creation of OPEC and the oil price shock, research was initiated on the likelihood of wars erupting over access to, and control over, vital natural resources such as oil and water.[14]

This activity was, in many ways, a modern revisiting of themes that military strategists and political scientists had been examining for centuries. In the fourth century BC, Plato had argued that resource abundance made a state an attractive target to those seeking to acquire wealth through force. Two thousand years later, philosophers such as Jean-Jacques Rousseau reflected on the ways in which climate and topography shaped threat and vulnerability around the world. The research of the 1970s simply updated some of these long-standing themes.

But this work also emerged during that period when the environmental movement, concerned about the adverse impacts of human beings on nature, was gaining critical mass and establishing itself as a global force. In this context, it is not surprising that environmentalism and security would begin to encounter each other in new and unexpected places. The members of the Brundtland Commission played an important role in this regard by moving beyond familiar geopolitical themes to argue, in their 1987 report, that if humankind did not act quickly to implement aggressive sustainable development measures, "then the deepening and widening environmental crisis [might] present a threat to national security—and even survival—that may be greater than well-armed ill-disposed neighbours."[15] Conserving the planet's natural resources and ecological integrity had, for this influential group, become a fundamental requirement for security at all levels of social organization.

This proved a timely argument as well as an innovative one. Two years after *Our Common Future* was published, the Cold War ended and an opportunity—perhaps a need—emerged throughout much of the world to think anew about threat, vulnerability and security in the post-Cold War era. Given the high profile environmental concerns had achieved by this time, and the mounting evidence that large-scale changes to the planet's climate system and biodiversity were creating conditions conducive to severe social impacts, in the 1990s the very conservative security communities of many states became interested in discussing the security implications of environmental change. Should the fears of *Our Common Future* be taken seriously? If so, what environmental actions had to be undertaken to prevent security disasters?

In the 1990s the very conservative security communities of many states became interested in discussing the security implications of environmental change.

This interest was reinforced by another intellectual sentiment that became widespread in this period. While most analysts continued to worry about nuclear weapons—and how and when they might be used—a large number of them began to argue that the threat of a third world war, which had been at the very centre of security policy for decades, was much diminished. According to this analysis, the reduction of this threat was partly due to fear of the consequences of world war, and partly due to the steady expansion of trade and democracy which made the use of force increasingly unattractive to many countries. In this context, people began to suggest that what really threatened many communities and societies around the world was a set of non-military threats—aggressive new diseases, economic failures, transnational criminal cartels, terrorism and environmental change.[16] Warfare persisted, of course, and had to be addressed, but it could no longer be the only item on any security agenda.

Although most of these non-military threats appeared to be familiar problems to which societies had already found solutions, analysts argued that technology had made them far more virulent than in the past and introduced a transnational character to them.[17] They flowed across borders with few constraints, with great speed and often with anonymity. In consequence, old strategies for addressing them were almost certain to be ineffective. A new approach was required.

Moreover, researchers contended, this new approach had to be developed at once. A number of trends suggested that the emergent class of non-military threats was likely to worsen in the years ahead, at least if current practices were allowed to proceed unchecked.

The last 100 years saw a fourfold increase in human population to six billion people, with an additional three billion anticipated in the first three decades of the new century. It also witnessed the 20-fold growth in the use of fossil fuels[18] and the altering of 46 per cent of the world's primary watersheds by dams[19] to meet the needs and wants of that expanding population. This growth in resource use coincided with increasing evidence of environmental degradation[20]—the reduction of a resource's productivity—and, arguably, of competition over resource use. From declining forests and fisheries, through soil erosion and water logging, to rising freshwater and marine pollution, many of the resources people need in order to survive and flourish were, and are, in trouble.

Many of the resources people need in order to survive and flourish were, and are, in trouble.

Worrisome trends include:

- a growing number of very poor, disenfranchised and alienated people;

- a heightened knowledge of this rising inequality, enabled by better access to information about the world;

- an accelerating flow of ideas, goods and people. Advanced communications and transportation technologies could move problems—from infectious diseases to stock market panics—from one part of the planet to another faster than ever before;

- a rise in access to arms—and possibly to weapons of mass destruction—that was due, in part, to the strategies and surpluses of the Cold War; and

- a tide of "state failures," where weak governments failed to consolidate power, provide basic services or maintain political legitimacy, and thus collapsed leaving chaos behind.

Against this daunting background, environment and security specialists found ways to collaborate on two research questions. First, could we

improve our understanding of the ways in which environmental change did or might affect the security of communities and societies, and perhaps even lead to violence and warfare? Second, could we identify courses of action that would steer the world away from such outcomes?

Attempts to answer these questions began almost as soon as the Cold War was declared dead.[21] This research abundance was due to the fact that the environmental community was, by the start of the 1990s, quite sophisticated and well-organized. It already had expended considerable effort examining the economic and moral implications of environmental change. As funds became available to study non-military security issues, those interested in environmental change acted quickly on what many saw as a logical and appropriate next step for the environmental movement.

Not every environmentalist agreed with this move, and many security specialists shared their skepticism. Some environmentalists worried that this was a Northern agenda that might provide new justifications for using force in the developing world.[22] Others were concerned that the open, cooperative and global spirit of environmentalism might be sacrificed to the more secretive and Machiavellian culture of security.[23] And some suggested that this joint venture was little more than a post Cold War grab for research dollars made possible by brandishing an image of threat that, in fact, was largely unsubstantiated and even illogical.[24] On the security side, many experts remembered environmentalists as strident critics of training, weapons development, weapons testing and combat. They wondered if this was not a clever way of trying to change the military's primary mission away from fighting and winning wars and towards such things as land management, waste reduction, reforestation and ecological restoration projects.[25]

But these concerns placed few constraints on the energy and activity of the 1990s. Researchers and practitioners on both sides concluded that it was the right time to rethink vulnerability, threat and security in a world that was rapidly changing. It was important that research, discussion and experimentation be open and inclusive, and draw upon the expertise and experience of many stakeholders. If it were proven that good conservation practices were more important tools for peace than traditional weapons, then security policy would have to be adjusted accordingly.

In a single decade this research produced a veritable cascade of papers, books, workshops and conferences in places ranging from Paris to Peshawar. While the research contains many subtle differences of interpretation, it has generated several distinctive lines of investigation that give a reasonable sense of the field's interests and accomplishments. These include:

- arguments that under certain conditions environmental stresses, such as resource scarcities, lead to or contribute to violent conflict;[26]

- counter-arguments that the above case is quite rare, and that such stress is more likely to lead to a decline in the quality of life, migration, or innovation and adaptation, including multilateral cooperation;[27]

- investigations, linked to the above two items, into the conditions under which societies are likely to adapt—or fail to adapt—to forms of environmental change;[28]

- studies of whether "greed" or "grievance" or some combination drives civil war, focusing predominantly on the incentives for violence created by trade in valuable natural resource commodities—timber, oil, diamonds and other minerals;[29]

- attempts to map areas of global vulnerability to environmental change and to develop early warning systems of environmentally-driven conflict and disaster;[30] and

- consideration of ways in which the extensive military and intelligence assets that the world created in the twentieth century might be harnessed to environmental missions.[31] For example, could the secret satellite imagery archived by the United States and the Soviet Union for 40 years help people to better understand climate change or deforestation patterns?[32]

After only 10 years, it is not surprising that the first attempts to answer these questions have provoked controversy and disagreement. It is clear that, in many cases, further research is required and that the data that supported the early research were often fragmentary and inconclusive. At the same time, this work has generated much interest among NGOs, state agencies and the public, and has produced some valuable insights and ideas.

A snapshot of the state of the research and its implications for development cooperation undertaken in 1999[33] found that the causes of conflict are multiple, complex and integrated, as a consequence of which it is difficult to isolate environmental degradation as a causal factor. Yet while the environment plays a minor role as a direct cause of conflict, resource depletion plays an important role in creating or exacerbating human insecurities, deepening ethnic divides and straining governance and dispute resolution mechanisms.

The environmental contribution to insecurity becomes increasingly relevant as the scale of analysis is shifted downwards towards the community level, and upwards beyond the state. While a careful review of evidence

shows that states are unlikely to go to war over shared water resources,[34] conflict over access to natural resources is a reality in many local communities.[35] Likewise, environmental security threats often transcend political borders and require international collective action. The 1986 nuclear meltdown at Chernobyl and its attendant devastation of neighbouring human populations and ecosystems, and the global recognition of the common threat to humanity posed by the declining ozone layer, together placed international environmental governance squarely within the domain of national security. Actions to combat environmental degradation and resource depletion can therefore provide opportunities for collaboration between peoples who might otherwise be opposed.

Noting that an analysis of the security implications of environmental change yields insights helpful for the design of development assistance, the study called for greater collaboration with experts from developing and transitional economies in research, to better reflect the realities on the ground.

In short, much work remains to be done to strengthen the environment and security knowledge base and theoretical frameworks it has produced, and to translate its insights into practical tools that can be used by decision-makers in government, development, business, security and biodiversity conservation.

The IISD/IUCN Task Force

Upon recognizing the relevance of environment and security issues to conservation and the unique contribution they can make in the field, the International Institute for Sustainable Development (IISD) and IUCN – The World Conservation Union embarked on a unique collaboration, the result of which is represented by this volume.

IISD is principally concerned with identifying and helping policy-makers resolve the political, economic and practical constraints on sustainable development, drawing on the best of both academic research and field practice.

IUCN – The World Conservation Union is a global union of governments, government agencies and non-governmental organizations dedicated to the science and practice of conservation. With 900 member institutions spread across 138 countries, and 50 years of experience in achieving conservation on the ground, IUCN is a leading reference on what works and what does not work in conserving the world's natural heritage.

In approaching environment and security, the two organizations believed they would encounter a series of compelling arguments in favour of sustainable development, and distill from the academic literature and from a new

set of case studies, useful tools and lessons for practitioners. They believed that understanding the link between conservation and social cohesion might open important new avenues for disseminating the message of sustainable development, and bring onside sectors of society that have been aloof. Critically, if investing in conservation could reduce the threat of local conflicts, it would strengthen the argument for international development cooperation, which has been in decline since the early 1990s.

In early 2000 and in collaboration with IISD, IUCN's Commission on Environmental, Economic and Social Policy (CEESP), a network of volunteer experts organized so as to provide intellectual support to the conservation movement and its practitioners, took the lead in exploring the environment and security link on behalf of the Union.

The Task Force [see the Chair's Preface] was chaired by Ambassador Mohamed Sahnoun, a distinguished diplomat and expert in international conflict resolution who has served as Special Representative of the United Nations Secretary General on conflicts in Africa. He was joined by six distinguished professionals from different parts of the world, who cut across a spectrum of expertise from academic research to field practice. This Task Force met several times in the course of the project to agree on the aims, the methodology and the criteria for case study selection; to recommend authors; and to review drafts of the case studies. The members provided invaluable guidance and expertise, and helped to generate interest in the project among policy-makers.

The results of the project were first presented at the IUCN – World Conservation Congress, which took place in Amman, Jordan, in October 2000. This workshop offered an opportunity to examine the relevance of the environment and security perspective in achieving IUCN's mission—the sustainable and equitable management of natural resources. The message of this Task Force resonated particularly well with people working in the field of conservation, for whom the link between environment and security is strongly felt. IUCN was asked to examine how environment and security might best be built into its global program and how it might assist its members and partners in targeting their conservation actions so as to enhance social stability and avoid conflict. Many of the conclusions and recommendations found in this volume result from the debate at the Amman workshop.

For its part, IISD continues to manage the CEESP Task Force—now Working Group—on Environment and Security, and is developing tools to address the range of challenges that conflict and insecurity pose for sustainable development. The collaboration between IISD and IUCN is being extended and reinforced, exploring new avenues and forging new partnerships in government, industry, academia and civil society.

The Task Force's Model – Environment, Livelihoods, Security

This book focuses on identifying the positive role that enhanced management of the environment can play in enhancing community security. In so doing, definitions are critical to analyzing and drawing out meaningful distinctions across diverse case studies.

As the meanings of both "environment" and "security" are abstract and contested, the Task Force agreed that, within the vast understanding of "environment" it would focus its research on living natural resources and essential life support systems. The term "security" is similarly broad, and may be considered at the personal level, at the level of the community, the nation and the world. It may embrace not only security from conflict, but also from the effects of such things as global warming, invasive species and disasters. For that reason, the Task Force has defined "security" as managing or preventing conflict and disaster, which are threats to communities and societies.

Conflict can be any fundamental disagreement that prevents cooperation and collaboration and causes social tension and dispute. Conflict can sometimes be a force for positive change, as it represents a dynamic state of human interaction. It can be non-violent (as in the case of broad-based civil protests), latent (repressed in a dictatorial regime) or open. It can take place at the local, regional, national and international level.

Conflict is significant for the purposes of this study, however, when its existence disrupts a community's livelihoods, undermines development or threatens its natural resource base.

Box 1A. Conflict Assessment 101: A Primer for Conservationists

What are the causes and structure of conflict?

It is problematic to disentangle the factors that escalate or deflate social tensions, since there are so many interacting variables. Conflict researchers distinguish between the underlying causes of conflict, and the triggers that turn tension into violence. These factors can be both external and internal to the area in conflict.

Underlying causes are inter-related political, social and economic factors "which create a potential climate for violent conflict without… making its eruption inevitable."[36] These include:[37]

- "*resource-based conflicts* based on competition for economic power and access to natural resources;

- *identity conflicts* based on competition between rival ethnic, religious or other communal identity groups for access to power and social justice;

- *ideological conflicts* based on competition between rival ideologies and value systems; and

- *conflicts over governance and authority* based on competition for political power and participation in political processes."

Triggering factors are "the events, actions and decisions which result in the escalation of disputes into violent conflict."[38] Among others, these might include economic shocks, changes in internal political cohesion and power distribution, influx of arms, actions of political leaders including use of identity politics, opening of borders, or large movements of people or capital.

Categorizing the nature of a particular conflict can be problematic. All conflicts fall somewhere along a continuum between all-out war and peaceful co-existence, including crisis at the edge of war, and the uneasy peace that precedes a true cessation of hostilities.[39] Even so, relations may be peaceful in some places and conflicted in others, and may jump dynamically from stage to stage rather than following a neat sequence of peace-conflict-reconciliation.[40]

The book does not explore the main concerns of the defence community, which are fundamentally oriented towards preventing and resolving international conflict and preserving state institutions. It also does not explore the positive role that can sometimes be played by the "greening" of military operations or by using security forces to protect the environment.[41]

The IISD/IUCN Task Force has focused its research on the link between environment and security through the prism of sustainable and equitable management and use of natural resources as the basis for livelihoods (See model, Figure A1 below). This focus also runs in parallel with the objectives of the Convention on Biodiversity, which commits nations to preserve biodiversity, to regulate access to biological resources and to ensure the equitable sharing of benefits from the use of these resources.[42] As will be seen in the cases presented, inequitable access or unsustainable use of resources plays a critical role in environment-related conflict, as well as in vulnerability to disaster.

Inequitable access or unsustainable use of resources plays a critical role in environment-related conflict, as well as in vulnerability to disaster.

Natural resource scarcity represents the limited availability of, or limited access to, a particular natural asset. Scarcity can represent limited quantity, quality, access or increased demand. It can be a function of environmental change, resource depletion or degradation. It can also represent relative scarcity, a situation of increasing inequality in access to a resource or the benefits its exploitation produces. Natural resource abundance, by contrast, represents a situation where there is a high concentration of valued natural resources in a particular area.

Access to natural resources is key as it underlies all livelihoods. Livelihoods are defined as the activities undertaken to translate resources—whether natural or human—into a means for living at the group or individual level, including the production of goods and services.

Coping strategies are the practices that groups and individuals adopt in the face of trends and shocks that affect the viability of their livelihoods, in order to restore their security. Practices include changing the mix of livelihoods, creating new livelihoods, seeking new sources of resources (by force of arms or otherwise) and migrating. While people could, in earlier times, turn to natural systems such as forests in times of crisis—such as after a storm or when a crop failed—today those natural resources may be owned by others or may be diminishing in quantity and quality.

In the face of a declining resource base or a sudden flood or drought, people—especially those who are poor, marginalized and most directly dependent on natural resources—may pursue coping strategies that exacerbate social tensions and increase vulnerability to disaster. It is through this mechanism that arable land, freshwater, wetlands, coastal zones and forests, each are critical to the security and stability of communities and nations.

In summary, therefore, the Task Force model traces a path from a trend or shock affecting access to a critical natural resource to a loss of livelihoods. It demonstrates how this requires the community to engage in a coping strategy which may include initiating conflict.
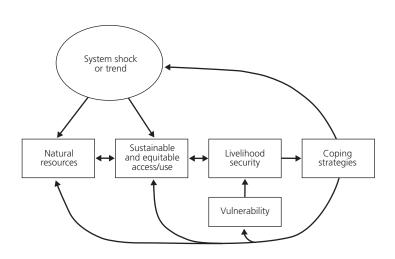
Natural Resources Sustain Communities Through Livelihoods: Livelihoods are the mechanisms through which people translate natural resources into the things they need to survive and thrive. A failure to ensure sustainable and equitable resource use, over-consumption of resources in support of particular livelihoods, or the impacts of a sudden shock such as war or disaster on natural resources or their rate of consumption, can lead to a loss of livelihoods.

The Impact of Shocks and Trends on Livelihoods Depends on Their Vulnerability: The seriousness of the shock or trend for the practice of a livelihood is related to vulnerability, which is exposure to harm, and capac-

ity to endure and recover. Low vulnerability allows a community to mini-mize damage to the livelihood, or to recover from the loss of the livelihood.

Communities Seek to Restore Welfare Through Coping Strategies: Livelihood loss leads to a variety of coping strategies, which may include development of new livelihoods, increased demand for productivity from the remaining livelihoods, conflict or migration in search of additional resources, or cooperation and trading with other groups. Each of these coping strategies has implications for the natural resource base and the mix of livelihoods sustaining the community.

Figure A1. Natural Resources, Livelihoods, Security and Coping Strategies

This linking of environment and security of local communities through the mechanism of livelihoods is emerging as the "missing link" between poverty, environmental degradation and conflict. As one Task Force member hypothesizes in a recent publication, it is the sudden and rapid loss of livelihoods and impoverishment stemming from inadequate access to critical natural resources that deepen the fault lines prevalent in almost all societies and mobilize angry and underemployed young men towards violent ends.[43]

Overview of the Case Studies

This book looks at eight case studies, unified by the relationships described in the model above and the overriding question: can conservation make a contribution to social stability and peace? The cases have deliberately been selected to illustrate a range of interactions, from global and regional con-

cerns to national and local ones. A majority are from the developing world, where the environment and security interactions are as yet insufficiently studied, and where the challenges and opportunities are different. But they also cover the developed world. While the cases differ in the way that they envision and present the relationship between resource management and security, they all highlight how resource mismanagement can contribute to security concerns and undermine the foundation for development and environmental action.

The book opens with a survey of the relationship between biodiversity conservation in tropical forests and war by IUCN's Senior Scientist, Jeff McNeely. Reviewing the importance of violent conflict as a means for traditional societies to adapt to change, McNeely weighs the evidence—both positive and negative—concerning the impacts of war on tropical forest biodiversity and conservation activities. He stresses that war has negative impacts, both from hunting and clearing of vegetation and from the forced migration of refugees and combatants. He notes, however, that peace without attention to conservation can create its own problems for biodiversity, particularly in the post-conflict race to generate government revenue. Citing a fear that conservation of tropical forests might one day be imposed by international military force, he concludes that enhanced resource management has a critical role to play in fostering stable and prosperous societies, and stresses the potential for international peace parks to help resolve contentious border disputes.

Peace without attention to conservation can create its own problems for biodiversity.

Following this overview are five cases exploring the theme of "nations on the edge," where the combination of weak governments and resource-related competition contributes to violence.

The chapter on Pakistan, a region of vital interest given the current political context, focuses on an area that is resource poor and whose culture can reasonably be described as a martial culture. Authors Matthew and Zaidi show how rapid population growth, the massive influx of Afghan refugees and environmental mismanagement extending to the colonial era, have led to severe forms of scarcity and degradation. Environmental stress, in turn, clearly contributes to the worsening of the civil violence that has long been endemic to the area. In a world of conflict and hardship, growing resource stress is undermining traditional livelihoods, leading to two linked results. On the one hand, there has been a remarkable turn to high added-value activities such as the arms and drug trades, and an escalation of illegal transfrontier commerce; and, on the other, unemployment and limited opportunities have created conditions ripe for the radicalization of youth who stream from their villages to towns and religious training schools

within the province. Given its proximity and its ties with Afghanistan, this has turned northwest Pakistan into a flashpoint. Averting a crisis may require a combination of environmental action and development in which communities are given a central place.

Noting that in Indonesia, illegal harvesting of timber is twice the legal cull, forestry expert Charles Barber examines how ill-considered and corrupt forest policies in this island nation have resulted in resource plunder and escalating levels of internal conflict. The author argues that Indonesia is a geographically dispersed country where the state is weak, reliance on forest resources high, and ethnic, religious, and regional cleavages are deep. The removal of the authoritarian regime that brutally suppressed these disputes, coupled with illegal logging and corruption, has made management of the forests a national security concern. Under Suharto, inequitable and exploitive forest policies were imposed, and traditional community dispute resolution mechanisms were dismantled. Forest fires in Sumatra and Kalimantan, which drew so much public attention a few years ago, are seen not as an accident or even the result of an unfortunate concurrence of circumstances, but the direct result of a series of policy failures. Indonesian society will be paying the price for these social and environmental failures for many years to come, yet the tragedy could have been avoided. The author stresses the need to restore confidence in the legal system and other mechanisms for non-violent dispute resolution, to strengthen governance at the local level and to root out corruption.

David Kaimowitz offers a different perspective on environment and security in Central America through his case study of the Bosawas reserve in Nicaragua, which has housed three separate armed anti-government movements over the last 10 years. It is becoming evident that regions like this, which combine limited government presence with high concentrations of lootable natural resources, are breeding grounds for armed insurgencies. The government's failure to address the grievances of respective interest groups led each of them to take up arms in order to consolidate control over the region's land, forest, mineral and other resources. In contrast to the other resource-based conflicts examined in this volume, these confrontations were fuelled by resource abundance rather than resource scarcity. The sketches Kaimowitz provides illustrate how people marginalized by the societies within which they live, and cut off from access to land and resources, will often resort to force to secure exclusive control over the resources to protect their livelihoods, to further economic ambitions or to finance military activities. He calls for conservationists to promote

Limited government presence with high concentrations of lootable natural resources, are breeding grounds for armed insurgencies.

resource management issues as a basis for cooperation and negotiation, and to work with others in restricting illegal trade of natural resources.

It would be simplistic to suggest that resource scarcity was the cause of the genocide in Rwanda. In fact, the first major study of that hypothesis concluded just the opposite.[44] Yet with compelling detail, James Gasana examines how the cumulative effects of high population pressure, inequitable distribution and shortage of land, and resource degradation led to different types of environmental scarcities in Rwanda during the 1980s. In the context of a power struggle amongst the political elites, these scarcities became an overwhelming hardship for the rural poor and fuelled growing dissatisfaction with the state, leading to conflict in the 1990s. Gasana suggests that there is a direct correlation between those parts of Rwanda that are most environmentally degraded and those parts to which the genesis of the civil strife can be traced. "Environmental refugees" from the degraded areas moved out of their home areas, joining forces with others from similarly marginalized lands, until a flow of flood force overwhelmed the capital. While the manipulation of ethnic sentiment ultimately triggered the extremely violent confrontations of 1994, the role of environmental scarcities appears to have been very direct. Gasana's conclusion is that only by ending the winner-takes-all approach to resource control in the region will security for all be attained.

Inequitable distribution and access to land resources also undermine human and environmental security in Matabeleland, Zimbabwe. As Katerere and Hill point out, many of the structural roots of the current strife over land in Zimbabwe have their origins in colonialism, as British land distribution and forest conservation policies evicted many people from their traditional lands. In this arid region of Zimbabwe, the indigenous people are particularly dependent on forests for their livelihoods and as a safety net in times of crisis. With a majority of its people forced onto the worst land, inhabitants in Matabeleland have had to overexploit their resource base, degrading and ultimately undermining their livelihoods and spawning further conflicts. Indeed, the authors allege that disputes over access to land led to the liberation struggle and ultimately to an independent Zimbabwe. Because they are unresolved, these land disputes continue to simmer, and at times boil over, today.

Turning our attention away from issues of violent conflict, Girot provides a regional overview of the role of environmental degradation in compounding disaster vulnerability. He uses examples from Hurricane Mitch in Central America to illustrate how the processes of deforestation, biodiversity loss, and land degradation can compromise, and in some cases strip, the buffering capacity of social and ecological systems. Similar to the other cases in this volume, inequitable distribution of land and income are held

largely responsible for the livelihood insecurity that fuels environmental mismanagement, driving poor people to settle in marginal locations and to undermine their own basis for survival. Moreover, this case study illustrates the complex, and oftentimes cyclical nature of some of the linkages between environment and security, as degradation leads to heightened disaster vulnerability and impacts, which further intensify insecurities. It offers a compelling case for the positive knock-on effects that might be expected from investments in environmental management and into institutions for cooperation at the local level. Strikingly, one of the themes of this case study is the apparent scarcity of quantitative analysis on the linkages between resource mismanagement and vulnerability to disaster. This may be an environmental service that has been critically undervalued in resource management decisions.

Are environmental conflicts a potential problem for the rich countries of the North? DeSombre and Barkin examine a dispute that led momentarily to a result so extreme that few would have thought it possible—two OECD countries in armed battle with each other in the waning years of the twentieth century. And the brief military skirmish (Canadians shooting warning rounds across the bows of a Spanish fishing vessel) was a direct result of the social tensions resulting from the massive failure to manage the North Atlantic fishery sustainably. This case, despite its *opera buffo* qualities, offers a sharp contrast to the other cases presented here. It involves two rich, industrialized countries engaged in a conflict over a resource of marginal economic value, the management of which was governed by an existing multilateral environmental agreement. Driven by broader national interests, namely national pride couched in the pursuit of environmental protection, it is argued that the degeneration of the misunderstanding into conflict—however limited—ultimately provided the incentive to move to a higher level of protection for the resource. It leads to an important question: What are the circumstances whereby resource-based conflicts can be harnessed to produce quantum improvement in the institutions for environmental management?

The book concludes with a cross-cutting analysis of what it takes to make conservation work in times of conflict, based on a multi-year research effort designed to distill the lessons learned in the field. Judy Oglethorpe and her colleagues at the Biodiversity Support Program provide a series of recommendations for conservationists in planning and continuing their activities during conflict and in immediate post-conflict situations. Reviewing the impacts of conflict on biodiversity conservation, they stress that while some impacts are unavoidable, there are many actions that can be taken before, during and after armed conflict to lessen their consequences. Based on their analysis, they stress that modest and strategic investments can make a big difference for the environment and for longer-

term social stability. They call on conservationists and donors to become better attuned to social and political context and trends, and to plan for contingencies. During conflict, they stress the importance of judicious planning so as to minimize risk to personnel. Even should it prove unsafe to continue operations on the ground, conservation capacity and model policy could and should be built amongst nationals exiled from their country, to prepare for the return of peace. Indeed, the immediate aftermath of conflict represents an exceptional window of opportunity to integrate conservation into post-conflict development planning, and for innovative ideas to be introduced into national policy. As the entire world turns its attention to rebuilding Afghanistan, after 23 years of severe environmental and social destruction, the insights of this case study may assume a special significance.

The immediate aftermath of conflict represents an exceptional window of opportunity to integrate conservation into post-conflict development planning.

Conservation In War And Peace

Before letting the cases speak for themselves, we felt it important to clarify why the linkages between environment and security are of particular relevance to conservationists, and why the conservation perspective might enrich this field of inquiry.

First, human settlements and economic activities are increasingly pushing at ecological limits and frontiers. The world's remaining untouched pools of natural resources are often located in politically unstable yet biodiversity-rich areas, where property rights are undefined, unenforced or contested.[45] Development may require entry into relatively undisturbed ecosystems, pitting modernity on a collision course with traditional and subsistence communities and often resulting in conflict. Protecting these biodiversity-rich "hot spots" and the communities within them is a key goal of the conservation movement.

Second, war undermines conservation efforts, as meeting immediate survival needs take precedence over consideration of managing resources for the long term. Protected areas are among the first victims of conflicts. In 1994 during the Rwanda conflict, for example, IUCN's Senior Scientist estimates that the Virunga National Park in Zaire lost 300 sq km of forested area because up to 40,000 people entered each day searching for food and firewood.[46] According to one source, at least 80 of Virunga's park staff have been killed in battles with insurgents since 1996.[47]

Conflict is a reality in many of the world's most biodiversity-rich regions. As a result, conservationists are finding themselves increasingly called upon—

or taking the initiative—to operate in tense and even violent situations. They may at times be working in areas that slip into conflict, and they may be called upon to participate in post-conflict assessments and rebuilding, especially whenever the international community is directly involved. In all of these situations, some understanding of the links among environment, conflict and security will be valuable. Awareness of what has been tried in different parts of the world, and of the major insights of the academic literature, may help in establishing priorities and avoiding pitfalls.

Third, the concepts and language surrounding the links between environment and security have proven to have considerable strategic value in bringing parties together and in accessing new sources of funding for the sustainable development movement. "Environment and security" provides a framework that allows different stakeholders in an area to meet and hold mutually beneficial discussions around issues of common concern: peaceful communities, safe water, and preservation of key forest areas and wildlife. Especially in the developing world, these efforts are facilitated when local and state defence and enforcement agencies are supportive of them.

The notion that improved natural resource management can help build stability and reduce conflict at a relatively low cost makes conservation appealing to a new—and vitally important—constituency, those charged with securing the peace. In doing so, it also has the potential to increase the attractiveness of conservation proposals to funding sources. As conservation gains more recognition as a peace-building tool, and even as one of the first steps towards building a society that is stable and hence appealing to investors, it becomes a necessary, as opposed to negotiable, part of any development strategy.

Fourth, at the local community level, some research suggests that security is a priority whereas conservation of natural spaces is perceived as a luxury. Experience with small communities in remote regions, such as northern Pakistan, suggests that the concept of environment and security is attractive and resonant at this level, and thus helps deepen appreciation of conservation proposals as essential to survival and development. Identifying natural resources and services critical to the survival and safety of a community can help conservationists prioritize investments in natural resource

The sustainable development agenda is a broad one; understanding the links between environment and security might help us identify what to do first.

management so as to maximize their social value. The sustainable development agenda is a broad one; understanding the links between environment and security might help us identify what to do first.

Finally, linking environment and security offers a positive response to those whose vision for our future is bleak and forbidding. This apocalyptic view of tomorrow is one where shortages of food, water and energy create the conditions for global breakdown—a planet-wide anarchy of violence and misery surrounding tiny islands of affluence.

While many analysts assign a low probability to this alarming neo-Malthusian prediction, and others openly ridicule and condemn it, it has become a useful boundary marker for policy-makers. The message it offers is clear and compelling, if extreme: societies that fail to conserve today, may fail tomorrow.

Understanding the environmental basis of security expands the utility of this concern by examining how development and environmental degradation affect social stability. It suggests a range of social outcomes from environmental change. These may include innovation and cooperation, as well as conflict and collapse. Understanding the relationship between environment and security proposes tools for promoting the former and preventing the latter. The choice is not between all or nothing; it is between better or worse.

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43. L. Ohlsson, "The risk of livelihood conflicts and the nature of policy measures required," Working Paper (University of Goteborg, 2000). Available at: http://www.padrigu.gu.se/ohlsson/files/Livelihoods-Roosevelt.pdf

44. See, for example, T.F. Homer-Dixon (1999), p. 17.

45. A. Rosenfeld-Sweeting and A. Clarke, *Lightening the lode: A guide to responsible large-scale mining* (Conservation International, 2000), p. 54.

46. J.A. McNeely, "Biodiversity, conflict and tropical forests," See this volume.

47. *Ibid.*

Overview A

Biodiversity, Conflict and Tropical Forests

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Abstract

As one of the world's last remaining strongholds of unexploited resources, tropical forests often serve as a point of contention as they become the focus of social, ecological, political and economic changes. Poor management of forest resources and the absence of an established set of equitable sharing principles among contending parties lead to shifts in resource access and control. Resulting tensions and grievances can lead to armed conflict and even war. Many governments have contributed to conflict by nationalizing their forests, so that traditional forest inhabitants have been disenfranchised while national governments sell trees to concessionaires to earn foreign exchange. Biodiversity-rich tropical forests in Papua New Guinea, Indonesia, Indochina, Myanmar, Sri Lanka, Central Africa, the Amazon, Colombia, Central America and New Caledonia have all been the sites of armed conflict, sometimes involving international forces. While these conflicts have frequently, even invariably, caused negative impacts on biodiversity, peace is often even worse, as it enables forest exploitation to operate with impunity. Because many of the remaining tropical forests are along international borders, international cooperation is required for their conservation; as a response, the concept of international "peace parks" is being promoted in many parts of the world as a way of linking biodiversity conservation with national security. The Convention on Biological Diversity, which entered into force at the end of 1993 and now has nearly 180 State Parties, offers a useful framework for such cooperation.

1.   Introduction

The "peace dividend" expected from the end of the Cold War has not paid off in terms of reduced violent conflict and the recent conflict in Afghanistan demonstrates the continuing potential for highly destructive war. Some tropical countries are facing generalized lawlessness and banditry, including by marauding ex-soldiers in several African nations and drug cartels in some parts of Latin America (Renner, 1996). Tension in various parts of Africa, Central America, Indonesia, Kashmir, Colombia, Sri Lanka, New Caledonia and elsewhere are further indications of war as a fact of modern life in many tropical forest countries.

Despite these widespread threats to national sovereignty, governments are obliged under the 1992 Convention on Biological Diversity (CBD) to conserve their own biodiversity (Article 1) and to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states (Article 3). Any negative impacts of war on biodiversity clearly are contrary to this international agreement. But what, specifically, are the impacts of war on biodiversity in tropical forest countries? This chapter attempts to identify some of the key issues in preparing a balanced assessment, and to suggest a possible role for the CBD.

The issues are complicated and the available evidence does not provide simple answers. But it is hard to avoid the conclusion that modern means of communication, growing human populations and levels of resource consumption, increased vulnerabilities of inter-dependent, integrated civil societies, and the spread of modern instruments of war—including chemical and biological weapons—are likely to make future wars extremely destructive for people and the rest of nature.

On the other hand, war is often seen as part of the way human societies adapt to changing conditions (see, for example, Harris, 1974; Keeley, 1996; and Vayda, 1974). The International Commission on Peace and Food (1994) concluded that historically, all the major changes in the international political and security system have been the result of armed conflicts, wars and revolutions. It appears that many, even most, societies have been defined by war, and that the organization of a society for the possibility of war has been its principal political stabilizer. The victors who emerged from the ashes of war have sown the seeds that would produce subsequent tensions, disputes and conflicts. It often seems that an institutional lack of capacity to adapt to change, or the inertia of vested interests in the status quo, means that societies inevitably become maladapted over time, eventually requiring a shock such as war to set them on a different course (Edgerton, 1992).

A fundamental issue is how humans stay within the productive limits of their supporting ecosystem. While most would agree that such adaptation should be possible through the application of knowledge and wisdom, history does not support such a rational view and, in fact, war is virtually universal in human societies as a means of resolving conflicts arising from various sources of maladaptation (Keeley, 1996). Underlying stress factors can produce or deepen rifts in societies, with disputes triggered by glaring social and economic disparities and exacerbated by the growing pressures of resource depletion, natural calamities, environmental degradation and perceived excess population. Biodiversity-related problems like desertification, soil erosion, deforestation, and water scarcity reduce food-growing potential, worsen health effects and diminish life-support capacity, which can lead to civil conflict and increase the likelihood of war. As Nietschmann (1990a: 37) concludes, on the basis of experience from Nicaragua, "Degraded land and resources are as much a reason for taking up arms as are repression, invasion, and ideology."

Because environmental stress can be a fundamental cause of armed conflict, issues of conserving biodiversity, using biological resources sustainably and sharing the benefits of such use in a fair and equitable manner—the three objectives of the Convention on Biological Diversity—are critical elements in discussions of national security in tropical forest countries. Investments in such activities as sustainable forestry, water conservation, land reform, and protected areas management, it can be argued, are vital contributions to peace. Our real challenge is how to manage our resources in ways that adapt to changing conditions (e.g., Holling, 1978), building on information that informs resource managers (hunters, farmers, foresters, herders and fishers) about the sustainability of their harvests. Given the conflicts that are inherent in growing numbers of people seeking to use a finite stock of resources, ways need to be found that keep the conflicts within productive bounds, rather than slipping into violence (Lee, 1993). Political dialogue among the concerned parties would seem an essential element.

This chapter will begin by briefly assessing war as one of the traditional social means for human societies to adapt to changing environmental conditions, then assess some of the positive and negative impacts of war on tropical forest biodiversity before suggesting several issues that must be addressed if modern civilization is to meet the growing security challenges of the twenty-first century. It will conclude by showing how conserving biodiversity can contribute to peace, building on the preamble to the Convention on Biological Diversity, which states that, "Ultimately, the conservation and sustainable use of biological diversity will strengthen friendly relations among states and contribute to peace for humankind."

2. The History of War and Biodiversity

Today's biodiversity is to a considerable extent the result of long-term interactions between people and their environments reaching back at least as far as the origins of fire (see, for example, Flannery, 1994; McNeely, 1994; Martin and Klein, 1984; Ponting, 1992). The greatest diversity of terrestrial species today is found in forested areas inhabited by tribal and other indigenous peoples, where relatively large areas of "unoccupied" territory serve as a sort of buffer zone between communities that may be embroiled—at least historically—in virtually constant warfare, including sneak attacks, revenge killings, kidnappings and raids on livestock (Keeley, 1996). It is instructive, therefore, to briefly examine the impact on biodiversity of warfare among traditional and indigenous societies, how modern armies relate to tropical forest-dwelling tribal peoples and the influence such relations have had on biodiversity.

Higher frequencies of war in traditional societies can be forecast by a history of unpredictable natural disasters and severe food shortages, as people have tried to protect themselves by going to war to take resources from enemies (Ember and Ember, 1992). Raids often included plundering food stores and gardens in the Americas, Polynesia, New Guinea and Africa, leaving an enemy facing starvation and rendering large areas of territory at least temporarily uninhabitable. While this could serve to provide larger areas of habitat to various species of wildlife, it could also lead to significant increases in the pressure of human population on the remaining wildlife populations. Losses and gains of territory were a very frequent result of warfare among pre-industrial societies, leading to dynamic tribal boundaries; and these frontiers often were places supporting great diversity of species. Keeley (1996: 112) concludes, "Even in situations where no territory exchanges hands, active hostilities along a border can lead to development of a no-man's-land, as settlements nearest an enemy move or disperse to escape the effects of persistent raiding. Although such buffer zones could function ecologically as game and timber preserves, they were risky to use even for hunting and wood cutting because small isolated parties or individuals could easily be ambushed in them."

These buffer zones often are where biodiversity is richest, especially in terms of large mammals. As one example, in South America at the time of the first contact with Europeans, large settled villages were found along the major rivers in various parts of the Amazon. The chieftains of these societies practised a type of warfare that often involved forces numbering in the hundreds of men drawn from multiple confederated villages who travelled by canoes and used sophisticated tactics to attack their enemies. The powerful chieftains often fought over territory, with large buffer zones separating them; these buffer zones often were refugia for wild game

(Ferguson, 1989). In the first voyage up the Amazon's Ucayali river in 1577, Juan Salenas Deloyola contacted three principal groups, similar in culture but speaking different languages (an indication of linguistic separation). Each was separated from the next by a distance of 50 to 60 leagues, about the same distance as was incorporated in the tribal territory. Myers (1979) considers this to be an example of a no-man's land, located between the defended territories of adjacent human groups.

While the evidence available at present does not support any particular conclusions about the relationship between ecology and war, competition for environmental resources very frequently is a factor in war between different communities in Amazonia (Ferguson, 1989). Vulnerability to attack may set a threshold on settlement size, or the threat of raids may encourage people to live together to maintain an adequate defensive force.

One of the world's biologically richest areas is in the upper Amazon, including Venezuela, Colombia, and Brazil: a true "biodiversity hotspot" (McNeely, *et al.*, 1990), where borders are not well demarcated. Perhaps not coincidentally, this is also an area that is occupied by a large number of culturally-distinct Indian groups which have formed long-term relationships with their environment, including elements such as warfare, infanticide and raiding, that are unacceptable in modern society (except, of course, where they are sanctioned by the government as part of modern warfare). For example, Chagnon (1988) has found that among the Yanomamo Indians, the largest Indian group in the Amazon rainforest, 44 per cent of males 25 or older have participated in the killing of someone, about 30 per cent of adult male deaths are due to violence and nearly 70 per cent of all adults over 40 have lost a close genetic relative due to violence. The relationship between indigenous peoples, biodiversity, colonists and the modern military in this frontier region is a complex and fascinating one that contains several important lessons for those seeking better understanding of the relationship between biodiversity and national security in tropical forest countries.

In November 1981, Brazil's President Fernando Color de Melo issued a decree to give the Yanomamo partial control of their traditional lands. The decree was opposed by the Brazilian military because the Yanomamo lands extend across the borders with Venezuela and Colombia, a militarily sensitive area. The decree was part of a zoning process that involved dividing the forest into protected areas, land for traditional Indian farming and hunting, and areas permitting environmentally destructive development such as logging, roads, mines and dams.

However, the Brazilian military has continued to impede full legalization of Indian land rights near its international borders, branding as subversives those scientists who are working internationally to save the Amazonian

forest habitats of the indigenous peoples. Lewis (1990) reported on a secret document prepared by the Brazilian High War College proposing that war could be used against indigenous or environmental organizations in the Amazon. The idea that the Amazon might be invaded by a foreign army of conservationists aiming to conserve the rainforest may appear ludicrous to those living outside South America, but it is taken seriously in the region and has been used to justify the Brazilian military's tight control of Amazonian policy (Conklin and Graham, 1995).

CIMI (1987) concludes that the Brazilian military sees the preservation of the rainforest and its peoples as a threat to national security, considering it necessary to "clean" the frontier strip of obstacles to the implantation of more permanent investments, which spells disaster for the Indians and for biodiversity. This perception perpetuates the conflict among the military, indigenous peoples and conservation interests. (For a Brazilian view, see da Costa, 2001).

This military mind-set is not confined to Brazil. In Venezuela, a proposal to create a Yanomamo Biosphere Reserve along the border with Brazil was rejected by the Ministry of External Relations, concerned that national and international public opinion would be mobilized to advance the human rights of the indigenous groups and to promote eventual self-development and self-determination. They singled out a group of Venezuelan ecologists and anthropologists as the core of an international conspiracy to undermine the ability of the government to control the Amazon territory and its native inhabitants (Hill, 1994). The high-level Congress of the Armies of the Americas (CAA) has reduced complex social problems into a black and white opposition between "national security" and "terrorist subversion," with those advocating Indian rights being linked to subversive organizations (a group that also included feminists and environmentalists). In essence, the CAA created a mythological history of the relationships between indigenous peoples and their land, defining the problems in terms that required military solutions (Hill, 1994) and ignoring the role of indigenous ways of life in maintaining the rich biodiversity of the upper Amazon, and the dependence of the forest-dwelling people on the biological resources of the forest.

New Guinea is a tropical forest-covered island that has been a particularly fertile ground for the study of war, as warfare has been frequent, deadly and a defining factor in the lives of most tribal peoples of the island during the time anthropologists were available to study its highly diverse societies (over 700 languages are known from New Guinea). For example, warfare among the Maring, a people of the New Guinea Highlands, facilitated demographic shifts, adjusted relationships between population and land, and alternated the build-up of pig herds with slaughter for pig feasts that

played an important role in warfare. Rappaport (1984) saw warfare as part of a self-regulating ecological system which maintained the population of people and pigs below the carrying capacity of the land. Warfare in association with hunting has been well documented among a number of other New Guinea groups, including the Purari, the Mae Enga, the Kiwai, the Trans-Fly peoples, the Marind-Anim, the Dani, the Kolopom, the Jacquia and the Asmat (Meggitt, 1977; Heider, 1970).

Generally speaking, the New Guinea tribes engage in two rather different kinds of warfare. One is highly ritualistic, involving hundreds of men who meet in a designated public battleground and shoot arrows at each other; these battles tend to be generally inclusive and casualties are low. The other kind of warfare is more secular, brief, and infrequent. It often involves a large-scale clandestine attack which kills large numbers of people and destroys property (Shankman, 1991). Some battles lead to massacres of over 100 people in an hour or so (Blick, 1988), which can amount to over five per cent of the group's population (an impact equivalent to 14 million Americans dying). Heider (1979) sees New Guinea warfare as a cycle of battles and raids over many years that constantly splits alliances and rearranges confederations, thus setting the stage for subsequent battles. The result of such fighting is that fields and home sites are abandoned, thereby leading to the redistribution of land and other resources and creating buffer zones that provide sanctuary to at least some components of biodiversity.

Indigenous warfare was prevalent throughout Melanesia, and anthropological accounts of pre-colonial warfare come from the Admiralty Islands, New Ireland, New Britain, Bougainville, Choiseul Island, New Georgia, Malaita, San Cristoval, New Hebrides (now Vanuatu) and New Caledonia, and both coastal and interior New Guinea (summarized in Knauft, 1990).

While the existence or intensity of warfare in pre-state societies is not a simple linear function of population density, population pressure or protein scarcity, all of these factors are important contributors, and it seems reasonable to conclude that ecological pressure works together with cultural and political dispositions toward warfare. The perception of individual or group land scarcity is a function of socio-cultural as well as ecological organization; perceptions of scarcity are often as important as the pattern of rainfall, the numbers of pigs or the game animals in the forest (Knauft, 1990). Thus the actual warfare carried out by the indigenous peoples of the tropical forests involved numerous factors reinforcing each other, including increasing human population density, related clearance of forests to increase domestic food production and declining wild food resources at the same time that demand for resources was increasing, leading to increased opportunities for conflict. The subsequent population redistribution certainly had profound implications for biodiversity.

To conclude this section, it appears that various forms of war have been part of the way traditional societies adapted to changing conditions, and—at least coincidentally—helped contribute to the rich biodiversity found today in many tropical forest areas occupied by traditional and indigenous peoples. Bringing peace to these regions will remove this means of adaptation, requiring other ways to conserve biodiversity and maintain the capacity to adapt to changing conditions.

3. The Impacts of War on Biodiversity in Tropical Forests

3.1 Negative impacts of war on biodiversity

War, and preparations for it, has negative impacts on all levels of biodiversity, from genes to ecosystems. These impacts can be direct—such as hunting and habitat destruction by armies—or indirect, for example through the activities of refugees. Sometimes these impacts can be deliberate, and a new word has been added to the military vocabulary: "ecocide," the destruction of the environment for military purposes clearly deriving from the "scorched earth" approach of earlier times. Westing (1976) divides deliberate environmental manipulations during wartime into two broad categories: those involving massive and extended applications of disruptive techniques to deny to the enemy any habitats that produce food, refuge, cover, training grounds and staging areas for attacks; and those involving relatively small disruptive actions that in turn release large amounts of "dangerous forces" or become self-generating. An example of the latter is the release of exotic micro-organisms or spreading of landmines (of which over 100 million now litter active and former war zones around the world—Strada, 1996).

This discussion could be long and dreary, but only a few illustrative cases will be mentioned. Perhaps the most outstanding example is Vietnam, where U.S. forces cleared 325,000 ha of land and sprayed 72,400 cubic meters of herbicides in the name of security (Westing, 1982). The impact on biodiversity was severe; spreading herbicides on 10 per cent of the country (including 50 per cent of the mangroves) led to extensive low-diversity grasslands replacing high-diversity forests, mudflats instead of highly productive mangroves, major declines in freshwater, coastal fisheries and so forth (Nietschmann, 1990a).

Other problems are more systemic. The State Law and Order Restoration Council (SLORC), the military government in Myanmar (formerly Burma), has been involved in violent confrontations with many of the tribal groups who inhabit the densely forested mountain regions along the country's borders with Bangladesh, India, China, Laos and Thailand. Some of these tribal groups, such as the Karen, have turned to intensive

logging to fund their war effort, even though such over-exploitation will eventually destroy the forest cover and make them more open to attack (Harbinson, 1992). The general lawlessness along the border with Thailand has greatly increased the flow of logs, both with and without government permission, leading to the virtual clear felling of many of the country's most productive forests.

Africa provides several recent war-related disasters for biodiversity in tropical forests. Like the upper Amazon, the Virunga Volcanoes region (including parts of the Central African countries of Rwanda, Democratic Republic of Congo and Uganda) is exceptionally rich in species diversity, including the rare and endangered mountain gorilla (*Gorilla gorilla*) whose total population is approximately 600. The civil war against the government of Rwanda was launched in 1990 from within the Virunga Volcanoes region, spreading deeper into Rwanda until 1994 and sending large numbers of refugees fleeing to North Kivu District in what was then Zaire, which then began a civil war of its own. The headquarters of several tropical forest World Heritage sites in Zaire were taken over by the military, including Virunga National Park, Kahuzi-Biega National Park and the Okapi Wildlife Reserve. In 1994, some 850,000 refugees were living around Virunga National Park, partly or completely deforesting some 300 sq km of the park in a desperate search for food and firewood. Up to 40,000 people entered the park every day, taking out between 410 and 770 tons of forest products. The bamboo forests have been especially seriously damaged, and the populations of elephants, buffalo and hippos have been much reduced. Organizations such as the Red Cross, Médecins Sans Frontière and CARE have supported well-meaning relief operations on the park boundaries and have even established a dump for medical wastes inside the park, with the obvious disease transmission risks associated with such practices (Pearce, 1994). At least 80 of Virunga's park staff have been killed in battle with insurgents since 1996.

A few other examples (among many that could be provided):

- The administrator and two rangers of the Saslaya National Park in Nicaragua (15,000 ha) were kidnapped by the Contras in 1983, forcing the National Environment Agency to abandon the management of the area (Thorsell, 1990).

- In 1996, the Kibira and Ruvubu National Parks in Burundi were used as sanctuaries and entry points for guerrillas fighting the government. As a result they also became operational areas for government troops, with both sides heavily involved in poaching (Winter, 1997).

- India's Manas Wildlife Sanctuary, a World Heritage site, has been taken over by guerrillas from the Bodo tribe, who have burned down

park buildings, looted most park facilities, killed guards, destroyed bridges, poached rhinos (*Rhinoceros unicornis*), elephants (*Elephas maximus*), tigers (*Panthera tigris*) and other wildlife, cleared forests and depleted fish stocks in the Manas river.

- Liberia's civil war has forced rural people to hunt duikers (*Cephalophus spp.*), pygmy hippos (*Choeropsis liberiensis*), forest elephants (*Loxodonta*) and chimpanzees (*Pan troglodytes*) for food (Wolkomir and Wolkomir, 1992).

- Some species are directly affected. During the Vietnam war, elephants were specifically targeted by helicopter gunships because they might be used as pack animals by the Viet Cong; and the white rhino (*Ceratotherium simum*) was exterminated from Sudan during the 17 years of civil war from 1955 to 1972 (Abdullah, 1997).

The conclusion is not surprising: war is bad for biodiversity.

3.2   Positive impacts of war on biodiversity

But war, or the threat of war, can also be good for biodiversity, at least under certain conditions. As Myers (1979: 24) put it, "In some respects, indeed, wildlife benefits from warfare: combatant armies effectively designate war zones as 'off limits' to casual wanderers, thus quarantining large areas of Africa from hunters and poachers." Of course, any benefits of war to biodiversity are incidental, inadvertent and accidental rather than a planned side-effect of conflict. But even so, it is useful to review some cases where war, or preparations for war, has benefited biodiversity, perhaps supporting the views of some anthropologists that war helps societies adapt to their environmental constraints.

For example, the border between Thailand and Peninsular Malaysia was a hotbed of insurgency during the mid-1960s to the mid-1970s. On the Malaysian side of the border, the military closed off all public access and potential logging activity in the Belum Forest Reserve. As a result, this extensive area of some 160,000 ha has remained untouched by modern logging pressures and therefore is rich in wildlife resources. Malaysia is now converting this into a national park that will form a transboundary-protected area with matching protected areas in southern Thailand.

While the second Vietnam War was an ecological disaster, it also led to some important biological research, such as the extensive, long-term review of migratory birds in eastern Asia carried out by the Migratory Animals Pathological Survey (McClure, 1974). The excuse for this research was its relevance to the war effort, but it has yielded data that are useful for numerous civilian conservation applications. And the watersheds through which ran the Ho Chi Minh trail, some of the most heavily-bombed parts of Indo-China during the second Vietnam War, have more

recently been remarkably productive in discoveries of previously unknown species. The discoveries of new large mammals include two species of muntjak or barking deer (*Megamuntiacus vuquangensis* and *Muntiacus truongsonensis*), a unique variety of forest antelope (*Pseudoryx nghetinhensis*), and a bovid ultimately related to wild cattle (*Pseudonovibos spiralis*) (Dillon and Wikramanyake, 1997) as well as the rediscovery of a species of pig that formerly was known only by a few fragmentary specimens. That such species could survive in such a heavily-bombed area is testimony to the recuperative power of nature and the ability of wildlife to withstand even the most extreme kinds of human pressure during warfare. Interestingly, these species now are even more severely threatened by the peacetime activities of development than they were by the Indochina wars.

Table A1. Impacts of War on Biodiversity

Negative Impacts	Positive Impacts
Deforestation	Creates "no-go" zones
Erosion	Slows or stops developments that lead to loss of biodiversity
Wildlife poaching	Focuses state resolve
Habitat destruction	
Pollution of land and water	Reduces pressure on some habitats
	Allows vegetation to recover in some areas
Reduces funds for conservation	Stops conservation projects
Forces people on to marginal lands	Disarms rural populations, thereby reducing hunting
Creates refugees who destroy biodiversity	Can increase biodiversity-related research

Some other species are likely to have benefited from the war in Vietnam. Orians and Pfeiffer (1970: 553) say that tigers "have learned to associate the sounds of gunfire with the presence of dead and wounded human-beings in the vicinity. As a result, tigers rapidly move toward gunfire and apparently consume large numbers of battle casualties. Although there are no accurate statistics on the tiger populations past or present, it is likely that the tiger population has increased much as the wolf population in Poland increased during World War II."

Fairhead and Leach (1995) report that parts of the Ziama region of Guinea, which includes an extensive biosphere reserve, became forested following a series of wars that affected the area from 1870 to 1910. The resident Toma people first fought with Mandinka groups from the north

and subsequently with the French colonial armies, causing major depopulation and economic devastation that in turn allowed the forest to reclaim agricultural land. The human disaster of war enabled nature to recover.

The impact of war on biodiversity is often decidedly mixed, with a complex combination of damages and benefits. Nicaragua provides an outstanding example. Engaged in civil war for over 20 years, nearly half of the country's population was relocated in one way or another, and nearly 100,000 casualties resulted. The human tragedy was immense, but biodiversity was able to recover from a long history of exploitation, as trade in timber, fish, minerals, and wildlife was sharply reduced. The domestic cattle population, which was roughly equivalent to the human population when the war started, was reduced by two-thirds, freeing pastures for re-colonization by forests, enabling the recovery of animal populations such as white-tailed deer (*Odocoileus virginianus*), peccaries (*Tayassu angulatus*), four species of monkeys (*Cebidae*), crocodiles (*Caiman Crocodilus*), iguanas (*Iguana iguana*), large birds and various mammalian predators. Fishing boats were destroyed and fishermen fled, leading to drastic declines in the catches of fish, shrimp and lobsters, which in turn revitalized these fisheries. On the other hand, some hunting by soldiers had at least local negative impacts on wildlife, and new military bases and roads were established in formerly-remote areas, opening them up to exploitation. Further, the country's once outstanding system of protected areas fell into neglect, and new areas planned were not established; the collapsing economy forced villagers into environmentally destructive activities, including clearing forest for firewood and harvesting wildlife for food. Nietschmann (1990b) concludes that a significant portion of this conflict was over resources and territory, not ideology. Biodiversity rejuvenated by the war came under renewed threat by people whom the war had impoverished; the post-war period saw a great acceleration of such impacts and now that peace has broken out, biodiversity is under renewed pressure.

On the other side of the world, the Indochina war was disastrous to Cambodia, in both human and ecosystem terms. Years of fighting have created a climate of lawlessness in which those who control the guns also control the country's most valuable natural resources, namely forests and fisheries. Overturning any feeble efforts at control, both are being depleted at dangerous rates now that peace has broken out, according to studies being carried out by the World Bank and the Asian Development Bank. Uncontrolled logging, much of it illegal, could virtually deforest the country within five years, according to ADB, with current harvesting over three times the sustainable yield. The fish, especially from Cambodia's Tonle Sap (Great Lake), are being over-harvested, primarily for export to surrounding—and wealthier—countries. The ecological productivity of the lake was based largely on the 10,000 sq km of flooded forest that ensured a

healthy flow of nutrients into the lake. But less than 40 per cent of the flood forest remains under natural vegetation. Since 1993, military commanders have come to regard the forest resources as their own resources, treating them as a supplemental source of finance irrespective of the long-term impact on the country's security. Continuing loss of forests will further affect the climate, cause erosion that fills irrigation channels and fishing grounds with silt, and leave Cambodian farmland more vulnerable to both drought and flooding. This complex of problems is very similar to that which faced Cambodia some 400 years ago, when the great civilization centred on Ankor Wat collapsed under environmental pressure (McNeely and Wachtel, 1988).

So while war is bad for biodiversity, peace can be even worse: in the 1960s, when Indonesia and Malaysia were fighting over border claims on the island of Borneo, they did relatively little damage to its vast wilderness, but in the 1990s they peacefully competed to cut down and sell its forests; in Indonesia, the 1997–1998 forest fires that caused US$4.4 billion in damage were set primarily by businesses and military to clear forests in order to plant various cash crops. Ironically, the prices of these commodities that were to be grown have fallen considerably in recent years, making them even less profitable. Vietnam's forests are under greater pressure now that peace has arrived than they ever were during the country's wars; Nicaragua's forests are now under renewed development pressures; and Laos is paying at least part of its war debts to China and Vietnam with timber concessions; I was told in Laos that the Chinese and Vietnamese timber merchants and logging companies are able to operate with impunity in Laos, irrespective of logging regulations, protected area boundaries, or any other considerations. This is perhaps not surprising given the dependence of the Pathet Lao on the support of Vietnam and China during the Indo-China wars. The motivations may be more noble in times of peace, but the impacts of inappropriate development on biodiversity following the end of hostilities often are even worse than the impacts of war. Market forces may be more destructive than military forces

4.   Biodiversity Loss as a Contributor to Conflict in Tropical Forests

Resource degradation, including loss of biodiversity, can create scarcities that push people out of the regions where they live. Insufficient supplies of firewood and timber, depleted aquifers and soil erosion can form a feedback loop of poverty, insecurity and environmental degradation. As Kane (1995) points out, "Felled trees, for example, no longer anchor soil, which washes away and clogs rivers, and the disrupted flows of water cause further soil erosion and disrupt harvests of fish. In rural areas where people directly depend on the soil and water and forests for sustenance, poverty is essentially an environmental trend. These people are usually cash poor, yet

so long as they are natural resource-rich, they can remain at home and prosper. But when people flee poverty they are often fleeing environmental impoverishment—after the top soil blew away or the well ran dry—in places without a rural economy that offers them alternative sources of livelihood."

Resource scarcity can arise from three sources: degradation or depletion of a resource; increasing consumption of the resource (for example, due to population growth or rising per capita resource consumption); and uneven distribution that gives relatively few people disproportionate access to the resource and subjects the rest to scarcity. Resource scarcity can lead to declining agricultural production, economic hardship, migrations of people from areas of environmental stress, and tensions within and among groups—a melange of factors that contribute to violent conflict (Homer-Dixon, 1994). When resource scarcity reduces the ability of states to meet the needs of their population, dissatisfaction can lead to declining state authority, which sooner or later nurtures violent collective action.

Homer-Dixon (1994) concludes, "Within the next 50 years, the planet's human population will probably pass nine billion, and global economic output may quintuple. Largely as a result, scarcities of renewable resources will increase sharply. The total area of high-quality agricultural land will drop, as will the extent of forests and the number of species they contain. Coming generations will also see the widespread depletion and degradation of aquifers, rivers, and other water resources; the decline of many fisheries; and perhaps significant climate change." Resource scarcities in many parts of the developing world are already contributing to violent conflicts that are probably early signs of an upsurge of violence in the coming decades that will be induced or aggravated by scarcity. Poor people in tropical forest countries will be particularly affected because they are less able to buffer themselves from resource scarcities and resulting social crises. These people typically already are suffering acute hardship from shortages of water, forests and fertile land. A major problem is that fast-moving, unpredictable, and complex environmental problems can overwhelm efforts at constructive social reform. Moreover, scarcity can sharply increase demands on key institutions, such as the State, while it simultaneously reduces their capacity to meet those demands. These pressures increase the chance that the State will either disintegrate or become more authoritarian, both of which enhance the likelihood for war.

5.   Conclusions

National and international security can no longer be conceived in narrow military terms. Ethnic conflict, environmental degradation and pollution, and famine leading to civil unrest or massive migrations of refugees, constitute threats to social stability and the preservation of a productive material

base—the planet's biodiversity. Thus stopping deforestation or augmenting food production capabilities in deficit areas directly and substantially contribute to the security of society, and can help prevent—or at least postpone—armed conflict. Allocating international resources to environmental monitoring and impact assessment, protection of economically important species, quick response to disasters and accidents, energy conservation, and the minimization and management of waste are all highly appropriate activities that will prevent strife and therefore reduce the likelihood of conflicts leading to war. As Thacher (1984: 12) put it, "Trees now or tanks later."

Box 2A: Transfrontier Protected Areas in Tropical Forest Regions

Many protected areas are located on national borders, and some have adjacent protected areas on the other side of the border, forming complexes that could be the focus of collaboration. IUCN (1997) calls these (perhaps optimistically) "Parks for Peace." The following is an indication of how widespread and important such areas are.

Continent	Transfrontier protected area complexes	Designated protected areas
Africa	39	110
Asia	31	74
Latin America	35	89
Totals	105	273

Compiled on the basis of information presented in IUCN (1997).

More broadly, some countries are recognizing the possibility of using protected areas designed to conserve biodiversity along their borders as ways of promoting peace (e.g., Hanks, 1998). In many countries, boundaries are found in mountainous areas which also tend to be biologically rich because of the great variety of habitats and ecosystem types found within relatively small areas, affected by differences in elevation, microclimate and geological factors. While such ecologically diverse areas are often particularly important for conservation of biodiversity, they also are frequently sanctuaries in war, especially civil wars and guerrilla wars.

Peace Parks are far more than a fond hope. Peru and Ecuador fought three territorial wars in the twentieth century, but Peruvian President Alberto Fujimori and Ecuadorian President Jamil Mahuad resolved their violent

border dispute in 1998 with an innovative plan that included creation of two national "peace parks" near the most contested stretch of their frontier. Four mediators—the United States, Argentina, Brazil and Chile—helped resolve the hottest regional dispute in South America through binding arbitration. The agreement also granted Ecuador free trade and navigational access to the economically important shipping routes of Peru's Amazon territory. While the agreement fell far short of Ecuador's desire for sovereignty over the disputed territory, leading to demonstrations against the government, many of Ecuador's economic goals were achieved. The area is also the territory of several Jivaro-speaking tribes, who frequently are at war with each other. The new peace with protected areas will need to involve the indigenous peoples as well (Faiola, 1998).

Given that national frontiers are especially sensitive areas where conflict is endemic and biological resources are especially rich, the idea of establishing protected areas on both sides of the border—as so-called "peace parks"—has attracted considerable attention, providing a symbol of the desire of the bordering countries to deal with many of their problems in a peaceful way (see, for example, Westing, 1993; Westing, 1998; and Thorsell, 1990). Zbicz and Greene (1998) have found that transboundary protected areas cover well over 1.1 million sq. km, representing nearly 10 per cent of the total area protected in the world (see Box 2A). In addition to indicating the importance of transfrontier protected areas, this also demonstrates how much of the world's land area devoted to biodiversity conservation is in remote frontier areas where risks of war historically are highest.

Brock (1991) concludes that although peace parks have probably had relatively little independent effect on international relations, transfrontier cooperation on biodiversity issues has the potential to develop into an important factor in at least regional politics by helping to internalize norms, establish regional identities and interests, operationalize routine international communication and reduce the likelihood of the use of force. The Convention on Biological Diversity could provide a basis for such cooperation, along with other relevant international instruments such as the World Heritage Convention and the Convention on Wetlands of International Importance.

Such areas also need to be ready to adapt to unstable conditions. Hart and Hart (1997: 309) conclude that "the best preparation for conservation in the face of regional instability is the professional development of national staff and strong site-based conservation programs." But a key element is that these site-based initiatives must be tied to an international structure that endures when nations crumble. They propose establishing a fund that provides for continued professional development and support for field activities by the staff of protected areas during crisis periods. Such support might be focused on specific sites of international biological significance

with the goal of developing semi-autonomous management within those areas. The mission of the proposed fund would be to build professional identity in national staff where national institutions have failed and to facilitate their reintegration into conservation activities after the crisis has passed. Again, such a fund could be significantly strengthened through support from the CBD and other global and regional conventions.

To conclude, trying to tease out causality in the relationship between war and biodiversity issues in tropical forests is highly complex, because individuals make multiple, mutually constraining decisions that are shaped by interacting environmental and social conditions, all of which have themselves multiple interrelationships. People often learn through conflict, as fundamental interests are challenged. As Lee (1993: 10) points out, "Conflict is necessary to detect error and to force corrections. But unbounded conflict destroys the long-term cooperation that is essential to sustainability. Finding a workable degree of bounded conflict is possible only in societies open enough to have political competition."

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Environment and Security Brief 1

Invasive Alien Species and Livelihood Security

Rapidly accelerating human trade and travel, facilitated by more efficient modes of transport such as planes and ships, have enabled the deliberate and inadvertent movement of species between differing parts of the world.[48] The result has been the introduction of plant and animal species into ecosystems where they do not occur naturally. Considered as the second highest cause of species extinction and endangerment, these disruptions threaten biodiversity and human health and can impose enormous costs on agriculture, forestry, fisheries and other natural resource-based industries, thereby undermining livelihood security.

Not all invasive species are harmful, as human history has often seen their deliberate introduction for the domestication of plants and animals. Nonetheless, many of them harm indigenous species by consuming, overgrowing and preying on them, competing for food and habitat resources, infecting or vectoring diseases to them, and hybridizing with them. On a broader scale, entire ecosystems can be disrupted as changes in species composition can alter hydrology, fire regimes, nutrient cycling and other such processes. Because of the small size of many islands, they possess relatively fragile ecosystems with fewer indigenous species and are therefore more sensitive to these impacts.

The socio-economic effects are equally far-reaching. Reduced crop yields and fish catches and increased control and management costs have profound economic implications and can undermine livelihood security. While estimates surrounding the total economic costs of invasive alien species are not conclusive, one study has estimated an aggregate cost of US$137 billion per year globally.[49] Human health is also impacted by species invasions through the spread of infectious disease agents. The bubonic plague, smallpox and measles were transmitted to human populations via invasive alien species. Moreover, the harmful impact of invasive species on local food and livestock production can cause hunger and famine.[50]

The zebra mussel, brown tree snake, Nile perch, water hyacinth and Indian mongoose are but a few well-known examples of invasive alien species that have had serious impacts on ecosystems and livelihoods. The Nile perch was introduced to Lake Victoria, Africa in 1954 to replenish drastically declining native fish stocks and the results were disastrous. Over 200 endemic fish species were driven to extinction as a

result of predation and competition for food. As more trees were harvested to process the Nile perch, increased erosion and runoff led to higher nutrient levels in the lake, creating ideal conditions for the invasion of certain algae and water hyacinth.[51] The resulting depletion of oxygen levels in the lake killed even more fish, thereby undermining the livelihoods of the local inhabitants who depend on the lake.

In an effort to address the rising the threat of such invasions, the Global Invasive Species Programme (GISP) has identified four major options and/or steps for dealing with alien species: 1) prevention; 2) early detection; 3) eradication; and 4) control.[52] Prevention of non-native species introductions is viewed as the first and most cost-effective option, and its execution can take three forms: 1) interception through regulations enforced by inspections and fees; 2) treatment of potentially contaminated materials; and 3) a ban on the movement of certain commodities. Early detection requires the careful survey of species or sites, including major entry points and ecologically sensitive and valuable areas. Eradication is more cost-effective the earlier it is implemented, and they have in the past involved the use of mechanical and chemical controls, as well as habitat management strategies and the hunting of invasive invertebrates. Finally, the control option of dealing with invasive species is adopted when eradication is not possible and the aim is to keep the number of species below an acceptable threshold. Methods typically involve targeted, labour-intensive measures (such as pulling weeds) or chemical processes such as the use of toxic baits or pesticides.

Through the creation of programs such as the GISP, resources have been developed to educate the wider public on the relative ease through which alien species can be introduced into different ecosystems and the potential impacts of these introductions. In so doing, conservationists are taking an active role in protecting the world's biodiversity and the communities that depend on its integrity and unspoiled productivity.

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People, Scarcity and Violence
in Pakistan

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Abstract

Interactions between environmental and social factors appear to be generating high levels of conflict and insecurity in northern Pakistan, a particularly alarming situation given the region's strategic location. Powerful forces such as poverty and population growth; recent events such as the Soviet invasion into neighbouring Afghanistan; and the persistent legacy of colonial corruption and resource exploitation have left this region highly vulnerable to certain types of social upheaval and ecological degradation. Increasingly, the latter is becoming a trigger and amplifier of the former, as livelihood insecurity stemming from poor or inequitable resource management leads to frustration, extremism and even conflict, thereby increasing environmental stress. Adaptation and stability in the region can be realized through efforts to improve environmental management, build educational and other infrastructure, establish effective conflict resolution mechanisms and address more controversial issues such as property rights, illegal livelihoods and refugees.

Introduction[53]

In recent years, population growth, poverty, cultural diversity, religious antagonism and environmental change have become common terms in the analyses of researchers studying conflict and security issues.[54] Each of these factors can be dangerous on its own; working together they have the potential to create problems that may be unprecedented in their scope and magnitude.[55] Insofar as this is true, trends in South Asia are worrisome, and many parts of the subcontinent stand out as potential sites of violence, conflict and insecurity in the twenty-first century. Among these, for reasons to be discussed shortly, the situation in northern Pakistan is especially alarming.

In the following pages we investigate interactive environmental and social factors that appear to be generating high levels of conflict and insecurity in northern Pakistan.[56] Powerful forces such as poverty and population growth, the impact of events such as the 1979 Soviet invasion into neighbouring Afghanistan and the 2001 U.S. war on terrorism in the same area, and the persistent legacy of colonial corruption and resource exploitation have combined to render this region highly vulnerable to certain types of ecological degradation and social upheaval.[57] Increasingly, the former is becoming a trigger and amplifier of the latter. Put simply, more environmental stress can mean more violence and conflict. This, in turn, can mean more environmental stress.

In the relatively compact expanse of South Asia, which contains one-quarter of the world's population and one-third of its nuclear arsenals, the prospect of more violence and conflict is of great concern to the international community. After considering these linkages in some detail, this chapter concludes with policy suggestions for domestic and foreign parties, suggestions that underscore the potential importance of conservation measures as a force for stability and security.

The idea that environmental change may be linked, directly or indirectly, to conflict and insecurity has received an enormous amount of attention, especially in the 1990s. Building on insights from the 1987 Brundtland Report and various earlier sources, scholars throughout the world have attempted to clarify these linkages through case study and quantitative analysis.[58] Work by Thomas Homer-Dixon (1998 and 1999), Nils Petter Gleditsch (1997), Gunther Baechler (1998) and many others has been influential in policy circles, and has played a role in modifying the way scholars and others think about security. Surprisingly little attention, however, has been paid to the possibility that the equation can be reversed.

Based on field experience in Pakistan and elsewhere, our intuition is that just as environmental change can contribute to conflict, conservation

measures may contribute to peace. This is perhaps even more difficult to demonstrate than the familiar environment-conflict link, which has been the subject of significant criticism, mainly on methodological grounds. Our objective, however, is not to attempt the impossible: to prove that more aggressive conservation practices inevitably would reduce conflict in northern Pakistan and perhaps have a pacifying impact throughout South Asia. Rather, we seek to identify ways in which environmental stress complicates an already complex and tense situation, and to suggest that relieving this pressure through better resource management has a reasonable chance of being beneficial from a security perspective. In the case of northern Pakistan, where relatively scarce resources are being overwhelmed by population growth and unsustainable practices, it does not seem to us implausible that the sustainable use of natural resources and the protection of vital ecosystems would make it much easier to create or preserve robust livelihoods, thereby reducing a prominent source of violence and tension.

A Note on Case Selection

While many areas of south Asia deserve careful scholarly attention, as well as sustained conservation efforts, it is the precise mixture of negative environmental trends and tense geopolitics that sets apart Pakistan's northernmost region. Located in the heart of the planet's most dramatic confluence of mountain ranges, which are also the source of much of the subcontinent's freshwater, northern Pakistan faces environmental challenges—including severe deforestation, soil erosion, waterlogging, flooding, air pollution and water pollution—that are unprecedented in its turbulent history. It is also a region that has known much conflict over the centuries—particularly in the nineteenth and twentieth. The prospect of an environmentally related intensification of violence and conflict in the region is particularly alarming given the possibility of spillover effects into any or all of the following regions:

- an Afghanistan to the north and west that is still reeling from over two decades of invasion, war, political extremism and economic collapse;

- the conflict-prone valleys of Kashmir and Jammu to the east—disputed territories that have soured India-Pakistan relations since 1947; and

- the rest of Pakistan to the south, made up of three provinces (Baluchistan, Punjab and Sind), each of which faces serious political and economic problems and has been plagued by persistent civil unrest.[59]

The situation in northern Pakistan is also of interest because it presents a problem that is a model of either evident or emerging conditions in other vulnerable and volatile regions.[60] In many of these cases, a model set of

interconnected variables—including rapid population growth, repeated economic failures and weak and ineffective institutions—are promoting practices that simultaneously damage the environment and cause the steady deterioration of sustainable livelihoods. In consequence, social systems become mired in conditions that are difficult to change and highly conducive to reproducing conditions of dire poverty, rampant infectious disease, and multiple forms of insecurity and violence.

As Pakistan enters the twenty-first century, its future, especially in the north, looks bleak to many observers.[61] Solving the complex challenges it faces may require financial and technical assistance from the North, as well as internal resolve to reform corrupt political processes, bolster the economy and inch forward carefully-conceived—but generally ignored—plans for sustainable development based on Agenda 21.[62] Success in northern Pakistan could generate valuable planning and policy models that might be adapted to help address similar problems elsewhere in the world. The social effects of failure, however, could spill across Pakistan's borders, adding to the already sizable stockpile of regional challenges and tensions.

Northern Pakistan in a Regional Context

In the weeks before and after the partitioning of South Asia in 1947, some 15 million people moved back and forth between the newly created countries of India and Pakistan. This turbulent beginning was only the first of many large-scale social and political upheavals that have affected this region over the past six decades, a pattern that several influential studies suggest is likely to continue—and perhaps intensify.

For example, the American political scientist, Samuel Huntington, writing about likely sites of future conflict around the world, argues that "[t]he great divisions among humankind and the dominating source of conflict [in the years ahead] will be cultural" (1997, page 67). He predicts that "[t]he clash of civilizations will dominate global politics" (1997, page 67). Within this paradigm, Huntington contends, south Asia stands out as one of the most vulnerable regions of the world. He worries that "[t]he historic clash between Muslim and Hindu in the subcontinent manifests itself now not only in the rivalry between Pakistan and India but also in intensifying religious strife within India between increasingly militant Hindu groups and India's substantial Muslim minority" (1997, page 77).

Norman Myers, a British scientist, offers further reasons for concern. While Myers also comments on the long-standing antagonism between Hinduism and Islam, which he believes may "be exacerbated by the fundamentalist Muslim spirit that emanates from Iran," the focus of his analysis is environmental degradation (1993, page 103). In particular, the Himalayan water catchment, which is vital to this region, is being damaged by rapid defor-

estation. "This environmental decline is leading to agricultural setbacks, indeed to the growing incapacity of many areas to support human communities. Yet the total population of this region, more than 1.2 billion people today, is projected to approach… 2.6 billion before it finally levels out… in the next century" (1993, pages 102–103). South Asia, Myers concludes, "presents much scope for conflict" (1993, page 101).

M. V. Ramana and A. H. Nayyar, physicists as well as policy analysts who are from south Asia, believe that conflict in the region could result in unprecedented levels of destruction. Recent events are especially worrisome in this regard. In May 1998, India conducted five nuclear tests; three weeks later Pakistan responded with six nuclear detonations of its own. In 1999, a two-month long war erupted between the two countries in the long-disputed province of Kashmir, claiming over 3,000 lives. U.S. diplomatic pressure persuaded Prime Minister Nawaz Sharif to act to end the conflict. But within months Sharif was ousted in a military coup staged, in part, because of his capitulation to U.S. pressure. In the future, conflict between India and Pakistan may not be so quickly contained. This is why, according to Ramana and Nayyar, "the Indian subcontinent is the most likely place in the world for a nuclear war" (2001, page 72).

As we finalize this text in early 2002, the region is in the midst of a new period of violent turbulence. Following devastating attacks against the people of the United States on September 11, 2001, the administration of President George Bush announced that it would take all necessary measures to dismantle terrorist networks, beginning with al-Qaeda. This organization, responsible for the September attacks, had established cells in some 60 countries, including Afghanistan where, over a 10-year period, it had built an elaborate and highly visible infrastructure for training and other activities, embedded itself into the south Asian drug trade, and garnered the support of the Taliban rulers.

The U.S.-led military campaign to destroy al-Qaeda's Afghan operations and remove the Taliban from power succeeded in a matter of months. Unfortunately, the impacts of this campaign appear to have been mixed, diverse and extensive. While new opportunities for peace and reconstruction are now evident in places like Kabul, many pre-existing tensions have been reinforced and some new problems have been introduced.[63] For example, to escape American bombing, large numbers of Afghans fled to the border with Pakistan, straining refugee camps in the north and adding a million internally displaced people to a population that has been unsettled for over two decades. Pakistan's official support for the U.S. campaign intensified divisions within that country, thus creating enormous difficulties for President Pervez Musharraf. During this same period, India-Pakistan relations deteriorated and the prospect of war loomed large.

Meanwhile, in Afghanistan, warlords of the Northern Alliance, who have closer connections to Russia and Iran than to Pakistan and who have been deeply implicated in the south Asian drug trade, began competing for power and position as the international community worked to reconstruct a country rendered virtually dysfunctional by 23 years of warfare (Orth, 2002). In short, in early 2002 India and Afghanistan were grinding uncomfortably against northern Pakistan, defining a turbulent region that may be lurching towards catastrophe.
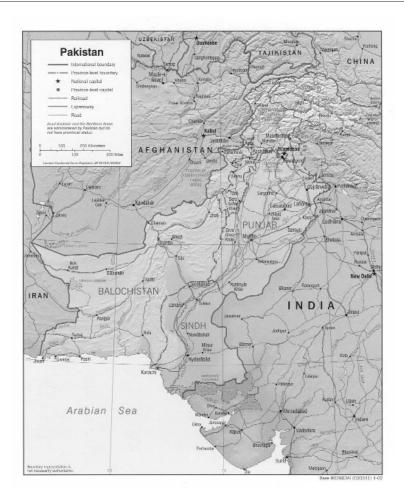
These three countries in turn lie on the borders of, among others: China (which may grow to become the next U.S.—or collapse like the former U.S.S.R.); Russia (whose economy and military are in shambles); Iran (whose revolutionary politics captured the world's attention throughout the 1980s and, according to some commentators, continues to inspire radicals in the region); and the newly independent states of Turkmenistan, Tajikistan and Uzbekistan (countries widely seen as disorganized, corrupt and heavily involved in the world's largest heroin trade) (Orth, 2002). Nuclear weapons, population pressures, environmental stresses, economic problems and group-identity conflicts are evident throughout this part of the world. Moreover, south Asia is comprised of a complex network of economic relationships, diverse cultures (over 50 languages are spoken in Pakistan alone) and ecosystems that cut across borders with little regard for the legal principle of sovereignty. Hence what happens in northern Pakistan happens in a tense, interconnected area, and thus may be of great importance both regionally and worldwide.

History and Geopolitics

Pakistan is, with the exception of the fertile Punjab province, a land of mountain and desert.[64] The high peaks of the Hindu Kush and the Himalayas define the northernmost part of the country. These magnificent mountain ranges give way to the fertile Peshawar Valley, irrigated by the Kabul and Indus Rivers.[65] Still further south, the northern region terminates in a series of alluvial and semi-arid plains that run on into the central provinces of Punjab and Baluchistan.[66]

The 17 million people living in northern Pakistan rank quite low on human development scales (see Table B1), although pockets of great wealth exist and many government officials have advanced degrees, often from European or North American universities. Fifty per cent of the population is Pashtun; at least another six million Pashtun live across the border in Afghanistan.[67] In the words of the political leader Imran Khan, his people "are one of the world's great warrior races" (Khan, 1993, page 3).[68] Martial values shape the culture; most people are well-armed; and violence is an accepted way of restoring honor and resolving disputes (Khan, 1993, pages 1–12, 33–34).

Figure B1. Map of Pakistan

Courtesy of The General Libraries, The University of Texas at Austin.

The legacies of a colonial past weigh heavily on this region.[69, 70] The British arrived in the late eighteenth century with hopes of creating a buffer state that would keep Russia out of Afghanistan. Britain's "Great Game" began with the first Afghan War (1838–42) and continued for over a century.[71] The British seized land and established settlements, but were not able to pacify the region. When they concluded that the Pashtun were impossible to defeat through force, they tried to divide and conquer them by acting to intensify discord among feuding Pashtun clans.

Table B1. Basic Facts about Pakistan

Category	Northern Pakistan	Pakistan
Total area (sq. km.)	74,521	803,940
Population (millions, 1998 est.)	16.5	135.1
Literacy rate	17%	36.4%
Population growth (1996 est.)	3.2%	2.1%
Per capita income (1996 est.)	US$200	US$470
Pop. Living in poverty (1996 est.)	20%	34%
Unemployment (1996 est.)	NA	16%
Refugees (millions, 1999 est.)	1.6	2.0
Forest cover	6–23%	5%
Grazing land	23%	6%
Arable land	19%	27%

Sources: *The New York Times Almanac* (1999); IUCN (1997 and 1998).

Unable to gain control over the Khyber Pass (a potentially lucrative trade route linking south Asia to the Middle East and Europe), the British turned their attention to cutting down the vast softwood forests of blue pine, fir and spruce that covered much of the region. Like the rest of Pakistan, the northern region was developed to provide raw materials for the infrastructure of the Raj. To this end, the British established a forestry service dedicated to logging, and a highly centralized political system propped up by bribery and military force. In the south of the region, they oversaw the construction of sprawling and inefficient irrigation systems, access to which became a vital part of the political economy of bribery that was established to facilitate colonial rule. Thanks largely to the British colonialists, deforestation and irrigation became the twin engines of environmental stress (see van Dijk and Hussein, 1994, page 35).[72] Today, soil erosion, waterlogging and flooding are among the many serious problems whose roots can be traced to the economic practices of the colonial era (see van Dijk and Hussein, 1994, pages 34–35; IUCN, 1997, pages 31–37).

The British allowed the local *jirgas* (or councils of elders) to manage routine affairs and resolve most local conflicts, a decision that ensured the continuation of a high level of clan identity and autonomy. When the British left in 1947, northern Pashtun clans were given the choice of independence or joining the new state of Pakistan. Those in the valleys of Kashmir and Jammu elected to recover their autonomy—and immediate-

ly became the targets of Indian, Pakistani and Chinese expansion plans.[73] The rest formed the North-West Frontier Province (NWFP) and the Northern and Tribal Areas.

Immediately following the division of South Asia, fighting erupted in many regions, including Kashmir.[74] When the United Nations intervened and a ceasefire was established in 1949, a temporary Line of Control was recognized based on military positions at that time. The hope was that India and Pakistan (and perhaps China, which claims portions of Kashmir) would negotiate a solution to the problem through peaceful means. Unfortunately, this has not happened, and the area continues to be the site of much conflict.[75]

There are many explanations for this. The area has long been perceived as being of tremendous geopolitical importance due to its location at the point of intersection of China, India and Pakistan. Over the years it has also acquired great symbolic value in both India and Pakistan. According to Eric Margolis, India regrets that Tibet was lost as a buffer state to China, and has resolved never to relinquish its hold over Kashmir (1999, 2000, pages 54–118). Pakistan appreciates the strategic and symbolic value of the region, and is also motivated by the fact that the majority of Kashmir's 11 million people are Muslims. Both sides cherish the image of Kashmir as a lush paradise. Chronic conflict, which erupted with great force in 1947, 1965, 1989–90 and 1999, has created a history of violence that has steeled the resolve of many on both sides not to budge from the goal of winning a decisive victory. Finally, after the Afghan people forced the Soviets to withdraw in 1989, some *mujahidin* brought their military skills and war fighting passion to Kashmir. Not surprisingly, members of the Indian government have accused the Pakistani military and intelligence agency of supporting these fighters, an accusation that contributed to the 1999 crisis. At that time, the U.S. pressured the government of Prime Minister Nawiz Sharif to do what it could to encourage the *mujahidin* to return to the Pakistani side of the Line of Control. Sharif complied and in October of that year, less than three months later, he was ousted from power in a military coup.

Ironically, no one is certain what would transpire if the people of Kashmir were given the freedom to decide their political future for themselves. India has been unwavering in its rejection of a referendum as the basis for resolving the conflict. While some observers predict that the Kashmiri would choose to join Pakistan, others suggest they might vote to recover their independence.[76] In spite of their strong Islamic roots, the people of Kashmir are not uniformly Islamic and they retain a powerful sense of local identity, place and history—the basis for a sense of shared fate and sovereign politics.[77]

While Kashmir represents an extreme case, throughout contemporary Pakistan local identities remain very powerful and politically salient, although a sense of being Pakistani may be growing (see McCarry, 1997; also Lieven, 2002).[78] Consequently, political elites continue to rely on support from the rural areas and clans with which they are associated. Ethnic, religious, provincial and national constructions of identity are rarely harmonized except around a small handful of highly symbolic issues such as the future of Kashmir and the possession of nuclear weapons to balance India's atomic arsenal.[79] On many matters, competing identities pull Pakistanis in different directions, and the more local forces tend to be dominant.

This sense of being separate and distinctive is especially acute in the north, which is often characterized by Pakistanis themselves as a wild and remote place akin to Corsica or Sicily in Western Europe (see Khan, 1993). It is a sentiment that is reinforced by the area's political system—for, unlike the rest of Pakistan, some colonial governance structures have remained more or less intact in the region's tribal areas. The virtually omnipotent Political Agents are now selected in Islamabad rather than London, but the office continues to rule through force and bribery while leaving many matters in the hands of local elders. Political corruption is as evident throughout the region today as it was prior to 1947;[80] Civil strife and acute violence are endemic and despite the efforts of some visionary directors, the forest service has had limited success in making the transition to sustainable forestry practices.[81] The lack of change in parts of this region may in some measure be due to the fact that Pakistan is 60 per cent Punjabi. Many Pashtun believe that during the first decades of Pakistan's existence, efforts to build a nation-state were focused largely on the more populous and fertile central and southern parts of the country, a process that tended to marginalize them and benefit the Punjab majority.

Recent external pressures have added another layer of difficulty to the challenge of reforming the north's colonial legacy of corruption and exploitation. In particular, following the Soviet invasion of Afghanistan in 1979, northern Pakistan became the staging ground for the first multinational *jihad* since the Middle Ages.[82] *Mujahidin* flocked to the capital city, Peshawar, from the Middle East, Africa and Asia. The U.S. Central Intelligence Agency provided $3 billion to support anti-Soviet forces in the province (Weaver, 2000, page 34). Virtually overnight, 3.5 million Afghan refugees crossed the border into northern Pakistan. Gradually, they where settled into 384 camps—over 200 of which were located on marginal lands in the NWFP. The refugees brought weapons, livestock and small amounts of gold, but they had precious little knowledge of how to manage the fragile resource base on which they would now depend (see Hanson, Matthew and Aziz, 2000).

Throughout the 1980s, the quantity of small arms in northern Pakistan grew enormously as the Afghan-Soviet war raged on its borders. Drug trafficking became widespread as refugees and others struggled to survive, and as holy warriors struggled to fund their resistance to the better armed Soviets (see Weaver, 2000), the Taliban, educators who ran the *madrassas*—conservative religious schools for some 600,000 Afghan refugees, Pakistani youth and visitors from the Middle East—became a significant political force, one that in the mid-1990s would gain control over most of Afghanistan.[83] And the natural environment of the region began to deteriorate even more rapidly than before under the added burdens placed on it.

Table B2. Key Dates in Pakistan's History

1940	Lahore Resolution calling for an independent Islamic state
1947	Independence
1951	Prime Minister Liaqat Ali Khan assassinated
1956	Proclamation of Republic; first constitution drafted
1958	Military coup
1960	First elected president
1965	India-Pakistan War
1969	Military coup
1971	India-Pakistan War; East Pakistan secedes to become Bangladesh
1973	Constitution adopted
1977	Military coup
1985	Elections
1998	Testing of five nuclear devices
1999	Fighting against India in Kashmir; military coup
2000	Government launches anti-corruption campaign
2001	U.S. war on terrorism in Afghanistan with Pakistani support

In brief, rapid population growth during a period of instability and conflict has overwhelmed political and economic arrangements that were fragile and inefficient from the outset, creating conditions in northern Pakistan that have been favourable to environmentally unsustainable practices. This volatile mix of social and ecological factors now fuels conflict and violence in this part of Pakistan, a situation that raises concerns throughout the region.

An Expanding Crisis

The model presented below is not intended to be a comprehensive mapping of all of the variables and relationships in northern Pakistan that may lead towards either, conflict and violence, on the one hand, or, on the other, cooperation and security.[84] Rather, based on information gathered through extensive interviewing and travel throughout this region in 1999, the model seeks to highlight elements that appear to be most determinative of the region's current vulnerabilities and threats to human security (see Hanson Matthew, and Aziz, 2000).

At the core of this model are reinforcing relationships among (a) unsustainable livelihoods, (b) the martial aspects of the culture, and (c) the rate and intensity of violence and insecurity. The area's growth in unsustainable livelihoods is in turn a product of external forces, population pressures, environmental stresses, and weak and corrupt institutions—variables that tend to be highly interactive. Because the variables that render people vulnerable and those that create conditions conducive to conflict and violence often reinforce each other, it is difficult for policy-makers and analysts to plot a course out of this situation without a high level of political resolve, considerable financial and technical resources, and strong local support for a range of interconnected goals.

To impart a sense of the challenges facing northern Pakistan, it is important to briefly describe each of the key variables.

External forces

External forces affect all aspects of the crisis scenario building in northern Pakistan. These include the process and institutional legacies of the period of British colonialism as well the wide-ranging effects of the Soviet invasion into neighbouring Afghanistan, and the U.S. war on terrorism. More immediately, at least in a spatial sense, Pakistan's ongoing rivalry with India over Kashmir is especially relevant because some believe that the NWFP has served as the staging ground for Pakistani involvement. The Pakistani military's response is that insurgents now come primarily from training camps in Afghanistan. It is clearly not coincidental that tensions in Kashmir have been especially great since 1989, when the Soviets were expelled from Afghanistan, and many of the *mujahidin* who had fought them remained in the area. Of course, to reach Kashmir they may well find it convenient to travel through northern Pakistan. The extent to which they are assisted, formally or informally, by Pakistanis is thus the subject of some controversy.[85]

The current dire situation in Afghanistan is also significant. Many residents of northern Pakistan—including some 1.6 million refugees—have

deep cultural ties to Afghanistan, as well as important commercial links to that country (links that that include drug trafficking and other illegal activities). Anecdotal evidence suggests strong ties between some Pakistani elites and the Taliban government (see, for example, Marsden, 1998, page 128). Early in 2001, the civil war in Afghanistan (between the Taliban and the Northern Alliance) escalated, while drought and cold contributed to widespread famine in the country. In the spring of that year the Taliban alienated the world community by destroying two ancient Buddhist statues. Then, on September 11 four targets were attacked in the United States, killing approximately 3,000 people, in an act of terrorism coordinated by Osama bin Laden. Because bin Laden was in Afghanistan at the time, the U.S. asked the Taliban to expel him so he could be tried for these attacks. When they refused, the U.S. launched a massive air strike. In these volatile conditions, many Afghans attempted to flee into Pakistan, a flow that both governments sought to cut off and even reverse, adding frustration and uncertainty to a profoundly desperate situation.

In early 2002, an interim government headed by the Pashtun leader Hamid Karzai was established in Afghanistan, and a variety of organizations such as the World Bank began developing plans for reconstruction. But as we write, the refugee camps remain full, fear of landmines disinclines many people to return, and the economy of Afghanistan is at a virtual standstill. Some reports suggest that bin Laden and members of al-Qaeda may have entered Pakistan illegally and found satisfactory hiding places from which to rebuild. Reasonable concerns about the rebirth of the heroin trade (which the Taliban had succeeded in reducing significantly); competition among Iran, Russia and Pakistan for influence in the region; and violent infighting among Afghan tribes all suggest that the future may be fraught with more instability and conflict. At the same time, expressions of optimism are not impossible to find, and a successful reconstruction cannot be ruled out. From our perspective, however, Afghanistan remains, in early 2002, a source of turbulence in the region.

Finally, endemic corruption, the drug trade and political extremism, (as well as allegations that some Pakistani military leaders are training and funding terrorists) are among the factors that have given the region a very negative image in the western world (Weaver, 2000). Coupled with sanctions against Pakistan for its nuclear weapons program, these factors have resulted in very little assistance or capital of any kind being available for northern Pakistan for over a decade.[86] This may change, however, if the U.S. rewards Pakistan financially for its support of the war on terrorism.

Since the Musharraf government assumed power in 1999, considerable attention has been paid to fighting corruption. Corruption, unfortunately, is an elusive term. What appears corrupt from one vantage might seem nor-

mal and even fair from another. Fighting corruption means getting consensus on definitions, targets and goals, and building a coalition that will work to those ends—two very difficult tasks. Further complicating matters, the government of Pakistan is not able, at this time, to rely on taxes to fund public policy initiatives. Instead, money comes largely through permits and concessions, which creates a situation that is very vulnerable to corruption at all levels of government. The lucrative character of the opium and heroin trade, and of other forms of illegal trade, significantly bolsters the incentives for corruption, especially at border crossings. Afghanistan, for example, has produced as much as 70 per cent of the world's heroin, worth some US$30 billion at street level. Afghanistan relies entirely on its neighbours such as Pakistan and Iran to provide pathways to the wealthy markets of the western world, and drug traffickers are willing to pay handsomely for this service.

Not all external forces, however, are negative. A vital and innovative network of non-governmental organizations (NGOs), focused largely on environmental issues and women's rights, provides many valuable services in northern Pakistan. In particular, entities like IUCN provide a bridge to skills, information and funds available in the outside world. The Aga Khan Foundation is also highly visible in the area, empowering communities, helping with conflict resolution and promoting a variety of sustainable livelihoods. Recent studies of NGOs demonstrate that they can be very successful in providing information, adding leverage to community efforts and pressuring governments at all levels to be accountable for their actions and sensitive to the needs of their constituents.
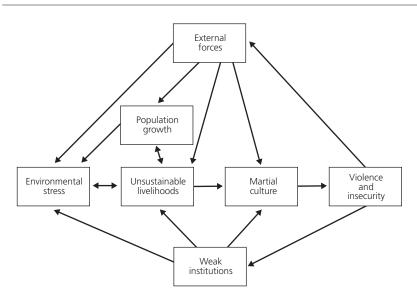
Population growth

Population growth in the region—which may exceed three per cent annually—has been fueled by the influx of Afghan refugees, cultural preferences, and poverty. As in many developing countries, the growing population tends to be poor and landless;[87] hence it is compelled to settle in environmentally marginal areas such as urban ghettos or the steep sides of mountains. Not only is it difficult to eke out an existence in such environments, but marginal lands are often contaminated by pollutants and more vulnerable to natural disasters such as flooding. In the capital city of Peshawar, for example, infrastructure for sewage and waste treatment has not kept pace with population growth, and exposure to contaminated water is virtually universal (see Hanson, Matthew and Aziz, 2000).

The toll on the fragile alpine environment further north also has been enormous. Under unprecedented population pressures, its forests are being decimated to provide fuel and shelter.[88] In consequence, topsoil is easily removed by wind erosion and flooding, reducing agricultural productivity and forcing people to rely heavily on food imports from the south. This

degradation is a serious concern in a cash-poor province with about 0.44 hectares of land available per person, only about half of which is productive (that is, available for agriculture, grazing or forestry).[89] This amount of land is approximately 10 per cent of the area needed to support consumption in the most efficient developed countries such as Japan, and about four per cent of the per capita area currently exploited by residents of the United States (Rees, 2000, page 84). Both population growth and environmental degradation reduce the amount of ecologically productive land available per person, resulting in a dire Malthusian scenario of scarcity. In this light, it is hard to be optimistic about the prospects for developing sustainable livelihoods in the region.

Figure B2. Model of Environmental Stress and Human Security in the NWFP

Weak institutions

Weak institutions exist throughout northern Pakistan. Those created by the British and sustained through bribery and force have persisted, and those introduced by the Pakistani government since 1947 often have been equally inefficient and corrupt. Local institutions such as the *jirga* are not well suited to handling problems of the magnitude faced in the region. Based on over 70 interviews conducted in the NWFP in the summer of 1999, it appears that distrust of the legal system and disillusionment with politicians and civil servants are a common source of anger and frustration

in the province.[90] For example, according to some official sources, as much as 90 per cent of the property in the NWFP is in dispute and the courts are perceived as susceptible to bribery and hence they are not trusted to respond fairly to conflicts. For many people, the only way to resolve pressing conflicts—such as those related to property rights—is to take matters into one's own hands, an approach that often involves violence. Weak institutions make it extremely difficult to plan and build infrastructure or create jobs, and tend to encourage unsustainable practices.

There is, however, some basis for optimism. First, the Musharraf government has embarked on an anti-corruption program that involves strengthening federal agencies and local authorities and making them more accountable to the public, while reducing and streamlining the middle layer of government—that is, all those agencies that mediate between Islamabad and local communities. On the other hand, Pakistan is developing a robust, skilled, energetic and savvy network of civil society organizations (CSOs). Second, as mentioned earlier, IUCN is exceptionally well-established with eight large offices throughout the country that have developed an extensive environmental program based on Agenda 21 principles. Other non-profits, such as the Aga Khan Foundation, are very visible in the north where they create space for discussion and action in many arenas, even ones rife with obstacles such as the empowerment of women.

Environmental stress

Environmental stress in northern Pakistan is widespread and severe. Polluted water and air in Peshawar, water shortages in much of the south, unsustainable forestry in the north, and land scarcity everywhere are among the environmental problems plaguing the region.[91] External pressures, population growth and weak institutions simultaneously enable destructive practices, many forged during the colonial era, while also making it very difficult to implement effective conservation management. This state of affairs particularly frustrates local authorities and environmental specialists who have invested considerable time and effort in developing the Sarhad Provincial Conservation Strategy for the NWFP (IUCN, 1996). Based on Agenda 21 guidelines, this strategy is a well-informed, highly sophisticated and widely ignored blueprint for sustainable development in the province. It focuses on the importance of developing a holistic approach that involves extensive community participation to improve governance structures, alleviate poverty and improve education in order to make possible long-term sustainable development. The Sarhad Provincial Conservation Strategy places special emphasis on addressing the challenges evident in urban environments and on promoting natural resource management. According to the authors of the report, higher levels of partici-

pation, better environmental legislation and greater governance capacity stand out as urgent objectives for the province.[92]

Unsustainable livelihoods

Unsustainable livelihoods are the most obvious result of the interactions of the variables described above. Although official figures are not available, direct observation and field interviews suggest that large numbers of men are unemployed or underemployed throughout the region (Hanson, Matthew and Aziz, 2000). Some seek casual labour in distant cities such as Karachi; others venture abroad to work in Middle Eastern oil fields, although cutbacks in this sector of the global economy have reduced opportunities for employment. Still others engage in illegal activities such as smuggling and drug trafficking. Many are compelled to draw down scarce resources for fuel and irrigation at unsustainable rates. Poverty encourages large families: they appear to be a rational strategy for minimizing economic risk by allowing families to maximize the household's economic diversity by sending members to work abroad or in southern cities in case local means of support fail. Nonetheless, unemployment and uncertainty prompt some men to gravitate towards the blame-casting critiques and revolutionary promises of political extremists. And everywhere one sees growing signs of resentment towards the refugees, who are constantly accused of working illegally and stealing.[93]

Martial culture

Martial culture is not a necessary variable for linking environmental stress to violence and insecurity, but it is a prominent feature of northern Pakistan. If the conditions described above were removed the level of violence in the region might be kept in check by time-honoured cultural restraint mechanisms (well-described in Khan, 1993: 15–46). But in the current context of uncertainty and stress, these cultural constraints are far less effective. Cities and villages in the province can and do erupt into mobs of angry, armed men. Calls to liberate Kashmir and Jammu reach receptive ears.[94] Even Pakistan's nuclear tests rally great support, perhaps for the message of defiance they send across the country's borders.

Violence and insecurity

Violence and insecurity have long been features of the north, but they are features that are now exaggerated by the negative forces outlined in this analysis. Given the volatile geopolitics of the region, this is not a condition that can be ignored without great risk. Today, northern Pakistan is trapped in a system of reinforcing negative relationships. A failure in one area is quickly transmitted to others. The conditions for a large-scale disaster are in place.

Hot Spots In Northern Pakistan

There are several hot spots in northern Pakistan, each of which has the potential to erupt into violence, sink further into poverty, push inhabitants into illegal or unsustainable livelihoods, or force people to migrate. In each case, people are made insecure. And in each case, environmental stress is likely to be an important part of the story.

Urban centers

Approximately 1.3 million people (including some 500,000 Afghan refugees) live in the NWFP's capital city of Peshawar. Once known as the "city of flowers," Peshawar's infrastructure has been overwhelmed by an annual population growth rate of 4.6 per cent. Raw sewage (only one-third of which is treated), industrial waste, fertilizers and pesticides pour daily into Peshawar's freshwater system. Approximately 40 per cent of deaths in the city are linked to water quality problems. Air pollution is also severe because of toxic vehicle and kiln emissions (brick kilns typically burn car tires). In addition, some 60 per cent of solid waste in Peshawar is not sent to landfills but accumulates in alleys and abandoned fields. Since 1979, Peshawar has served as a staging ground for the *mujahidin* as well as, the hub of the Golden Crescent drug trade and a bustling centre for smuggled goods. High unemployment and growing resentment over the continuing presence of Afghan refugees add to the general instability of the city.[95]

Agricultural areas

Many central and northern districts and villages of the NWFP have relied on old growth forests to provide essential ecological services such as flood control and commodities like fuel and building materials. Today, extensive logging is causing hardship as well as widespread and often violent conflict over property rights (according to unofficial government sources, as much as 90 per cent of NWFP forest rights are in dispute). Ineffective conflict resolution mechanisms, a sluggish economy and ideological extremism further incite the large, young and often unemployed citizenry to diffuse, often criminal, violence.

To the south, tensions are growing around water scarcity and social injustice. Water allocation in Bannu, for example, is based on a system of entitlements established by the British in 1905, and relies on a collapsing irrigation works that is choked with sediment. For example, since its completion in 1962 the Daran Reservoir has shrunk by 60 per cent due to siltation.[96] The system of canals that divert water from the region's principal rivers (the Kurram, the Indus and the Gambila) is choked by sediment and must be dredged frequently. The end result is that a small number of families granted unlimited rights to water by the British use this customary entitlement as the basis for continuing to monopolize large quantities of water (as well as to control most

of the farmland) while an increasingly restless majority experiences chronic water shortages.[97] The costs of building more just and efficient water distribution systems have so far been deemed exorbitant by local authorities, although plans to build a new dam on the Kurram River are under review.

Throughout the agricultural regions of the NWFP, population growth and environmental stress, (together with social conditions perceived as unfair, corrupt and inflexible) are the ingredients of potentially violent crisis.

Border region/tribal area

The almost-1,300-kilometre border between the NWFP and Afghanistan has historically been an explosive place. The legacies of British imperialism, the Afghan-Soviet War and the U.S. war on terrorism all haunt this region. For over 20 years the world has been exposed to a steady stream of reports about armed violence, drug smuggling and population movement across this border. What is less well known is that, as elsewhere in the NWFP, the British set up inefficient irrigation systems and large-scale timber harvesting operations in the border region that have resulted in salinization, waterlogging, soil erosion and flooding. In the wake of the Soviet invasion, hundreds of thousands of landmines remained hidden on the Afghan side of the border. Together with high levels of political uncertainty, virtually permanent civil war, severe weather and a chaotic Afghan economy, it is not surprising that refugees will often do anything to keep from returning to their homeland. To survive, these refugees cultivate poppy, produce heroin and smuggle a wide range of goods.

Meanwhile, untreated sewage and industrial wastes dumped into the Kabul River from many sites, especially the cities of Kabul and Peshawar, take a further toll on the environment. The Kabul River has levels of BOD, COD, coliform, nitrites, nitrates, sulphates and sulphides that pose serious health risks, especially to children and people who are malnourished. Again, in an unstable social context, rapid population growth and environmental degradation are creating high levels of human insecurity.

The U.S. war on terrorism may have flushed elements of al-Qaeda out of Afghanistan and into this area, although as we write, these claims have not been verified. Should this prove to be the case, then the region may find itself confronting military intervention from Pakistan and perhaps even the U.S. as well.

Refugee camps

The approximately 200 refugee camps located throughout the NWFP must also be considered as potential hot spots that could erupt into violence. The psychological stresses of living in such miserable and inhumane conditions for two decades make these heavily-armed camps a source of great concern. As many as 1.6 million individuals in northern Pakistan

continue to live as refugees, many of them born and raised in the camps. With little or no formal education and few livelihood options, they constitute a tremendous challenge to the future stability of the region. Accurate information is difficult to obtain, but it is widely believed, both in the region and in the international community, that some inhabitants of the refugee camps are involved in the conflict in Kashmir, had links to the former Taliban government in Afghanistan and engage in illegal activities such as drug trafficking (see Weaver, 2000). Moreover, tensions are growing between refugees and local Pakistanis who have accused the visitors of taking over the transportation sector, working illegally, and committing property and other crimes.[98] Officially, the governments of Pakistan and Afghanistan would like the refugees to be repatriated. But this has not been an easy policy to implement, especially given the economic and other hardships in Afghanistan.

The conflict between the U.S. and Afghanistan has worsened this problem considerably. On the one hand, the bombing campaign, combined with drought and unemployment, has created incentives for many Afghans to cross the border and enter the refugee camps. This reinforces the problems associated with these camps for over two decades. On the other hand, some analysts are worried that terrorist elements may also have found safe havens in the refugee camps. Should this be confirmed, the possibility of military action cannot be dismissed. In short, the refugees are part of the network of stresses plaguing the region, one that will have to be managed carefully until resettlement becomes viable. The prospects for violence within the camps, emanating from the camps, or aimed at the camps are considerable and probably increasing.

Northern areas/Kashmir

Although this area has been discussed in adequate detail earlier in this chapter, it is worth adding it to the list here because of its obvious status as a hot spot.

Scenarios of the Future

How might the forms of environmentally based insecurity discussed above play out in northern Pakistan in the years ahead? At least four scenarios are plausible.

Implosion

If traditional livelihoods and social systems erode and alternatives do not develop rapidly enough to alleviate growing fear and anger, the region's citizens might revolt against authorities. Violence in one part of the north might trigger violence elsewhere, leading to a general collapse of the economy.

Projection

Conversely, local fears and anxieties might be channeled into violence directed against the Afghan refugees or against Indians in Kashmir and Jammu. In either case, the level of conflict could rapidly spiral into a major catastrophe. Although the leaders of Pakistan and India have agreed to meet with the objective of resolving the dispute peacefully, the negotiations have been slow to take shape, and, to date, there is little basis for optimism.

Intervention

The outside world might decide to escalate its level of involvement in the north by combating the area's drug trade or other criminal activities or as a continuation of the war on terrorism. Intervention could be either indirect (or, as has already happened on a smaller scale in the case of drug trafficking, when Pakistan's national government was pressured to apply force itself) or direct.

Adaptation

Innovative, committed and forward-looking groups in northern Pakistan might succeed in efforts to: (a) improve resource management; (b) promote sustainable development; (c) build educational and other infrastructure; (d) establish effective conflict-resolution mechanisms; and (e) address such thorny issues as property rights, refugees, illegal livelihoods and Kashmir. Various groups—including IUCN, the Aga Khan Foundation, and the Sustainable Development Policy Institute (SDPI)—are already experimenting with reforestation and alternative energy sources such as mini-hydroelectric plants. They are setting up cooperatives to develop onion, fruit and nut industries, encourage tourism, and empower women. And they are encouraging dialogue and cooperation among religious elites, elders, landowners, refugees and government officials. Peaceful change cannot be ruled out as a scenario of the future.

Conclusions and Recommendations

What steps might promote conditions conducive to adaptation and stability rather than violence and conflict? While there are rarely simple solutions to complex problems, several actions can be suggested as priorities:

For external parties

Avoid stereotypes and negative images of the region.

They have little analytical value when they are stripped of historical context, and they are entirely misleading when they are used to characterize an entire population. For instance, simplistic, uncritical accounts of Marxism

guided much analysis during the Cold War, generating conclusions about threats and alliances that, in retrospect, were mistaken or exaggerated. These poor analyses led to serious distortions of the political dynamics of places such as Cuba under Fidel Castro, Chile under Salvador Allende and Nicaragua under the Sandinistas. They also led to costly policies that all too often supplied arms to squads of corrupt elites that, although espousing strong anti-communist views, were in fact committed to little more than personal aggrandizement at any cost. Contemporary political forces such as Islam (which has a long, varied and complex history) need to be carefully assessed in their proper historical contexts.[99] And contemporary labels such as "failed state," "quasi-state" and "rogue state"—terms that contain both tremendous symbolic power and implicit charges of incompetence and corruption—need to be reconsidered and avoided when possible. Thickly-detailed accounts of unfamiliar regions that are based on human intelligence and first-hand experience will rarely support simplistic claims about causality or threat. Such accounts will tend to make policy formulation a more challenging undertaking, but they may also lead to policies that work for all sides.

Appreciate the problems inherent in tackling a single issue.

A holistic approach is increasingly the only approach that seems likely to provide adequate leverage on some of the more daunting issues of developing countries. For example, population growth, environmental degradation, land tenure and poverty are clearly interrelated in northern Pakistan and constitute a multi-faceted policy challenge. While small-scale initiatives focused on one facet or another may yield some positive results, substantial progress will require that all aspects of the challenge be addressed. The real and potential impacts of any policy should be assessed across all variables likely to be affected. This of course is what the World Bank (2000) and other multilateral development and lending institutions now are arguing, based on 50 years of project design and implementation experience in diverse settings.

For example, family planning programs may achieve very little when implemented under conditions of dire poverty such as those found now in this region. Restrictions on what women are able to do means that there are powerful incentives to have as many sons as possible as a strategy for gaining social status and reducing economic risk. In turn, poverty alleviation programs are of limited success if they avoid the politically and culturally sensitive issue of clarifying and protecting property rights. But sorting out property rights in the region must be done with some sensitivity to ecological realities and the requirements of sustainability. Northern Pakistan is not only natural resource poor, but the forest cover it relies on for so many services is in grave danger. Unfortunately, coordination among various policy initiatives is not often evident among the governmental and non-governmental groups working in the province.

Resume some forms of development assistance to the region.

The $3 billion poured into the region by the United States in the 1980s was a great boon to the local economy and may have been of critical importance to the defeat of the Soviet Union in Afghanistan. But it did little to promote long-term development. Indeed, the purchase of vast quantities of arms may have made the north's long-term development more difficult than it would otherwise have been, as the weapons have remained in the region and are freely and cheaply available.

In the 1990s, U.S. aid was cut off to punish Pakistan for its nuclear weapons testing program. Residents of northern Pakistan fail to understand why, during the 1990s, their country fell completely out of favour with the United States in light of their valiant, decade-long involvement in the Soviet-Afghanistan War—which they feel made a small but real and costly contribution to winning the Cold War. They also feel that India's prior development and testing of nuclear weapons created a threat to which Pakistan was obliged to respond (see WWICS, 1999).

At the same time, the international community, including the U.S., largely abandoned neighbouring Afghanistan after the Soviet defeat. Not only did foreign policy shift against Pakistan, the many problems created or amplified during the war against the Soviets were left unresolved. Drug trafficking, arms dealing and the plight of the Afghan refugees received intermittent and generally inadequate assistance, leaving Pakistan to cope with enormous burdens.

The area greatly needs a larger social and industrial infrastructure and more resources to manage environmental change and strengthen the economy. Aid targeted at addressing some of the region's most pressing problems—especially water and air quality in Peshawar, sustainable forestry in the north, and basic education and infrastructure throughout the region—could have immediate, positive results that would also lay the groundwork for economic development and regional stability in the years ahead. The situation in Afghanistan is a source of great concern.

Private communications with Afghans suggest that they are certain that if the region is abandoned again, the future will be extremely violent.[100] Terrorists will resettle in the area, warlords will fight each other and neighbouring countries will be drawn in as they compete for influence and material gain. In 2002 it is hard to measure the commitment of the U.S. and the world community, but very few funds have entered Afghanistan. The magnitude of the country's problems has only been estimated by the World Bank and various NGOs. The preliminary conclusions are that virtually every sector is in dire need of assistance—transport routes are severely damaged, communications systems scarcely function, the health system

is in critical condition, as are the educational and economic realms, governance scarcely exists, and the environment is generally degraded. This bleak situation currently places pressure on Pakistan as Afghans seek to leave their country, as pollution from Kabul flows into Peshawar, as tensions mount in the tribal areas, and as the structure of the drug trade changes, to mention only a few issues. If the world abandons Afghanistan, this pressure will mount, making it more difficult to address problems in northern Pakistan.

For internal parties

Fight corruption and inefficiency in the political system by strengthening federal and local institutions while reducing the mandates of provincial institutions that have failed.

One way of describing the political problems in northern Pakistan is to say that strong local institutions have been diluted and displaced by weak provincial and federal institutions. The question of how to distribute resources and authority within a state has challenged many countries. Even in the most successful cases (such as the United States and Canada), the distributions are constantly renegotiated as needs change. Pakistan has very little that unifies its four provinces symbolically, structurally or institutionally. Given the magnitude of its current problems, it may not have the luxury of working its way towards strong federal and provincial institutions through decades of trial and error. At this point in the country's history, at least some foundational institutions—such as the constitution, the military and the courts—must gain legitimacy in the eyes of all sectors of the society. Indeed, a fair system of laws interpreted and enforced by reliable police forces and courts could be of great value in promoting a healthy, united future. Clarifying and improving civil-military relations, improving tax collection and providing basic public goods and services such as clean water, education and health care are also obvious areas where great gains could be made that would pull together the provinces and add substance to the existing sense of shared fate and purpose.

Focus on the restoration and sustainable use of basic environmental goods and services.

Northern Pakistan is one of those places where improvements in social system performance are contingent on implementing aggressive environmental programs. The region's economy is largely natural resource based, and its water and forests are vital resources that are under particular attack. By protecting these resources and weaving them into sustainable economic practices, local authorities would also be increasing the potential for developing new economic sectors (such as eco-tourism, fruit trees and onion cultivation) that can draw in foreign exchange. If they allow these

resources to collapse, however, it may deprive the region both of its foundation and its future.

Foster sustainable livelihoods by searching for a solution to the highly-divisive issue of contested and unclear property rights.

Throughout the world, unfair or insecure land tenure is a challenge to sustainable livelihoods, conservation management and environmental stewardship. The situation in northern Pakistan appears to be especially dire—there may be neither enough land to support the population nor enough funds to compensate for scarcities through strategic imports. Steps must be taken on both fronts if sustainable livelihoods are to become a reality for the populace. But virtually every potentially positive step forward—from family planning to the cultivation of fruit trees—requires a clarification of property rights to create better stakes in the system and higher levels of security for the populace.

Promote regional stability.

Tensions among Pakistan, India and Afghanistan are serious and show few signs of decreasing in the near future. One out of every five people on the planet lives in these three countries. They border a Russia that has capsized and is sinking fast, and a China that seems poised between ascending to superpower status and fragmenting into several parts (see Goldstone, 1999). The entire region may be a dry forest that a misplaced match could set ablaze. Kashmir and Afghanistan are possible ignition points. And even if a region-wide catastrophe does not develop, simmering tensions make it difficult to move many important policy sectors forward, especially those that would benefit from transnational cooperation. In either case, the promotion of regional stability would be wise. Pakistan has ties to both Afghanistan and India that could allow it to play a vital regional role as peace-builder.[101] The United States or another objective and powerful third-party should facilitate a framework for such a dialogue.

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Environment and Security Brief 2

Environmental Causes of Human Migration

By Ted Gaulin

While the influx of refugees from Afghanistan have had a direct, severe and multifaceted impact on sustainability in Pakistan, the case represents only one form of interaction between human migration and the environment. In many other cases, researchers have found that environmental degradation is not merely a consequence of migration, but also a cause. Indeed, by one estimate the number of people displaced from their homeland because of marked environmental disruption is nearly as high as those displaced for political reasons.[102] While verification of such assertions is difficult since the UN and other organizations do not track so called "environmental refugees" as a specific category, recent research indicates that environmentally induced human dislocation is a real and growing trend. Studies suggest that large populations are being displaced for three principle reasons: the gradual degradation and depletion of vital natural resources; the sudden disruption of human and ecological processes by natural disasters; and the contamination of traditional habitats by industrial accidents.

The work of Homer-Dixon has demonstrated that in a number of developing countries, population growth and unsustainable human activities have degraded or depleted vital resources such as cropland water and forests, leading to large-scale internal migrations. In Mexico, for example, population pressure and unsound agricultural practices have produced a scarcity of cropland that has caused tens of thousands of peasants to migrate across the country in search of cultivable land. The degradation or depletion of key natural resources has produced similar migrations in Rwanda, South Africa, Haiti, and the Philippines.[103]

In addition to gradual or cumulative environmental changes, sudden environmental disruption by earthquakes, droughts and floods can also displace large numbers of people. A drought in the Sahel in the mid 1980s, for example, caused more than two million people to leave their homes in search of food, many of them crossing national borders. Likewise, severe flooding in Bangladesh has caused massive internal and transnational migration over the last 20 years.[104] According to the IPCC, migration resulting from these forms of environmental disruption is likely to increase in the future, as global climate change is projected to produce stronger storm surges and more frequent droughts.[105]

Human-induced environmental disasters can also lead to large-scale human dislocation. This is dramatically illustrated in the case of Bhopal, India where the accidental release of toxic gases from a pesticide factory led to the flight of nearly 800,000 residents, and in the case of Chernobyl where the explosion of a nuclear reactor caused the exodus of more than 115,000 people.[106] Similar accidents, albeit on a smaller scale, occur frequently throughout the world. Between 1986 and 1992, there were over 75 major chemical accidents which displaced over 2 million people.[107] In the former Soviet Union, pollution stemming from cold war weapons production have led thousands to migrate in search of habitable land and clean water.[108]

There are number of important dynamics at work in the processes outlined above. First, these three causes of environmental displacement can interact in ways that make environmental disruption worse. For example, scholars argue that the impact of the drought in the Sahel was amplified by agricultural practices that had seriously degraded the quality of the soil.[109] Second, environmental refugee movements can have powerful feedback effects that exacerbate environmental pressure in the areas they occupy. For example, Homer-Dixon shows how migrants are often relegated to marginal lands—such as steep hillsides—that are least productive and easily degraded.[110] This pattern virtually ensures the future vulnerability of refugee and host community, and it sets the stage for future migration. Finally, scholars emphasize that the impact of environmental disruption on human migration is strongly influenced by social and political factors such as equity in the distribution of resources, the degree of political openness, and the level of social conflict. This implies not only a need for sustainable development, but for also policies that promote human security more generally.

Environment and Security Brief 3

Impacts of Refugee Movements on the Environment: UNHCR's Response

Conflict and disaster often result in the mass displacement of whole communities, which can, in turn, generate substantial environmental impacts. In recognition of this, the United Nations High Commission on Refugees (UNHCR) has incorporated environmental considerations into its programs in order to minimize the impact of refugee crises on the environment.

Refugee camps are often established in environmentally sensitive areas, such as arid and semi-arid regions, where the impact of large numbers of people and their livestock can easily exceed the buffering and carrying capacity of the local environment. Renewable natural resources commonly become a basis for survival, as forests are cleared for shelter, firewood, and livestock feed, and turned into farmland. Forest destruction, and the accompanying effects of soil erosion, water sedimentation, and land degradation, often holds serious implications for human welfare and ecosystem health in the settled region, as long-term sustainability is compromised.[111]

Such refugee-related impacts on the ecosystem can lead to tension with the local community, as competition for resources intensifies and refugees new to the area are unfamiliar with traditions or laws protecting wildlife or sacred sites. This increased competition can therefore undermine traditional resource management systems, whereby members of the local community forego sound management practices in order to ensure their own access to and use of natural resources. In addition, refugees are often used as cheap sources of labour by resource-extractive enterprises, and often become the scapegoats for subsequent environmental damage to a region.[112]

UNHCR responded to these issues in 1993 by establishing the Office of the Senior Coordinator on Environmental Affairs at Headquarters in Geneva. The Office prepared *Interim Guidelines on the Environment* the following year, and detailed its new environmental policy in *UNHCR Environmental Guidelines*, which was issued in 1996.[113]

Although UNHCR's primary concern is the immediate welfare of refugees, environmental protection measures are now included in each of its three phases of work: emergency, care and maintenance, and durable solutions. In order to address environmental concerns during

the emergency phase, where the immediate welfare of the refugees is the priority, UNHCR contingency planning includes looking for camp sites that minimize the burden placed on local populations and their resources. Because this is not always possible during emergency situations, where there is little time to make decisions, environmental problems are more likely to be addressed during the care and maintenance stage. Environmental impacts are considered during camp planning and management processes whereby activities such as road construction, site clearance, drainage systems, and shelter facilities are factored into decisions. Social and environmental surveys are conducted to monitor refugee impacts on the local population and ecosystem, and if necessary, more appropriate campsites are identified. To reduce the level of resource consumption, UNHCR also promotes environmentally friendly technologies such as alternative fuels or fuel-efficient stoves and techniques.[114] Finally, during the durable solutions phase of work, which seeks to secure refugee livelihoods either through repatriation, local settlement, or resettlement in a third country, environmental rehabilitation programs are implemented in order to reverse the negative impacts of refugees. Environmental education and training is also provided so as to encourage sustainable resource management and improved relations between refugee and local populations.

UNHCR's success in these efforts is due in large part to the cooperation and contributions of governments and other organizations. Through continuation and expansion of these projects and collaborations, UNHCR is seeking to build a better and more secure future both for refugees and their environment

Endnotes

53. This chapter is indebted to research undertaken for Hanson, Matthew, and Aziz (2000), and to comments and suggestions made by Art Hanson and several reviewers.

54. See Homer-Dixon & Blitt (1998); Homer-Dixon (1999); Deudney & Matthew (1999); Lowi & Shaw (1999); Diehl & Gleditsch (2001). For an interesting alternative view developed in South Asia, see Nauman (1996).

55. See Kaplan (1994) and Homer-Dixon (1999).

56. Northern Pakistan includes the North-West Frontier Province, the Northern Areas, and the Tribal Areas, all of which are separate administrative entities.

57. By "war on terrorism" we are simply reiterating the terminology used by the United States to explain and justify its campaign in Afghanistan, as this terminology has been widely adopted and will be familiar to most readers.

58. For an overview of this work, see Deudney and Matthew (1998). Extensive bibliographic material, as well as summaries of much of the research conducted over the past decade, is available in the Woodrow Wilson Center's annual Environmental Change and Security Project Report, edited by Geoff Dabelko.

59. For discussion of environment and security in the region, see Myers (1993), pages 101–121. For a discussion of the challenges facing Pakistan at this time, see Lieven (2002).

60. For similar cases, see Homer-Dixon & Blitt (1998).

61. There are certainly more optimistic views, and some trends are very positive. These are mentioned, as appropriate, throughout this chapter.

62. These plans are presented in great detail in the Sarhad Conservation Strategy prepared during the 1990s by a variety of Pakistani organizations in association with the International Union for the Conservation of Nature. See IUCN (1997).

63. Private communications with a large number of Afghans suggests that, at this point in time, only Kabul is fully under the control of the transition government.

64. For a succinct and colourful overview of the country, see McCarry (1997).

65. In many ways, the Indus River is the lifeblood of the region. Originating in western Tibet, it flows northwest through China and Kashmir, then shifts south, extending virtually the entire length of Pakistan before draining into the Arabian Sea a few miles east of Karachi. The Kabul flows into it from Afghanistan, meeting the Indus at Peshawar. Several other rivers flow from India, ultimately converging in the Panjnad, which meets the Indus almost in the geographic center of Pakistan. Settled for thousands of years, the region served by the Indus includes extensive irrigated farmland. In 1960 India and Pakistan signed the Indus Waters Treaty, which divides the Indus basin into

two systems, exclusively controlled by India (about 20% of the water) and Pakistan (about 80% of the water) respectively. As in the case of other shared river basins such as the Mekong, Nile, Jordan, Tigris and Euphrates, some analysts worry that as water needs grow in both countries, attempts may be made to restructure the Treaty, peacefully or through the use of arms. See, for example, Klare (2001).

66. For further detail, see IUCN (1998) and van Dijk & Hussein (1994).

67. Members of the former Taliban government in Afghanistan are Pashtun.

68. Although Khan does not represent the Pashtun politically, he traces his ancestral roots to this group and has written about its culture and politics (1993).

69. As the well-known Indian scholar Anil Agarwal writes, "the British in effect made us illiterate, they made us poor, and they deurbanized us" (1996, page 13).

70. For a valuable account of this period written by a Pakistani intellectual, see Mirza (1999).

71. For an excellent discussion, see Margolis (1999, 2000).

72. In some parts of the province, overgrazing is also a problem. This practice may be especially acute in some of the marginal areas in which refugee camps were established.

73. After more than fifty years of conflict, reports suggest that many of the people of Kashmir and Jammu would still like to be independent–an option neither of their neighbours endorses. For an interesting, well-informed discussion of the conflictual politics of this region, see Margolis (1999, 2000).

74. The term Kashmir is often used to refer to both Kashmir and Jammu, and to a large swathe of the Northern Areas. This geographic reference originated when the Hindu Ghulab Singh, with British support, seized control of several principalities–which then became known collectively as Kashmir–in the mid-nineteenth century.

75. From a UN perspective, resolution of this issue is as elusive as that between Israel and the Palestinians, which has also been on the UN agenda for over five decades.

76. This attitude has been confirmed in extensive interviews conducted in the region in 1999.

77. Readers unfamiliar with Islam may find Armstrong's (2000) highly regarded introduction of value.

78. It is important to stress that we do not wish to characterize Pakistan as a "failed state," a term popular in the United States in the 1990s, although we recognize that it has several serious and long-term political problems that make the state less efficient at providing public goods and services than one might wish. Mirza (1999), for example, identifies many accomplishments in the realm of state-building in his, admittedly partisan, historical analysis.

Clearly there are unifying elements at work and trends that hold great promise. A highly educated bureaucracy, extensive sustainable development plans, great contributions to world affairs such as the assistance provided to the international community following the Soviet invasion of Afghanistan and during the campaign against terrorism–these are a few diverse examples of remarkable achievements. Our point in this chapter is that the positive forces in Pakistan must operate in a turbulent context and face serious challenges, described here, which have been amplified or created by outsiders. Such conditions make the project of state-building daunting and, at times, erratic, but they do not make it impossible.

79. This is probably not an unusual situation. See, for example, Walzer (1994), pages 85–104.

80. The term "corruption" is widely used by Pakistanis themselves when they discuss political problems, but one should be careful not to read too much into it. A sustained political analysis might well reveal that the situation is quite complex, and, in some ways, distorted by the idea of corruption.

81. According to van Dijk and Hussein, the province's forest cover is about equally distributed between the Hazara and Malakand Divisions of the NWFP, and in Hazara, it is declining at the rate of between 1.4 and 8 percent annually. This means that the forest cover could disappear within twelve to seventy years (1994, page 35). Van Dijk and Hussein identify the breakdown of customary ownership systems as among the major causes of the rapid rate of deforestation. Throughout the 1990s, the government implemented a ban on logging in an effort to reduce the amount of flooding in the region. Field observation suggests that the ban had a minor impact on deforestation rates. An aggressive reforestation program has added forest cover, but it is not clear that this will survive and flourish. See Hanson, Matthew, and Aziz (2000).

82. For an excellent discussion, see Weaver (2000).

83. For a useful account of the Taliban, see Marsden (1998) and Rashid (2000).

84. Portions of this analysis have been published previously in Matthew (2001).

85. It would not be inaccurate, however, to note that India has made this charge without making public much evidence.

86. At the time this is being finalized, Pakistan is collaborating with the United States in its efforts to dismantle al-Qaeda, the terrorist organization linked to Bin Laden and to the September 11 attacks. This cooperation may lead to more financial assistance for northern Pakistan. An escalation in the number of refugees in the area makes further assistance extremely important. If it is not forthcoming, the situation may worsen dramatically. Moreover, disagreement over the U.S. approach to punishing Afghanistan for its alleged support of al-Qaeda will almost certainly intensify tensions in Pakistan, and especially in the north.

87. Myers contends that if "the present 3.1 percent growth rate continues [in Pakistan], the amount of cultivated land per rural inhabitant will decrease

from 0.8 acre in 1983 to less than half as much in 2010" (1993, page 107). To put this into a perspective that gives bite to the concept f scarcity, it is useful to consider calculations made by William Rees (2000). According to Rees, the most efficient developed countries, such as Japan and Korea, require about 5 acres of productive land per capita. The least efficient, such as Canada and the United States, require closer to 12 acres per capita. In all cases except Canada, developed countries do not have enough productive land to support their needs and must draw from less developed countries. In this light, Pakistan's 0.4 to 0.8 acres per capita must be seen as inadequate for anything approximating a Western lifestyle.

88. According to a report prepared by the IUCN, fuel wood consumption in northern Pakistan is ten times higher than elsewhere in the country. In the forty years from 1952 to 1992, forest cover in Hazara Division declined by 52 percent. Unfortunately, this is an area in which trees grow slowly but burn quickly (IUCN, 1998, page 11). Myers writes that "Fuelwood accounts for half of the country's energy requirements and nine-tenths of wood consumption, and demand is expected to double within another fifteen years" (1993, page 106).

89. Author's calculations, based on various sources.

90. For information on field work, see Hanson, Matthew, & Aziz (2000).

91. Information drawn from Myers (1993); van Dijk & Hussein (1994); IUCN (1998); and Hanson, Matthew, & Aziz (2000).

92. The following quotes are indicative of the tenor of the Sarhad Provincial Conservation Strategy: "The Sarhad Provincial Conservation Strategy aims to secure the economic, social and ecological well-being of the people of the NWFP through the conservation and sustainable development of the province's natural resources." (IUCN, 1997, page 5)

"The neglect and abuse of the environment over the past decades has come to pose a formidable challenge, and the large number of complex problems cannot be addressed in a short period of time." (Page 3).

"The SPCS has identified certain priority areas for action. These include governance and capacity development, poverty alleviation and population, community participation, communication and education, urban environment and sustainable cities, sustainable industrial development, natural resources management, biodiversity conservation and cultural heritage and sustainable tourism." (Page 5)

93. Articles in the major newspaper, *The Frontier Post*, often link refugees to crime even in the absence of evidence.

94. About 60,000 people have been killed in Kashmir and Jammu since 1989.

95. Data from Hanson, Matthew & Aziz, 2000.

96. Myers notes that "Because of sedimentation, the Mangla and Tarbela reservoirs, two of the largest in the world, are expected to remain operational for only a fraction of their anticipated lifetimes" (1993, page 106).

97. According to Myers, water shortages may prove to be Pakistan and the region's greatest challenge. He writes that "Year after year, acrimonious debate breaks out among the provinces over sharing water supplies. Worse still, these internal conflicts may well spill over into India. Of the Indus River basin's 400,000 square miles, 160,000 square miles lie across the border in India" (1993, pages 107–108).

98. Based on a review of articles in *The Frontier Post* in the summer of 1999.

99. For information see Armstrong (2000).

100. All such communications are confidential at this time. However, an indication of the type of sources referred to is available at http://www.gechs.uci.edu.

101. For a thoughtful analysis of the complex links between Pakistan and India, see Mirza (1999).

102. J. Jacobson, "Environmental refugees: A yardstick of habitability," Worldwatch paper, 86 (Washington, D.C.: Worldwatch Institute, November 1988).

103. On the cases of Mexico, Rwanda and South Africa see T.F. Homer-Dixon and J. Blitt (eds), *Ecoviolence: Links among environment, population and scarcity* (Lanham: Rowman and Littlefield, 1998). *On the cases of Haiti and the Philippines see Thomas Homer-Dixon, Environment Scarcity and Violence* (Princeton: Princeton University Press, 1999).

104. A. Suhrke, "Environmental degradation, migration, and the potential for violent conflict." In Nils Petter Gleditsch (ed.) *Conflict and the Environment* (Dordrecht: Kluwer Academic Publishers, 1997), pp. 264–268.

105. *Ibid.* p 263.

106. E. Vlachos, "Environmental refugees: The growing challenge," In Nils Petter Gleditsch (ed.) *Conflict and the Environment* (Dordrecht: Kluwer Publishers, 1997), p. 304.

107. S. Lonergan, "The role of environmental degradation in population displacement," *Environmental Change and Security Project Report* 4 (1998), p. 9.

108. E. Vlachos (1997), p. 304.

109. A. Suhrke (1997), p. 362.

110. T. Homer-Dixon and J. Blitt (eds.) (1998), pp. 6–7.

111. United Nations High Commission for Refugees (UNHCR), *Refugees and the environment: Caring for the future* (Geneva: Environment Unit and Public Information Section, 1999), p. 6.

112. *Ibid*, p. 12.

113. *Ibid*, p. 9.

114. *Ibid*, pp. 10–11.

Forests, Fires and Confrontation in Indonesia

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Abstract

Decades of mismanagement and plunder of Indonesia's forests have resulted in rapid deforestation and escalating levels of conflict and violence between local resource users and external actors from government and the private sector. Destructive forest policies during the Suharto regime (1966–1998) weighed heavily on the local and indigenous communities, as unsustainable long-term logging concessions barred access to the resources upon which they depended. With the regime change in mid 1998, the State has lost its ability to forcefully suppress the increasing number of forest-related conflicts, many of which are related to illegal logging activities. Because traditional conflict resolution mechanisms withered during the Suharto regime and new mechanisms were not established, these conflicts are now becoming an internal security threat for Indonesia. This has weakened the State's capacity to reform forest policy just when—for the first time in three decades—real reform has become possible. Addressing the country's problems will involve restructuring the legal system, developing alternate dispute resolution institutions, and strengthening the capacity and integrity of local governments. International organizations can contribute to this process by identifying, combating and reducing corrupt government practices.

Note: This chapter reports on the situation in Indonesia through the end of 2001. Despite a change of administration in the Indonesian government since the writing of this document, the trends noted have not changed substantially—if anything, they have only worsened.

1.   Introduction

Indonesia possesses the last remaining large tracts of tropical forest in Asia, and is one of the key global centers of terrestrial biodiversity. These forests are also very important to the national economy and to the livelihoods of millions of forest-dependent local people across the country. Rapid deforestation and forest mismanagement in Indonesia have long been of concern to the international conservation community—Indonesia's forests can fairly be said to be in crisis. But is Indonesia's forest crisis a "security" concern, either for Indonesia or for the rest of the world, on par with traditional security concerns such as preventing war, maintaining domestic peace and order, coping with natural disasters, or avoiding economic collapse?

This paper argues that forests are indeed a security issue for Indonesia, providing evidence for the following arguments:

- Most of Indonesia's land area is legally designated as forestland, and the many natural resources of this vast area are an important economic resource for national and local economies.

- Ownership and use of forest lands and resources have been contested and conflict-ridden for the past three decades, and the usurpation of longstanding local claims by government and private interests has left a legacy of bitterness and anger in many areas of the country.

- Decades of poor management and forest degradation have set the stage for catastrophic forest fires, particularly in 1997–1998, the effects of which have spread well beyond Indonesia's borders.

- Weak forest management capacity and pervasive corruption have allowed illegal logging to grow into a sophisticated and organized criminal enterprise which now provides more than half of the country's timber supply.

- The collapse of the authoritarian Suharto regime in 1998 has exposed deep and jagged ethnic, religious and regional rifts in Indonesian society. These have exploded in savage communal violence in many parts of the country, and longstanding disputes over forest lands and resources are often a key flashpoint for these outbreaks of violence.

- Mechanisms for the orderly and just resolution of social disputes over forest lands and other resources are weak and unreliable. Traditional dispute resolution mechanisms were suppressed and stunted during the Suharto years, while the judicial and parliamentary systems fell into disgrace as corrupt rubber stamps for the regime's political and economic interests. Without any legitimate forum in which grievances can be heard, many Indonesians have increasingly turned to violence.

- In the context of the weak and fractious post-Suharto Indonesian state, the crescendo of violent conflicts over forest lands and resources have become a major security issue, not only threatening forest conservation efforts but also influencing core security concerns such as the capacity of the government and the military to maintain civil peace and physical security for Indonesian citizens, and the political future of the current president.

The chapter concludes with an analysis of the policy and institutional reforms—both within and outside the forestry sector—needed to reduce the level of forest-related conflict and thereby strengthen both Indonesia's security and efforts to conserve its forests.

2. How Forest and Security Concerns Are Related in Indonesia

A considerable amount of scholarship and policy discussion has focused on the connections between environmental degradation and security over the past decade.[115] Simply put, "there is growing consensus that environmental degradation can and does trigger, amplify or cause conflict and instability, and a growing concern that environmentally induced conflict might increase."[116] And conflict, especially violent conflict, is commonly considered to be a threat to security. Thus, the argument goes, preventing and ameliorating natural resource degradation and scarcity can reduce the threat of conflict and thereby enhance security.

This school of thought has many sources: rising concern about environmental degradation; efforts by the traditional security community to redefine its mandate and relevance in the post-Cold War world; a desire in the environmental community to see environmental stresses taken seriously as "hard" issues on par with issues such as arms proliferation, insurgency, and the like. It also has its detractors, however, such as Deudney (1990) who argues that:

> First it is analytically misleading to think of environmental degradation as a national security threat, because the traditional focus of national security—interstate violence—has little in common with either environmental problems or solutions. Second, the effort to harness the emotive power of nationalism to help mobilize environmental awareness and action may prove counterproductive by undermining globalist political sensibility. And third, environmental degradation is not very likely to cause interstate wars.[117]

Indonesia is, however, perhaps one of the best rebuttals of this view: It currently faces a security crisis that is related almost entirely to internal mat-

ters and has little relationship to interstate threats of attack or invasion. Indeed, at first glance, Indonesia would seem to have enough "traditional" security problems to handle—all domestic—without dragging forests or other environmental issues into the fray. Consider the following:

- The fourth most populous country in the world (population about 200 million), Indonesia consists of some 17,000 islands scattered across more than 5,000 km, with a dizzying diversity of cultures, languages, and ways of life.

- For more than three decades (1966–1998), Indonesia was ruled by the authoritarian "New Order" regime of President Suharto. The economy grew impressively during most of that period, the military and bureaucracy grew in strength and influence, and all forms of opposition (democratic, Islamic fundamentalist, separatist) were effectively suppressed.[118] The New Order came to an end in mid-1998, however, following the crash of the economy in late-1997 and an accompanying crescendo of popular protest against the widespread corruption and pervasive human rights violations of Suharto's regime.[119]

- Following an interregnum under Suharto Vice-President B.J. Habibie, a new president,[120] Abdurrahman Wahid, came to power in October 1999 after the country's first democratic election in more than four decades.[121] While praised as a sincere democrat, Wahid's fractious coalition government—and his mercurial and frequently baffling personal style—have raised serious questions about his capacity to govern, or even to stay in office for his full term.[122]

- Indonesia's economy is in tatters, partly as a lingering result of the East Asian financial crisis that began in late 1997, but more fully explained by the tangled web of Suharto-era economic mismanagement, cronyism and corruption that the economic crash revealed. Most of the country's banks, and many other key economic players, are bankrupt, the value of the Indonesian Rupiah remains low, and employment and inflation are high. Presently, the national economy is being kept afloat on the basis of an IMF-led international bail-out package and oil revenues.

- The centrifugal tendencies inherent in such a large, multi-ethnic archipelagic nation have been unleashed since the demise of the New Order. East Timor—invaded and occupied by Indonesia in 1975—was finally given its independence after a bloody UN-supervised referendum process in mid-1999.[123] Long-simmering separatist movements in the resource-rich provinces of Aceh and Papua (formerly called Irian Jaya) have been reinvigorated,[124] and other provinces (such as oil-rich Riau, in Sumatra) have begun to talk about independence as well.[125]

- Partly in reaction to these separatist movements—but also in response to a more widespread antipathy to the centralized governance of the Suharto era—the government is moving rapidly towards a new system of "regional autonomy." But the provincial and district governments who will be the beneficiaries of this sweeping decentralization are, for the most part, completely lacking in the capacities needed to govern effectively. Indeed many are still run by entrenched and corrupt holdovers from the Suharto era.[126]

- Ethnic and religious killing, looting, ordinary violent street crime, and savage vigilantism have exploded all over Indonesia since 1998. Moslem-Christian violence in the eastern province of Maluku has taken thousands of lives,[127] and similar savagery has appeared in parts of Kalimantan and Sulawesi.[128] As of mid-2000, the government estimated that there were more than 765,000 "internal refugees" fleeing these various conflicts.[129] Crime rates have soared in the cities, along with brutal "street justice" in which hundreds of suspected street criminals have been beaten and burned to death in the street.[130] On Java, the lynching (often by beheading) of people suspected of being sorcerers or witches has increased dramatically as well.[131]

- The Indonesian military—reeling from revelations about its past human rights atrocities in East Timor, Aceh and elsewhere, and what it sees as its humiliation in "losing" East Timor—appears unable to contain the growing violence.[132] Indeed, in Maluku, Christian and Moslem troops sent to quell the fighting ended up fighting with the respective factions.[133] Similarly, the police—long reviled by most Indonesians as corrupt, brutal and ineffective—are unable or unwilling to stem either the growing crime rate or the vigilantism that has mushroomed in response.[134]

- Corruption, is widely acknowledged to have been pervasive at all levels of government and the private sector during the Suharto era—a 3,000-page mid-2000 report by the State Audit Bureau and independent auditors, for example, clearly identified billions of dollars that went missing during the last five years of Suharto's presidency.[135] And the situation has not changed appreciably: The same audit body announced to Parliament in mid-July 2000 that more than $20 billion of state funds allocated in the 1999–2000 financial year—some 46 per cent of the total—was unaccounted for due to various kinds of "irregularities."[136]

- The legal system is widely considered to be so corrupt and inefficient that senior officials were, in early 2000, debating "importing" Dutch judges—on the assumption that no honest ones could be found in Indonesia.[137] The disgrace into which the legal system has fallen has in turn hurt the credibility of the many corruption and human rights investigations into the Suharto era that are underway.

Given this frightening panoply of problems, what relevance do forests have to Indonesia's security? Quite a bit, for a variety of reasons.

A number of studies from around the world have shown that scarcities of renewable resources, in combination with other factors, can trigger civil conflict.[138] Three factors can produce renewable resource scarcities. First, environmental degradation can reduce the aggregate pool of available resources; for example, forest loss, cropland degradation, or destruction of fish habitat reduces the absolute supply of those resources (supply-induced scarcity). Second, the demand for a resource can increase due to growth in population or per capita resource consumption. Population growth divides a resource among more and more people, which reduces its per capita availability, while rising incomes and industrialization can increase the per capita demand for a resource (demand-induced scarcity). Third, unequal resource distribution concentrates a resource in the hands of a few people and subjects the rest to greater scarcity (structural scarcity).[139]

Scarcity by itself does not necessarily produce conflict. The level of social conflicts provoked by rising scarcity—and the probability that tensions will turn violent—are influenced by the context of state and the society. As in the case of fire the probability of violent conflict over forest resources is a function of the level of conflict *risk* and conflict *hazard*. The risk of conflict rises as the level of resource scarcity and unresolved grievance and tension rises. Drawing an analogy to fire, this is the "fuel load" with the potential to ignite. The hazard of conflict—the probability that latent tensions and grievances over resources will ignite into open conflict—is a function of the volatility of ethnic, religious, political, economic and other tensions and grievances in the area in question, in combination with the level of legitimacy, effectiveness, and accessibility of non-violent dispute resolution mechanisms (or, alternatively, forcible means of suppressing disputes).

In a strong state with effective dispute resolution mechanisms (or effective state capacity to repress grievances) and a diversifying economy in which scarcity of a particular resource becomes relatively less important, resource scarcity and competition need not lead to a great deal of open conflict. This was largely the situation for most of the Suharto era in Indonesia.

But in a country where the state is weak, reliance on the resource is high, and mechanisms to either resolve or repress grievances are not functioning, scarcity is likely to lead to much higher levels of conflict. And where the society is already wracked with numerous ethnic, religious and regional tensions and conflicts, the additional conflicts arising from resource scarcity may interact synergistically, creating a spiral of interlinked and escalating conflict. This is the situation that Indonesia faces today.

Indonesia's legally-defined "forest lands" (*kawasan hutan*) as mapped by the government covered some 144.5 million ha—about 75 per cent of the country's land area, although that number has declined somewhat in recent years. Only about 80–95 million ha (there are no definitive figures) actually possesses tree cover, however, and less than half of which is thought to be primary forest. But these "forest lands" also serve many other functions: the reservoir of land for conversion to food and estate-crop agriculture and timber and pulp plantations; and large areas of mining concessions.

From the perspective of power relations, the official definition of "forest lands"—bearing little resemblance to any ecological definition of "forests"—is a political strategy to assert state hegemony over natural resources, social relations, and political authority across that vast territory.[140] One corollary of this political construction of "Indonesia's forests" has been the marginalization of the interests and claims of the millions of rural people living in or adjacent to state forest lands, including numerous indigenous tribes living more or less traditional lifestyles, small-holder migrant farmers, and people living on government-sponsored "transmigration" resettlement schemes established over the past three decades—people viewed as "backward" and "undeveloped" in the New Order discourse of "development."[141] Thus a second corollary of the "political forest" is the need for the area to be "developed" by the forces of modernity—the logging concessions, plantations, mining firms and other large corporate interests under the patronage of the Suharto regime.

Thus, if "forests" are taken to encompass all of the lands administered under the government's forestry laws and agencies, and the resources found therein, it is clear that we are talking about a considerable proportion of Indonesia's land area, natural resources, and population. Furthermore, we are talking about a political representation of "forest," not only an economic or ecological one, and the long history of conflicts within the political forest indicates that it is a contested political representation.

Resolution of conflicts in that vast area, and management of its considerable natural resources, are thus clearly important concerns for the future political and economic security of Indonesia, for at least five reasons:

First, sustainable and productive management of forest lands and resources—including those areas already converted or slated for conversion to plantations and other uses—will be a key determinant of Indonesia's short-term economic recovery and its long-term economic sustainability, as will be shown elsewhere in this chapter.

Second, three decades of Suharto-era administration of forest lands and resources has left a bitter legacy of usurpation and anger among local com-

munities throughout the country. Logging, mining and petroleum concessions, transmigration schemes—and later, timber and oil palm plantations—were established without regard for existing local forest land uses or the customary (*adat*) law systems governing them. While Suharto cronies grew wealthy in Jakarta, millions of local people lost their access—often by force—to the forest resources they depended on, and tribal groups were subjected to demeaning programs intended to "civilize" them. In the post-Suharto era, many of these people justifiably feel that it is "payback time"— recent events have illustrated that either the government must respond to this mandate, or people will take the law in their own hands to redress their grievances, sometimes violently. Unfortunately, another legacy of the Suharto era is a situation in which traditional dispute mechanisms have been dismantled, and nothing has been put in their place: The New Order's response to forest-related disputes was either to ignore them or repress them by force, leaving local people with little alternative but to suffer or to resist by way of surreptitious sabotage or (infrequently) open rebellion.

Third, in the timber sector itself, the majority of the country's timber is now supplied by large-scale, organized illegal logging. Given the importance of timber to the economy—the forest products sector was worth at least $8 billion in 1998 (with some estimates reaching $20 billion)—the fact that most log production in the country is now in the hands of organized crime would certainly seem to be a legitimate security concern. Large scale illegal mining—almost all of it in or adjacent to forest lands—has also exploded across Indonesia, particularly in Kalimantan, on a staggering scale—the government estimates that there are 62,000 illegal miners across the country, twice the number working legally.[142]

Fourth, three decades of forest mismanagement and degradation have resulted in extensive and recurrent fire episodes. In 1997-98, fires—most intentionally set to clear plantation lands—affected 10 million ha and caused damages of at least $10 billion. "Haze" from the fires blanketed not only much of Indonesia but also Singapore and much of Malaysia for months on end, creating considerable friction between Indonesia and its neighbours.

Finally, the bloody "ethnic and religious strife" that dominated Indonesian headlines for much of 2000 and 2001 is closely tied to competition over forests and natural resources. These conflicts clearly demonstrate that forests are one of the nation's key security concerns—not only "blood," "culture"and "religion." As Hildyard argues (in reference to Rwanda and Yugoslavia):

> "Blood" and "Culture" have long provided people the world over with seemingly "commonsense" explanations for civil conflict.... How else can the sheer horror of neighbours hacking each other

to pieces be explained—neighbours who had previously lived together in apparent harmony?… Yet scratch below the surface of inter-ethnic civil conflict, and the shallowness and deceptiveness of "blood" or "culture" explanations are soon revealed. "Tribal hatred" (though a real and genuine emotion for some) emerges as the product not of "nature" or of a primordial "culture," but of a complex web of politics, economics, history, psychology and a struggle for identity.

This is not to deny that ethnicity—be it in Rwanda or anywhere else in the world—is a very real social force, a force whose outcome can be as positive as it can be murderous. It is to insist, however, that the shared values, histories, customs and identities that generate "ethnicity" are socially constructed. At root, ethnic conflicts result not from blood hatred, but from socially, politically and economically-generated divisions.[143]

The savage "ethnic cleansing" of Madurese immigrants by local Dayaks in Central Kalimantan in early 2001, for example, arose largely as a result of competition over forest lands and resources caused by the Suharto-era transmigration resettlement program on Kalimantan:

The transmigration program in Kalimantan resulted in the rainforests being replaced by palm oil and coconut plantations. The Dayaks soon found themselves at the bottom of the economic pile and unable to pursue their traditional means of existence…. The government appropriated Dayak lands whilst no efforts were made to give them a chance to share in the exploitation of their traditional resources…. This was colonization happening a second time around and was met by indigenous resistance that has grown over the years…. This was a powder keg waiting to be ignited.[144]

The causes of conflict here, as elsewhere across the country where race or religion is blamed, are age-old patterns of greed and injustice now dressed up in exotica. Kalimantan was often seen by policy-makers in Jakarta as an empty place full of natural resources which would be there for the plucking as long as Jakarta's generals and cronies of former president Suharto wanted them. Forestry concessions were dished out by Suharto to buy off or appease people in his way. State firms and foreign investors arrived to take what logs, coal, gold and oil they could…. For the Dayaks, old patterns of cultivation and sustainable forest management were wiped out. Land title, which was once a matter of communal agreement, was lost…. Even though the culprits in this drama sit more in national government than in any particular racial group, it was the migrants who took the blame.[145]

Many observers also believe that the bloody Moslem-Christian fighting in Maluku has been fanned and manipulated by the remnants of Suharto's New Order regime in order to paralyze and discredit the present government, derail investigations into past corruption and military brutality, and preserve their power over natural resource-based and other sources of income.[146]

In short, forest resources, conflict and security are closely linked in today's Indonesia. Security issues as fundamental as the unity or break-up of the nation, and the ability of elected president to remain in office[147] are inextricably tied to the fate of Indonesia's forests, and the Suharto-era legacy of their mismanagement and plunder.

3. Indonesia's Forest Resources in Crisis

3.1 What is at Stake? The Values of Indonesia's Forests

Indonesia possesses the greatest remaining expanse of tropical rainforest in Southeast Asia, and is one of the planet's most important repositories of forest biodiversity.[148] These forests are an important source of livelihood for millions of forest-dependent people—including many indigenous forest-dwelling peoples with long-standing customary traditions of forest resource management—as well as a key component of the national economy.

Much of the vast area legally classified as "forest land" of various types is already deforested or in varying states of degradation. But despite the importance of forest resources to Indonesia, relatively little good data exist about their extent and condition. One reason is that hundreds of millions of dollars put into forest mapping in the 1990s was corruptly siphoned off by one of Suharto's closest cronies, erstwhile "timber king" Mohamed "Bob" Hasan.[149]

Estimates of actual forest cover made in the early 1990s ranged from 92.4 million to 113 million hectares.[150] A 1999 estimate, based on 1997 satellite imagery, concluded that about 95.8 million ha still carried some form of forest cover, but cautioned that the analysis could not shed light on the condition of those forest areas.[151] Indeed, a 2000 recalculation of forest areas, carried out by the Ministry of Forestry and Estate Crops, concluded that only about 36 million ha of primary forest remained in Indonesia, while an additional area of about 14 million ha consisted of logged-over forest still in good or medium condition.[152] This accords with a 1997 World Resources Institute (WRI) analysis which concluded that Indonesia had only some 53 million hectares left of "frontier forest"—relatively undisturbed areas of forest big enough to maintain all of their biodiversity.[153]

Biologically, these remaining forests are extremely diverse. While Indonesia occupies only 1.3 per cent of the world's land area, it possesses about 10 per cent of the world's flowering plant species, 12 per cent of the world's mammals, 17 per cent of all reptile and amphibian species, and 17 per cent of all birds.[154] The country's 17,000 islands span the Indomalayan and Australasian realms, and the archipelago contains seven major biogeographic realms and a great diversity of habitat types. Forest habitats range from evergreen lowland dipterocarp forests in Sumatra and Kalimantan— among the most species-rich on earth—to seasonal monsoon forests in Nusa Tenggara, non-dipterocarp lowland forests in Irian Jaya, and the world's largest areas of mangrove forest. Many islands have been isolated for millennia, so levels of endemism are high. Of 429 locally endemic bird species, for example, 251 are unique to single islands. Most of Indonesia's insects are also found nowhere else, with many genera confined to individual mountain-tops.

In addition to acting as a storehouse of biological riches, products from Indonesia's forests constitute a significant part of the national economy. During the 1990s, forest products, on average, contributed about six–seven per cent of GDP and 20 per cent of foreign exchange earnings, with forest product revenues in 1998 totaling $8.5 billion, ranking second only to oil.[155] An industry source predicted in January 2000 that the value of forestry sector export production alone (not, presumably, including production for the domestic market), would reach $8 billion—and claimed that a similar figure had been attained in 1999.[156] Confusingly, however, the Ministry of Forestry and Plantations Strategic Plan for 2001–2005, issued in July 2000, states that the contribution of forestry to the national economy in the fiscal year 1998/1999 totaled nearly $23.7 billion, with plantation crops contributing an additional $4.1 billion.[157] Despite these considerable discrepancies in the various ways that the "total value of the forestry sector" is tallied, it is clear that forests are a key component of the Indonesian economy. Some 183,000 people were directly employed in the legal logging and forest products sectors in 1997,[158] And given that at least half of Indonesia's timber is thought to be cut illegally, as discussed below, there are probably as many as 200,000 people employed in illegal operations.

Indonesia's forests also yield many non-timber forest products, the most valuable of which are rattan canes, which had an export value of $360 million in 1994.[159] The total value of exports of "wildlife and plants" for the 199/2000 fiscal year was more than $1.5 billion according to the Ministry of Forestry and Plantations, although the components of this aggregated total are not specified.[160] The forests also provide valuable environmental services such as protecting the hydrological balance of watersheds and storing carbon that would otherwise increase the concentration of greenhouse gases in the earth's atmosphere.

A large but undetermined number of forest-dwelling or forest-dependent communities live in or adjacent to Indonesia's forests. Estimates made over the past several decades have varied wildly on the precise numbers—from 1.5 to 65 million people—depending on which definitions was used and which policy agenda was at stake.[161] As of mid-2000, the Ministry of Forestry and Plantations reported that 30 million people "depend directly on the forestry sector for their livelihoods."[162] Many of these forest-dwellers live by long-sustainable "portfolio" economic strategies which combine shifting cultivation of rice and other food crops with fishing, hunting, the gathering of forests products (e.g., rattan, honey, resins) for use and sale, and the cultivation of tree crops such as rubber for sale. These local values of the forest are poorly appreciated, though, because they are not reflected in formal market transactions.

3.2   Deforestation Rates in Indonesia

Until mid-1999, Indonesia's deforestation rate was variously estimated to be between 0.6 and 1.2 million ha by various sources.[163] A forest cover mapping effort carried out by the government with support from the World Bank during 1999, however—analyzing 1997 satellite imagery—concluded that the average annual deforestation rate for the years 1986-1997 has actually been about 1.7 million ha (See Table C1). Hardest hit was Sumatra, where 30 per cent of the huge island's forest cover vanished during this period.[164] Deforestation has also brought an increase in poaching, with some of Indonesia's most well-known large mammal species—such as the Sumatran tiger and the orangutan—headed towards extinction.[165]

In short, Indonesia appears to have lost some 20 million ha of forest between 1985 and 1997, and probably an additional four million ha since then, for a total of 24 million ha over the past 15 years—an area roughly the size of Laos or the United Kingdom, and fully 25 per cent of the area that was forested in 1985.

From a biodiversity perspective, the massive loss of the lowland rainforests, particularly in Kalimantan and Sumatra, is the most destructive. If current deforestation trends continue, a World Bank study estimates that "non-swampy lowland forest will become extinct in Sumatra by before 2005, and in Kalimantan soon after 2010."[166] These lowland rainforests are also poorly represented (less than five per cent are included) in the national system of protected areas.

Table C1. Forest Cover and Deforestation in Indonesia, 1985–1997

	1985		1997		Deforestation		
	Forest	% total land area	Forest	% total land area	Decrease 1985-97	% loss	Ha/year
Sumatra	23,324,000	49%	16,632,000	35%	6,691,000	29%	558,000
Kalimantan	39,986,000	75%	31,512,000	60%	8,474,000	21%	706,000
Sulawesi	11,269,000	61%	9,000,000	49%	2,269,000	20%	189,000
Maluku*	6,348,000	81%	[> 5,544,000]	?	> 800,000	13%	67,000
Irian Jaya	34,958,000	84%	33,160,000	81%	1,798,000	5%	150,000
Total	115,885,000	68.5%	c. 95,848,000	57%	20,505,000	17%	1,709,000

* Data for Maluku are preliminary

Source: World Bank, 2000. "Deforestation in Indonesia: A Review of the Situation in 1999." Draft. Jakarta. May 5.

3.3 Forest Mismanagement in the Suharto Era: The Roots of Deforestation and Conflict

These alarming rates of deforestation have their roots in the forestry policies and practices of the corrupt and cronyism-riddled Suharto era. For three decades, the Suharto regime pursued a policy of centralized and predatory forest resource extraction and forest conversion (to plantations and resettlement colonies), largely ignoring conservation concerns and suppressing local community resistance. Today, Suharto is gone but Indonesia still faces his regime's legacy of forest resource scarcity, social conflict and vulnerability to catastrophic fires.

Under Indonesia's Constitution, authority and responsibility for "branches of production which are important for the State and which affect the lives of most people," belongs to the state. Outside of Java, however, there was little commercial exploitation of forest resources until the late 1960s, and forests were for the most part governed by local systems of customary (*adat*) law and resource management. Under Suharto this situation rapidly changed, and the constitutional mandate of state "authority" over forests was basically interpreted to mean that the state "owned" the nation's forest lands. Under the 1967 Forestry Law and its numerous implementing regulations, certain lands were classified by Ministerial Decree as official "Forest Area"—an area that officially expanded to some 144.5 million ha at one point, fully 76 per cent of the country's land area, and includes many non-forested areas, as noted above. In turn, Forest Areas were sub-classified for production, various types of protection, or conversion to non-forest land uses such as agricultural plantations. In the 1980s, "consensus" maps delineating these categories were drawn up for each province.[167]

Table C2 compares official forest area classifications from 1986 (Based on these "consensus" maps) and the figures released by the Ministry of Forestry and Plantations in mid-2000. Note, however, that the latest figures from the Ministry vary significantly from the figures in Table C3, below, which are drawn from a World Bank analysis using other official figures from 1999—such reporting variations are common in Indonesia's forestry sector.

The most important consequence of this state-controlled system of forest land use allocation was the rapid parceling out during the 1970s and 1980s of more than 500 20-year, renewable logging concessions to private sector firms. Officials figures state that these concessions generated 612 million m^3 of logs between 1970 and 1999, although some industry analysts have argued that actual removals were approximately twice this volume.[168] In the 1990s, additional areas were allocated to industrial timber plantations (4.7 million ha) and large-scale plantation development, primarily for oil palm (three million ha)—some of that area being former logging conces-

Table C2. Official Forest Land Use Classifications by Area, 1986–2000

Forest classifications	1986		2000		Change 1986–2000	
	Area (ha)	%	Area (ha)	%	Area gain/(loss)	% gain/(loss)
Normal production	31,850,000	22%	35,200,000	29%	3,350,000	10.5%
Limited production	30,520,000	22%	21,800,000	18%	(8,720,000)	(28.5%)
Protection	29,680,000	21%	31,900,000	27%	2,220,000	7.5%
Conservation	18,250,000	13%	23,300,000	19%	5,050,000	27.5%
Conversion[169]	30,540,000	22%	8,200,000	7%	(22,340,000)	(73%)
Total	140,840,000	100%	120,400,000	100%	(20,440,000)	(14.5%)

Sources: *Ministry of Forestry Strategic Plan 2001–2005*. Jakarta: Ministry of Forestry and Plantations. July 2000 (for 2000 data.); RePPProT (Regional Physical Planning Programme for Transmigration), *The Land Resources of Indonesia: A National Overview*. Jakarta: Overseas Development Administration (U.K.) and Department of Transmigration. 1990 (for 1986 data).

sions degraded by poor logging practices. Nearly three million ha were also allocated for clear-cutting and use by the government's "transmigration" program, which sought to relocate peasants from the over-crowded volcanic islands of Java and Bali to the country's forested "outer islands," primarily Sumatra, Kalimantan, Sulawesi, and Irian Jaya (western New Guinea, renamed Papua in 1999). By contrast, only 17.3 million ha of the country's forests were included in conservation areas, with an additional 30.1 million ha designated as Protection Forest (generally water catchments and steeply sloping areas). Table C3 summarizes the official data, as of 1999, on the area of permanent forest estate (i.e., not including areas slated for conversion to non-forest uses) and actual forested area within it (but note discrepancies with other official data issued in mid-2000 on the area of permanent forest estate, in Table C3.)

Table C3. Permanent Forest Land Categories and Proportion Holding Forest Cover

Functional category	Designated area, forest land 1999 (ha)	Actual extent of forest cover (ha)	Per cent of designated area with actual forest cover
Protection forest	30,100,000	24,100,000	80%
Park and reserve forest	17,300,000	14,900,000	86%
Production forest	30,600,000	24,700,000	81%
Limited production forest	31,000,000	25,300,000	83%
Total	109,000,000	89,000,000	82%

Source: Fox, J., M. Casson and G. Applegate, *Forest Use Policies and Strategies in Indonesia: A Need for Change.* Jakarta. Paper prepared for the World Bank. May, 2000.

Logging Concessions and the Timber Industry

When the Suharto's New Order came to power in the mid-1960's, economic planners took immediate steps to develop Indonesia's weak economy and began to develop the legal framework to permit private firms to harvest and export timber. Sumatra and Kalimantan were the first targets of forest exploitation because they had the largest stocks of commercially valuable tree species and were closest to Asian markets, and numerous logging concessions were granted there.

Export of unprocessed logs rose dramatically in the 1970's, providing foreign exchange, capital to build Indonesia's emerging business empires.

From 1969 to 1974, for example, nearly 11 million ha of logging concessions were granted in East Kalimantan alone.[170] While only four million m³ of logs were cut from Indonesian forests in 1967—mostly for domestic uses—by 1977 the total had risen to approximately 28 million m³, at least 75 per cent of that for export.[171] Gross foreign exchange earnings from the forestry sector rose from $6 million in 1966 to more than $564 million in 1974. By 1979, Indonesia was the world's major tropical log producer, with a 41 per cent share ($2.1 billion) of the global market, representing a greater export volume of tropical hardwoods than all of Africa and Latin America combined.[172]

Roads, towns, and other infrastructure were built in Sumatra and Kalimantan in the wake of the timber bonanza, and the populations of these islands grew substantially. East Kalimantan, which was undergoing a simultaneous oil boom, doubled its population between 1970 and 1980, transforming the landscape as agricultural settlers followed the loggers into the forests.[173]

The timber industry went through a period of consolidation as a ban on log exports was imposed in the early 1980's, creating a few enormous vertically integrated timber firms that concentrated on plywood production.[174] The number of plywood mills in the country rose from 21 in 1979 to 101 in 1985 and production rose from 624,000 m³ in 1979 to nearly 4.9 million m³ in 1985, and rose further to over 10 million m³ in 1993, nearly 90 per cent of that exported. At the same time, the industry became increasingly concentrated in the hands of a small number of regime-connected firms. By 1994, the top ten groups controlled nearly 24 million ha (37 per cent) of the 50 million ha of logging concessions in the country, a figure which rose to 64 per cent in timber-rich East Kalimantan. These big firms formed a cartel (Apkindo) that made Indonesia the world's largest plywood producer and succeeded in raising international plywood prices.[175] Suharto's family and inner circle were important players in the industry. According to the watchdog group Indonesian Corruption Watch, Suharto's family alone had a forest concession area of 4,130,000 ha.[176]

The year 1995 was the high water mark for the Indonesian timber industry, with some 585 concessions holding nearly 70 million ha across the country—more than one-third of the nation's total land area.[177] Beginning in the mid-1990s, however, numerous concessions whose 20-year contract period had ended were either transferred into the hands of five state-owned forestry corporations (Inhutani I through V),[178] or reconstituted as joint ventures between private firms and one of the Inhutanis. By mid-1998, only 39.3 million ha remained wholly in the hands of private concession-holders, while 13.7 million ha were being managed by the five state Inhutani firms, eight million ha were under state-private joint

ventures, and an additional 8.3 million ha had been slated for conversion to non-forestry uses.[179]

In early 2000, the Ministry reported that there were 387 concessions still actively operating, out of a total of 500 licensed to operate over a total forest area of 55 million ha—most of which was in a damaged condition.[180] A further Ministry analysis, released in July 2000, however, stated that there were a total of 652 recognized concession units covering an area of 69.4 million ha, with 293 units still holding valid licenses (nearly 34 million ha), 288 with expired licenses but apparently still in place (nearly 30 million ha), and 71 units (about 5.5 million ha) which had been formerly returned to government control (See Table C4).

Table C4. Production Forest Area and Logging Concession Area and Status as of 2000

Logging concession status	Number of units	Area (ha)
20-year concession grant still running	293	33,950,000
20-year concession grant expired	288	29,980,000
Expired concessions formally returned to state control	71	5,470,000
Total	652	69,400,000

Source: *Penataan Kembali Prengelolaan Hutan Produksi di Luar P. Jawa Melalui Restrukturalisasi Kelembagaan Usaha di Bidang Kehutanan [Reorganizing Management of Production Forests Outside Java by Restructuring Forestry Sector Management Institutions].* Jakarta: Ministry of Forestry and Estate Crops, July 2000. Available at http://www.dephut.go.id/informasi/umum/restrukturisasi.htm.

Logging concessionaires in Indonesia operate under a huge number of regulations and contractual provisions that in theory obligate them to implement a sustainable selective cutting system, replant logged areas, pay royalties, defend concession areas against illegal loggers, and observe a variety of environmental safeguards. In reality, these rules are rarely followed, and abuses are widespread.

The extensive damage wrought by the concession system over the past three decades is only now being documented and acknowledged by the government. Based on analysis of 1997-1999 Landsat satellite imagery covering 46.7 million ha of running and expired concessions, the Ministry announced in mid-2000 that only 41 per cent of that area still remained under primary forest cover, 29 per cent consisted of logged-over forest in "good" or "moderate" condition, and fully 30 per cent was fully degraded (See Table C5). Extrapolating those figures to the entire 69.4 million ha of forest now or recently held by logging concessions, it can be provisionally

concluded that some 20 million ha of Indonesia's most biologically diverse and economically valuable forests—an area twice the size of Portugal and four times the size of Costa Rica—have been destroyed by concession activities alone over the last three decades.

Table C5. Forest Condition in 432 Current and Expired Logging Concessions Covering 46.7 million Hectares (Based on Analysis of 1997-1999 Landsat Images)

	Concession areas (320 units)		Expired concessions managed by state forestry corporations PT. Inhutani I-V (112 units)		Total	
Forest condition	Area (ha)	%	Area (ha)	%	Area (ha)	%
Primary forest	18,300,000	45	600,000	11	*18,900,000	41
Logged forest in good–moderate condition	11,100,000	27	2,500,000	44	13,600,000	29
Degraded forest, scrub and agriculture	11,600,000	28	2,600,000	45	14,200.000	30
Total	41,000,000	100	5,700,000	100	46,700,000	100

Note: * 7.3 million ha of the 18.9 million ha of primary forest remaining in the area surveyed (39 per cent of it) lies within Papua Province (Irian Jaya)

Source: *Penataan Kembali Prengelolaan Hutan Produksi di Luar P. Jawa Melalui Restrukturalisasi Kelembagaan Usaha di Bidang Kehutanan [Reorganizing Management of Production Forests Outside Java by Restructuring Forestry Sector Management Institutions].* Jakarta: Ministry of Forestry and Estate Crops, July 2000. Available at http://www.dephut.go.id/informasi/umum/restrukturisasi.htm.

In April, 2000, the Forestry and Estate Crops Ministry announced that it would stop issuing licenses for new concessions, and would carefully study existing concessions whose licenses had expired before granting any extensions.[181] In November 2000, however, the Ministry suddenly announced that it was issuing 21 new concessions and granting 49 extensions or renewals of existing concessions.[182] Meanwhile, nothing has been done to reduce demand from the country's wood processing industries. The state-sponsored expansion of the plywood industry in the 1980s created considerable over-capacity in relation to the amount of timber Indonesia's forests can sustainably produce. In September 1998, the Minister of

Forestry and Estate Crops predicted that the wood-processing industry would face an annual log shortage of at least 25 million m^3 over the next five years. As of mid-1998, the industry officially included 1,702 sawmill companies, with a combined annual production of 13.3 million m^3, 105 plywood firms with installed capacity of 8.1 million m^3, and six pulp and paper companies with production capacity of 3.9 million m^3. Taken together and producing at full capacity, these industries needed 57 million m^3 of timber at that time, while the officially-designated annual cut for the ensuing five years was set at 31.4 million m^3.[183] That target was in fact much higher than other estimates of a sustainable cut. The World Bank's 1993 Indonesia Forestry Sector Review, for example, argued that a realistic level would be only 22 million m^3 per year. By April 2000, the Ministry's estimate of annual industry demand had risen to 63.5 m^3 of logs, while legal timber production had dropped to 18 million m^3,[184] down from approximately 26 m^3 in 1998 (See Table C6).

Table C6. Timber Supply in Indonesia, 1998: Estimated Contributions of Legal and Illegal Logging

Number of timber concessions	464 units
Area of timber concessions	51,251,052 ha
1. Estimated legal production from concessions	15,769,385 m3
2. Estimated legal production from forest land conversion	10,162,080 m3
3. Total legal production of timber (1+2)	25,931,465 m3
4. Total amount of timber used by licensed mills	46,587,681 m3
5. Use of Illegally-Logged Timber by Licensed Mills (4-3)	20,656,216 m3
6. Estimated Illegal logging for pulp and paper industry and domestic use	11,943,784 m3
Total illegal timber production	32, 600,000 m3

Source: Brown, D.W. 1999. *Addicted to Rent: Corporate and Spatial Distribution of Forest Resources in Indonesia.* Jakarta. DFID/ITFMP.

Illegal Logging

Illegal logging is widespread and systematic in many parts of Indonesia. Indeed, Indonesia's timber economy can now be said to be largely an illegal, underground economy: According to a 1999 study by the Indonesia-U.K. Tropical Forest Management Programme, illegal removals are thought to be in the range of 30 million m^3 per year, exceeding legal cutting[185] and thus supplying the majority of the country's timber (See Table C6). A senior official of the Ministry of Forestry and Estate Crops pre-

sented an even grimmer view in early 2000, revealing that the Ministry's most recent data, for 1998, showed that legal log production in that year was only about 21 million m^3—down from 30 million m^3 in 1997—while illegal logging jumped to 57 million m^3 to account for 70 per cent of total wood consumption for the year. The main cause, he said, was that "the wood-processing industry has been allowed to expand without reference to the available supply of timber, resulting in vast overcapacity. The shortfall in the official timber supply is being met largely by illegal logging, which has reached epidemic proportions."[186]

Illegal timber brokers flourish throughout the country, supplying processors who cannot obtain adequate supplies legally.[187] Logging concession roads often provide illegal loggers with access to the forest, encouraged by the lack of meaningful access controls by either the logging firms or local forestry officials. Corruption among civilian and military officials, many of whom are closely involved in illegal cutting and marketing, is pervasive.[188] As one Indonesian environmental activist put it during a January 2000 Consultative Group on Indonesia (CGI)[189] meeting on forests, "Illegal logging is not simply about destruction of the forests. It's also about the system of corruption and wealth that it creates."[190] A June 2000 analysis from the Ministry of Forestry and Estate Crops officially stated what has been common knowledge for some time:

> Illegal logging has come to constitute a well-organized criminal enterprise with strong backing and a network that is so extensive, well established and strong that it is bold enough to resist, threaten, and in fact physically tyrannize forestry law enforcement authorities…. Illegal cutting occurs in concession areas, unallocated forest areas, expired concessions, state forestry concessions, areas of forest slated for conversion, and in conservation areas and protected forests.

> Indeed, illegal logging is increasing in conservation areas, since these areas have better timber potential than production areas. The actors in illegal logging are: (a) laborers from communities in the forest areas and also many who are brought there from other areas; (b) Investors, including traders, concession holders, or holders of legal timber cutting permits (IPK), and buyers of illegal timber from processing industries; and (c) Government officials (both civilian and military), law enforcement personnel, and certain legislators.[191]

Official involvement in illegal logging has become so blatant and widespread that provincial legislators in Sumatra's Jambi province felt obliged to make a public appeal to military, police and justice officials to stop supporting illegal loggers' operations.[192] Indeed, illegal logging has become so

pervasive that the Indonesian Plywood Association (Apkindo) complained in June 2000 that illegal sources from Sumatra and Kalimantan were supplying at least one million m^3 of Indonesia's seven million m^3 China market.[193] And the international aid agencies and lending institutions grouped in the Consultative Group on Indonesia (CGI) have issued a number of warnings that continued aid to the forestry sector is contingent on more effective action to eradicate illegal logging.[194]

Timber plantations

Beginning with the Fourth Five-Year Development Plan in 1984, and accelerating around 1990, the Indonesian government launched an ambitious plan to establish vast areas of monocultural fast-growing timber plantations, particularly in Sumatra and Kalimantan. At the outset, the government justified the program in terms of augmenting supplies of timber from the natural forests and promoting nature conservation,[195] and to this ostensible end timber plantation entrepreneurs have received interest-free loans from the "Reforestation Fund" collected from logging concessions. In addition, a joint program of the Ministries of Forestry and Transmigration was introduced in 1992 under which the government would supply 40 per cent of investment, plus labour from specially-established transmigration settlements, while investors would supply the remaining capital. By 1999, more than 757,000 ha of allocated concessions—and about 25 per cent of the area actually planted—were linked to transmigration sites.[196]

The timber estate program got off to a slow start. In the late 1980s, the government was planning to open 1.5 million ha annually, reaching a total of between 4.4 and 6 million by the year 2000. But by 1999, the total area actually planted stood at about one million ha, according to one set of government figures.[197] Another set of figures (from a World Bank analysis of government figures) shows 2.4 million ha of plantations having been "realized" by the end of 1998 (See Table C7)—as already noted, conflicting figures such as this are common in Indonesia's forestry sector, and all such estimates should be considered provisional.

Despite its initial professed intentions, the timber estate program has in fact become a powerful engine of deforestation and is currently almost totally devoted to providing feedstock for the rapidly-growing pulp and paper industry, which is annually adding some 13 million m^3 of demand that would not exist in the absence of the industry's growth.[198] Plantations have often been established on degraded timber concessions by the very same firms whose poor logging practices degraded the forest in the first place. As the World Bank has pointed out, "logging operations can degrade a site with little risk of serious penalty, and in the process set themselves up to receive a license to convert the site so damaged into a HTI [timber plantation] or tree crop estate."[199]

Table C7. Timber Plantation Development to 1998 (Ha)

	Allocated	Realized to 1998
Sumatra	2,148,964	893,463
Kalimantan	2,928,414	956,261
Sulawesi	255,791	85,455
Maluku	64,775	77,656
Irian Jaya	153,250	39,996
Other	48,730	352,215
Indonesia	5,599,924	2,404,364

Source: World Bank, 2000. "Deforestation in Indonesia: A Review of the Situation in 1999." Draft. Jakarta. May 5.

The pulp and paper industries have grown without any reference to the growth of plantation timber supplies. Investments in the sector between 1987 and 1999 totaled $8 billion, and the total size of both industries has grown by over 750 per cent in that period. Pulp producers are currently capable of producing 4.6 million tons of pulp per year, which requires timber feedstock of 22.5 million m^3. But of the 100 million m^3 of timber consumed by pulp firms since 1987, only five million m^3 has come from plantations—the remainder has come from legal clearcutting on plantation concessions, and illegal sources.[200]

While physical plantations have only provided a tiny percentage of the feedstock for pulp firms, the areas allocated for plantation development have provided a great deal of timber to the industry—through the clear-cutting of natural forests within plantation concessions. Timber plantation concessions tend to be quite large, in the range of 200,000 to 300,000 ha. But in reality, only 60,000 to 80,000 ha of each concession is actually being planted with new trees. The remainder of these plantations, usually logged-over but sometimes unlogged primary forest, are logged to supply the designated mill operation until the rotation planting can supply pulpwood at some theoretical time in the future.[201] Thus, as of early 1999, the government's latest statistics showed that only about 1 million ha of physical plantations had been established in all of Indonesia, out of a total area of nearly three million ha allocated to plantations—a mere 35 per cent.[202] The remaining two million ha is rapidly being clearcut and, in many cases, burned: Industrial timber plantation firms were identified as major culprits in the intentional setting of fires to clear land during 1997. Of the 176 plantation firms accused by the Forestry and Environment Ministries in September 1997, 28 of them (16 per cent) were industrial timber plantations.[203]

Oil Palm Plantations

The development of estate crops—oil palm, coconut, rubber, cocoa and the like—has been a powerful engine of deforestation in Indonesia, with oil palm by far the most important crop in this regard. Palm oil is extracted from the fruit of a species of palm originating in Africa (*Elaeis guineensis*), and is widely used as cooking oil and as an ingredient in soap, margarine, and a variety of other products. Global production grew from 14.7 million tons in 1994 to nearly 16 million tons in 1997. Production in that year was dominated by Malaysia (50.6 percent), the largest producer, and Indonesia (28.8 percent), the second largest. Global production is expected to grow by more than 7 per cent annually for the foreseeable future, and Indonesia is expected to be produce some 12.2 million tons in 2005, 41.4 per cent of the total.[204]

Expansion of oil palm plantations is currently among the most important forces driving deforestation in Indonesia, although different sources give widely varying estimates of area planted, and all of the figures presented here should be treated as approximations. According to several sources, the area covered by these plantations grew from 106,000 ha in 1967 to about 606,000 ha in 1986, and skyrocketed to 2.5 million ha in 1997.[205] A World Bank analysis published in 2000 provides slightly different estimates (See Table C8). 46 per cent of oil palm area is held by private companies, with small-holders and older state-run plantations making up the rest.[206]

Table C8. Oil Palm Plantation Development, mid-1980s to 1998 (ha)

	Oil palm area mid-1980s	Oil palm area 1998	New oil palm area since mid-1980s	Outstanding applications from developers (1995)
Sumatra	805,800	2,240,495	1,434,695	9,395,697
Kalimantan	0	562,751	562,751	4,760,127
Sulawesi	11,800	101,251	89,451	665,379
Maluku	0	0	0	236,314
Irian Jaya	23,300	31,080	7,780	590,992
Other	1,800	21,502	19,702	1,777
Indonesia	842,700	2,957,079	2,114,379	15,650,286

Source: World Bank, 2000. "Deforestation in Indonesia: A Review of the Situation in 1999." Draft. Jakarta. May 5.

Most plantations are currently in Sumatra, with Kalimantan being rapidly developed (particularly West Kalimantan), and Papua (Irian Jaya) the primary target for future expansion. According to one recent study, "it can be said that almost all of the existing oil palm plantation areas result from the conversion of production forest." This is because the procedure for acquiring forest land is relatively easy, and the firm can clear-cut and sell standing timber, a profitable side-business. As of 1997, the agreed area of Production Forest to be converted for plantations had reached 6.7 million ha—in addition to nine million ha proposed for further tree crop plantation development on other lands.[207]

The Suharto government aimed to reach a total of 5.5 million hectares of oil palm plantations by the year 2000. The economic crisis temporarily slowed plantation expansion, however, and the actual figure for 2000 is approximately three million ha.[208]

Indonesia's palm oil industry is dominated by some of the same domestic conglomerates that control the logging, wood processing, and pulp and paper industries. Just four companies hold 68 per cent of the one million hectares of estates in private hands in 1997.[209] There is also considerable foreign investment: at of the end of 1998, there were 50 foreign firms involved in the oil palm sector with total investments valued at $3 billion.[210]

Table C9. The Growing Role of Land Clearing (Clear-Cutting) in Indonesia's Legal Timber Production, 1995–1998 (m³)

Source of production	1995	1996	1997	1998	% of production 1995	1998
Logging concessions	17,308,737	16,943,933	15,268,134	15,597,546	78%	57%
Land clearing (clear-cutting)	4,708,696	5,398,196	8,021,328	10,038,228	21%	37%
Community woodlots	138,105	124,883	682,006	1,266,455	1%	4.5%
Timber plantations	——	514,692	474,268	425,893	0%	1.5%
Total	22,155,538	22,981,704	24,445,736	27,328,122		

Source: World Bank, *The Challenges of World Bank Involvement in Forests: An Evaluation of Indonesia's Forests and World Bank Assistance*. Washington, D.C. 2000.

As with timber plantations, oil palm firms were major culprits in the fires of 1997–98, and are considered to be the largest single forest fire risk factor in Sumatra and Kalimantan. Burning is attractive to plantation firms because it removes waste wood and vegetation rapidly, and requires relatively little heavy equipment and technical expertise.[211]

And together with timber plantations, the clear-cutting of forests for oil palm has become an increasingly important source of Indonesia's supply of timber from natural forests. Clear-cutting is technically illegal on permanent forest lands, but when areas are officially slated for conversion to plantations, permission to clearcut is an often-lucrative part of the deal. Timber from this kind of land-clearing contributed 37 per cent of the legally documented timber supply in 1998, up from 21 per cent in just four years (See Table C9).

The Transmigration Program

Transmigration—the government's long-running program to resettle people from densely populated Java and Bali to Sumatra, Kalimantan, and the other "outer islands"—opened 1.7 million hectares of agricultural land and transported some 8 million people between 1969 and 1993. The actual impacts on forests are much greater, however, given the poor site choices and the land-clearing practices employed. A 1994 World Bank evaluation of the $560 million in loans it made to Indonesia for the program during the 1970s and 1980s concluded that land clearing was not carried out according to agreed legal and contractual guidelines. Slopes over eight per cent had been cleared, trees were bulldozed into waterways, erosion measures along contours were not taken, and no attempt was made to harvest the commercial timber left partly burned in the field. Impacts on local communities, particularly traditional indigenous groups, have been extremely negative. In the case of the forest-dwelling Kubu of Sumatra, for example, the report concluded that "there has been a major negative and probably irreversible impact" on that group's livelihood and culture.[212]

Over the past decade, the emphasis of the transmigration program has shifted away from subsistence agriculture and towards providing wage labour on industrial timber estates and oil palm plantations—almost 39 per cent of timber estate areas that have actually been planted lie in transmigration sites,[213] and nearly one million ha of oil palm plantations had been established with a formal link to transmigration sites by the end of 1995.[214]

Since the fall of Suharto, simmering tensions between transmigrants and locals—often concerning competition over forest resources—have erupted in violence throughout the country, leading to hundreds of deaths, as discussed later in this paper. By 2000, the program had largely ended, with

the Minister in charge of looking after the program saying "Transmigration is finished. The only people being relocated now are refugees. We are having to clean up the mess that Suharto's government left."[215] Unfortunately, the damage done to Indonesia's forests by this ill-conceived program is largely irreparable, and its legacy of conflict continues to intensify.

4.   Burning Down the House: The Forest Fires of 1997–1998

One of the most visible results of the 30-year spiral of forest mismanagement and plunder described above was the outbreak, in 1997 and early 1998, of some of the worst forest and land fires that the world has ever seen. In mid-1997, the ongoing processes of deforestation in Indonesia coincided with a particularly severe occurrence of El Niño—the climatic phenomenon that periodically visits drought upon Southeast Asia—to spark massive fires that caused damages conservatively estimated at nearly $10 billion (see Table C10), burned nearly 10 million hectares (see Table C11), and shrouded much of Southeast Asia is "haze" for a period of months.[216] Tropical moist forests do not ordinarily burn, even under severe drought conditions. But the forests in much of Indonesia have been degraded to the point that they have transformed from a fire-resistant to a fire-prone ecosystem.

It was clear by early 1997 that it would be an El Niño year in Indonesia, but despite warnings from the Environment Minister, burning, primarily to clear land degraded forest land and scrub for industrial agriculture, continued across vast areas of Sumatra and Kalimantan. The use of fire for land clearance is not restricted to Kalimantan and Sumatra—and fires were reported from 23 of Indonesia's 27 provinces in 1997–98—but the large number of fires set on those two massive islands by plantation firms and government projects clearing tens of thousands of hectares at a time produced enough smoke by July to create a blanket of haze that spread hundreds of kilometers in all directions. Deliberately set fires in grasslands and scrub lands escaped into adjacent logged forests that burned with greater intensity. The fires eventually reached drained peat swamps, where fires burned beneath the surface long after above ground fires exhausted their fuel supplies.

Large scale burning has produced persistent haze over large areas of Sumatra and Kalimantan during every dry season, but the haze normally dissipates in September when heavy rains extinguish the fires. This was not the case in 1997 when the rains failed, the fires intensified, and the haze thickened and spread to neighbouring countries. Haze reached Malaysia and Singapore in July, and air quality deteriorated dramatically in September, triggering an outburst of complaints that drew global media attention. By late September, approximately one million km^2 were haze-

Table C10. Summary of the Economic Cost to Indonesia of the 1997–98 Fires and Haze

	Estimated economic losses (USD millions)		
Sector	Minimum	Maximum	Mean
Agriculture			
Farm crops	2,431	2,431	2,431
Plantation crops	319	319	319
Forestry			
Timber from natural forests (logged and unlogged)	1,461	2,165	1,813
Lost growth in natural forest	256	377	316
Timber from plantations	94	94	94
Non-timber forest products	586	586	586
Flood protection	404	404	404
Erosion and siltation	1,586	1,586	1,586
Carbon sink	1,446	1,446	1,446
Health	145	145	145
Transmigration and buildings and property	1	1	1
Transportation	18	49	33
Tourism	111	111	111
Fire fighting costs	12	11	12
Total	8,870	9,726	9,298

Source: National Development Planning Agency (BAPPENAS), 1999. Final Report, Annex I: Causes, Extent, Impact and Costs of 1997/98 Fires and Drought. Asian Development Bank Technical Assistance Grant TA 2999-INO, Planning for Fire Prevention and Drought Management Project.

covered, affecting about 70 million people. Land, air, and sea transport accidents were linked to the poor visibility caused by the haze, including a ship collision in the Straits of Malacca that killed 29 people. Hospitals and clinics were filled with people seeking treatment for a variety of respiratory, eye, and skin ailments. Schools, businesses and airports closed, and tourists stayed away, inflicting severe economic hardship on the region.

By comparing satellite images of fire "hotspots" with land use maps, the government determined, in September, that the majority of the fires were occurring in timber and oil palm plantation areas—although small farmers were also implicated as well—and the government announced a total ban on burning, followed by threats to punish offending firms. Even as fires burned out of control into surrounding forests, peat swamps and agricultural lands, however, plantation owners and farmers started new fires to take advantage of the extremely dry conditions, causing the haze to intensify and spread further, resulting in health alerts and transportation disruptions across the region.

Efforts to put out the fires, even with assistance from Malaysian volunteers and fire suppression aircraft from Australia and the United States, were largely ineffective. Poor coordination (especially between air and ground operations), lack of equipment, lack of funds, insufficient training, lack of water, and the remote location of many of the fires were often cited as the reasons for failure. Aerial suppression by water bombers was also hindered by the lack of accurate land cover maps and infrastructural support, and land-based efforts were impeded by the reluctance of many rural people to fight fires on land that was not theirs. The number of fires began to decline during October and November, probably partly due to mounting pressure exerted by the government on plantation firms but also because these firms had burned as much land as they needed by that time. Peat swamps were still burning in late November, but were partially extinguished when rain finally began to fall in December.

The rainy season, which usually lasts at least six months in western Indonesia, began to taper off in less than two months. By the end of January 1998, hundreds of hot spots again appeared on NOAA satellite images, as the drought carried over into a second calendar year and rainfall cycle. The pattern of 1997 was repeated in the coastal swamps on Sumatra's east coast from January through April, while in Kalimantan the fires were concentrated in East Kalimantan—a province that had escaped extensive burning in 1997 (although it had been the site of Indonesia's worst previous fire incident, during the 1982–83 El Niño event). The drought was also beginning to cause food shortages due to below-normal harvests and total failure of the rice crop in some areas. The plight of rural communities already reeling from the effects of the fires, haze, and drought was worsened by the growing economic impact of the dramatic devaluation of the Indonesian currency over the second half of 1997. Farmers began to clear even more land by burning in the hope that they could increase the next harvest to offset 1997 drought losses. Fears also arose that forest exploitation and related burning would increase as firms tried to offset the effects of the economic crisis.

Fires continued to spread during the month of March. Efforts to fight fires were hampered by the increasing scarcity of water as the drought caused surface water to dry up and the ground water level to sink beyond the reach of wells. Haze once again blanketed Singapore and parts of Malaysia, and the fires did not end until heavy rains finally arrived in mid-May.

Analysts have encountered considerable technical difficulties in precisely determining the total area burned during the 1997–98 fires, and in estimating what kinds of vegetation types burned in which areas. Based on the most recent analyses, however, it seems certain that at least 9.5 million ha burned (see Table C11). The extent of the area affected by air pollution from the fires has been easier to determine. Indeed, the international news media were initially attracted to the 1997 fires by the dramatic spectacle of a "thousand mile shroud" spreading over an area of 1 million km^2 where hundreds of millions of people live. Accurate analysis of the health impacts, however, has also proven difficult.

The cross-border nature of the disaster initially created some expectation that the neighbouring countries of the Association of Southeast Asian Nations (ASEAN) would relax their general policy of non-interference in members' "internal affairs" and take some collective action to force Indonesia to act more effectively to prevent future fires. But despite public anger and a number of pronouncements by Malaysian and Singaporean politicians, it appears that neither these two countries—both greatly affected by the 1997–98 haze—nor ASEAN as a regional organization are going to press forcefully for change in Indonesia. At least not until the next massive outbreak of fires and haze.

Harwell has pointed out that the 1997–98 fires were unique not only in their extent and impacts, but also because of the way in which their causes, impacts—and resulting prescriptions for combating them—became a battleground for conflicting representations of reality about Indonesia's forests.[217] Many (but not all) in the government blamed "nature," which had visited such a severe El Niño drought on the country—thereby dismissing the role of 30 years of forest mismanagement. Donor agencies—which launched some two dozen fire-related projects in 1998—tended to take a safely "apolitical" and technical view of the problem and the solution: what was needed was more coordination meetings between officials, more training in fire-prevention and firefighting techniques and, above all, more remote sensing and GIS "capacity-building." And assessments of the damages—almost all funded by donors—focused on quantifiable economic costs, effects on orangutans and other elements of forest biodiversity, and efforts to determine, by use of sophisticated satellite analyses, the location and extent of fire impacts. Regional discussions in the Association of Southeast Asian Nations (ASEAN) took on a similar tone, "an approach to the fires as an event, not as a symptom of a larger problem, and the

Table C11. Estimated Extent of Spatial Damage by Fire in 1997/98 (ha)

Island	Montane forest	Lowland forest	Peat and swamp forest	Dry scrub and grass	Timber plantation	Agriculture	Estate crops	Total
Kalimantan		2,375,000	750,000	375,000	116,000	2,829,000	55,000	6,500,000
Sumatra		383,000	308,000	263,000	72,000	669,000	60,000	1,756,000
Java		25,000		25,000		50,000		100,000
Sulawesi		200,000				199,000	1,000	400,000
Irian Jaya	100,000	300,000	400,000	100,000		97,000	3,000	1,000,000
Total	100,000	3,283,000	1,458,000	763,000	188,000	3,844,000	119,000	9,756,000

Source: National Development Planning Agency (BAPPENAS), 1999. Final Report, Annex I: Causes, Extent, Impact and Costs of 1997/98 Fires and Drought. Asian Development Bank Technical Assistance Grant TA 2999-INO, Planning for Fire Prevention and Drought Management Project. (April.)

emphasis on high tech remote surveillance rather than proximal (field-based) approach to data collection and remediation."[218]

Very little attention was paid to assessing the views of and impacts on the rural people of Kalimantan and Sumatra who were most affected. For them, the "disaster" that caught the world's attention in 1997 had actually begun long before, with the systematic expropriation and destruction of forest resources chronicled above. The fires, catastrophic as they were, were the logical continuation of that process.

In April 2000, Indonesia's environment minister promised his counterparts from neighbouring countries a "haze-free year."[219] By July 2000, however, fires were burning again in Sumatra, and the haze had crept over the Malacca Strait to Singapore and Malaysia,[220] thick smog temporarily closed the airport at Medan (Sumatra's largest city),[221] the Indonesian government was reported to have "no plan" to fight the fires,[222] and indeed no fire suppression activities were being undertaken or suspects being arrested.[223] With a "haze-free year" apparently not on the horizon, the State Minister of Environment told the press that he was "really ashamed every time my counterparts from Malaysia and Singapore call me to complain about the haze coming from Sumatra," and blamed the burning on plantation companies engaged in "organized crime which often involves government officials and military officers.... Many companies feel free to burn because government officials or military officers back their activities."[224]

This most recent outbreak of fires and haze is only the most visible manifestation of a disturbing reality: despite the change of regime and the clamor for *reformasi* in the forestry sector, forest policy and management practice has changed very little since 1998.

5. Forest Resource Scarcity and Civil Conflict in Indonesia

5.1 Forest-Related Conflict in the Suharto Era

During the mid-1960s, Indonesia was among the poorest nations in world, with a per capita income of just $50 and its economy in shambles. During his three decades in power, Suharto utilized exploitation of the archipelago's rich natural resources—primarily oil, timber, and minerals—to jump start and sustain a process of economic development that the World Bank praised in 1994 as "one of the best in the developing world." Per capita income rose from $50 in 1967 to $980 in 1995, and poverty was cut from 60 per cent to an estimated 15 per cent of the population.[225]

Exploitation of forest resources played a significant role in fueling Indonesia's rapid economic development. But the profits from logging and other forest industries flowed largely to a small coterie of elite Suharto

cronies and their patrons in the government, as discussed previously. Meanwhile, the costs of Suharto's forest policy were borne largely by local and indigenous communities—and by the country's vast assemblage of species of forest plants and animals. Centuries-old systems of customary rights over forests, and traditional resource management systems were swept aside in the name of "development" and under the authority of national laws that arrogantly declared that the central government "owned" the 75 per cent of the nation's land area legally designated as "forest land." Local communities were barred from the forest resources they had so long depended on, and the forests themselves were recklessly logged and cleared, causing massive erosion, flooding and drought in many areas, and period forest fire catastrophes.

The rapid expansion of timber and oil palm plantations in the 1990s, detailed previously, also led to numerous conflicts with local communities. While the impacts of logging concessions on local communities can be quite onerous, people are still able to retain some access to forest resources in the concessions. Plantations, however, and the clear-cutting that accompanies them, impose a much greater level of deprivation on communities who depend on the forest areas in question for livelihood resources.[226]

The transmigration program was also a catalyst for conflict in the Suharto era. Many of the massive transmigration sites, located in formerly forested areas wholly unsuited for agriculture, became massive plains of hard-baked laterite soils and *alang-alang* grass (*Imperata cylindrica*)—rural slums baking in the tattered remains of the rainforest. Coming from completely different cultures than the local residents, and forced by frequent agricultural failure to compete with local residents for adjacent forest resources, transmigrants often fell into conflict with local communities. As the futility of farming annual crops on these sites became evident—and as programs to develop timber and oil palm plantations gathered steam in the early 1990s—many transmigration sites were officially linked to plantation schemes, to provide cheap labour for the plantation companies.

It is not surprising that conflicts between local forest-dependent communities and outsiders—logging and plantation companies, mining operations, and transmigration sites—became an endemic feature of Indonesia's forest areas in the 1980s and 1990s. Such conflicts were inevitable given the vast scope of New Order forest enclosure and resource appropriation in a context where tens of millions of rural people depend on forest resources for their livelihoods.

These conflicts were not, however, a sign of organized political action to unite aggrieved peasants and restore a more equitable balance of forest resource access and control. Some local protests involved physical action by local villagers (such as tearing up plantation seedlings or burning log-

gers' basecamp buildings), but such was the strength of the Suharto regime that it was able to repress and contain these simmering conflicts and grievances. That capacity was, however, dependent on a particular set of circumstances: abundant natural resources; continued economic growth and poverty reduction; a unified and heavy-handed military intelligence and domestic security apparatus which largely accepted and served the objectives of state policy; the transformation of the electoral process into a state-controlled mechanism for reinforcing its legitimacy; a quiescent and depoliticized peasantry and urban workforce; a small (until very recently) middle class willing to accept authoritarian politics in exchange for growing wealth; and the continuity of Suharto's 30-year rule.

These conditions all changed precipitously with the fall of Suharto, the onset of economic crisis, and the ensuing political turmoil and breakdown of civil order that endures to this day. Formerly abundant, forest resources are increasingly scarce. Relatively strong in the Suharto era, the Indonesian state is now weak and in disarray. And the formerly quiescent peasantry and urban workforce is increasingly politicized and, in more and more cases, violent in pursuing its grievances. As a result, conflicts over forest resources have increased in number and intensity by an order of magnitude.

5.2 Forest Resource Conflict in the Post-Suharto Era

Indonesia has become a conflict-ridden society since 1997. From the massacre of ethnic Chinese in May 1998 and bloody religious and ethnic riots and warfare in Kalimantan, Sulawesi and Maluku to the violent separation of East Timor in 1999 and the ongoing civil war with separatists in Aceh, much of Indonesia has become a violent and dangerous place. This is important to remember in evaluating conflicts over forest resources: even if forest resources were abundant, well-managed, and equitably distributed, there would still be a very high level of violent conflict in many parts of the country. But at the same time, it cannot be denied that forest resource scarcity—particularly structural scarcity—has become an important flashpoint for social unrest and civil conflict, and that the sharpening fissures in Indonesian society are providing the spark to set off smoldering tensions over forest resources. As a result, conflicts have broken out over virtually all types of forest resource and resource use.

Logging Concessions and Illegal Logging

Logging concessions, as already noted, have long been a source of tension and occasional conflict between logging firms and the state on the one hand, and local communities on the other. What has changed is the degree and intensity of those conflicts: In March 2000, the Association of Indonesian Forest Concessionaires (APHI) reported that 50 timber companies which control about 10 million ha of logging concessions in Papua

(Irian Jaya), Kalimantan and Sulawesi, have stopped their logging activities due to growing conflicts with local residents, who not only claim ownership of the firms' concessions, but also often threaten the workers.[227]

In the Suharto era, such local impertinence was usually dealt with rapidly and violently by police or military personnel "rented" to logging firms. Currently, however, the companies find themselves increasingly on their own: the thinly-stretched military, dealing with large-scale violent conflict in numerous parts of the country, lacks the resources to respond to these concession conflicts. The Forestry and Plantations Ministry has softened its tone on such local protests, even admitting that logging firms may be to blame. And the fact that most of the concessions where conflicts are occurring have been linked to members of the Suharto family and inner circle—and hence are said to have been obtained through corruption—means that few officials are eager to spring to their defense.[228] But despite this change in attitude, the government seems to have no plan for resolving these concession conflicts (there is no specific mention of dealing with them in the Ministry of Forestry and Estate Crop's 2001–2005 Strategic Plan, for example, although the general problem of local grievances is acknowledged), and the Ministry admitted in early 2000 that it was unaware of the specifics of the ongoing conflicts.

Illegal logging has become endemic throughout Indonesia, as noted above, and is both a cause and a result of conflict over resources. It causes conflicts with local communities where illegal logging operations steal timber in their areas, but it also gives rise to conflicts within communities, where some people are employed by the illegal logging operations—and thus benefit—while others suffer the impacts, such as diminution of local water supplies, increased erosion, and more frequent forest fires—either set deliberately to hide evidence of illegal cutting, or caused by increased fuel loads of downed waste material.

Illegal logging is also the result of forest-related conflicts. When the status of a particular area is contested or unclear (such as a logging concession where local protests have stopped operations), it becomes an easy target for illegal cutting. And where local communities feel unjustly deprived to access to forest resources, they may often retaliate by "stealing" timber—timber that they feel is actually theirs.

The dynamic of forest fires is similar to that of illegal logging. Fire is used as both an offensive weapon by firms seeking to displace local claims over land they want for plantation development, and as a defensive weapon by local communities. And both the risk and hazard of fires increases in areas where ownership and control are contested, giving the areas an "open access" character. Fire is thus both a weapon and a result of conflict over forest resources.[229] Indeed, the use of fire as a weapon by local communi-

ties has a long tradition, extending back to local resistance to teak planta-
tions established on Java in the nineteenth century.[230]

Oil Palm Plantation-Related Conflicts

The rapid development of oil palm plantations on forest lands has been a
major source of conflict with local communities, particularly in Sumatra
and Kalimantan. Reports on these conflicts follow a similar pattern. (1)
Land on which local communities have longstanding claims and are often
growing tree crops or harvesting non-timber forest products, are allocated
to a company without consultation with the community. (2) People
protest to the company and local officials, and often the company makes
promises of compensation, participation in the plantation scheme, or
other enticements. (3) The company does not honor its promises and the
community again protests to local government and company officials. (4)
Nothing is done to meet their demands, and local people take action,
destroying or confiscating equipment and vehicles, occupying basecamps,
preventing plantation staff from working, and the like. (5) The company
hires local police or military (sometimes dressed in the "black ninja" out-
fits that have become popular with hired thugs and assassins on Java) to
retaliate, and more violence ensures. Some typical cases from around the
country include the following:

- *South Tapanuli, North Sumatra:* On August 3, 1998, hundreds of vil-
  lagers from Ujung Gading Jae village clashed with PT Torganda, a
  company that had been allocated a large area of customary (*adat*) land
  for oil palm development, without the consent of the traditional own-
  ers. Two villagers were wounded and a bulldozer was burnt. The clash
  came after local farmers had ambushed plantation workers in the
  process of destroying an area of land planted with fruit trees by the
  community. The company was accused of ordering its employees to
  burn villagers' land and houses in retaliation—over 100 houses and
  lands in three villages were burnt.[231]

- *Muara Pahu, Jempang and Bongan, East Kalimantan:* In December
  1998, villagers in an area being developed for oil palm by PT London
  Sumatra (LonSum) seized heavy equipment, including bulldozers and
  trucks, and set fire to part of the company's basecamp, destroying two
  office buildings, a fertilizer store and worker accommodations. This
  incident came after residents of nine villages had presented the com-
  pany, a month earlier, with a demand for $25 million in compensation
  for losses of land and crops, and damage to traditional burial sites.
  Villagers continued to occupy the base camp until May 1999. On
  May 7, armed forces—allegedly paid by LonSum—forcibly ejected
  the villagers. 12 villagers were arrested, four people disappeared, and
  the deaths of two others is thought to be linked to the incident.[232]

- *Senangan and Lae Butar, Aceh:* Local communities complained in 1997 that PT Socfindo acquired their land without permission and did not pay any compensation, and demanded that the land be returned to them. The company alleges that two of its staff were tortured and three seriously beaten by villagers in January 1998, and has accused the local community of destroying palm plantations and staff houses. The armed forces have since entered the situation—allegedly paid by the company. Several villagers have been killed in resulting clashes.[233]

- *Lubuk Linggau, South Sumatra:* In this area, Boustead Holdings is accused of planting oil palm on customary (*adat*) land without adequate compensation. The community demanded that the land, already planted with oil palm, be returned. The company refused. In March 1998, villagers occupied the company's base camp, confiscated machinery, and burnt some plantations and vehicles. They remained occupying the base camp for 45 days, until they were forced off by estate workers who claimed that the occupation was keeping them from working (and therefore getting paid). The company has tried to organize meetings with local government officials to try and settle the issue, but the government has done nothing and the company has suspended further planting until the future status of the land is clarified.[234]

Timber and Pulp Plantation-Related Conflicts

Timber plantations and pulp processing factories have been another important source of recent conflicts, generally similar in cause and form to those involving oil palm plantations. In September 1998, for example, local people in Lampung province (southern Sumatra) occupied a timber plantation area under the concession of PT Dharma Hutan Lestari in Tanjungbintang. Thousands of farmers cut trees, piled them at several locations on road sides and then sold them.

The case of PT Indorayon Inti Utama (PT IIU) in North Sumatra is a particularly bitter and violent conflict that has attracted considerable attention, revolving around a massive plantation and pulp factory complex near Lake Toba, Southeast Asia's largest lake. The company, which is part of the Raja Garuda Mas conglomerate, obtained a logging concession and established a pulp processing operation in the late 1980s, and almost immediately fell into violent conflict with the local Batak people. Local complaints ranged from the forcible takeover of traditional lands without compensation to erosion and air and water pollution. In one incident, the company took a group of local women to court for tearing up seedlings in areas the community claimed as their traditional land.

The situation really heated up as the operation expanded during the 1990s, building a $600 million pulp mill in the town of Porsea (overlooking Lake Toba), owned by Asia-Pacific Resources International Ltd. (APRIL), a Singapore-based holding group (Raja Garuda Mas holds a minority stake) and expanding PT IIU's concession holdings to 269,000 ha. Within weeks of Suharto's resignation, hundreds of villagers angry over pollution, deforestation, and uncompensated land claims occupied and shut down the facility, burning 12 company vehicles, two warehouses, and six houses. In the words of one farmer guarding the road, "any truck passing will be stoned and maybe burned. This is war." The company made some attempts to negotiate with the community, but all failed, and the mill hardly operated at all from mid-1998 until present, while violence has flared repeatedly. In March 1999, after police used force to lift the blockade, four company employees were kidnaped, three of them killed. The president at the time, B.J. Habibie, ordered the plant closed for two weeks for an environmental audit. No audit has been done, however, and the plant remains closed at present writing, despite President Wahid's May 2000 order that the plant be partially reopened.

Reflecting the situation in many conflict-ridden corners of Indonesia, the President's order appears to be unenforceable: neither provincial nor central officials have the political will or the ability to carry out the decision by force—which appears to be the only way the plant will be opened. The situation remains tense (there was more violence, and one death, in June), and opponents are in no mood for compromise. In the words of on local farmer, "everything that company says is bullshit. If the government tried to force it open, it will be total war." The Minister of Industry and Trade lamented that "this case is one of so many time bombs left by the [Suharto] government. Whatever decision there is, it's going to be messy." Meanwhile, the company has fallen on hard times, with its market capitalization listed at only $25 million (it was closer to $1.5 billion in the 1990s), and some $400 million in outstanding debt.

In late 2000, the company reorganized under a new name (PT Toba Pulp Lestari) and voiced hopes that operations would resume in the near future, under "a new paradigm to avoid negative impacts on the environment and the health of the people." Shortly thereafter, the governor of North Sumatra ordered military troops to guard the facility, generating a renewed bout of local criticism from the many locals and environmental activists who remain committed to the plant's final closure. In the words of one local spokesman, "It seems as if the governor pays little attention to the social and environmental problems caused by the company's operations. If people from the grassroots level are not involved in negotiations, a new riot will break out in the near future." The situation remains tense and unresolved.

The much-publicized case of the Bentian Dayak people of East Kalimantan and their conflict with a timber plantation project of a company owned by Suharto crony Mohamed "Bob" Hasan is another noteworthy case that illustrates the dynamics of timber plantation conflicts. This case, however, offers at least some hope that change is possible in the post-Suharto era. A logging concession had operated in the area in question, Jelmu Sibak, since the 1980s, occasioning many complaints from the local community (over forest and crop destruction), but never provoking violent conflict. Originally held by the U.S.-based company Georgia-Pacific, it was acquired by Hasan's Kalimanis group in the 1980s. In the early 1990s, Hasan's company PT Kalhold Utama began development of a timber plantation-transmigration site on Jelmu Sibak traditional lands, destroying trees and crops and bulldozing traditional grave sites. Through their traditional leader, L.B. Dingit, the local people protested to local and national government officials, and sought the assistance of national and international environmental activists to press their case. Development of the plantation continued, however, accompanied by growing threats and intimidation from security personnel. A legal case was brought against Mr. Dingit in 1993—for allegedly falsifying signatures on a letter to government officials—and intimidation continued during the ensuing years, including perpetual legal harassment and repeated "field investigations" intended to scare the villagers into dropping their complaint. Meanwhile, Dingit received the prestigious Goldmann Environmental Prize in 1997 for his leadership of the resistance to the plantation, heightening national and international scrutiny of the conflict. Dingit's "forgery" case was finally heard in 1998 (over nearly six months and 36 court sessions), and in September of that year, he was completely exonerated, with the judge stating in his decision that in the new climate of reformasi, customary law and territories must be respected under Indonesian law. It seems likely that international scrutiny, and the ill-repute into which Mr. Hasan had fallen with the resignation of his patron from the presidency— influenced the judge, who cited the Goldmann Prize as evidence backing up Dingit's defense. At present writing Mr. Hasan is facing multiple corruption prosecutions, his company is in receivership, and the Bentian Dayak can fairly be said to have won their case. The case is an exception—indigenous peoples rarely win such cases—but it illustrates the possibility that conflicts of this kind can be resolved—in theory—by Indonesia's legal system, even when they are as longstanding and bitter as this one.

In Sumatra's Riau province, representatives of 439 families brought a similar case to the provincial legislature in March 2001, demanding $17 million in compensation for 1,700 ha of land taken over by PT Riau Andalan Pulp and Paper since 1992. In testimony before a legislative committee, the locals testified that the land takeover was without their consent or pay-

ment of any compensation, and that their protests invariably suppressed by the military. In 1997, the frustrated villagers blockaded all of the company's plantation access roads, triggering a violent melee with local police in which scores were injured. An attorney for the group spent three years in jail on charges of organizing illegal demonstrations as a result. This case shows that local communities seeking redress for illegal takeovers of their forest and agricultural lands are at least willing to try utilizing existing dispute resolution mechanisms. If the legislature does not provide relief, however, it is likely that they will once again return to the barricades.

Conflicts Related to Transmigration Sites

In recent years most transmigration sites have been linked to development of oil palm or timber plantations, as noted above (Lubuk Linggau in South Sumatra, for example—one of the oil palm conflicts noted above—is a major transmigration site). But the development of a transmigration site adds an ethnic/regional, and sometime religious, dimension to conflicts over land and forest resources. Many conflicts at transmigration sites are outwardly "ethnic" conflicts between local communities and the Javanese migrants—but access to forest lands and resources is almost always a significant element of what they are fighting over. In case after case, indigenous inhabitants and transmigrants have clashed, sometimes bloodily.[235]

As ongoing moves towards greater regional autonomy take hold, local governments are opposing moves to send new transmigrants to their regions, and the program appears to be winding down. As the *Far Eastern Economic Review* reported in March, 2000:

> Haunted by past mistakes and allegations of corruption, the transmigration programme was dealt its final blow by the birth of regional autonomy. Local districts are anxious to spend money on their native poor, rather than help outsiders. In some areas, the political backlash has also been coupled with terror, with nearly five thousand transmigrant families fleeing danger in Aceh, the Moluccas and East Timor.

> In the coming year, the government will dispatch no new transmigrants, and officials admit it's the end of an era for a programme that was once a bedrock policy of former President Suharto. "We will be perceived as succeeding if there is no more transmigration programme," says Alhilal Hamdi, minister for transmigration and population.[236]

But ending the program, welcome as that may be, does not solve the problems at already-established sites. The savage violence brought to bear by local Dayak people on Madurese transmigrants in Central Kalimantan during early 2001, in which at least 500 people were killed (many by

beheading and disemboweling) is a chilling reminder of the future con-
flicts that this misguided program will continue to provoke in the near
future. And, as previously noted, conflicts over forest lands and resources
is very much at the heart of the carnage in Central Kalimantan, and are in
large part a legacy of this disastrous social engineering scheme. Ironically,
transmigration was often promoted in the 1980s as a way to relieve
resource pressures, overcrowding, and resulting scarcities and conflicts on
Java, Madura and Bali. Instead, it has brought environmental destruction
and savagery into the heart of Borneo and many other forested parts of
Indonesia.

Conflicts Related to Protected Areas

Some 23.3 million ha of forest lands in Indonesia have been designated as
national parks and nature reserves, although resources to run the system
have always been meager, and effective protection has been sporadic. Many
protected areas have long been encroached on by small farmers, poachers,
and illegal loggers, and parts of some protected areas have been illegally
converted to plantation agriculture.[237] Since 1998, however, encroach-
ment into protected areas has increased dramatically, as is the case with
Central Sulawesi's Lore Lindu National Park, where locals have taken over
thousands of hectares in Central Sulawesi's Lore Lindu National Park to
plant cash crops and cut timber.[238] Similar occupations have been report-
ed at Kutai National Park in East Kalimantan.[239] Organized illegal logging
has been well-documented in Aceh's Leuser National Park and Central
Kalimantan's Tanjung Puting National Park,[240] and is widely thought to
be widespread in many others.

Encroachment, illegal logging and poaching in protected areas has not
given rise to much violent conflict, however, for the simple reason that
such activities are for the most part unopposed by park management offi-
cials or other government agencies. One striking exception has been the
Leuser Development Programme—a large European Union-funded proj-
ect to conserve Leuser National Park and its surrounding ecosystem in
Aceh Province—which has actively opposed (and in some cases, tri-
umphed over) illegal park conversions to oil palm, and encroachments by
logging concessions, illegal loggers, local government plans to build roads
through the park, and planned transmigration sites on its boundary.[241]
While not leading to violence, the program's efforts have created a great
deal of heated local opposition and protest from some quarters. Should
Indonesia decide to take protection of its national parks more seriously—
and should the international community decide to seriously fund such an
effort—these kinds of tensions would very likely explode into violent con-
frontations in many protected areas.

6.   Forest Policy Reform: The Key Issues

In the *reformasi* euphoria following Suharto's resignation, many felt that at least fundamental changes could be undertaken that would slow deforestation, restore a measure of justice and honesty to resource management, and ameliorate the growing levels of conflict (See Box 3A). The substantive reforms needed in Indonesia's forestry sector have been widely discussed for at least a decade, and there is general consensus of what needs to be done. Box 3B summarizes some of the more widely discussed and supported forestry sector reforms. Few of these sectoral reforms have been implemented since 1998, however, despite much talk. And no progress has been made in addressing the more fundamental reforms needed to change the structures of economic privilege, political power, and governance that lie behind Indonesia's forest crisis and the conflicts it has engendered. Key unresolved issues include the following:

Who Should Make Forest Policy and Reaps Its Benefits: Jakarta or the Regions?

The basic division of authority over forests between central and provincial governments has been left in limbo. With regard to the basic authority to decide what is and is not forest land and what it may be used for, a 1992 spatial planning law[242] gave provinces the right to make these basic land use planning decisions—although this contradicted the 1967 Basic Forestry Law. The revised Basic Forestry Law of 1999, however, specifies that the central government retains the right to "determine the forest estate" and "plan the use of the forest," and need only "pay attention" to the local land-use plans made under the 1992 law. On the other hand, two 1999 laws on regional autonomy[243] seem to shift significant power over natural resources to the regions, specifying, for example, that 80 per cent of state income from resources (including forests) shall go to the regions. Both laws still lack implementing regulations, however, and "many lawyers and government officials regard these laws as essentially inoperable."[244] Meanwhile, a senior official of the agency charged with implementing the regional autonomy laws publicly accused the Forestry Minister of opposing and "rejecting" autonomy on the grounds that regional authorities are incompetent to manage forestry affairs. "The key issue," said the official "is whether the forestry ministry is ready to hand over all the benefits it has enjoyed so far," adding that the ministry had in the past been a "fertile" ground for corruption.[245]

Given the increasing levels of regional frustration with the "great sucking sound" of Jakarta's longstanding appropriation of resource rents, and the growing strength of separatist movements in some key resource-rich provinces (Aceh, Irian Jaya, Riau), resolution of this key issue seems crucial to maintaining a functional system of management over forests and

other natural resources. And failure to resolve it could become a spark for violent separatist uprisings in the near future.

What About the Rights and Interests of Local and Indigenous Communities?

Rhetoric about the need to manage forests in the interests of traditional (*adat*) and other local communities has been pervasive for several years, but from a legal and policy perspective, very little has changed since the Suharto era. Numerous analyses have attempted to glean openings for developing a more local community-oriented forest policy from the spate of new laws and regulations, and there are some hopeful changes around the edges. But the basic structure of power over forest lands remains as it has always been: the state controls the forest and all who would use it may do so only by leave of the state.

Box 3A: Forest Policy Reform Efforts Since 1998

There has been much talk about forest policy reform since Suharto's fall in 1998 and a flurry of new regulations have been enacted, but little has been done that will effectively address the spiral of forest loss and social conflict described in this paper. Pressures for reform are strong, however, and have arisen from six principal sources:

• Reform of the forestry sector is viewed as a fundamental part of the larger movement to eradicate "corruption, collusion and nepotism" (usually termed "KKN," its Indonesian acronym) that characterized the Suharto regime. According to official data, more than 80 per cent of the country's forest production areas are controlled by the family and close friends of the former president.[246]

• The IMF-led international economic aid program for Indonesia that was initiated in early 1998 in response to the economic crisis contains a number of forest policy conditions, mostly related to increasing competition and economic rationality within the logging concession and timber pricing and marketing system. Maintaining this economic lifeline has thus depended, in part, on at least formal enactment of the donors' forest-related demands.

• The growing clamor for greater regional autonomy by Indonesia's provinces—particularly those that are rich in natural resources—implies a significant shift in the balance of power between the central government and provincial and local government units with respect to natural resources, including forests. Indeed, the very legitimacy of the central government to make forest policies and monopolize forest rents has been called into question by many proponents

of regional autonomy, and "reform" is equated in many minds with rapid decentralization.

- The growth of a more democratic political environment has given non-governmental organizations (NGOs) and the press greater political space to expose illegal logging and other malfeasance in the forestry sector, and to call for major reforms. NGOs, academics and the press now regularly make statements about forest policy that would have resulted in a prison sentence or worse during the Suharto years.

- The disastrous forest fires of 1997–98 created additional international and domestic pressure to reform the poor logging and land conversion practices that were a root cause of the conflagration.

- Finally, many local and indigenous communities—nursing decades-old grievances against the central government and the private sector forest industry firms allied to it—are not waiting for the policy-makers' reforms, and are taking matters in their own hands through land occupations, strikes, and destruction of logging and plantation facilities.

Given these pressures, there was a considerable amount of optimism at the outset that forest policy reform would move forward rapidly, and numerous forest policy reform committees and working groups were set up, including an official National Committee on Forest Policy Reform. By 2000, however, the momentum had slowed, for essentially two reasons. First, the fall of Suharto did not greatly affect the structure of production or power in the forestry sector. While it has become *de rigeur* for even the most venal Suharto-era forestry bureaucrats to trumpet their commitment to *reformasi*, confronting a pervasive and entrenched system of privilege and corruption has been quite another matter. As a World Bank internal memo warned as early as September 1998:

> There remains a strong element in the forest industry, and in the official forestry agencies, that will resist reform, or at best will give it token acceptance while attempting to preserve the privileges of the past. All that can be said, at this point, is that the political predominance of an industry based on vested interest and institutionalized market distortion can now be seriously dealt with, in a manner that was not previously possible.[247]

Second, the capacity of the government bureaucracy to actually *manage* forests —let alone reform their management, has always been quite weak. In the Suharto era, the forestry bureaucracy essentially administered a vast network of patronage and corruption, while actually forest resource extraction was managed (poorly) by private sector conglomerates, backed up by military force (usually paid for by the companies)

when necessary. The state's capacity to effectively and even-handedly implement policies and laws and provide real oversight of resource management in the field, however, is virtually nonexistent.

As a result, Indonesia now has a wealth of new "reform" policies, laws and regulations— "reform on paper." But a quick look at what has actually been accomplished in the areas most needing reform shows that "reform in action" has been a failure.

Legal and regulatory changes since 1998 are embodied in numerous decrees and laws, culminating in a new Basic Forestry Law (Law No. 41 of 1999), rammed through the parliament during the waning days of the transitional Habibie government in the face of fierce opposition from virtually all reformist elements. The most specific provisions of the Law codify regulations issued during the previous year to satisfy the demands of the IMF and World Bank, largely embodying changes in the logging concession system that the World Bank had been pushing for since the early 1990s. Other provisions enacted by the government limit the size of logging and plantation concessions, limit the area that any one company may be granted, and favours participation in concession ownership by cooperatives and small and medium enterprises in various ways.[248]

Some analysts (including the author) believe, however, that this "sustainable logging" policy package that the World Bank and IMF are promoting will not reduce deforestation even if implemented, and is in any case unlikely to be implemented beyond issuance of decrees and regulations.[249] One of the greatest flaws is its assumption that most logging in Indonesia is carried out on selectively-logged concessions. As shown elsewhere in this paper, however, most of Indonesia's timber supply comes from illegal logging and clear-cutting of areas slated for conversion to plantations. Another flaw is the condition that restrictions on foreign investment in oil palm be lifted, a measure widely criticized as an incentive for further deforestation and forest fires (and privately disavowed by World Bank officials as "the IMF's idea.")

The 1999 Forestry Law does establish a category of customary forest (*hutan adat*), but defines it as state forest that happens to lie within the territory of a "customary law community," the definition of which is to be elaborated (by the government) in future regulations. The government is obliged under the Law to respect the rights of those communities that have received it's blessing as truly "customary," but "only as long as those rights do not conflict with national interests." In short, the government unilaterally determines which communities qualify as "customary," and then unilaterally decides which of the communities' rights to respect. It is not

surprising, therefore, that the 1999 Forestry Law has been denounced by indigenous peoples' organizations and NGOs as a worthless sham with respect to protection of the rights of traditional forest-dwelling peoples.[250] Thus, the new law has increased—rather than reduced—the probability of conflict between the state and corporate interests on the one hand, and local and indigenous communities on the other.

Should the Production Capacity of the Forestry Industry Be Forcibly Reduced By State Action?

Illegal logging, as already noted, is pervasive in Indonesia, driven by the massive imbalance between the demand for wood from industry and the amount of wood that can be sustainably—or even legally—produced. Illegal logging is also a major source of growing conflict over forest resources, as illegal loggers denude watersheds, destroy local community's resources, and feud with legal logging operations. Logically, demand must be reduced if illegal logging is ever to be decreased. But nothing in the flurry of recent legislation even mentions demand reduction or industry down-sizing. And while the 2001–2005 Strategic Plan for the forestry and plantations sector provides extensive statistics on over-capacity, reducing that capacity is not included, even in passing, as one of the goals for the sector.[251] Short-term interest in continuing to produce foreign exchange (and not scare off foreign investors)—and reluctance to confront powerful industrial conglomerates—has clearly won out over reasoned economic analysis, consideration of ecological impacts, or fear of the future social conflicts that this over-capacity will surely fan. The Trade Ministry's Director General of Forest Products, for example, is resolutely opposed to any measures to close existing mills: "We have already issued the licenses. We can't suddenly withdraw them. Investors would get scared."[252]

Even with regard to the country's thousands of openly operating illegal sawmills, the Trade Ministry official argues that the government has no data on their location, doesn't have the money to find out, and therefore will not move to close them. The Minister of Forestry and Plantations also endorses a lenient policy on illegal mills saying that "we need to warn them that what they are doing is illegal. If we remind them once, then twice, and they still insist on operating, only then should be take action against them." In any case, he argues that the concerns of donors and others about Indonesia's forest crisis is "a little over the top. We need to make an effort to preserve our natural resources, but we shouldn't make any hasty decisions. We don't need drastic change in our policy orientation."[253]

Should All Clearing of Remaining Forests be Banned?

Conversion of forests for timber and oil palm plantations has been a major source of deforestation and social conflict. But beyond formal announce-

ment of a "moratorium" on all further forest conversions until a "National Forest Plan" is completed (another commitment to the World Bank, made in early 2000), no serious action has been taken to stop forest conversion. Indeed, in June 2000 the Minister of Forestry and Estate Crops issued a decree specifying the process for conversion of forest lands for plantations, with the objective of "optimalizing the utilization of [forest] land for plantations."[254] No mention is made of a moratorium on conversion—indeed the regulation seems aimed at speeding up the conversion process and ensuring that concessionaires work their concessions. Neither is there any requirement that plantations be sited on degraded lands, or that either the concessionaire or the government consult with affected communities in the area.

Even if the government were taking their moratorium pledge seriously, there is clearly no need to complete another planning exercise to determine that no more forested land should be converted for plantations: The lowland rainforests most coveted for conversion are so depleted that strict legal protection of all that remain is the only scientifically defensible choice. Converting swamp forests to agriculture of any sort is recipe for economic failure and fiery disaster, as was illustrated in the 1997-98 fire episode. Hill forests are for the most part too inaccessible and steep to be viable for plantation agriculture, and are in any case far more valuable for their water catchment function. And Indonesia already has some 40 million ha of severely degraded forest land available for plantation development, by the government's latest estimate.[255]

Meanwhile, while the government sends mixed signals about whether further clearance will be allowed, the clearing goes on in a *de facto* manner, either directly (often with the blessing of regional officials, in the name of "regional autonomy") or indirectly (through illegal logging, which degrades the forest to the point where officials can say "its not really forested anyway.")

Box 3B: A Forest Policy Reform Agenda For Indonesia

Inventory, stabilize, legally protect and defend the remaining forest estate.

Indonesia's highest priority should be to complete work on a comprehensive inventory of the status of remaining natural forests, and to then take all necessary measures to preserve this area as permanent forest estate. Recommended include the following:

- Carry out an accurate inventory of vegetative cover and land uses lying within the legally-defined forest estate.

- Grant clear legal protection as permanent forest estate to all remaining natural forest areas in good condition (primary and secondary forests), and ban conversion to non-forest uses.

- Grant strict protection to all remaining primary forests in Indonesia (i.e., ban logging, mining, or conversion in all remaining primary forests).

- Stabilize the boundaries and management of the highest-priority protected areas and seek international assistance for a priority parks rescue program.

Recognize and legally protect forest ownership and utilization by indigenous and forest-dependent communities and assist them in managing the forest sustainably and productively.

Once the true forest is legally secured, a process of reordering its uses—and users—can begin in earnest. And once there is an accurate accounting of unclaimed degraded forest lands available for other uses, decisions can be made on the most efficient and equitable distribution of those areas among various stakeholders. But before any zoning or allocation takes place on these lands, the long-standing wrongs committed by the Suharto government against the rights and livelihoods of indigenous and other forest-dependent communities must be corrected. Key actions include the following:

- Legally recognize ownership of forests lying within the customary territories of indigenous and traditional (*adat*) communities, and mobilize financial and technical assistance to map these areas.

- Establish a new "community forest concession" management right that may be granted on state forest lands, and encompasses the options of selective logging for timber, harvest of non-timber forest products, and rehabilitation and plantation forestry on degraded forest lands.

- Establish effective mechanisms for independent citizen monitoring of trends and threats related to forest lands and resources.

- Strengthen and intensify the processes of multi-interest dialogue on forest policy reform that began during 1998.

Reduce Industrial Demand for Wood to the Level of Sustainable Supply by Reducing the Size of Indonesia's Wood Processing Industry.

The imbalance between timber supply and demand is the main factor driving illegal logging in Indonesia, as well as the growing role of clear-cutting and land conversion in providing raw material to industry. Indonesia should have only as much processing capacity as can be supplied from sustainably, legally-harvested sources. This means that approximately one half or more of the existing wood processing industry capacity should be shut down. Politically impossible in most con-

texts, Indonesia is currently faced with a unique opportunity to take this bold step, due to the ongoing banking and corporate insolvency crisis, and the commanding power of the Indonesian Bank Restructuring Agency (IBRA) over many of the largest (and most corrupt) logging and wood processing conglomerates. The Indonesian government should, therefore:

- Utilize IBRA's control over the assets of insolvent timber processing firms as leverage to close down processing facilities.

- Reduce all subsidies for remaining processing facilities, to ensure that those who stay in business are operating efficiently.

Reform Logging Practices and Broaden Forest Use to Include Multiple Uses and a Wider Variety of Users.

Commercial logging, as currently practiced, threatens the degradation and eventual destruction of much of what remains of Indonesia's forests. The government recognizes the need for reform, but its current push to essentially nationalize the logging industry (by gradually putting logging operations in the hands of state-owned corporations)—touted by the Ministry of Forestry and Estate Crops as a panacea for poor concession management—is misguided and unlikely to improve concession practices. State corporations already control significant concession areas, and their performance is not significantly better than that of private companies.

But whether concessions are run by state or private corporations, there are two broad tasks to be carried out in order to transform current wasteful and inequitable utilization of Indonesia's natural forests towards sustainability and equity. First, the existing system under which timber is produced—both on legal timber concessions and illegally—must be reformed. Second, the framework for natural forest utilization needs to be broadened to encompass an ecosystem perspective and to incorporate a wider range of forest resource uses and users than has been the case. To that end, the following steps need to be taken over the next several years:

- Carry out field-level assessments of all operating logging concessions and revoke the licenses of all concession-holders who have substantially or continually violated the terms of their concession agreements.

- Change the economic incentives that encourage waste and a "cut-and-run" mentality by loggers.

- Step up the evolution of the current concession system towards Permanent Forest Management Units.

- Conduct a comprehensive economic and institutional analysis before moving hastily to turn concession management over to state-owned forestry corporations on a large scale.

Rethink and Reform the Plantation Sector.

As discussed above, the fast-growing pulp and paper and oil palm plantation sectors are exerting major pressure on the forest, and were the major culprits behind the 1997–1998 forest fire disaster. The clear delineation of the nation's permanent forest estate and establishment of its unambiguous legal protection against conversion, recommended above, are the most important first steps in restraining the destructive role that plantation development is currently playing. Key additional actions that need to be taken include the following:

- Institute a moratorium on granting of new concessions for oil palm, timber, and other plantations until a national inventory of permanent forest estate is completed.

- Ban the establishment of plantations on all but truly degraded forest lands.

- Revise the incentive structure for timber plantations to discourage the cutting of natural forest.

- Safeguard the interests and livelihoods of local communities in plantation areas.

- Strengthen rules and penalties against clearing plantations with fire.

Should Bad Debts of Insolvent Forestry and Plantation Firms Be Forgiven or Called In?

Closely linked to the issue of resolving overcapacity is the question of how Indonesia's corporate debt crisis will be resolved, an issue raised in an important analysis by Purnomo in early 2000:[256] By the end of 1999, private firms held $51.5 billion in outstanding debt to the Indonesian Bank Restructuring Agency (IBRA), of which $34.3 billion is nonperforming. Forest and plantation sector activities account for about eight per cent ($4.1 billion), about $2.7 billion of which is estimated to be nonperforming. In addition, forest and plantation conglomerates are holding $2.4 billion in domestic nonperforming loans related to investments in other sectors, and at least $15 billion in outstanding loans to foreign creditors. In short, the companies which control a significant part of Indonesia's forestry and plantation sectors owe their creditors at least $20 billion in loans which they are not making payments on.

This high level of nonperformance by forest-linked firms results from their ability, during the Suharto years, to obtain financing with minimal due diligence, either from state banks (ordered to make the loans by regime officials), or by banks owned by the conglomerates themselves, which regularly violated financial rules with impunity. Numerous subsidies from the government—not least of which being free access to forest and land resources—further skewed the calculus of profitability over the long term. As a result, many such firms have established processing operations dependent on illegal or unsustainable logging, and that have generated numerous violent conflicts with local communities, as previously discussed.

IBRA was established to restructure Indonesia's failed and highly indebted banking system, and as such has become the single most important holder or potential holder of forest and estate crop assets in Indonesia. Two of the largest conglomerates, for example—the Bob Hasan Group and the Salim Group—have been in receivership under IBRA since early 1999, and IBRA has strong legal authority to call in the nonperforming loans of most other big forest firms—and seize their assets—if they do not pay their debts to banks under IBRA's management. Thus, IBRA has the legal means and the opportunity to effectively shut down a considerable proportion of the country's excess wood processing capacity. But, indications are that IBRA will write off at least 70 per cent of the nonperforming loans held by companies under its control, which would amount to a write-off of $1.9 billion in bad debt owed by the forestry and plantation sector alone. Such a move would provide yet another huge subsidy to these firms, squander the chance to substantially reduce production capacity with a strong legal and economic justification, and encourage the companies to continue investing in environmentally destructive and socially divisive forestry sector projects.

In summary, the forest policy "reforms" of the past several years have only scratched the surface of the problems that beset the Indonesian forestry sector and can be described, in the words of one analysis, as "reform without change."[257] As a result, the conflicts engendered by Suharto-era forest policies have continued to grow and multiply. At the same time, the collapse of the economy, weakening of the state, and decline of peace and order have fanned these conflicts into something far more threatening to Indonesia's security than has been the case in the past.

7. Forests, Conflict and Security in Indonesia: What Can Be Done?

The spiral of forest resource scarcity and conflict described in previous sections is increasing becoming a significant threat to three important dimensions of Indonesia's security.

First, conflicts over forest resources contribute to Indonesia's eroding domestic civil peace and order, a value that lies at the core of what we generally mean by "security." People are fighting with each other in Indonesia over many things, of which forest resources are only one. But, as noted above, most of the country is defined by the state as "forest land," and many conflicts that are "ethnic" or "religious" on the surface have their roots in, or are linked to, competition for increasingly scarce forest resources. And at the same time, the country's ethnic, religious and regional tensions have the potential to inflame forest-related disputes more so than would be the case in a situation of greater ethnic and religious tolerance and harmony.

Violence and lawlessness also beget more violence and lawlessness. Many of the cases of forest-resource conflict discussed above involve local communities with legitimate grievances against the government or private companies. Unable to gain satisfaction—or even a fair hearing—for their complaints, and frequently intimidated by use or threat of state-sanctioned violence, they have taken matters in their own hands, often violently. However understandable such reactions may be, they set a precedent for looting and lawlessness by people and groups who have no legitimate grievance, but rather seek personal profit from the growing disorder. Thus, for every case of a community attacking an oil palm operator in the name of a truly just cause, there are probably 10 gangs of well organized criminals systematically looting oil palm plantations for their own benefit, and "looting of both ripe and unripe fruit reduced overall production by 10 percent" in 1998 and 1999, according to the head of the industry association.[258]

Second, Indonesia's security has an important economic dimension which is also threatened by the growing levels of conflict over forest resources. The decline in oil palm production just noted is one example. Others include the closure of the $600 million Porsea pulp mill in North Sumatra, and the stoppage of work on some 10 million ha of logging concessions, noted previously. Illegal logging is costing the government millions in foregone timber royalties.

In broader perspective, the rising level of conflict dampens prospects for new foreign investment, especially when the government publicly admits, as it did in July 2000, that it can no longer guarantee the security of foreign investors' assets.[259]

Third, the ecological dimensions of forest degradation and loss threaten Indonesia's security in a different but important manner as well. Deforestation has been implicated in increased erosion, flooding, drought, fires, and landslides in many parts of the country, and is thus directly threatening the physical security and health of millions of people, although these

impacts (with the exception of large-scale fires and landslides) are cumulative, and therefore not always as visible as political and economic crises.

The processes eroding these three dimensions of security—political, economic and ecological—reinforce each other. Economic crisis has increased forest clearing by local communities,[260] which in turn increases the incidence of erosion, flooding and fires. Mismanagement of logging concessions and perverse forestry sector policy incentives have contributed to rising levels of both illegal logging and civil violence, and so forth. And the erosion off all three dimensions of security make the job of conserving Indonesia's forests far more difficult.

What can be done to break this vicious circle? As noted in the previous section there is a long and daunting list of forest policy reforms that need to be undertaken if deforestation is to be slowed, forest-related conflict is to be reduced, and forest polices are to contribute to Indonesia's security rather than diminishing it. The problem lies in the lack of necessary preconditions, outside of the forestry sector, for making and implementing any kinds of policy reforms.

Action is necessary in four areas if there is to be any progress in implementing real forest policy reforms and reducing the level of forest-related conflicts:

7.1   Reform the Legal System and Restore Its Credibility

Indonesia's legal system is virtually non-functional, and the judiciary is widely dismissed as so corrupt as be useless for the principled resolution of disputes. This is particularly unfortunate for the conflict-ridden forestry sector. If communities cannot receive, and do not expect, a fair hearing and resolution for their disputes with logging and plantation companies, for example, they will continue to take matters into their own hands.

The situation is no better for administrative lawmaking by government bureaucrats (the source of most law in Indonesia), which is arbitrary and confusing—even most bureaucrats admit to not understanding the tangled and contradictory mass of regulations an decrees that they in theory operate under. Interpretation and implementation is largely left to the arbitrary (or corruption-influenced) hands of mid-level bureaucrats, and there are not meaningful avenues for appealing the content of administrative decrees or the decisions made under them. Key areas for legal reform include the following:

- Restructure the judiciary so that it is free of political influence in its decision-making;

- Reform procedural and standing requirements to make the courts more accessible to ordinary citizens;

- Institute and implement an accountable system of administrative law-making that includes provision for public notice and comment and the obligation of agencies to publicly respond to comments;

- Establish strong and clear freedom of information policies and regulations and open official decision-making proceedings to greater public scrutiny and participation.

7.2 Develop Alternate Dispute Resolution Institutions

Even a well-functioning legal system is often poorly-suited to resolving complex, multi-party disputes which may be best resolved by means of a negotiated settlement rather than a black-and-white legal decision. Needed in Indonesia are new dispute resolution mechanisms that can take a more informal and innovative approach to bringing parties together and fashioning compromises than is possible in the judicial system. Indonesia's many distinct traditional cultures have a rich heritage of such dispute resolution systems, although they have been suppressed and disused over the past three decades. In some areas of the country where traditional cultures are still strong, reviving these traditional institutions to help resolve forest-related disputes may be one useful avenue for local progress.

At the national level, a possible option would be the establishment of a National Commission on Community Natural Resource Conflicts. Such a body might function with a core set of respected Commissioners serving fixed terms and drawn from all relevant stakeholder groups, supplemented by specialist advisors brought in to hear particular cases about which they have expertise. Aggrieved parties could petition the Commission for a hearing, which would be granted based on transparent threshold requirements. Parties accused by the plaintiffs would have the opportunity to present their defense. The Commissioners and their advisors would then fashion a proposed agreement, and turn the case over to mediators who would sit with the aggrieved parties to try and come to an agreement.

Such a body would be unlikely to have the power to compel parties to take actions or pay compensation, but it would provide a venue for negotiation, and its decisions would exert a powerful moral force in any subsequent judicial, administrative or legislative proceedings, should the parties be unable to come to an agreement. To maintain its credibility, the proposed Commission would have to have the formal endorsement of the president, but would need to be seen as fully independent of undue influence from government or the private sector. Significant funding would be required to make such a venture work, but it is the kind of idea that international donors, frustrated at the lack of progress in their conventional forestry grant and lending programs, might be interested in funding.

7.3 Resolve the Balance of Power Between National and Local Government and Strengthen the Capacity and Integrity of Local Government Units

The eventual balance of governmental authority between Jakarta on the one hand and the provinces on the other (not to mention the sub-provincial *kabupaten* unit of government) is unknown, and contested. Some degree of decentralization is inevitable, but what form that will take, and how it will affect specific sectors of the economy, is an open question at this point. It is clear, however, that sub-national units of government have very little capacity to manage natural resources. Unfortunately, devolution of powers from the center will surely be based almost wholly on political exigencies—such as amelioration of separatist rebellions in Aceh and Papua—and not on a reasoned appraisal of who can do what best. And decentralization of authority is unlikely to be accompanied by the resources necessary to build effective capacity in local government units.

Clarifying the powers of local governments—and the limits on that power—and strengthening the capacity and integrity of local government officials and institutions are thus among the most pressing priorities for Indonesia. This is particularly important for resolving ongoing forest-related conflicts, since the government must speak with a clear and unambiguous voice if it is to be credible. And it is important for preventing new conflicts from arising as a result of bad policy decisions—already, many local officials are using "regional autonomy" as a pretext for parceling out forest lands and resources in a bid for both official and unofficial income.

7.4 Combat and Reduce Corruption

Despite the fall of the famously corrupt Suharto regime, Indonesia's government and private sector remain riddled with corruption from top to bottom. Not everyone is corrupt, of course—and there are a few courageous individuals and institutions fighting hard against corruption—but by and large, corruption is accepted an inevitable feature of business and government—despite the periodic sacrifice of a Suharto era crony or officials for investigation and prosecution.[261] The deficiencies of the legal system and widespread corruption are, of course a vicious circle, feeding on each other.

For the forestry sector, the obstacle to implementing policy reforms are obvious, and are well illustrated by the situation in April 2000, when the Minister of Forestry and Estate Crops alleged that Indonesia's timber barons were amassing a "war chest" of millions of dollars to be used to bribe judges and other officials to head off planned investigations of corruption in the forestry sector.[262] The head of watchdog group Indonesian Corruption Watch expressed pessimism about the outcome of the investi-

gation: "I doubt that any of the tycoons will be punished because the attorneys and judges can easily be bribed."263

Many of the measures recommended above would help to reduce corruption. But combating corruption must go beyond the institutions of government. The media and NGOs—such as Corruption Watch—have an important role to play in investigating and exposing corrupt practices. Strengthening their capacity and professionalism to do so is therefore an important priority for investment and action.

This is a daunting reform agenda, and it obviously encompasses matters well beyond the ambit of the forestry sector and forest-related conflicts. Some might say it is unrealistic, and indeed, this author is pessimistic that such changes are likely to come about in the near future. But, as Raikes points out, it is difficult to make "practical suggestions," when one's research "tends to show that what is politically feasible is usually too minor to make any difference, while changes significant enough to be worthwhile are often unthinkable in practical political terms."264

Indonesia's recent history of conflict and bloodshed—much of it forest-related—demands bold action. Otherwise, the future is likely to be as grim as the present for both Indonesia's forests and its people.

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148. For a detailed analysis of the importance of Indonesia's forest biodiversity in global perspective, see R.A. Mittermeier and C.G. Mittermeier, *Megadiversity: Earth's biologically wealthiest nations* (Mexico City: CEMEX, 1997).

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164. World Bank (2000).

165. "Poaching brings the extinction of the Sumatran tiger near," *Deutsche Presse-Agentur*, December 20, 1999; "Rape of forest threatens to wipe out orang-utans," *The Guardian*, March 23, 2000.

166. World Bank (2000).

167. Indonesia's forestry laws divide forest lands into Limited or Regular "Production Forests;" "Protection Forests" (set aside to protect watersheds or erosion-prone slopes); "Conservation Forests," including National Parks and Nature Reserves; and "Recreation Forests," including Hunting and Tourism Parks. In addition, some forest lands could be classified as Forest Available for Conversion to non-forest uses, while a small remainder are "Unclassified Forests." Under the province-by-province Consensus Forest Land Use Planning process (TGHK) undertaken in the 1980s, government-controlled Forest Area in each province was divided into these various categories and recorded on official maps. The TGHK forest land use allocations have been revised numerous times since the mid-1980s, but still represent the basic legal framework for forest land use.

168. C. Barr, "Will HPH reform lead to sustainable forest management?: Questioning the assumptions of the 'sustainable logging' paradigm in Indonesia," In C.J. Pierce Colfer and I.A. Pradnja Resosudarmo (eds.), *Which way forward? Forests, policy and people in Indonesia* (Washington DC: Resources for the Future, forthcoming, 2001).

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177. D.W. Brown, *Addicted to Rent: Corporate and Spatial Distribution of Forest Resources in Indonesia; Implications for Forest Sustainability and Government Policy* (Jakarta: Indonesia-U.K. Tropical Forest Management Programme, September 1999).

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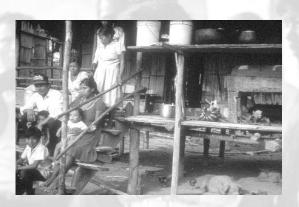
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**Resources, Abundance
and Competition in the
Bosawas Biosphere Reserve,
Nicaragua**

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Abstract

Since its creation in 1991, the Bosawas National Natural Resource Reserve in
Nicaragua has housed three armed anti-government movements, each seeking
reparations for their roles and/or losses during the civil wars of the 1980s. Conflicts
over abundant yet valuable resources are common in forested frontier areas like
Bosawas because these regions combine limited government presence and legiti-
macy with inaccessible terrain and multiple ethnic groups, which result in poorly
developed property regimes. As a result, groups in these regions often have to
take up arms in order to consolidate control over vital resources for which they
compete. The Nicaraguan government's failure to address the grievances of former
anti-Sandinista Mestizo insurgents, demobilized government soldiers, and the
Miskito Indians led each of these groups to seek access to and control over the
region's land, forest, mineral and other resources. Unlike most other resource-
based conflicts, the situation in Nicaragua emerged from resource abundance
rather than resource scarcity. In some cases, use of the natural resources in contention
helped to finance military activities. Conservationists can facilitate a resolution to this
and similar situation by supporting national forest policy reform, promoting conser-
vation issues as a basis for cooperation and negotiation, and endorsing efforts to
restrict illegal trade in natural resources.

1.   Introduction

On October 31, 1991, Nicaragua's President Violeta Barrios de Chamorro signed presidential decree 44-91, thus creating the Bosawas National Natural Resource Reserve, the largest protected area in Central America. Subsequently, the United Nations Education, Science, and Culture Commission (UNESCO) declared Bosawas a World Biosphere Reserve. The Reserve itself covers 7,400 square kilometers of tropical moist forest in Northeast Nicaragua. Its buffer zone includes the six municipalities of Bonanza, Cua Bocay, Siuna, Waslala, Waspam, and Wiwilí. The total area of these municipalities (23,000 square kilometers) is slightly larger than El Salvador. The municipalities house around a quarter of a million people (Ramírez, Cedeño and Sánchez, 1995).

During much of the last ten years since the Nicaraguan government created "Bosawas," the Reserve has also housed three armed movements. Former anti-Sandinista Mestizo insurgents came together in the Northern Front 3-80, while demobilized Nicaraguan government soldiers established the Andres Castro United Forces (FUAC). The Miskito Indians formed "descendants from the mother earth" or YATAMA (the acronym in Miskito). These armed movements combined broad political agendas with specific demands for their members and supporters. Many of their demands focused on access to the region's land, forest, minerals, and other resources. The groups were willing to fight to win control over these resources. The armed movements also affected how other people used natural resources in the region by "taxing" or regulating resource use or by discouraging certain types of investment through the threat of violence.

The Bosawas Biosphere Reserve itself was not the cause of the appearance of these armed groups, although resentment over its creation may have played a minor role in local support for their activities. Nor did the Nicaraguan Government create the Bosawas Biosphere Reserve in response to the armed groups' presence. Nevertheless, the armed movements' presence did affect the management of the Reserve, and similar problems plague protected areas in many other countries.

To a certain extent, the conflicts between the Nicaraguan government and the armed movements were resolved through the murder or co-optation of many of the movements' principal leaders. Nevertheless, violence remains endemic in the region and new armed uprisings may spring up at any moment. It has proven difficult to resolve the conflicts through negotiations in part because the government has limited desire and capacity to fulfil its promises and in part because each time the government makes concessions in response to pressure it encourages other groups to take up arms.

This paper examines each of the three armed movements, the role of conflicts over natural resources in stimulating their activities, and how their

presence influenced what happened to the environment. It argues that
conflicts over relatively abundant yet valuable natural resources—particu-
larly land and timber—significantly contributed to the emergence of these
armed movements and that control over these resources helped to fund the
movements' activities. Armed conflicts are common in forested frontier
areas such as the Bosawas region where many of the world's protected areas
are located because they combine limited government presence and legiti-
macy with inaccessible terrain and multiple ethnic groups. Because of
poorly developed property regimes when groups in these regions compete
for resources they often have to take up arms to consolidate their control
over them. Finally, the paper notes that the armed conflicts analyzed had
both negative and positive impacts on natural resources, depending on the
specific armed movement, natural resource, and situation.

The information presented in this chapter comes largely from press reports,
project documents, and interviews with key informants, including a handful
with the commanders of the armed movements themselves. Based on this
information it is difficult if not impossible to fully determine each armed
group's motives at different points in time. This is further complicated by the
fact that the groups themselves clearly had multiple, varying, and sometimes
contradictory motives. While the author has sought to the best of his ability
to accurately reflect each group's objectives in his analysis of their activities, he
readily admits that his analysis remains partial and not fully consistent.

2.   The Context

Recent research suggests that a substantial number of civil wars in devel-
oping countries stem from different groups' desire to gain control over
valuable natural resources such as timber, petroleum, minerals, and mar-
ketable animals. By taking control over such resources armed groups hope
to obtain large rents (i.e., incomes that accrue solely as a function of their
possession of the resource) without having to transform the resource in any
way. In many instances, they can also use the capital that such control over
resources provides as a source of funds to finance their military endeavors.
Thus, for example, armed insurgencies have sold diamonds mined from
regions under their control to help finance their wars in Angola and Sierra
Leone. Similarly, both the government and the Khmer Rouge used timber
to bankroll a large portion of their military operations in Cambodia
(Berdal and Malone, 2000). So, depending on the circumstances, natural
resources may constitute either the end or the means of military conflict.
Often they are both. This implies that environment-related conflict can
emerge not only from resource scarcity, but also from resource abundance.

Typically, struggles over abundant valuable natural resources occur in loca-
tions where central government control and national legal systems have

traditionally been weak. Indigenous peoples inhabit many of those locations, often as the result of having been pushed out of other areas coveted by more powerful ethnic groups. Such areas tend to have difficult terrain, poor soils, low population densities, and bad roads, and lie far away from major markets. Scott (1998) refers to such areas as "non-state spaces." These "spaces" turn out to be the type of area where natural forest ecosystems have survived in their most pristine state, precisely because their natural resources had not historically attracted the sustained attention of outside businessmen or migrants or attracted it only briefly. Because of this high level of ecosystem integrity in these areas and the fact that they did not traditionally appear to be of much economic value, governments have often declared these regions protected areas.

The problems arise when someone discovers that the resources in these areas are worth more than previously believed or new conditions increase their value. Such situations tend to lead to a gold rush mentality and the formation of agricultural, mining, logging, or hunting frontiers. As new groups swarm into areas that previously had a limited government presence and lacked a functioning system of formal property rights, a land grab ensues, and only the strongest and best-armed prevail. This situation is made worse if in addition to such disputes over resources, dissident political forces use the forest as a safe haven or ethnic conflicts break out between outsiders and the local indigenous groups. This is what has happened in Bosawas.

Historically and culturally, the eastern portion of the six municipalities in the Bosawas Biosphere Reserve belongs to Nicaragua's Atlantic Coast region. Indigenous Miskito and Mayangna villages grow crops along the rivers, hunt, fish, pan for gold, and harvest small amounts of timber. The Miskitos live largely in the municipality of Waspam while the Mayangnas are concentrated in the municipality of Bonanza. Until recently, first British and subsequently North American influence in this area was at least as strong as that of the Nicaraguan government, which never fully integrated the region into national life. The region remained physically isolated from the rest of the country and the Moravian Church provided a large part of the region's limited available social services. The principal outsiders that came into the area were multinational timber and mining companies. These provided employment for indigenous people and generally did not threaten their territorial rights.

Prior to the 1980s, most non-indigenous *mestizos* in the present-day Bosawas Biosphere Reserve region lived either in small villages in the agricultural frontier areas of Cua-Bocay, Waslala, and Wiwilí or in the mining towns of Bonanza and Siuna. The agricultural frontier areas were largely in the most western and southern parts of the region and dense forest sepa-

rated them from the indigenous areas. Several times during the twentieth century, gold mining boomed in Bonanza and Siuna and large numbers of migrants flowed into work for the mining companies. Otherwise, however, immigration into the Bosawas region by non-indigenous Nicaraguan farmers and loggers remained limited because the lack of roads kept the region inaccessible.

During the 1980s, practically entire Bosawas region was the scene of two bloody wars, one between Nicaragua's Sandinista Government and Miskito insurgents in the east and a second between the Government and the largely *mestizo* Nicaraguan Resistance (RN) in the South and West. In both cases the United States government financed the insurgents. The war forced many people to flee the area, while the government forcibly resettled others. Most economic activity eventually ground to halt.

In an effort to reach peace with the Miskito insurgents, in 1987 the Sandinista Nicaraguan National Assembly approved a Regional Autonomy Law that created two autonomous regions on the Atlantic Coast, each with its own multi-ethnic regional government (Hale, 1994). From that law emerged the Northern Atlantic Autonomous Region (RAAN), which includes four of Bosawas' six municipalities: Bonanza, Siuna, Waslala, and Waspam. Between 1987 and 1990, various Miskito insurgent groups signed peace agreements with the Nicaraguan Government. The war did not come to a complete end, however, until 1990, when Sandinista presidential candidate Daniel Ortega lost the presidential elections to opposition leader Violeta Barrios de Chamorro.

Separate peace negotiations also took place between the Sandinista Government and the Nicaraguan Resistance (RN). In this case also, however, the war did not come to a complete end until the fall of the Sandinista regime in 1990. Following the end of the war, the Nicaraguan Government and international agencies provided special assistance to relocate demobilized Sandinista soldiers and former anti-government insurgents in the area and built new roads and repaired existing ones, which greatly increased the value of the local resources. Tens of thousands of small and medium—sized farmers and ranchers of *mestizo* origin moved into the agricultural frontier villages and towns of Cua-Bocay, Siuna, Waslala, and Wiwilí, which had been off limits during the war (Stocks 1998). Some were attracted by the prospect of clearing forest to plant crops and pasture, even though much of the land was of poor quality. Others went after the gold, particularly since the collapse of large-scale mining activities during the war opened new opportunities for small-scale mining to move in once the war ended. Bosawas' substantial mahogany, cedar, and other timber resources attracted the interest of multinational companies, timber merchants from the Nicaraguan Pacific, and resettled

ex-combatants, as well as local groups of various ethnic origins. The war's termination also allowed government and international conservation agencies into the area to stake their own claims on a portion of the region's resources.

The result of all this has been various conflicts. In some cases those conflicts fueled the armed movements discussed in the following section, although they were certainly not the sole reason the movements emerged. In other cases, they never reached the point of armed violence. *Mestizo* settlers and indigenous communities fought with each other over land. Large mining and logging companies, small-scale *mestizo* miners and loggers, and indigenous people competed for control over timber and gold. The declaration of the Bosawas Biosphere Reserve and the arrival of international conservation projects, which wanted to use the region's resources for carbon sequestration and biodiversity protection, rather than agriculture, logging, and mining, generated further conflicts with both *mestizos* and indigenous communities.

In general, the Nicaraguan Army tried to stay out of these conflicts whenever possible. The Army has its origins in the Sandinista regime. After the Sandinistas lost the 1990 elections they handed over the reigns of the civilian government but the military high command remained intact. While it respects the Nicaraguan Constitution, it has had no particular sympathy for either the administration of President Violeta Barrios de Chamorro or that of Arnoldo Aleman, which followed. Despite this attitude, however, as will be shown below, the Nicaraguan Army has found it impossible to avoid responding to the various armed movements that emerged after the war officially ended in 1990.

3.   The Crises and Their Resolutions

This section discusses three separate crises—each associated with a distinct armed movement that emerged after 1990. These movements had common characteristics. All three grew out of poor management by the Nicaraguan government and international agencies of the demobilization of government soldiers and anti-government insurgents that had fought in Nicaragua's civil wars during the 1980s. The government and the international agencies promised the ex-combatants land, credit, training, social services, and other support, but largely failed to fulfil these promises. Tens of thousands of young men who had grown accustomed to military life returned to their communities or moved to the agricultural frontier where they found it exceedingly hard to make a living from agriculture and small-scale extractive activities without government support. They resented the fact that the national government gave out timber and mining concessions to outsiders and created protected areas that limited local communities'

access to natural resources, while showing little interest in either the people who had fought in the war or other local inhabitants. Those that had opposed the Sandinista government felt betrayed by the Chamorro Administration, which they had helped bring to power. Those that had supported the Sandinistas could not understand why the Nicaraguan government—including the Nicaraguan Army—had abandoned them after they had faithfully served the government's interests on the battlefield. National political forces used these sentiments to their own political ends by fostering armed movements that they could use to pressure the national government. This resulted in movements that combined an often confusing and constantly shifting mix of broad national concerns, regional agendas, and specific demands for their members. In the remainder of this section, we examine each of the three crises and their resolution. Then, in the following section, we look at the interactions between the armed movements and natural resources and environmental issues.

3.1   The Northern Front 3-80

After the Nicaraguan Resistance (RN) laid down its arms in 1990, the government earmarked Siuna and Waslala as sites where "development poles" would be established. It chose those areas because many RN fighters came from or had operated there and the areas still had large areas of land available (Cuadra Lira and Saldomando, 1998). The International Support and Verification Commission of the Organization of American States (CIAV/OAS) was to oversee these groups' resettlement (United States Department of State, 1998). However, the demobilized fighters received little titled land, credit, or social services.

Meanwhile, continuing violence between former RN combatants, ex-Sandinista soldiers, and security forces gave many ex-RN combatants a pretense to rearm. Right wing Nicaraguans and Cubans in Nicaragua and Miami and American politicians such as Senator Jesse Helms wanted the Chamorro Administration to eliminate Sandinista presence in the armed forces and return the properties the Sandinistas had confiscated to their previous owners. They were willing to provide funds and political backing for armed bands as a means of pressuring Chamorro to do those things (Nicaragua Network, 1993).

The Northern Front 3-80 emerged in this context. It was the first armed movement in the Bosawas region post 1990, beginning sometime around 1991, and took its name from the pseudonym of former Nicaraguan Resistance (RN) commander Enrique Bermúdez. Its leader, Jose Angel Talavera, initially demanded that Chamorro fire her Ministers of Defense and of the Presidency, whom he considered pro-Sandinista. He also demanded Chamorro ensure the safety of former RN fighters.

At different times, the FN 3-80 negotiated with the government about disarming and the Nicaraguan army effectively left certain areas in the FN 3-80's hands. During much of the period between 1992 and 1997, the FN 3-80 controlled large areas of Cua-Bocay, Waslala, and Wiwilí. Until the International Support and Verification Commission (CIAV-OAS) closed its offices in 1997, it regularly consulted with the FN 3-80s commanders before taking any action. So did an European Union rural development project in Cua Bocay. When the FN 3-80 decided it did not want the government agrarian reform institute (INRA) titling land in the area, their threats and intimidation forced INRA to pack up and leave. Talavera's troops also maintained "order" in the region, by killing off thieves, cattle rustlers, and rapists.

The negotiations between the government and the FN 3-80 began in early 1993. Then, in August of that same year, the FN 3-80 kidnapped a government delegation that had gone to convince Talavera to disarm. In response, a pro-Sandinista force took hostages of its own, including Nicaragua's Vice President Virgilio Godoy. Five days of negotiations followed before both sides finally released their hostages. For the next month or so, the government's army refrained from attacking the FN 3-80. Then negotiations broke down again, in part because the FN 3-80 took two French military attaches hostage (Nicaragua Network, 1993).

Just when the Nicaraguan army was advancing at the beginning of 1994, Cardinal Miguel Obando and the director of the conservative newspaper *La Prensa* proposed a cease-fire. This forced the army to step back. In February 1994, the FN 3-80 declared a unilateral cease-fire. In response, the army announced it would not take any offensive action. After several weeks of negotiations, the government signed a disarmament agreement with Talavera in which it offered to provide land, credit, technical and medical assistance, and to purchase each automatic rifle the FN 3-80 handed over. The CIAV / OAS promised to increase its presence and support in the FN 3-80 security zones. The Nicaraguan Government Army agreed to limit its troop strength in eight towns, including San Jose de Bocay and Wiwilí, and allowed FN 3-80 members to assume key positions in the police departments of Bocay, Cua, and Wiwilí (Nicaragua Network, 1994).

By April 1994, several hundred FN 3-80 members had disarmed and moved into security zones in Cua Bocay and Waslala. However, a number of FN 3-80 commanders, including Sergio Palacios, refused to disarm because they felt there was not enough in the deal for them, and continued to fight on (Cuadra and Saldomando, 1998).

The Nicaraguan government's army scored a major victory when it managed to kill Palacios in 1996 (United States State Department, 1998).

Palacios' death opened the door to new negotiations. The two parties reached an agreement in May 1997 that included land, food, clothing, seeds, housing materials, and services for FN 3-80 members, as well as amnesty and security guarantees (Immigration and Refugee Board of Canada, 1997). At the FN 3-80 commanders' request, the government added a clause whereby "both parties agree to combat the destruction of the forests and the government promises to take the necessary steps to avoid their depletion." Unofficially, the government permitted the FN 3-80 to name the auxiliary mayors in several towns. By the time President Arnoldo Aleman arrived by helicopter to Cua Bocay on July 21 for the formal ceremony declaring the disarmament complete 1,197 FN-380 members had laid down their arms (Associated Press, 1997). Since the FN 3-80's formally disarmed some former members have formed criminal bands and taken to random kidnappings, assaults, and cattle theft.

3.2   The Andres Castro United Front (FUAC)

After the Sandinistas' electoral defeat in 1990 and the demobilization of tens of thousands of soldiers from the government army, many of those soldiers were left as unhappy and frustrated as their RN counterparts. After years of fighting for the Sandinista Revolution, they saw former sympathizers of the pre-Sandinista Somoza dictatorship return to the country and large landowners regain the properties that the government had confiscated from them. They perceived the Nicaraguan army's high command to be turning its back on its former colleagues in order to protect its own interests while they found themselves out on the street, with little land, credit, training, employment or services. Several thousand of them responded by taking up arms.

Sometime around 1992, former Sandinista military officers led by Edmundo García and Gustavo Navarro formed the clandestine Andres Castro United Front (FUAC) in Managua. García and Navarro named the FUAC after a Nicaraguan who fought against William Walker in the 1850s (González Silva, 1997). They soon moved their base of operations to Siuna where the limited government presence, remote terrain, and dissatisfied population provided optimal conditions for their activities.

In Siuna and Cua Bocay, the FUAC concentrated its attention on villages inhabited by farmers that belonged to pro-Sandinista agricultural cooperatives, which had benefited from the Sandinista agrarian reform during the 1980s. These zones provided fertile ground for the FUAC's activities. The farmers that lived in these zones had been the privileged recipients of Sandinista largesse. But under the subsequent Chamorro and Aleman governments they were completely marginalized and neglected. The later governments stopped providing agricultural credit, cut back on healthcare and education, failed to maintain the roads, and showed no interest in titling

the farmers' land. When the FUAC arrived in the area and denounced the poor condition of the roads and the lack of transport, credit, electricity, and health care, they found farmers willing to listen. The farmers were even more impressed when the FUAC began killing cattle rustlers and other suspected criminals.

From the beginning the FUAC consistently mixed broad political attacks against President Aleman with specific appeals for improvements in local conditions and demands for material benefits for its own members (FUAC, 1997a, 1997b). It shifted back and forth between defending the local farmers and the residents of Siuna and focusing on its own members, most of who were former soldiers.

The FUAC publicly announced its existence in July 1996. A period of great tension followed. Although the Mayor of Siuna organized a peace commission in February 1997 to dialogue with the FUAD, including the Nicaraguan army and the national police, the negotiations broke down and the situation became a standoff. The Mayor then convoked a civilian peace commission formed by representatives of the churches and local NGOs and several months of tense negotiations and violence followed during which there were casualties on both sides (Immigration and Refugee Board of Canada, 1997). The Mayor of Rosita, a neighbouring municipality, tried to convince the government that foreign mining and timber companies would not invest in the area if the conflict continued, but substantive negotiations did not begin until August 1997.

The negotiations took five months. Between October 1997 and January 1998, the FUAC moved its troops into four "peace enclaves," where they were allowed to maintain their arms without being attacked by the Nicaraguan army. Two of these enclaves bordered on the Bosawas protected area. The FUAC had total control in the enclaves and administered justice there.

As the negotiations proceeded, the general political and regional demands fell by the wayside and both parties increasingly concentrated on what the FUAC soldiers would receive. In the peace accord signed by President Arnoldo Aleman and the FUAC in December 1997, the government committed itself to provide land, health care and scholarships to the FUAC soldiers, as well as six months of food provisions. The government also agreed to allow the FUAC to set up its own Foundation and promised to support FUAC efforts to get international funding for housing, credit, infrastructure, and training (Government of Nicaragua, 1997).

The FUAC officially disarmed on Christmas Day, 1997. Some 423 FUAC soldiers laid down their arms and theoretically returned to civilian life. However, within six months, the FUAC began accusing the government of failing to live up to its commitment to provide land and public services

(Gómez Nadal, 1997). Some former FUAC members re-baptized themselves as the Revolutionary Armed Forces (FAR) and went back to the bush (Program for Arms Control, Disarmament, and Conversion, 1998). In November 1999 these groups kidnapped a Canadian mining expert and several others. The Nicaraguan Army accused García of masterminding the kidnapping. Eventually, the kidnappers released the Canadian but soon after both García and Navarro were assassinated under mysterious circumstances (Envío, 2000). Violent bands with unclear motives continue to operate in the area.

3.3   Descendants of the Mother Earth (YATAMA)

Unlike the FN 3-80 and FUAC, Yatama had no central leader. Instead, it was a loose confederation of indigenous military commanders and their followers. For this reason, it is difficult to describe the group's objectives, since each commander held a somewhat different position. The huge gap between Yatama's formal demands and the topics that eventually dominated its' negotiations with the government further confuses the situation. The Yatama said that it was fighting for "autonomy" and the "demarcation of indigenous territories." What this means remains unclear. Most Yatama commanders did not feel that Nicaragua's 1987 Autonomy Law or the regional government of the RAAN met their needs, nor did they particularly want land titles for their individual communities.

The Yatama seem to have wanted the government to recognize a single large indigenous territory, allow them to directly govern their own affairs, and compensate them for using their natural resources. They also wanted it to remove non-indigenous soldiers and police from their territory. They were angry that even though they helped bring Chamorro and Aleman to power by fighting against the Sandinistas and despite the fact that their territory was rich in timber, gold, fish, and other natural resources, they remained poor and the subjects of discrimination (Chamorro, 1999). They felt the Chamorro and Aleman governments paid even less attention to them than to the former Nicaraguan Resistance (RN) fighters and that Aleman had personally humiliated them. Nonetheless, despite these broader grievances, the actual negotiations revolved around demands for housing, credit, food, and other types of direct government support.

Between 1992 and 1995, sporadic incidences of violence broke out between the Yatama and government forces on a number of occasions. Each time this occurred, the government calmed the situation by promising small concessions, but then later often failed to keep its promises (Burke, 1995; Cuadra Lira and Saldomando, 1998).

Things heated up again in February 1997, when the Miskito regional Council of Elders held the "IX General Assembly of Indigenous People

and Ethnic Communities" in Puerto Cabezas. That Assembly gave new impetus to the demands for regional autonomy and the demarcation of indigenous territories. About a year later, some 1,500 Yatama combatants assembled in Bilwaskarma and took up arms (Flores, 1998a). Within a short while, Yatama troops controlled most towns along the Coco River and had attacked the military post in Bismuna (Flores, 1998b).

Negotiations began almost immediately. The Nicaraguan Army withdrew most of its troops and left the area under Yatama control. The Army's high command declared that the problem was political, not military, and that the civilian authorities should resolve it. The Government provided food for Yatama troops while the negotiations continued and offered to give the Yatamas credit and to speed up efforts to pass an Indigenous Land Law.

The negotiations dragged on until June. Then in July, the largest sawmill in Puerto Cabezas burned down, and arson was suspected (Leist, 1998). Although the Yatama did not take credit for the attack, the pace of negotiations picked up again after this incident. The government promised to create offices in Puerto Cabezas and Waspam to assist the combatants in numerous ways, such as providing them with housing, credit, and land. In addition, they promised to help search for Miskito cadavers from the 1980s war, to create a voluntary Miskito police force and furnish it with boots and uniforms, and to begin to demarcate community lands. By February 1999, 1,500 Yatama troops had laid down their arms (López, 1999). Within a few months, however, the Yatama, like the other factions, were also complaining that the government had failed to meet its promises.

4.   Relevance to Environment and Security

Three major causal relations link the issues of environment and security in the cases just presented. First, the struggle to control the natural resources of Bosawas and to a much lesser extent the desire to limit the destruction of those resources were important factors contributing to the armed conflicts. All three armed groups were particularly interested in obtaining land, but they were also concerned with timber, and in the case of the Yatama, gold and fish. Second, the groups partially financed their bellicose activities through the exploitation of natural resources or through taxing their exploitation by others. Third, the armed movements themselves significantly influenced the use of natural resources in the region, whether deliberately or inadvertently. A fourth issue that also has relevance for people interested in promoting environmental conservation is the fact that many of the same characteristics that made the Bosawas region an attractive location to be declared a protected area also greatly increased the likelihood the armed movements would operate there. These include abundance of natural resources, remoteness, and poorly defined property rights, among others.

4.1 Natural Resources as Motives of Discontent and Sources of Revenue for Fighting

Both the FN 3-80 and the FUAC demanded agricultural land from the government. In a context of widespread unemployment, where most of the demobilized RN combatants and government soldiers had limited skills, they saw access to land as one of their few options for survival. Forest covered much of the available land and some of the land the groups demanded was within the protected area of the Bosawas Reserve.

Timber was another resource the two movements had an interest in. In certain instances, they simply viewed it as a resource they could appropriate. In other cases, they opposed logging by groups from outside the region, either out of a regionalist sentiment that the benefits from logging would not stay in the area or out of genuine concern about environmental destruction.

In the mid-1990s, the Cua Bocay rural development project financed by the European Union improved the road to Ayapal, the main center of FN 3-80 activities. Outside loggers soon took advantage of this road and moved into the area. FN 3-80 commander Sergio Palacios initially allowed them to work in the area, as long as they gave him money, boots, and other provisions. In Waslala, the FN 3-80 actually issued its own "logging permits" and large numbers of FN 3-80 combatants became chainsaw operators. One person interviewed for this chapter commented that Palacios' supporters were willing to protect the loggers in exchange for a couple of cartons of cigarettes. Around Bocay, the FN 3-80 served as bodyguards for the loggers and threatened or attacked anyone who opposed their activities (Comisión Nacional de Bosawás, 1995).

Eventually though, Palacios became concerned about the loggers' negative impact on the environment. The full reasons for Palacios' conversion on this issue remain unclear, although apparently a local environmentalist convinced him that logging would provoke droughts and dry up local water sources. Some of Palacios' supporters opposed the loggers and even went so far as to destroy their tractors and equipment. This continued even after the Nicaraguan Army killed Palacios. At the FN 3-80 commanders' request, the government added a clause in the final peace accord in 1997 whereby "both parties agree to combat the destruction of the forests and the government promises to take the necessary steps to avoid their depletion" (Associated Press, 1997).

In the case of the FUAC, several of the group's demands related directly to forest resources. It wanted the government to provide the organization a forest concession large enough to provide employment for 500 local people once it disarmed. At the same time, their demands also called for "the

respect and conservation of national natural resources, which includes laws related to the exploitation and management of the same, taking into account the populations of the neighbouring areas." To elaborate such laws and regulations, they proposed a "technical commission with the participation of environmental organizations and civil society producers and professional groups" (FUAC, 1997a).

From the FUAC's perspective, these two positions were not as contradictory as they might first appear. During an interview with FUAC commanders García and Navarro in Managua in mid-1998, they made it clear that although they objected to outsiders exploiting the region's resources they did not object to logging by local people. They assumed the local people would manage the forests in a sustainable fashion. As they put it, "In the FUAC, we believe that the only ones who can save this region is its own population…. They are the ones who can guarantee the sustainable management of their forest resources, of the riches others are trying to snatch away from them" (personal communication, Angelica Fauné, 1998, translation by the author).

This position at times led the FUAC to support activities that destroyed forests and at times led them to take the opposite position. For instance, the FUAC turned a blind eye to the destructive logging activities of an "Agro-Forestry Cooperative," which operated in a FUAC stronghold and was led by former Sandinista Army Officers. It also strongly supported local road improvements, without any regard for how they might affect forests. In an extreme example, they kidnapped the mayor of Cua-Bocay for failing to build a road he had promised and demanded that the government improve the road from Waslala to Siuna, part of which runs along the edge of the Bosawas protected area.

On the other hand, in a bizarre incident in September 1997, a group calling itself the "Ecological Armed Front (FEA)" issued a communiqué saying it had "taken up arms to defend against the unscrupulous loggers who are principally responsible for the destruction of the environment." It then confiscated 25 chainsaws and burnt them in the central plaza of Puerto Viejo in Waslala "as a warning against people and companies that dedicate themselves to cutting down forests and destroying natural resources." The group declared that one of its main objectives was to end government corruption and said it would not respect government logging licenses (Nicaragua Network, 1997). No one has publicly linked the FEA and the FUAC. Nevertheless, the fact that the FUAC essentially controlled Puerto Viejo at the time makes one suspect the FUAC at least tolerated the FEA and may even have been behind it.

However, it must be admitted that while the FUAC undoubtedly resented outside control over and destruction of the region's natural resources, in

the final analysis this does not seem to have been a central concern. As the negotiations proceeded, the FUAC's demands that related to natural resources and the environment largely fell by the wayside. Both the FUAC and the Nicaraguan government increasingly concentrated on what the FUAC soldiers would receive. The government agreed to set up a joint commission to study the natural resource issues including the Ministry of Environment and Natural Resources, the Ministry of Defense, and the FUAC, but not much happened after that. The main things the government committed itself to in the peace accord President Arnoldo Aleman signed with the FUAC in 1997 were to feed the FUAC members and provide them with land, health care and scholarships (Government of Nicaragua, 1997).

Unraveling the Yatama story is even more complex. If one takes the Yatama commanders' public declarations at face value, the Miskitos' defense of their natural resources was central to their armed uprising. In May 1998, seven Yatama commanders signed an unpublished proclamation in which they said, "Foreign companies and their concessions are freely destroying our Mother Nature and its resources with the support of the government institutions and the regional governments. The forests disappear. The marine species get exterminated. The precious minerals are being depleted. The natural elements become scarce. The wild animals die and all the nature together with the Indians cries out in pain over the destruction" (translation by the author).

Nevertheless, press reports and the author's interviews with Yatama commanders suggest that the Miskitos did not object to outsiders logging in their territory, as long as they controlled the process and indigenous people benefited. Many Miskitos had worked for foreign logging companies and felt positive about the experience. Some people interviewed suggested that the Yatama financed some of their operations by extorting money and materials from outside logging companies, although the author was unable to confirm that. What the Yatama did strenuously object to was central government approval of logging in their territories without their permission. Similarly, they also opposed the government's establishment of the Bosawas Biosphere Reserve on what they considered indigenous territory.

At the Yatama's request, during the first negotiations in 1992, the government agreed to request that a U.S.-financed forestry project hire demobilized Yatama soldiers as forest guards and train them in forest management and silviculture. It also promised to turn over a small sawmill to the Yatama so that Miskito families could construct their houses. In return, the demobilized soldiers agreed to plant three trees to replace each tree they cut (Hurtado *et al.*, 1992). However, these were minor aspects in the negotiations. Even though the Miskitos' grievances related to government

natural resource policies clearly contributed to the subsequent Yatama uprising, ultimately once again the commanders laid down their arms in return for direct government payments and services.

In summary, the desire to gain access to land, timber and other natural resources, and frustrations over lack of local control over and benefits from these resources contributed to the three armed movements—and hence major security problems. Logging also helped finance the groups' military activities. At one time or another, all three armed groups showed concern about forest destruction. Ultimately though, the natural resource and environmental concerns did not prove central to the disarmament agreements the armed movements negotiated with the government.

4.2 The Armed Movements' Impact on the Environment

Independent of the armed movements' motives, they also had a number of important and at times contradictory effects on the environment. On the one hand, the presence of armed movements greatly hindered the Nicaraguan government's efforts to keep farmers and loggers out of the protected areas within the Bosawas Biosphere Reserve. Logging greatly increased in certain areas under the armed movements' control. Both Cua Bocay and Waslala underwent heavy logging during much of the period when the FN 3-80 controlled the area, as did parts of Siuna under that the FUAC "governed," and certain areas of Waspam where the Yatama ruled. Government forestry officials basically stayed out of those zones. However, it is difficult to determine to what extent the armed groups' own regulatory activities limited certain logging activities or what would have happened if the armed movements were not there. The presence of the FN 3-80 facilitated the entrance of former RN soldiers and other *mestizo* farmers into the southern portion of the protected area of the Bosawas Biosphere Reserve. As one American anthropologist working in the area put it, "In a practical sense as well as a kinship sense these guerillas are just another face of the land invasions [of *mestizo* settlers into the Biosphere Reserve]" (Stocks, 1995:13). Government rules prohibiting families from moving to these areas meant little since the government did not control the territory. Due to the FN 3-80's presence in the area, none of the conservation projects in the Reserve was willing to work in the agricultural frontier areas within the Reserve in Cua Bocay or Waslala.

On the other hand, the general climate of violence discouraged investment in cattle ranching, which helped limit the conversion of forest to pasture. The armed presence of the Yatama soldiers undoubtedly made *mestizo* cattle ranchers and other small farmers think twice before encroaching upon Miskito territories. Although both the FN 3-80 and the FUAC favoured cattle ranching and most of their members aspired to become ranchers themselves, their activities inhibited livestock expansion. Their troops fre-

quently ate ranchers' cattle and kidnapped ranchers for ransom. Many cattle ranchers invested elsewhere as a result. In certain instances the FUAC and the FN 3-80 also took specific actions to rid the region of outside logging companies. Finally, the kidnapping of a Canadian mining official by the FUAC in Bonanza likely discouraged mining in the area.

5.   Conclusion

What can an organization like IUCN do in a situation like the Bosawas Biosphere Reserve in the 1990s? From Aceh and Papua in Indonesia to Mindanao in the Philippines and Chiapas in Mexico, as well as in Burma, Cambodia, Angola, Rwanda, the Congo, Sierra Leone, Liberia, and Colombia, irregular and semi-regular military forces control large portions of the jungles and mountains. Moreover, little suggests that the end of the Cold War has changed that. The combination of valuable natural resources, weak states, poor people with rich backers, regional and ethnic grievances, and inaccessible terrain remains just as explosive as ever.

The first thing recommended for IUCN is to recognize this fact and its implications. One clear implication is that conservation efforts and the resolution of military conflict must go hand in hand. Unless conservationists firmly commit themselves to addressing the underlying causes of endemic violence in the developing world, ultimately their efforts are likely to fail. Similarly, conservationists must convince governments and international financial and technical cooperation agencies that addressing the governance issues in the forested regions of the developing world is essential to achieve and/or maintain peace in those countries. A second implication is that as long as major conflicts exist in many of the tropical forest regions and government control over and presence in much of the world's tropical territories remains largely fictitious, any international agreement these governments sign or national forest policy they adopt will have little relevance. Paper agreements and paper policies are as unlikely to succeed as paper parks. Given limited resources, the IUCN should concentrate on initiatives that have a good chance of achieving a real impact. This implies only working at the national policy level in countries where the governments actually influence what goes on in the forested regions.

IUCN may also have a role in conflict resolution on the ground. In the conflicts in the Bosawas region, the armed movements raised environmental concerns and brought environmental issues to the negotiating table, but lacked the technical knowledge and understanding that might enable them to shape viable proposals. Potentially, environmental issues have a universal appeal that could allow governments and armed movements to reach agreement, and build mutual confidence. Raising such issues may also open up space to bring other social groups into the nego-

tiations and make them less polarized. The IUCN's unique position of having both governments and non-governments organizations as members could put it in a strong position to take a facilitating role in these processes. To do this it must develop its own capacity to understand these processes, create a set of internal rules and procedures for operating in areas of severe conflict, and learn how to negotiate binding agreements with serious monitoring and verification. Traditional participatory methods that assume good will on the part of all the parties involved are unlikely to succeed in war zones.

To the extent that illegal logging and mining help finance military activities, the IUCN could actively support international and national activities to restrict trade in illegal timber, diamonds, ivory, and similar products. In this regard, it is important to focus not only on the trade itself but also on the Banks that lend money to those that are engaged in illegal activities and receive deposits from them. A number of international agreements exist that limit Bank involvement in illegal activities. Conservationists need to make better use of such agreements and to work to strengthen them.

The IUCN cannot undertake these activities alone. To achieve its conservation objectives it must work closely with international and national agencies concerned with natural security, refugees and displaced people and development assistance. Within this context, it is particularly important to stress the long-term environmental and developmental aspects of armed conflict. Just as is becoming increasingly clear in the case of natural disasters, treating the symptoms of violence as a short-term emergency without addressing the underlying long-term causes of that violence is doomed to fail. Although the Nicaraguan government has more or less succeeded in neutralizing the FN 3-80, the FUAC and the Yatama commanders in the short-term, violent conflict is likely to reappear in the Bosawas Biosphere Reserve in one form or another. Without the permanent creation of new employment opportunities, the provision of basic government services, and the establishment of a multi-ethnic governance system with broad local acceptance, there can be no long-term peace, nor conservation.

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Environment and Security Brief 4

Eco-Terrorism: The Earth Liberation Front and Direct Action

The actions of "eco-terrorist" organizations such as the Earth Liberation Front (ELF) add an ironic, yet relevant dimension to the environment and security debate. Whereas many of the authors in this volume have argued that resource conservation and management can contribute to social stability and peace, eco-terrorists perpetrate direct actions in the name of conservation. While both approaches strive to protect the natural environment, eco-terrorists wilfully inflict damage on those profiting from resource exploitation, using economic sabotage and property destruction. Members of the Earth Liberation Front (ELF) have become eco-terrorism's most renowned practitioners, having orchestrated a number of high profile and costly attacks. Although they insist their activities are non-violent and "take all necessary precautions against harming life,"[265] the FBI considers the ELF among the leading domestic terrorist threats.[266]

Not to be confused with environmental terrorism, which involves using natural resources both as a target and a tool for depriving populations and destroying property, eco-terrorism aims to slow or halt human encroachment on the environment and draw public attention the effects of development projects. Specifically, it involves the unlawful destruction of the built environment (roads, buildings, and machines)—symbols of capitalism and the environmentally destructive profit motive—in defence of natural resources.[267] Subscribing to a deep ecology ethic, which broadens the notion of self to include all of nature, eco-terrorists view their actions as measure of self-defence, measures protecting a "larger self"—the biosphere.[268]

Formed in 1993, the ELF is a decentralized, non-hierarchical underground movement operating in small, autonomous cells. This structure enables members to maintain their anonymity, thereby providing them with protection from law enforcement. There is no official "membership," as ELF consists of individuals and groups of people who choose to carry out eco-terrorist activities under its banner, while adhering to several broad guidelines. Operating and recruiting via the Internet, anonymous dispatches claiming responsibility for certain acts are sent to the ELF spokesperson, who then officially notifies the media and public.[269] The ELF's most infamous attack was in October 1998, when they set fire to a ski lodge in Vail, Colorado, protesting resort expansion

and destruction of the lynx habitat and causing some $12 million in property damage. Reflecting upon the impact of this action, the ELF web site states, "Many of those who felt the earth was defenseless against the capitalistic drive to destroy it now felt hope, and many of those who felt unstoppable in their pursuits for profit at the expense of the natural environment began shaking in their boots."[270]

Subsequent attacks have been on university labs, warehouses containing genetically modified crops, corporate offices and headquarters, horse corrals, and increasingly, newly built luxury homes. Traditional acts of eco-terrorism continue to be carried out (spiking trees, smashing windows, and slashing tires), but arson has become the method of choice in many ELF attacks. While the practical aim is to dissuade people and businesses from locating in certain areas, critics claim that the ELF's activities only succeed in generating fear among average citizens. And although supporters steadfastly insist that direct actions have neither damaged any natural resources nor resulted in any human casualties, opponents feel that it is only a matter of time before some hapless bystander or firefighter is injured or killed. To those who do not subscribe to the ideology espoused by the Earth Liberation Front, and other eco-terrorists, it would seem that they have juxtaposed security of the earth's natural resources with the security of people's welfare and livelihoods.

Endnotes

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Natural Resource Scarcity and Violence in Rwanda

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Abstract

The social and political implications of different types of environmental scarcities were important contributors to the violent conflict in Rwanda during the 1990s. These scarcities, which became acute in the1980s, were the result of complex interactions between demographic pressure, inequitable access to and shortage of land resources, and resource depletion or degradation. The resulting degradation of ecological capital forced rural inhabitants into a vicious cycle of poverty, thereby compounding their dissatisfaction with the State. The government's failure in acknowledging and addressing such grievances prompted political dissension and presented opposition leaders with an opportunity to wage war against the regime. When the country became deeply entangled in the war, radical politicians were able to re-centre the dialectic from rich versus poor to Tutsi against Hutu. In order to promote a peaceful, stable future, the meaning of national security must be re-conceptualized to emphasize human and environmental security. Efforts must be made towards designing sustainable development strategies that promote the conservation and diversification of land use and other resources, address the environmental impacts of refugee influxes, and support population planning.

List of abbreviations and acronyms

AFP	Agence France Presse
DRC	Democratic Republic of Congo
FAO	United Nations Food and Agricultural Organization
FLH	Family land-holding
IDPs	Internally displaced persons
Inh.	Inhabitants
Kcal	Kilocalorie
MRND	Mouvement Républicain National pour la Démocratie et le Développement (National Republican Movement for Democracy and Development)
NAC	National Agriculture Commission
RAF	Rwandan Armed Forces
RPF	Rwandan Patriotic Front.

Table D1. Chronology

Nov. 59-Sept. 1961	The Social Revolution in which the Hutu peasantry dissented against the Tutsi landlords causes more than 150,000 Tutsi to flee the country.
1 July 1962	Rwanda gains independence from Belgium
July 62–July 1973	The ruling Hutu elite refuses Tutsi access to political power and does not facilitate the return of the refugees; power becomes progressively south-based
5 July 1973	J. Habyarimana takes over power in a military coup d'état, and the power base shifts to the north
December 1978	Institutionalization of a one-party system
23 January 1986	Y. Museveni takes over power in Uganda with the help of Rwanda refugees
1988	Influx into Rwanda of Hutu Burundians fleeing massacres perpetrated by the Tutsi army
1989	Famine in southern Rwanda causes hundreds of deaths and an exodus of poor peasants towards neighbouring countries
1 October 1990	The Tutsi rebels of RPF based in Uganda attack Rwanda
10 June 1991	Habyarimana government legalizes opposition parties
Aug '91–May '92	Insurgency in the south and in the Capital to force the opening of the government to opposition parties gives rise to intra-Hutu violence
16 April 1992	Coalition government to allow democratic transition is established, with a prime minister from opposition party
1 August 1992	A cease-fire agreement is reached between RPF and Rwandan government
8 February 1993	RPF violates the cease-fire and war creates 1 million IDPs
4 August 1993	Arusha Peace Agreement signed
21 October 1993	The first democratically elected President of Burundi, Melchior Ndadaye (Hutu), is assassinated by men of the country's Tutsi army
4 April 1994	Famine warning by FAO and OXFAM
6 April 94	A missile hits the plane transporting President Habyarimana of Rwanda and President Ntaryamira of Burundi, killing all the occupants
7 April–June 1994	Genocide of Tutsi and resumption of war
19 July 1994	RPF wins war and takes power in Rwanda; over 2 million refugees flee to neighbouring countries

Introduction

Many studies on the Rwandan conflict tend to oversimplify its causes by overemphasizing what is presented as a historical antagonism between Hutu and Tutsi ethnic groups. However, in assessments that attempt to get away from such a narrow focus, analysts such as Bächler (1999) and Gasana (1997) reveal the significant role played by environmental factors, among other root causes. Environmental causes of major significance in this context are natural resource-linked and are due to population pressure, decline of agricultural land per family land-holding (FLH), soil degradation and shortage of firewood. In the mid-1980s, environmental stress caused a famine that resulted in hundreds of deaths and produced thousands of southern Rwandan environmental refugees who unsuccessfully attempted to settle in Tanzania. The National Agricultural Commission (NAC), that was set up in March 1990 in the aftermath of this famine warned the government that unless adequate measures were taken to improve food access for the deprived rural populations, a social crisis was very likely to erupt before the turn of the century.

At the time the NAC conducted its work, the factors at work on the fault-lines of Rwandan society included population pressure, environmental scarcity, unequal access to land for those who depended directly on natural resources, unequal education opportunities, unemployment of rural youth, and unequal representation in power. The major divisions within the Rwandan society were regional, ethnic and social. The elites' micro-society had its additional fault-lines within which the factions struggled to control access to State resources, control of the means of public violence and State apparatus, and above all, control of the economy of the Capital City—Kigali.

While the politics of ethnic violence in Rwanda have been thoroughly analyzed, what remains less understood is how the environmental scarcities interacted with social, economic and political factors to heighten the explosiveness of tension in the period preceding the 6 April 1994. Available data show that strong grievances linked to environmental scarcities existed at the end of the1980s. Although this was a reality, no one could have predicted a catastrophe of the magnitude of genocide. There can therefore be no room for a kind of deterministic thinking that attempts to rigidly link environmental degradation to human destruction.

However, this does not justify the unquestioning approaches followed by most analyses, which limit their focus to the effects of the conflict and to the political strategies of the actors, without analyzing their root causes. Of course, attention to politics is very important, especially considering that the 1994 genocide could have been avoided had the country had politicians of such a mind. There is no justification for the violent options chosen by key decision-makers in the government and military, who obvious-

ly lacked political vision. Nevertheless, in order to build a sustainable future for the Rwandan society, it is necessary to elucidate the context in which these disastrous political choices were made and allowed to cause so much damage. In this sense, the focus on politics alone is insufficient for the study of the Rwandan crisis.

In this paper, I provide another perspective of the analysis of the Rwandan conflict. Specifically, I will attempt to show the political and social implications of environmental scarcities and how they relate to the 1994 violent conflict. I use Thomas Homer-Dixon's analytical framework (Homer-Dixon, 1999) in combination with the data that was available between 1984 and 1990 on agricultural productivity, population, land tenure, fuel-wood needs and availability and soil erosion. Homer-Dixon's model highlights three sources of environmental scarcities: structural scarcity, which is caused by an imbalance in a distribution of resources that favours the powerful groups of society, demand-induced scarcity which is caused by population growth or increased per capita resource consumption, and supply-induced scarcity which is caused by degradation or depletion of environmental resources. It further highlights two pernicious interactions of these sources, which are resource capture and ecological marginalization. Population pressures and marginalization led to soil degradation, contributing to fallow reduction and to further declines in land productivity. The resulting degradation of the ecological capital forced rural inhabitants into a vicious cycle of poverty.

This paper will show how the discontentment of the poor peasantry driven by environmental and population pressures, in conjunction with drought and famine, made leaders of the Tutsi rebellion based in Uganda believe that there was an opening for war against the regime. When the country became deeply entangled in the war, radical leaders were able to re-center the political dialectic, from rich versus poor, to Tutsi against Hutu, inciting ethnic hatred and the spiral of political violence which led to genocide in 1994.

This analysis demonstrates the need to pay increased attention to environmental scarcities as important factors in the Rwandan conflict. Solutions to this bi-polar ethnic conflict cannot successfully be mobilized without a re-conceptualization of national security that emphasizes human and environmental security over the security of ethno-political regimes. Indeed the challenge for Rwandan society is how to change from a model of resource distribution where one winner-takes-all to one where all ethnicities can win.

Overview of the Case

Rwandan society comprises three ethnic groups: Hutu, Tutsi and Twa. Before the 1994 genocide, these groups made up 89 per cent, 10 per cent and one per cent of the population, respectively. However, the picture we

would have from the prevailing historical accounts is that Rwandan society is ethnically dual. The percentage of the Twa group is so small that they do not weigh significantly in coalitions with the other groups.

Before the end of the 1950s, the Tutsis were the dominant group in Rwandan society, accounting for more than 95 per cent of chiefs and 88 per cent of the political bureaucracy (Bächler, 1997:182). Following the 1959 Social Revolution in which the Hutu peasantry dissented against the Tutsi feudal landlords, there were violent changes in governance and a redistribution of land to landless peasants. An estimated 150,000 to 200,000 inhabitants of the Tutsi ethnic group fled violence to neighbouring countries. Subsequent ethnic strife triggered by refugees' armed attacks on the country in the 60s left thousands of Tutsi victims of massacres. The new Hutu leaders continued to live under the specter of a counterrevolution and as such, created a *de facto* one-party regime in which the Tutsi had no political voice.

This winner-take-all outcome characterized a political system in which the winners of the Hutu elite alienated the losers of the Tutsi aristocracy from political processes. It was facilitated by the Cold War: as the rebellion of Tutsi refugees who attacked Rwanda in the 60s was armed by communist countries, the Western powers supported the Hutu regime in an attempt to stabilize the political situation and prevent the emergence of Communism.

In 1973, Major-General Juvénal Habyarimana, a Hutu, led a military coup d'état that brought to power a predominantly northern elite and founded the Second Republic. The development endeavor pursued by his regime was rapidly undermined by severe contradictions. Issues of rural poverty, and the numerous dualities within Rwanda such as those between the north and south, the Hutu and Tutsi, the rich and the poor as well as eventually that between the refugees and inner population, overcame any attempts for compromise or government control.

On 1 October 1990, the predominantly-Tutsi Rwandan Patriotic Front (RPF), led by a former Ugandan deputy minister of Defense, Major-general Fred Rwigema, attacked Rwanda from Uganda. As the existing grievances were too complex to be solved by military means alone, war degenerated into an ethnic conflict, and thereby forced Habyarimana to open the regime to multiparty system. The rebirth of multi-party system in 1991 under war tension and ethnic and regional rivalry led the State to loss of control and to a rapid self-empowerment of radical factions. These factions competed for membership amongst the dispossessed of all categories, but particularly amongst the landless rural youth. The armed conflict and the tensions along the regional and ethnic rivalries led to tri-polar politics: Habyarimana's party, the opposition parties constellation and the RPF.

In April 1992, Habyarimana formally accepted to abide by a protocol signed by his party and 4 opposition parties on the formation of a coalition government for the democratic transition. Based on this protocol, a plural government headed by a prime minister from the opposition, and comprising 10 ministers from four opposition parties and 9 ministers from Habyarimana's party was formed on 16 April 1992. With the real opposition occupying key government portfolios, there was an end to Habyarimana's one-party regime. However, he remained in power as head of state, and leader of the most powerful internal political faction.

On 4 August 1993, the Arusha peace accord was signed between the government and the RPF. It provided the RPF with 5 key government portfolios out of a total of 21. The accord also provided that sixty per cent of the military was to be from the government's Rwandan Armed Forces (RAF) and forty per cent from RPF, but the command at all levels had to be equally shared between RAF and RPF.

On 6 April 1994, a missile hit the plane transporting J. Habyarimana and President C. Ntaryamira of Burundi, killing all passengers aboard. Taking into consideration the assassination of President Ndadaye of Burundi in October 1993, a total of three Hutu presidents had been assassinated in 6 months. The Presidential guard and the militias attempted to exploit the deaths of these three Hutu presidents by inciting anti-Tutsi violence in order to maintain control of the Rwandan state. At the same time, the RPF resumed war and attacked from the North. In fear of retaliation, a huge portion of the Hutu population fled into Tanzania and Zaire to escape the RPF advance. The Front won the war and set up a new regime on 19 July 1994.

Demographic Pressure and the Threat to Human Sustainability

Demographic pressure and inequitable access to land resources cause ecological *pembenization* of the poor peasantry

In the 1980s, the inequality in access to land resources in Rwanda caused severe structural scarcity for the rural population, the majority of which were affected by ecological marginalization. For this process of marginalization, I shall use the term "*pembenization*" from the Swahili word "*pembeni*" or "aside," used in Rwanda's national language in the expression "*gushyira i pembeni*" which means "to push aside." It depicts more concretely the process by which a large section of the peasantry in Rwanda has been progressively put aside by the development models followed by successive regimes of independent Rwanda.

Ecological *pembenization* occurs as a result of unequal access to resources and high population pressure which shift the poor peasantry to unpro-

ductive steep slopes, very acidic soils, or deprives them of land entirely. The land tenure model granting total freedom to peasants to manage their family land-holdings (FLHs) did not foresee the consequences of land fragmentation in successive generational transfers. As the traditional mode of heritage consisting in partitioning parental FLH among all the heirs was not reformed, there was an excessive fragmentation of cultivated land, resulting in a great number of near-landless and landless farmers. At the end of the1980s, virtually all cultivatable land in Rwanda was already in use.

Table D2 gives descriptive data from the 1984 agricultural survey summarized by P. Dooms (1989) on the size categories of FLHs, and further analyzed by Gasana (1994) who estimated that 43 per cent of poorer families owned only 15 per cent of cultivated lands, with average FLH area varying from less than 0.25 ha to 0.75 ha. About 50 per cent of rural families had to hire land to produce for their basic subsistence needs. On the other end of the spectrum, 16 per cent of land-rich families owned 43 per cent of cultivated lands, with an average FLH area of more than 1 ha. As a result, poor farmers were squeezed in steep unproductive lands, where the soil is constantly removed by erosion, becoming in-situ ecological refugees. In 1989 it was estimated that 50 per cent of cultivated soils had slopes higher than 18 per cent.

As a result of this imbalance, about two thirds of the population of Rwanda was unable to meet the minimum food energy requirements of 2,100 calories per person per day, their effective food energy consumption having fallen below 1,900 cal per person per day. As the hungry were not only landless or near-landless, but also earned little or no monetary revenue, there was a structural famine whose roots were embedded in the inequitable and disorderly land tenure. In 1985, poor families spent 88 per cent of their earnings to purchase food, and 98 per cent of the poor were rural families. The skewed distribution of land concentrating almost half of arable land in the hands of wealthier people who did not need to use its full potential aggravated this situation. This situation contributed to the appalling per cent of rural unemployment amongst adults that had reached 30 per cent at the end of the 1980s and to slow human development, as most indicators showed (see Box 4A). By mid-1990, before the beginning of the war, it was already clear that as a result of this inequitable land access and high population pressure, the social explosion was only a matter of a few years. A report of the NAC expressed that fear in the following terms (Gasana, 1991a):

> It can be concluded that if the country does not operate profound transformations in its agriculture, it will not be capable of feeding adequately its population under the present growth rate. Contrary

to the tradition of our demographers who show that the popula-
tion growth rate will remain positive over several years in the
future, one can not see how the Rwandan population will reach
10 million inhabitants unless important progress in agriculture as
well as other sectors of the economy were achieved. Consequently
it is time to fear the Malthusian effects that could derive from the
gap between food supply and the demand of the population, and
social disorders which could result from there.

Unequal access to land resources aggravated socio-economic cleavage
between the poor peasantry and the elites. From the 1970s, appropriation
of new land became increasingly linked to political power. Ranches and
fields in drained productive wet valleys were allocated to men of influence
or to their rural relatives.

Box 4A: Some socio-economic indicators before 1994	
Area of Rwanda	26,338 km^2
Demographic data:	
Population in 1992	7.5 millions
Urban population	426,000 inh.
Crude population density	290 inh/km^2
Density on arable lands	843 inh/km^2
Rate of natural increase, 1991	3.2%/year
Life expectancy at birth	46.5 years
Literacy (%)	52.1%
Average education (at age of more than 25 years)	1.1 year
School enrolment in 1990 (between 6 to 25 years)	39%
Population below poverty line	85%
Population depending for their living on:	
Agriculture	90%
Industry	2%
Services	8%
Supply of food energy (% of needs, 1988-90)	80%
Gross national product, 1991	270 US$/capita

Resource capture—by which the powerful elites amassed land, in combination with population pressure, resulted in accelerated environmental degradation. By the end of the 1980s the ethnic categories were not the issue any more. The real issue was the appalling poverty of a greater section of the rural population. This poverty had various causes which lead to food insecurity and misery: lack of access to land, to education, and to health services.

Table D3 gives a description of the social categories based on agricultural statistics of food energy consumption. The *abakire,* rich families, have an adequate amount of land, are involved in business or are employed in the administration or in politics. They are either in power or are well connected to those in power. Their sons and daughters have access to schools. The *abakene*, poor families, have threshold FLHs of between 0.8 to 1.0 ha. This is considered to be a "threshold FLH" because it represents the minimum area necessary to secure a stable food situation.

They have barely what they need for their subsistence, and they owe what they do have either to their barely adequate FLHs or to supplemental employment. They are unable to invest because they have no savings, they have no connection with those in power and their children have no clear future perspectives. Even further down on the social scale, the *abatindi* have neither access to land, nor to paid jobs because of lack of opportunities for unskilled labor, nor to health services. The peasants in this category may have small FLHs on rocky eroded hill slopes. As they are illiterate and powerless, they are permanently exposed to violence, malnutrition and to environmental haphazard.

The categories *abakene*, *abatindi* and *abatindi nyakujya* were divided not so much by ethnic identities but through access to land and state resources. The members of these categories described collectively the administrative and political elite, Hutu or Tutsi, as *abaryi* or "eaters," who merely exploited them. This is typical of the kind of rhetoric that was fast developing in the 1980s, that of the rich versus the poor and not of the Hutu versus the Tutsi.

The incidence of scarcity due to inequitable access to land resources was most severe in the agro-ecological regions where soils remain very acidic. In the local terminology of the national language, these acidic soils were called "*ubutaka bushalira*" or sour soils. "Sour" soil was characteristic of the south and southwestern prefectures of Gikongoro, Cyangugu and Kibuye, and parts of Butare, Gisenyi, Kigali and Byumba. Soils in these high altitude regions lack regenerative capacity when they are put under intensive cropping. Their optimal use is forest or tea crop cover. Only highly manured gardens around homesteads could develop the so-called "*sols anthropiques*" which were productive. In addition, these poor-quality lands

were extremely vulnerable to disasters. Localized famines of 1989 were particularly severe throughout the highlands of Cyangugu, Gikongoro, Gisenyi and Kibuye prefectures.

In the Rwandan context, the notion of resource capture should be expanded to include the capture of State itself, both in the political and economic sense. To have access to power, to those who are in power or to own property was a means of securing political power. In the 1980s the political, military and administration elites focused on amassing wealth and the régime did not pay sufficient attention to the broader social issues of poverty, education, health, and equity of access to natural resources. On the contrary, there was a practice of land accumulation by those in power, and the development of state administration. In one of the most accurate analyses of the extent of capture of State in Rwanda, Maton (1993) illustrated how the wealthy leaders, regardless of ethnic group or any other status, were fiercely and irresponsibly amassing considerable wealth amid appalling misery, on the verge of a "social and political volcano that could explode at any time."

The correlation between political power, wealth and resource capture was established from reliable statistics in the above study by Maton. He showed that since the early 1980s, the revenue of State servants was higher than those of businessmen. Furthermore, nearly 22 per cent of the revenue of the richest came from the rural sector in 1982. In 1993–94, that contribution of the rural sector had passed to 50 per cent.

Regional allocation of foreign aid to development projects reflected this accumulation pattern. Furthermore, a project could be physically located in a given region, but economically target beneficiaries of a different region where the project manager came from. By the mid-1980s, competing regional interests over projects dominated politics. The expectations of the south as expressed in consultations that were held in each prefecture in a national planning process could not be met. Indeed the plan could not be elaborated because the exercise became highly divisive. Inequitable social conditions and political oppression started to highlight the disparities in the distribution of rural development projects. As power was in the hands of a northwestern elite, the discontented southerners held the regime to be responsible for this.

The notion of resource capture must be further extended to include the attempts of the elites to exploit the situation of poverty itself as a means of attracting foreign aid. This poverty became a resource for the elite, as different factions struggled to capture the resources that ought to target the poor. Even after the return to multiparty system that took effect in June 1991, the elites interpreted democracy as a way of securing access of members of their factions to these foreign aid resources.

Up until the mid 1980s, the capture of national resources had permitted harmony among various factions of the national elite. However, in the second half of the 1980s, this situation deteriorated rapidly as the value of Rwanda's exports diminished due to the fall of coffee prices on world market. The value of coffee exports which was US$60 per capita per annum in the period 1976-1979 fell to US$13 in 1991. With decreased external earnings, the capacity of the regime to redistribute State resources among its clients, to reward political loyalty and to attract new supporters suffered, and dissension against it consolidated.

Soil degradation accelerates and worsens environmental scarcities by reinforcing population pressure, contributing to fallow reduction and to further soil degradation

Table D3 gives demographic data, by prefecture, for the years 1991 and 1994. The population of Rwanda increased more than threefold over a period of fifty years, from 1,887,000 in 1948 to 7,500,000 in 1992. The rate of annual population growth was one of the factors of the imbalance between food production and food demand. Population grew 1.5 per cent in 1948. It was 2.6 per cent in 1970, 3.7 per cent in 1978, 3.4 per cent in 1987 and 3.2 per cent in 1992.

About 92 per cent of the country's population was rural and earned its living from agricultural activities practiced on 11,250 km^2 of cultivated land (43 per cent of country's area). This represented a density of 843 inhabitants/km^2 of arable land. With a population density of 290 inhabitants/km^2 in 1992, Rwanda was the most densely populated country in Africa. The low percentage of urban population meant that most of the country's population increments were absorbed by the rural sector. This, with the land fragmentation by generational transfers in heritage practices, lead to high proportions of small FLHs. With 1,277,000 rural families, the average family thus had only about 1 ha of land upon which to subsist.

The topographic conditions of the country are not favourable for high population densities. The topography is rugged and sharply demarcated hills and mountains with steep gradients characterize the land. Thus high population pressure caused the reduction of fallow land and increased pressure on marginal and pasturelands, accelerating deforestation and erosion. As land was further divided amongst heirs with each successive generation, the total family production output and the per capita food availability decreased. This practice insured that each new generation inherited more poverty, and rural families of younger generations had fewer resources to invest in health and education.

High population caused a reduction of grazing lands, whose area cover dropped from 34 per cent in 1965 to 16 per cent in 1987. The conse-

quence of this was that there was an increase in livestock densities on remaining grazing lands, which contributed to their rapid degradation and negatively affected the value of the farmland. Based on the total national production that stagnated since 1983, the biophysical carrying capacity[271] was estimated to be 5,240,000 inhabitants (Gasana, 1991a). The total population permanently living under food insecurity was 2,360,000 in 1990. As a result of high population growth, agriculture production stagnated since 1983 and labour productivity fell, while population continued to grow at more than three per cent per annum. By the early 1990s, rural unemployment affected the equivalent of 30 per cent of active population. Policy response to high population growth was adopted only in the beginning of the1980s. Family planning programs were implemented, but they had had no effects when the multi-faceted social, economic and environmental crisis erupted in late 1980s.

One of the factors that contributed to poor population policy in successive regimes was the demographers' presentation of predictions of continuous geometrical long-term population growth, without taking into account the carrying capacity parameters. For example, it was projected that Rwanda would reach a population of 26.7 million inhabitants by the year 2030, whereas in actuality it would be difficult to imagine how it could reach even 10 million if there wasn't either a technological revolution to increase crop production or an economic revolution in order to reduce direct dependency on natural resources.

In the beginning of the 1990s, Rwanda faced an enormous challenge of meeting the needs of its population which was projected to reach 10,239,000 by the year 2000. The projections made by the ministry of Agriculture, Livestock and Environment in December 1991 (Gasana, 1991c) showed that the required productions necessary to meet this population increase were a real challenge. They required doubling the 1990 production level on the same arable land, and this represented an average annual production growth of 7 per cent between 1992 and 2000. This required achieving a thorough technological transformation of agriculture, a project which obviously could not be achieved in such a short time. There was little chance that the country could reach these targets shown in this table as the enormous technology gap, increasing soil losses due to crop production intensification and declining soil fertility due to soil nutrient removals presented substantial obstacles to progress.

All this highlights once again the importance of the population variable in the Rwandan socioeconomic and environmental tangle. It became clear that the country was paying the penalty of not having adopted appropriate population policies aiming at slowing population growth and developing non-land based economic activities earlier. It is evident that high

demographic pressure and resource capture led to unsustainable land use as the poor were forced to farm on shallow soils of steep hillsides in combination with the shortening of fallow periods and the cultivation of pasturelands and forested areas. Furthermore, there was a spillover of population onto marginal lands. Poor farmers who had not inherited land distributed after the Revolution were squeezed onto steep and stony lands where soil is constantly removed by erosion. For its part, soil erosion increased demographic pressure on natural resources by reducing soil organic matter and nutrients, diminishing water retention capacity and reducing soil depth available to root growth.

Due to shortage of land, most agriculture is practiced on hillside. Table C5 shows that 50 per cent of arable land has slopes that are higher than 10°. The annual loss of agriculture land due to soil erosion was estimated to be equivalent to 8,000 ha in 1990, representing 0.7 per cent of total arable area. This represents the loss of the capacity to feed 40,000 inhabitants every year. It was further estimated that to compensate the loss of soil fertility due to erosion requires the import of about 142,000 tons of fertilizers every year, or about 140,000 tons more than the quantity used in 1989 for food crop production.

This hillside agriculture faced three uncertainties in the northwestern region as described by Charlery de la Masselière (1994): uncertainty about the integrity of land heritage, which puts into question, for example the possibility of controlling soil degradation on the hillsides; uncertainty about profitability of productive investment, on which depend land conservation measures; and uncertainty about small-holders' economic future, which may lead them to leave the hills.

High-altitude FLHs on steep slopes of acidic soils without permanent cover crop were those hardest hit by soil erosion. The deprivation of farmers in these conditions was passed to their children, whose situation was even worse. Soil erosion, in a country with a land resource-based economy, contributed therefore to the erosion of the social fabric by aggravating social disparities, locally between farmer families, and nationally between agro-ecological regions. It is one of the factors of the violent social relations that have not allowed the peasants to live in good harmony with the environment. The affected populations lived in a permanent situation of environmental scarcity as they suffered all the consequences of excess or shortage of rains, crop diseases, landslides, soil acidity, and could neither grow buffer crops such as banana, nor apply the more secure multi-tier agricultural systems.

Regional disparities in agricultural productivity, disfavouring the southern prefectures of Cyangugu, Gikongoro, Kibuye, but also certain highlands of Gisenyi in the northwest, were due more to large areas covered by eroded

acidic soils than to an allocation of development projects favouring the north. In the 1980s, hundreds of poor farmers in the southern highlands died as victims of severe environmental scarcities while others fled the country as ecological refugees. The ill social consequences of the environmental discrimination compounded the political rift between the ruling northern elite and the southern region. As we shall see, the rampant famine in the south contributed to the weakening of the legitimacy of Habyarimana's one party regime.

One of the factors that aggravated the decline of agricultural productivity was fuel-wood scarcity, which has links with soil degradation. In Rwanda there is a heavy dependency on biomass as a source of energy. Combined with an accelerated population growth, this dependency contributes to accelerated deforestation. It was estimated that at least 90 per cent of wood production in Rwanda was used as fuel-wood. In the period 1991/92 the estimated difference between total annual wood needs and actual wood consumption was 4,489,500 m^3 (Gasana, 1991b; Gasana, 1994). The difference between actual total annual wood consumption and the annual allowable cut was 1,899,000 m^3. This means that the rate of wood harvest was 57 per cent greater than the growth of new stock. It was estimated that this over-harvesting produced a net deforestation rate of 8,000 ha per year, and involved accelerated use of farm crop residues as a substitute for fuel-wood equivalent to 1.7 ton of organic matter per ha per year. Wood scarcities therefore had negative effects not only on the reduction of vegetative cover but also on the loss of soil fertility. With the increasing use of crop residues as a source of domestic energy, it was estimated that only 26 per cent of the organic matter that was required to maintain soil fertility was recovered. The reduction of food production resulting from the decline of soil organic matter was the equivalent of 65,000 tons of cereals per year.

Survey data reported by Samyn (1993) shows that the average wood production in the farming systems at that time was 1.54 m^3 per ha per year. The small FLHs had enormous difficulties in producing all the fuel-wood they needed for domestic use. It was also estimated that intensification of agro-forestry could raise the average wood production from 1.54 m^3 to an optimistic 4.04 m^3 per ha per year. However, even if such a challenge could have been met, FLHs of less than 0.75 ha would still not have been able to produce all the wood they needed for domestic use as Table D6 shows. The structural scarcity of wood, one which had an enormous negative impact on farm crop production, was rooted in the lack of land for small FLHs and had been aggravated by overpopulation. The effect of scarcity as well as other factors described above, in conjunction with meteorological variations and crop diseases, had the effect of significantly reducing the per capita food energy supply.

A comparison of regional disparities in food supply based on data on food energy production between 1984 and 1989 showed that for a total of 7 out of 10 rural prefectures, the rate of production growth increase had been negative. It was positive for Kibungo and Ruhengeri and stagnated for Byumba. The situation was even worse for the rate of production increase per capita. All the prefectures recorded a negative rate. The most dramatic cases were for Gikongoro (-51.3 per cent), Kibuye (-48.2 per cent), Butare (-42.5 per cent), Cyangugu (-39.7 per cent), Gitarama (-24.3 per cent), and Gisenyi (-22.6 per cent). These are prefectures where demography interacts adversely with the effects of high soil acidity.

Delegitimization and Destabilization of the State: Internal Political Dissension Developed From Growing Rural Poverty That Threatened the Regime's Legitimacy

The rebellion leaders thought that both dissension and the discontentment of the dispossessed peasantry were an opportunity to wage war against this regime

The Second Republic, by concentrating political power to the northwestern region and putting an end to democratic processes initiated by the 1959 Social Revolution, sharpened competition for power and resources between Hutu elites of different regions, in addition to the Hutu-Tutsi competition which already existed. The grievances of the landless and near-landless peasants of southern Rwanda never ceased to be expressed ever since the elite of northern region took dominance of the Rwandan politics.

Discontentment in the south worsened with the belief that the regime was investing more in rural development in the north than in the south. As a result of lack of transparency in national project accounting, southerners did not see them as a consequence of adverse ecological conditions of their region. The southern-based political dissension that had begun to develop in the early 1980s exploited grievances linked to environmental scarcities in order to rally the peasantry against the regime. Indeed since 1989 the representatives of farmers' organizations started to vocalize this dissent against the administration. They denounced the dispossession of the poor peasantry, who were forced to sell their lands in order to survive.

This discontentment of the southern peasantry reached its peak by 1988–89. As I mentioned earlier, environmental scarcities were of such a magnitude that human sustainability itself started to be threatened as famine caused hundreds of deaths, and thousands more fled to other regions and to neighbouring countries. Since that time, the decline of the legitimacy of Habyarimana's regime accelerated. The leaders of the RPF in Uganda judged that time was ripe to declare war against the regime. In an

interview broadcast by the Voice of America in the week of the outbreak of the October 1990 War, a spokesperson of the RPF rebellion justified the choice of this particular timing referring to the convergence of conditions, citing the appropriation of national resources by the ruling elite and famine in the country, as follows:

> "… RPF chose this particular time because objective conditions in Rwanda were ripe. In the past the problem used to be presented as a Hutu versus Tutsi conflict, later it was presented as north versus south conflict, and then as a conflict between Gisenyi and Ruhengeri, and between Bashiru and Bagoyi groups. (…) Our analysis is that the contradictions were ripe, as Rwandans realized that the conflict was neither between Hutus and Tutsis nor between North and South, but between them and a clique of people who want to hold power and appropriate the country's resources. For this reason we thought this was the appropriate time. In addition there were problems of famine and others which showed that this was the time."

The dialectic of resources scarcity and resource capture by the elites continued after the breakout of war. This is illustrated by the following excerpt of an interview given to Radio Rwanda by the chairperson of a southern peasant organizations federation, TWIBUMBE BAHINZI:[272]

> There is a generalized famine in the country, that is difficult to eradicate, because it is only the cultivators-pastoralists who are bearing its impacts, while the "educated" are enjoying its side effects. Those who should assist us in combating that famine are of no use to us (...). There are still many obstacles before the end of the famine. It will require no less than a revolution similar to that of 1959, so that cultivators-pastoralists may have leaders who are really willing to assist them. (...)

> On top of this there is war. Even if the cultivators-pastoralists can still till the land, it is very difficult for them to work in good conditions when they have spent the night guarding the roadblocks, and are not sure that they are going to harvest. (...). As in the case of famine, it is the educated and the politicians who "eat" side effects of war, and the cultivators-pastoralists and the militaries who "eat" its ill effects.

This interview shows that despite the rigor of war, the peasants were not yet considering that ethnicity was an issue. At this time, their debate was still around social effects of environmental scarcities, social inequality in the country, and governance.

However, both war and radical politicians re-centered the dialectic of the 1980s, shifting it from rich versus poor and north versus south to that of Tutsi against Hutu.

In the context of war and internal pressure for political change, the standing regime could not protect itself from external pressures and there were few resources available to maintain authoritarian rule. Habyarimana was unable to come up with a new vision that would put an end to the growing societal rift. Even his allies started playing Hutus against Tutsis, and at the same time, the increasingly vocal farmer's representatives were undertaking to politicize the issue of rural poverty, and pursued an agenda contrary to the State.

By mid 1991, Habyarimana opened the system to multipartism. However, the political parties which emerged were only splintered factions of the former ruling party, civil servants led by influential politicians. The strength of the latter depended on their potential to protect their followers in the administrative bureaucracies and to ensure their share of State resources. The proliferation of violent party youth wings brought about the quasi-privatization of security and public violence. Militants of the major opposition parties based in the south wanted to topple Habyarimana's regime by a popular uprising based on discontentment of southern peasantry. They organized the rural youth of their parties into wings called *Inkuba*, or thunder, and *Abakombozi* or liberators, that perpetrated acts of wide scale vandalism in order to destabilize the regime.

Although the presence of environmental scarcities helped quicken the advent of political pluralism, acute party competition contributed to a deep political uncertainty. The opening of the political system coincided with a context of fierce war for power, and a loss of internal political coherence in the civil and military administrations. In the end, efforts to find solutions to environmental scarcities ground to a halt as the major focus became centered on war and factional politics. As far as agricultural production was concerned, there was a total paralysis of policy implementation, as the new political environment required the abandonment of the top-down agricultural extension methods.

In order to mobilize and enroll the rural youth, opposition parties exploited the issue of land resource capture by those who were close to the regime, linking it to landlessness and rural poverty. They used a model they designated as *Ukubohoza* or liberation, to force the restructuring of political resources between the northwestern ruling elite and the south-based opposition. Their strategy was to rally the unemployed urban and rural youths, using political and economic domination of the north as an argument to explain the root cause of their grievances. Their crusade consisted of acts of civil disobedience such as invading the offices of local administrations

and seizing the lands owned by influential authorities or those used by cooperatives and by development projects. Arsonists also targeted forest plantations established on degraded communal hillsides.

There is a correlation between these types of violence and the socioeconomic conditions of the communes where they occurred. Table D7 shows that a disproportionate fraction of the 30 communes with lowest revenue per capita were localized in southern prefectures of Gikongoro, Kibuye and Cyangugu. It further indicates that the incidence of sociopolitical violence was less likely to occur in prefectures where the average food energy production per capita per day was higher than 1,500 kcal. Their distribution followed very closely the occurrence of very acidic, high altitude soils of very low agricultural potential. It is in these communes, in addition to the Capital, that political violence started. In the south, violence took the form of an insurgency movement which drew its force from deprivation of the landless and near-landless peasantry and the desperateness of uneducated and jobless rural youth. Insurgents, in a way that was reminiscent of the 1959 Revolution, imposed new municipal authorities in Cyangugu, Gikongoro, and Kibuye prefectures.

It should be noted that the 30 richer communes, mostly found in productive agro-ecological regions of the Kibungo, Kigali and Byumba prefectures, had no record of insurgency. However there were cases in which rival politicians imposed violence on these richer communes. Hence, not surprisingly, this violence focused along ethnic lines and targeted the Tutsi. The communes concerned had significant Tutsi populations, such as Kanzenze in Kigali prefecture, and Murambi in Byumba prefecture, where the Liberal Party, mostly Tutsi, wanted to establish a stronghold.

In the *Ukubohoza*, the opposition goal of power sharing matched the youth's goal of land sharing. The spirit generated by the insurgency was extended to the administration in general. As opposition parties entered the government on 16 April 1992, there was a new phenomenon of partitioning of State in disguise of "power sharing." In this generalized instability, personal interests of leading party heads fluctuated, and the Government failed to maintain political coherence. Parties treated their departments as private fiefdoms. This contributed to rivalries and to a low level of accountability. A party holding a portfolio would use it for advancing its strategies, from use of administration resources for the party to member recruitment and non-member exclusion. This created job insecurity among the civil servants, and job insecurity led to the creation of perverse solidarity. Under conditions of economic hardships, strong political allegiance was essential for survival in the new politically segmented administration. Thus, elites, fearful of losing their government positions and power, created protection alliances and recruited landless rural youth in party youth wings for their political protection.

For the hard-liners in Habyarimana's camp, considerations of maintaining political power took precedence over ending war. Similarly, for the rebellion and its allies, considerations of power took precedence over securing society's harmony. With the impetus of the *Ukubohoza* insurgency, the partitioned State power lost its ability to control violence in rural areas. In many communes, discontented youth and radicalized poor peasantry were setting the rules themselves, manning road blocks and impeding the gendarmerie's law maintenance operations.

To halt this destabilization, the *Interahamwe* youth wing was organized by men close to Habyarimana as a response. In certain areas, the *Interahamwe* defended the influential politicians, protected their lands from squatters or "liberated back" the lands that were already taken over. In the northern prefectures of Gisenyi and Ruhengeri, a considerable effort was underway to prevent the rally of the youth around the theme of land resource capture. Leaders of farmer's organizations were enrolled in the ruling party, MRND and local members of the opposition met a harsh treatment. The climate was so hostile against dissension that even the landless and near-landless peasants had to support Habyarimana's camp in solidarity against southern-based opposition.

With this solidarity, the capture of land resources remained a dormant issue in the north. Yet in the late 1980s through 1991 there remained discontentment in Gisenyi about the World Bank sponsored capture of ranches by the members of Habyarimana's family and their close allies. In the Gisenyi and Kibuye prefectures, violence in poor communes took the form of ethnic strife. Politicians exploited the rampant misery in order to turn the landless rural poor against the Tutsi, promising them their lands in return for support. This pattern was observed in 1991 in Kibilira commune of Gisenyi prefecture, and in August 1992 in Gishyita and Rwamatamu communes of Kibuye prefecture.

The northwestern-based regime, besieged by the central and southern political dissension, tried to avoid a matching movement of the northern peasantry. To prevent insurgency, the dissatisfaction of the poor peasantry in the prefecture of Gisenyi had to be channeled into ethnic strife. For this, the northwestern ruling elite used kinship ties to strengthen its influence on potential dissidents and to rally their support, and recruited landless youth in the north-dominated army. Ethnic strife of this pattern concerns the communes of Kibilira and Satinsyi. In other communes of Gisenyi and Ruhengeri, ethnic violence was more openly a result of the criminalization of the administration. Local authorities became intolerant of the opposition which they considered to be a contagion from the southern and central regions. They incited Tutsi massacres in several communes, including Giciye, Kayove, and Mutura in Gisenyi, and Nkuli and Kinigi in Ruhengeri.

By mid 1992, the major endeavor of political parties was to control the rural society. As it constituted 90 per cent of the country's population, it was not only a reservoir of votes, but also, being a reservoir of poverty, it was a reservoir of militants for youth militias. There were strong fears of civil war opposing the rich and the rural poor. With this in mind, Habyarimana deployed a great effort to personally request the influential farmer representatives, individually, to rally the peasant movement on his side. He promised them to take their advice into account and to include their own goals in the agenda of his party. With this outreach effort, he had no problem in co-opting some of the most vocal farmer representatives in different positions of his party and in making them abandon their rhetoric concerning rural poverty.

Mass movements of internally displaced persons (IDPs) concentrating in particular regions worsen misery, create ethnic tensions

After the failure of its first attack in October 1990, the RPF resorted to guerrilla war and maintained a military pressure on the country. As the war front advanced, thousands of civilians were forced into displacement camps. This caused immense suffering to the inhabitants of Byumba and Ruhengeri prefectures and disrupted agricultural production in two prefectures that were among the four that recorded overall food production surpluses.

It must be underlined that the displacement of populations fleeing war in the north contributed singularly to the combustion of ethnicity that led to the deterioration of the political process in 1994. The civilian populations of a different ethnic group than that of the rebels were explicitly targeted by the rebellion based in Uganda, expulsed from their homes and continuously bombed in the camps in an attempt to force them to move further into the government controlled zone. Their living conditions were harsh and the rigor of war operations often made dreadful assaults on personhood and dignity.[273] At each phase of the war as the frontline kept advancing, there was a new and more significant influx of IDPs because the rebels included the camps among the military targets.

The IDPs out-flux reinforced the ethnic dimension of the conflict and was the beginning of the most tragic drama of the country's history. The war casualties exceeded 100,000 people, and the infant mortality rate reached 300 per 1,000 live births. With the overwhelming numbers of populations involved, the means of traditional hospitality in recipient areas of the prefectures of Byumba, Ruhengeri and northern Kigali were far exceeded. The IDPs were settling in the open or in communal forest plantations, setting up round thatched huts of fortune ironically named *blindés*, because, in addition to resembling in shape and size the small armored cars of the army's special units, they were quite the opposite as far as the protection effect was concerned.

There were four phases of the IDPs outfluxes:

- In the first phase (October–December 1990), the front, localized in Byumba, forced 30,000 inhabitants of the Muvumba and Ngarama communes to flee their homes.

- In the second phase, the guerrilla-type war extended to other communes of Byumba (Bwisige, Cyumba, Gituza, Kivuye, Kiyombe, Mukarange, Ngarama) and by the end of 1991 the IDPs population had reached 350,000 inhabitants.

- In the third phase, in January of 1991, the RPF widened and elongated the war front after the attack on Ruhengeri town and in Butaro and Cyeru communes. By July 1992, when the cease-fire Agreement took effect, the IDPs population in the camps had reached 500,000 inhabitants.

- The fourth phase corresponds to the violation of the cease-fire agreement of February 1993 by RPF and the resumption of war. At this time, the total number of IDPs had surpassed 1,000,000 inhabitants, or about 1/7 of the total country's population, which had been regrouped into 40 camps. The situation further worsened in October 1993 as a new influx of 350,000 Burundi Hutu refugees who had fled violence following the assassination of President Ndadaye were hosted in Butare prefecture, already in a very precarious food situation. In total, the number of IDPs and refugees together reached 1,350,000 inhabitants.[274]

This phenomenon took place in areas of high populations of Ruhengeri and certain communes of Byumba, both of which did not have sufficient resources for the incoming populations. Short of food and of wood for cooking, these IDPs had their normal caloric food intake drastically reduced. In addition, the social impacts of these camps were dramatic. Families were separated and scattered, affecting marriage, divorce rates and morality standards. Health centers were overwhelmed and mortality increased. Suspension of schooling and lack of occupation for the youth led to increased delinquency and crime. As of February 1993, the situation was as follows:

- In Byumba, the inhabitants abandoned 12 of 17 communes, while five communes had more than double their population.

- In Kigali and Urban Kigali prefectures, the total population of IDPs from Byumba and Ruhengeri was about 500,000 inhabitants.

- In Ruhengeri prefecture, five of the 16 communes were abandoned, while six communes, which hosted the IDPs, had more than doubled their population.

The scarcity situation existing before the war was aggravated. Supply of food energy was at best 1,100 calories per person per day,[275] not only due to a limited food supply, but also to reduced means of transportation available to humanitarian organizations. This combined to create severe environmental scarcity which was the result of previous demand-induced and supply-induced scarcity. The push of the frontline was followed by the push of the front of ecological devastation and exacerbation of environmental scarcity. In the end, this situation led to total economic deprivation of families and entire regions, and had catastrophic consequences on the economy and on social fabric at the national level. The mechanism is quite straightforward:

- population pressures increased, as refugee camps were located in the same regions (prefectures) as the origin of those concerned;[276]

- Growth of influx of populations with the advance of the frontline at each phase of war further increases population pressures;

- Increase in the demand for food, firewood and water scarcity in recipient communes provoked an increase of the rate at which environmental resources are used;

- Disruption of agricultural production due to pillaging of crops, war insecurity, disruption of services;

- Host populations become as challenged as IDPs in terms of scarcity;

- Tensions developed between IDPs who received assistance, and host populations who did not receive assistance but whose crops were pillaged and who could not produce according to normal standards;

- Increase in the radius of resource scarcity. Where the rate of resource replenishment is lower than the rate of increase in resource demand, resources are rapidly depleted, and prices of basic food items rocket upwards;

- Strain on resources reduces access to food commodities in urban areas like Kigali and in turn brings social tension to the national level;

- At each new phase of war, IDPs and host populations move together in a new area, and this increases pressure on the environment;

- The dispossession of IDPs appeared more and more irreversible and the spread of deprivation reinforced frustration and heightened ethnic hatred;

- The transitional government which had become effective as of 16 April 1992 and had negotiated a peaceful settlement was placed under heavy stress as it divided spending between acting to stabilize the

frontline, and to prevent further IDPs influx while assisting the existing needy populations in camps.

There was a powerful interaction of dynamics that increased the flow of IDPs, environmental scarcity, and escalation in radical political discourse and political violence. Environmental scarcity compounded by war was an overwhelming factor behind the use of ethnic politics by unscrupulous political actors. The intransigence of the rebellion further contributed to the escalation of ethnic politics by providing the conditions that consolidated the political base of hard-liners.

When war broke out in 1990, youth aged between four and seven never completed their primary school. Instead they lived in conditions of social disruption in the camps, where they experienced daily hardships, insecurity and death. They became the principal base for the recruitment of members of *Interahamwe* militias. They reinforced the alliance between the radical politicians and the urban delinquents, not for ideological commitment, but because of the torture of famine and other conditions linked to the extreme misery of the camps and lack of alternatives. Indeed they served whoever paid or fed them. Many were seen turning the party colours of their caps inside out in riots, depending on which party hired them.

War in the North and the advance of the RPF, driving people from their homes as they marched southward, created anti-rebellion sentiment. The discontentment of the IDPs helped President Habyarimana reclaim support and legitimacy. Indeed he became the IDPs' most vocal advocate and the leaders of his party had openly manifested more sympathy to their miserable situation than had the opposition leaders and the opposition-led government. With the progress of the Arusha peace negotiations, the phenomenon of population displacement entered into the vote equation. For the regime and the anti-RPF camp, the IDPs represented an important capital of votes to win over, and for the opposition, they represented a loss of votes. Here we have the harsh reality for the IDPs. For many of them the warring factions were divided into two camps among which they had to chose: the camp of those who wanted them to die before voting and the camp of those who wanted their votes before they died.

In the prevailing political environment, the IDPs could not get the sympathy they so much needed, as their camps moved closer to the Capital Kigali. Instead they encountered hostility from the opposition members, Hutus and Tutsis alike. They found themselves in utter bewilderment, unable to understand this lack of sympathy for their situation. On the other hand, the inhabitants of Kigali could feel and see directly the realities of war-induced environmental scarcities. Not far from the city, about 500,000 IDPs were in camps, such as Rutare, Mugambazi, Mbogo, Rutongo. Prices for food rocketed upwards, as Byumba and Ruhengeri,

which were among the 4 breadbasket prefectures of the country, were invaded. Kigali's fuel wood forest plantations were cut down in the communes of Buyoga, Tumba, Mugambazi, Mbogo, Tare, Rutare, and Muhura.

Ethnic-based slaughter in the wake of assassination and its impact on neighbouring Congo-Zaire

In the beginning of 1994, the Rwandan society was under the interacting stresses of unsettled political and military tensions, a struggle for power and State resources among the elites, environmental scarcities, and the IDPs' growing resource needs. In this context of simmering rebellions and failing institutions, ethnic tension combusted.

The government was therefore unable to cope with a famine of unprecedented magnitude in the country's history. By the end of March 1994, there was a real threat of mass starvation resulting from this tangle of stress factors. In the beginning of April 94, FAO and OXFAM made a stern appeal for urgent assistance for more than 800,000 inhabitants who were under the threat of death by starvation. Here is an account made by AFP news agency in a release of 4 April 1994:

> NAIROBI, 4 April (AFP) – At least 500,000 people are threatened by famine in Rwanda, due to drought, food shortage, influx of populations displaced by the civil war, and the influx of Burundian refugees (…).
>
> The 500,000 are "populations in extreme urgency," (…). The number of those affected at different levels is comprised between 800,000 and 2.5 millions (…).
>
> A report established by the humanitarian organization OXFAM with the collaboration of the government and other organizations sets at more than 800,000 the number of people who need urgent food aid. (…).
>
> Another survey by the humanitarian organization Caritas puts at more than one million the population in urgent need, and the government is requesting food aid for at least 2.5 million people, different humanitarian sources indicated.
>
> Two weeks ago, the United Nations Agriculture and Food Organization (FAO) had found the food situation all over Rwanda to be "critical" and had estimated that only urgent food aid can avert the famine.

When the plane carrying presidents Habyarimana of Rwanda and Ntaryamira of Burundi was shot down on 6 April 1994, it was like pouring fuel on a burning house. This event, at a moment of extreme ethnic

tension in both countries, ignited the Rwandan society. War resumed on 7 April and the fear it caused added to the above threat of widespread starvation and offered a new tool to extremist political Hutu groups. Seeking to prevent the takeover of Rwanda by the Tutsi-led RPF and its southern-based sympathizers, they used the presidential guard and the *Interahamwe*, comprising mostly Hutu youth from IDPs camps near Kigali, to perpetrate the murder of Hutu opposition politicians and the mass slaughter of the Tutsi.

This account of the succession of events that characterized the Rwandan political process in the early 1990s shows clearly that the humanitarian tragedy of the IDPs, which was an effect of the October 1990 war waged by a Tutsi-led rebellion, caused a spiral of environmental scarcities, which led to a spiral of ethnic hatred. This dreadful context of acute environmental scarcity, heightened ethnic tension and the resumption of war, was harnessed by extremist Hutu politicians as a pretext for the Tutsi genocide.

The RPF defeated the RAF and took power on 19 July 1994. Following this takeover, over 2 million Hutu refugees fled to neighbouring countries, including 1.2 million to the Democratic Republic of Congo (DRC).

This massive exodus had a devastating environmental, social and political impact on the Eastern DRC, particularly in the Northern Kivu Province. This is a fertile and densely populated area, where Rwandan immigrants, Tutsi and Hutu, known together as Banyarwanda constituted the majority of the population. They comprised immigrants who arrived before colonial era, those who arrived in organized transmigration under the colonial administration, and the 1959 Tutsi refugees.

Before 1994 exodus into the region, there were already land tenure disputes and political competition in the Masisi, a region of Northern Kivu, pitting the Congolese Hunde, with their Nande and Nyanga allies, against the Banyarwanda. The disputes resulted from economic domination by the Banyarwanda, who controlled the lands and were using their wealth to secure political influence, both locally and in Kinshasa. The grievances due to the inequitable access to land which resulted led to ethnic clashes in 1993. This violence, which targeted the Banyarwanda, caused more than 6,000 deaths and displaced 250,000 people.

Following the massive influx of Hutu refugees in 1994, there was a new Hunde, Nande, Nyanga and Hutu alliance against local Tutsi, who were forced to flee to Rwanda. However, as many Hutu refugees infiltrated in Masisi in search of land to cultivate for survival, pressures on environmental resources mounted and the Hunde feared that this influx would further strengthen the Hutu control over the land resources and local politics, and eventually lead to the creation of a Hutu state in the Great Lakes

Region. Amid this rising fear, the Hunde and Hutu politicians competing for political influence in the Capital Kinshasa fomented animosity between indigenous groups and Banyarwanda populations. The resulting conflict caused thousands of deaths and displaced 200,000 people.

After Laurent Kabila's power takeover in the DRC, there was a new reshuffling of alliances. The Hunde, Nande, Nyanga and Hutu united against Tutsi and forced them to flee to the Congolese town of Goma and to Rwanda.

The succession of land disputes between frequently-shifting alliances of warring groups in Northern Kivu were sharpened by the contagion of the Rwandan ethno-political conflict. The most recent of these disputes pitted the pastoralist Hema against the Lendu peasants in the Ituri region. It resulted from claims made by Hema on the land allegedly belonging to the Lendu.

These land resource conflicts in Eastern DRC help sustain conflict in the region, as the Rwandan and Ugandan occupying armies are accused of arming sympathizers among the rival groups.

Conclusion

This paper illustrates how the ethnically-based winner-take-all land access model implemented following the 1959 Revolution failed to constitute a durable response to the ethno-political conflict in Rwanda. This model of natural resource distribution lacked a coherent land tenure framework, and a mechanism to integrate the losers into the exercise of power. In addition, successive post-independence regimes reinforced a system of many-faceted exclusions: regional, ethnic, political, social, economic and ecological. This led to explosive interactions between ecological exclusion affecting the poor peasantry and political exclusion affecting the elites of central and southern regions and the Tutsi. These interactions provided an opportunity to the rebellion and to extremist politicians who turned ethnic rivalries into political tools.

The analysis shows the need to pay greater attention to the role of environmental scarcities in the Rwandan conflict. It departs from most studies that focus on history and politics and shows clearly that there exist environmental root causes of the Rwandan conflict, different from those that have been addressed so far.

Three factors made the social effects of natural resource scarcity contribute to violence. First, large populations were adversely affected by scarcity, and were dissatisfied with the State. Second, the government did not consider seriously the significance of this dissatisfaction, and there was no open national debate on peaceful solutions. Third, the emerging opposition

leaders challenged the regime by organizing the dissatisfied and unemployed populations into armed militias, the youth in particular, and playing upon ethnic mistrust.

The major conclusion emerging from this analysis is that demographic pressure, inequitable access to land resources, and increased fragmentation of landholdings due to generational transfers, together caused loss of livelihoods and ecological marginalization of the poor peasantry. Peasants were trapped into practicing unsustainable crop production on easily degraded steep hillsides, further degrading lands, diminishing productivity and decreasing fallow times. The resulting degradation of the ecological capital led the rural economy into a vicious circle of shrinking returns and increased pressure on a steadily diminishing resource base.

Internal political dissension developed from the dialectic of worsening rural poverty, threatening the regime's legitimacy. The rebellion leaders thought that the discontent of the dispossessed peasantry was an opportunity to wage war against the regime. By forcing many to abandon their homes as IDPs, this war further worsened environmental scarcities and polarized the Rwandan society along its ethnic axis.

A cause-effect chain between environmental scarcity and conflict emerged: from environmental scarcities leading to the 1988/89 famine to political dissension in the south and to the Tutsi-led RPF war of October 1990; from the RPF war to increased environmental scarcity and to a spiral of ethnic tension after February 1993, culminating with the Tutsi genocide triggered by the assassination of President Habyarimana.

As regards lessons learned, four aspects seem to be relevant. First rapid population growth is the major driving force behind the vicious circle of environmental scarcities and rural poverty. The dynamics of this growth exerted an enormous pressure on natural resources and caused an imbalance between demand and supply, the rapid decline of agricultural productivity and the decrease of food availability. It induced the use of marginal lands on steep hillsides, shortening of fallow, conversion of pasturelands to crop production, deforestation and soil degradation. If so, then, second, conserving the environment is essential for long-term poverty reduction. Yet doing so requires breaking the vicious circle of demographic pressure—cultivation of steep hillsides—poverty. Decelerating population growth is the only way that will insure sustainable protection of the environment. In the long term, this is possible only if Rwanda adopts a bold population policy with aggressive family planning programs aiming at reducing fertility rate. In addition, sustainable agriculture systems based on technologies that improve soil fertility and increase fuel wood production can reduce the risks faced by the peasants.

Third, to break the links between environmental scarcities and conflict, win-win solutions are essential as far as access to natural resources of different sociological groups is concerned. The present winner-take-all model is one in which the ethnic group which fails to grab power loses its access to natural resources and thus loses resource security for its members. This has created a society that is constantly gripped by fear. The winner fears the return of the loser and this fear leads to bipolarization and to the distinction between dominating and oppressed groups. The fear is symmetrical between the two ethnic groups because of society's ethnic duality. Domination of one ethnic group leads to resentment by the oppressed one. This resentment leads to ethnic enmity. Enmity maintains tension and leads to revenge when the upheavals resume. The resulting double symmetry of fear and enmity that is the source of structural instability is now the root core of the Rwandan conflict. The Tutsis think that the Hutus threaten their existence, including their access to natural resources. The Hutus think the same of the Tutsis.

Fourth, solutions to a bipolar ethnic conflict cannot successfully be mobilized without a re-conceptualization of Rwandan national security that emphasizes human and environmental security before the security of ethnopolitical regimes. Indeed the challenge of the Rwandan society is how to change the ominous winner-take-all model and build a win-win situation. How will it be possible to convince all the rival ethnic factions that sustainable peace will come about only if Hutus seek security and prosperity without excluding Tutsis, and that Tutsis seek the same for Hutus? The answer would be to find a mechanism, perhaps based on a civilian-controlled police force, which would assure mutual security not just for the members of the ethnic faction in power, preventing it from monopolizing access to state and natural resources, and providing assurance of security for all.

The memories of past inter-ethnic victimization and revolving cycles of vengeance are a reality. It is equally a reality that ethnic violence is an important element of state violence, and both are associated inextricably with ethnic armed forces. These forces have become a real threat to the survival of society because instead of protecting all citizens, they are divided strictly along ethnic lines. A political model based on ethnic armies simply leads to the partitioning of society into rival groups paradoxically united by enmity and mutual fear. These military forces have sought winner-take-all solutions in the aim of maintaining ethnic power and ensuring the exclusion of losers. Yet these armies deprive human development initiatives of capital and resources, in a country where there is a great need to invest in education, health and environmental restoration.

Demilitarization is a pre-condition for interethnic confidence rebuilding and for helping Rwanda to turn away from environmental resource abuse

and ethnic violence. A police force which is placed under civilian control and exercises its coercive power legitimately, in a way that is legally and socially acceptable may be best. There must be enough safeguards in the constitution and the legislation to prevent the use of police violence against innocent citizens. Even police power and means of violence should not be so important that they could neutralize the entire society.

A new model based on human and environmental security and not security of ethnic factions in power requires reparation of the social fabric through interethnic and interregional confidence building, improvement of governance and reparation of the environment. The foundations for human and environmental security should include: improving equity in access to natural resources, creating employment, governing more accountably, and strengthening civil society.

With regard to this conclusion, the recommendations for the roles of IUCN and to other relevant international organizations are as follows:

1. *Assist the Great Lakes countries in re-conceptualizing the meaning of national security and promoting demilitarization and a shift of resources towards basic human security needs.*

   Rwanda faces enormous challenges that stand between today's symmetrical ethnic fear and a secure future for all Rwandans, Hutu and Tutsi. The international community and relevant international organizations could help in developing a new national security vision in Rwanda. Security for each individual citizen, whatever his ethnic group, and not security of ethno-political factions in power, could allow the country to achieve national reconciliation and socioeconomic reconstruction. The Costa Rican model of demilitarization and disarmament to build a democratic welfare state could serve as an inspiration.

   At present, a quasi-ethnic army is used to ensure the protection of the Tutsi faction in power against the excluded Hutu factions, a ferment for continued sociopolitical violence, not only in Rwanda but also in the entire Great Lakes region. Rwandan society remains gripped by tension, given a past of ethnic violence where the army was an instrument for maintaining the power monopoly. At present there seems to be no formula by which the armed forces can cease to be ethnic in their composition and command. If they reflect the actual ethnic proportions in society, they will be considered a threat by the Tutsi minority group. If, on the other hand, the Tutsi are over-represented, the Hutu will feel insecure. This is the dilemma faced by both Rwanda and Burundi, which have not yet freed themselves from the impasse of the winner-take-all model.

2. *Assist these countries, Rwanda and Burundi, in designing sustainable development strategies that reduce the heavy dependency of their population on cropland.*

The techniques for agricultural production used in both Rwanda and Burundi are environmentally unsustainable at the high population densities in these countries. To ensure adequate living standards for their populations, these countries need to transform their economies and their agricultural systems.

The vicious circle of poverty and environmental degradation can be broken by empowering citizens at every level. It is therefore of utmost importance to guarantee every citizen a basic education, which will help him or her to live a decent life, free of ignorance, famine, illness, and unemployment. An education program targeting a minimal level for every man and woman should be provided, so that youth may become fully responsible citizens who will not participate in extremist groups.

Sustainable development is a useful framework within which to address the environmentally linked aspects of the Rwandan conflict. In this context, demilitarization of Rwanda may be a key factor for peace and reduction of poverty. This should be recognized by donors and it should be put on the political agenda. There should be a dialogue on how to free national resources for sustainable development programs and on how to prevent their diversion to maintain ethnic armies.

3. *Assist in the search of strategies of reducing the environmental scarcities caused by IDPs and refugee influx in host areas.*

Massive displacement of populations fleeing conflict zones compels refugees to use fuel wood and water at an unsustainable rate in order to survive the extreme hardships of insecure camps. In addition to the stress caused to environment by this accelerated destruction of resources, the Rwandan case clearly shows that sharp environmental scarcity caused by population displacement and the resulting desperateness of IDPs may elevate conflict to new heights.

In light of the frequent environmental damages caused in the Great Lakes region by population flows in conflict areas, there is a need of new strategies of humanitarian and international political intervention. In this regard, IUCN and other relevant organizations could propose "Guidelines on protection of IDPs and mitigation of the impacts of sociopolitical conflicts on the environment."

For long-term peace and stability in the Great Lakes region, strategies aiming at promoting democracy may lead to more reliable results.

Promoting open political systems based on democratic principles is the only way to build consensus on common goals for national resource use.

4. *Assist in elaborating strategies for population planning and reduction of the demographic growth rate that take into account the protection of environment.*

    It is evident that Rwanda must seek ways to maintain a sustainable population by reducing the average birth rate. In the past total fertility rate per woman remained very high. The impact of family planning efforts has not been significant. The high population levels and slow economic growth have resulted in unsustainable pattern of natural resource use and deterioration of life support systems. Assisting the country in changing the trend in demographic growth is therefore crucial. There is a particular need to improve the education of women in an effort to raise awareness on the high fertility rates, and to improve access to contraceptives.

5. *Promote land use and sustainable livelihood systems that reduce loss of productive land and increase its carrying capacity.*

    Rwanda must improve land productivity in order to meet the needs of its population. This requires improvements in agricultural productivity as one of the factors in increasing or at least maintaining the carrying capacity of the land, and ensuring the long term social stability. There is need to further invest in agricultural research, allowing the development of sustainable agroforestry systems capable of producing greater yields in ways that are consistent with environmental protection.

6. *Assist with fuel wood production and development and implementation of alternative energy sources.*

    Deforestation and resulting land degradation have contributed to the misery of Rwanda's population, and inefficient traditional wood energy use remains a threat to sustainable agriculture. Forest cover needs to be increased. In particular, access to fuel wood in densely populated areas needs to be improved. At the same time there is need to explore other alternatives of energy sources (e.g., solar cookers) in order to reduce the pressure on existing forest resources.

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Tables

Table D2. Characteristics of family landholdings (FLH) in 1984

Category of FLH by area (ha)	Per cent of total number of FLHs	Per cent of total area of FLHs	Average area (ha)	Average family size	Food energy production per capita in kcal per day in 1989	Relative land produc- tivity index
< 0.25	7.4	1.0	0.215	3.4	1,156	3
0.26–0.50	19.0	5.9	0.413	4.0	1,414	1.9
0.51–0.75	16.5	8.4	0.585	4.4	1,721	1.5
0.76–1.00	13.8	10.0	0.763	5.1	1,893	1.4
1.01–1.50	15.6	15.7	1.034	5.4	2,027	1.1
1.51–2.00	11.1	16.1	1.424	6.0	2,249	0.9
> 2.00	16.4	42.9	2.274	6.4	2,521	0.6

Table D3. The population of Rwanda, by prefecture, in 1991 and 1994

Prefecture	Population in 1991 (from census)	Population in 1994 (estimated)
Butare	766,839	838,190
Byumba	783,350	856,237
Cyangugu	515,129	563,059
Gikongoro	464,585	507,812
Gisenyi	734,697	803,057
Gitarama	851,516	930,746
Kibungo	655,368	716,347
Kibuye	470,747	514,548
Kigali (rural)	918,869	1,004,365
Kigali (urban)	237,782	259,906
Ruhengeri	766,112	837,395
Total	7,164,994	7,831,663

Table D4. Average food energy availability in different social categories

Social category	Percentage of national population in the category	Available food energy in kcal per person per day
Abakire (the rich)	25	> 2,100
Abakene (the threshold poor)	15	1,900–2,100
Abatindi (the poor)	50	1,400–1,900
Abatindi nyakujya (the deprived)	10	< 1,400

Table D5. Classification of cultivated land by slope category

Category of slope		Area of cultivated land	
Description Steep	Slope (in degrees)	Percentage	ha
Level to undulating	0–5	34	382,500
Undulating	5–10	16	180,000
Sloping	10–25	32	360,000
Steep	25–30	8	90,000
Very Steep	30–35	6	67,000
Stiff slope	> 35	4	45,000
Total		100	1,125,000

Table D6. Needs and potential of wood production in the FLHs based on a consumption of 0.71 m³ per capita per year and mean annual wood production 4.04 m³ per ha per year

Category of FLH by area (ha)	Wood needs per FLH in m³ per year	Potential annual wood production per FLH in m³	Net wood production budget per FLH in m³ per year
< 0.25	2.41	0.87	- 1.54
0.26–0.50	2.84	1.67	- 1.17
0.51–0.75	3.12	2.36	- 0.76
0.76–1.00	3.62	3.08	- 0.54
1.01–1.50	3.83	4.18	+ 0.35
1.51–2.00	4.26	5.75	+ 1.49
> 2.00	4.54	9.19	+ 4.65

Table D7. Data showing correlation between poverty and incidence of sociopolitical violence in 1991–1992

Prefecture	Food energy production per capita in kcal per day in 1989	Distribution of the 30 richest communes	Distribution of the 30 poorest communes	Incidence of insurgency or ethnic strife (1991–1992)
Gikongoro	657		Kivu, Mudasomwa, Mubuga, Muko, Musange, Musebeya, Nshili, Nyamagabe, Rwamiko,	Kivu, Nshili
Cyangugu	846		Kamembe, Karengera, Kirambo	Gatare, Gishoma, Kagano, Karengera
Butare	1,056		Huye, Kigembe, Maraba, Ngoma, Nyabisindu, Runyinya	
Kibuye	1,097		Bwakira, Gishyita, Gitesi, Kivumu, Mabanza, Mwendo, Rutsiro, Rwamatamu	Gishyita, Rwamatamu
Kigali	1,187	Bicumbi, Butamwa, Gikomero, Gikoro, Kanombe, Kanzenze, Mbogo, Mugambazi Musasa, Rubungo, Rushashi, Rutongo, Shyorongi, Tare	Nyarugenge	Nyarugenge

Prefecture	Food energy production per capita in kcal per day in 1989	Distribution of the 30 richest communes	Distribution of the 30 poorest communes	Incidence of insurgency or ethnic strife (1991–1992)
Gitarama	1,219			Masango, Nyabikenke, Nyakabanda, Taba
Gisenyi	1,230	Nyamyumba		Giciye, Kayove, Kibilira, Ramba, Satinsyi
Ruhengeri	1,595	Nyakinama		
Byumba	1,763	Muhura, Murambi, Tumba	Cyumba, Kibali, Kivuye	
Kibungo	2,086	Birenga, Kabarondo, Kayonza, Kigarama, Muhazi, Mugesera, Rukira, Rukara, Rusumo, Rutonde, Sake		

Environment and Security Brief 5

Land Degradation in Haiti

For the island nation of Haiti, land degradation has increasingly become an impediment to development and poverty alleviation. Apart from undermining agricultural productivity and restricting family incomes, this degradation has also become a catalyst for social tension and conflict.[277]

Several processes are driving Haiti's land degradation. These include depletion of soil nutrients, salinization, agrochemical pollution, soil erosion, vegetative degradation, and deforestation.[278] The full impact of Haiti's land degradation reaches far beyond decreased productivity and reduced yields on of individual family, but holds broader, socio-political implications. Declining agricultural production and family income can prompt rural families to migrate to urban areas. This migration can lead to several pathways that generate social tension and conflict. In one scenario, rural to urban migration can lead to a rapid population growth in Haitian cities, particularly Port-au-Prince, thereby placing substantial strain on local resources such as water, sanitation, and drainage systems. Amidst rising discontent over declining standards of service and deteriorating living conditions, public protest and rioting may erupt over the government's inability or unwillingness to adequately address the situation.[279] The second scenario looks at how migrants usually settle in small groups, sharing similar origins and/or ethnic backgrounds. In the face of rising fuelwood prices and scarcity of other resources, conflict can emerge, pitting these groups against each other to compete over resource access.[280] Although the immediate causes of conflict in Haiti and elsewhere are usually more directly attributable to poverty, weak, irresponsive or corrupt government, and a lack of economic opportunities, it is important to recognize that particularly in Haiti's case, land degradation often initiates social instability and poverty,[281] culminating in violence.

Conservationists should address the environmental contributors to conflict and their implications for social stability. An effective, multipronged approach to slowing down and eventually reversing land degradation will require the combined efforts of local communities, government bodies, and NGOs.[282] Conservationists should help the government develop a framework for political and economic reform that incorporates the prevention of land degradation. Furthermore, conservationists can work with local non-government organizations and the government to establish more efficient needs-based donor allocations.[283]

Because much of the land degradation occurs on Haiti's small farms, conservationists can also work with the owners and operators of family farms to help them adopt more environmentally sound activities and identify incentives for sustainable land use.[284] Farmers can be educated on the impact of their choices and agricultural practices on their land's productivity and sustainability.[285] Furthermore, community forestry projects can be established so that communities can benefit from this common interest, and protect the island area from deforestation, which contributes to soil erosion and flooding.[286]

Environment and Security Brief 6

Impact of Conflict on Rwanda's Mountain Gorillas

The plight of Rwanda's mountain gorillas provides a powerful example of the impacts of conflict and environmental degradation on biodiversity. There are only around 650 mountain gorillas left in the wild. Approximately 300 live in southwest Uganda's Bwindi Impenetrable Forest and about 350 more are found in the forested slopes of the Virunga Conservation Area (Volcano National Park), which spans the Democratic Republic of Congo, Rwanda and Uganda.[287]

The gorillas have confronted a number of threats over the past for decades. Diane Fossey, an American primatologist who lived and worked with the mountain gorillas from 1963 to 1985, first drew public attention to the devastating effects of poaching and habitat encroachment on gorilla populations, that were facing extinction as a result. While there were an estimated 450 gorillas in the Virunga national park in 1960, their numbers dropped to only 254 in 1981 because of these activities. Thanks in part to the international attention gained by the conservation and research efforts of the Karisoke Research Center, founded by Ms. Fossey in 1967 in Rwanda, the gorilla population was better protected during the 1980s (the last human-induced gorilla death during that decade taking place in 1983) and numbers climbed back up to 324 by 1989.[288] But this was a short-lived victory, as 1990 saw the outbreak of civil war in Rwanda. The Hutu and Tutsi clashes between 1990 and 1994 directly threatened conservation efforts, with the park headquarters and Mountain Gorilla Veterinary Project's laboratory being destroyed, along with the Karisoke Research Center. By the mid-1990s, most conservation work was suspended because of the genocide in Rwanda. If gorillas were not caught in the crossfire, they were threatened by habitat destruction from military activities and sprawling refugee settlements, as well as increased poaching and snaring activities. Greater proximity to human activities also increased the gorillas' exposure to diseases, to which they have very little immunity.[289]

In spite of a catastrophic civil war and genocide during the 1990s, and continued instability in the region, the mountain gorillas have pulled through miraculously well: a recent estimate put the population in the Virunga forest at 358, up from the 1989 numbers. This increase is attributed to persistent, low-level conservation activities, even in the worst circumstances.[290] Basic financial and logistical support of park

staff, and in some instances collaboration with the government army, enabled conservationists to monitor and protect gorilla groups.

Efforts to clean up the park have been underway, and gorilla conservation is being promoted as a sustainable economic measure, as gorilla tourism attracts valuable foreign currency. With Rwanda's large population of rural poor desperately in need of farmland, the gorillas still face an uncertain future. Conservation workers say that local people need to be convinced that the gorillas and the forest are important, as well as potentially profitable.[291] However, incidents such as the March 1999 killing of eight tourists and their guide by Rwandan rebels in southwest Uganda could undermine such efforts, and point to the continued instability in the region.[292] Without peace and an increased awareness of the importance of the native ecosystem and its species, the delicate balance of preserving mountain gorillas and human livelihoods in Central Africa cannot be achieved.

Endnotes

271. In absolute terms, these disparities would not be alarming. But it is necessary to be aware of two things. First, farm differentiation according to size developed very rapidly from an egalitarian situation of the 1960s. Secondly, the proportion of those families that could not produce enough to satisfy their needs because of minute landholdings was too high. What is important to note is the absolute lack of access to land resources for a great number of rural families especially under conditions of high unemployment.

272. The biophysical carrying capacity is the total population that could sustainably inhabit the country under its present agricultural technology and a rural based economy.

273. Excerpt from a debate in the national language broadcast by Radio Rwanda on 28 January 1992.

274. This is illustrated for example by two documentaries of the Rwandan Television, "SOS Butaro" and "SOS Byumba", which contain IDPs' accounts collected in July 1992.

275. Personal communication by the director of the Rwandan Red Cross at that time.

276. This can be illustrated by the case of the Prefecture of Byumba. It had a total of 17 communes of which 11 had their populations displaced and concentrated in only 4 host communes of Gituza, Muhura, Murambi and Rutare. Thus Muhura Commune, with a population of 50,000 inhabitants, was hosting an additional population of 80,000 inhabitants displaced by war in northern Byumba, after February 1992.

277. P. Howard, *Environmental scarcities and conflict in Haiti: Ecology and grievances in Haiti's troubled past and uncertain future* (Ottawa: Canadian International Development Agency, June 1998), p. 7.

278. S.J. Scherr and S. Yadav, "Land degradation in the developing world: Issues and policy options for 2020," 2020 *Vision Brief* 44 (International Food Policy Research Institute, June 1997).

279. P. Howard (1998), p. 37.

280. T.F. Homer-Dixon, "Environmental scarcities and violent conflict: Evidence from cases," *International Security* 19(1) (Spring, 1994).

281. P. Howard (1998), p. 7.

282. T. White, p. 3.

283. P. Howard (1998), p. 46.

284. S. J. Scherr and S. Yadav (1997), p. 4.

285. T. White, p. 5.

286. P. Howard (1998), p. 43.

287. "Rare gorillas threatened by Rwandan rebels," *The Globe and Mail*.

288. P. Smita, "Mountain Gorillas: Rising from the Mist," Animal Planet, http://animal.discovery.com/tunein/gorillas/gorillas.html; I. Fisher, "Simple aid to gorillas pays off: Babies in the bamboo," *The New York Times*, March 6, 2001, http://www.awf.org/news/1203

289. A. Guclick, "Caught in the crossfire: The legendary mountain gorillas of Rwanda are in danger of being lost in the mists," *The Environmental Magazine*, http://www.emagazine.com/september–october_1996/0996cur-rgor.html

290. I. Fisher (2001).

291. I. Fisher, "African warfare threatens rare mountain gorillas," *The New York Times*, April 1, 1999, http://www.undp.org/missions/drcongo/tourisme1.htm

292. S. Denyer, "Gorillas, Rhinos Under Threat in Heart of Africa," *Reuters*, April 3, 1999, http://www.undp.org/missions/drcongo/tourisme1.htm

Colonialism and Inequity in Zimbabwe

Photo: A young Zimbabwean harvesting crops, Mbanefo Obiago/WWF-Canon

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Abstract

The battle over access to land resources in Zimbabwe demonstrates how gross inequities with respect to distribution of and access to key life supporting resources such as land and forests can compromise human and environmental security, and undermine conservation efforts. Matabeleland North, a large province in western Zimbabwe with low rainfall and poor soil fertility, has been a staging ground for such conflict. Colonial land policies alienated indigenous people from much of the land, and effectively started a cycle of resettlement, resource exploitation and degradation, ultimately leading to livelihood insecurity and resource-based conflicts. Following independence in 1980, this cycle was perpetuated in Matabeleland North as civil war raged on in the western part of the country, fuelling more insecurity and impeding environmental management and conservation efforts as the State's forest administration broke down. Both the people and the environment in Zimbabwe will continue to suffer until the inequities in resource distribution and access are resolved. Conservationists can contribute to this process by advocating policies that integrate communities into resource management decisions, by initiating and strengthening negotiation processes and conflict management skills, and by promoting further research and dialogue on Africa's protected areas that take into account colonial legacies and socio-political contexts.

Overview

Matabeleland North is a large province in western Zimbabwe with low rainfall and poor soil fertility. Traditionally, indigenous Zimbabweans in the region survived by a combination of agriculture and use of forest resources. Beginning with the invasion in 1890, British colonists alienated the indigenous people from much of the land. Rural blacks were largely confined to communal areas, while the remaining land was designated as white-owned commercial lands, demarcated or other forest lands and national parks. These land and resource allocation arrangements were first established under the Land Apportionment Act of 1930, and were furthered by the Land Tenure Act of 1969 (Vudzijena, 1998). The forced evictions in Matabeleland North have been described as "institutional violence," and in some parts of the province the evictions were described as "exceptionally harsh even for Rhodesian standards" (Alexander *et al.*, 2000)

Inequitable land distribution forced people in communal areas to subsist through overexploitation of resources, leading to resource degradation and ultimately enormous insecurity as livelihoods became threatened. This situation was further exacerbated when the colonial government established "state forests" for conservation purposes and as a source of indigenous commercial timber. The first indigenous forests were demarcated in 1936 and other forests were added in 1941. This development resulted in the further exclusion of local people from land and resources, which the people had previously depended on as a safety net in times of drought and resource shortages.

Not surprisingly, population growth and increasing resource scarcity forced people to encroach into state forests and underutilized commercial farms. The ensuing struggle for land and resources led to the liberation struggle in the 1970s and eventually to the independence of Zimbabwe in 1980. Throughout the liberation struggle the colonial government was not able to control settling in these demarcated regions, which further undermined conservation attempts and the sustainable use of resources. After independence, uncontrolled settlement in demarcated forests continued in Matabeleland North following the outbreak of a civil war in the western part of the country between the minority Ndebele and military forces of the newly elected government of independent Zimbabwe. This civil war resulted in a complete breakdown in forest administration, furthering resource depletion and illegal settlement in both the forests and surrounding large-scale commercial farms (See Table E1).

The legacy of inequitable land and resource distribution remains unresolved and has fueled resource depletion and associated human insecurity, mainly in the communal areas. Communal households are unable to diversify their sources of income due to social and environmental constraints. Ultimately, the inequity led to the current occupation of large-scale com-

mercial farms throughout Zimbabwe by landless people. Both the people and the environment in Zimbabwe will continue to suffer until the inequity in resource distribution and access is resolved.

Table EI. Key Events Affecting State Forests in Matabeleland

Time period	Event
1890	Alienation of indigenous people from the land begins with the arrival of British colonists.
1890–1970	Increased land alienation, including the establishment of Demarcated State Indigenous Forests beginning in 1936.
1970–1980	The liberation struggle, leading to independence in 1980, during which time the government is unable to manage or control resource use and settlement in state forests.
1980–1987	Civil war, with continued inability of the government to manage or control resource use and settlement in state forests.
1987–present	Internal peace accord (1987) and re-establishment of forest management. Poor progress on land redistribution. Continued occupation of state forests.

Conceptual Considerations

This case study reinforces the model of environment and security links illustrated throughout this book. It demonstrates how gross inequities with respect to distribution of and access to key life supporting resources can undermine conservation efforts. In Zimbabwe, inequity contributed to resource scarcity, which ultimately undermined livelihood security and forced people in communal areas to encroach into conservation areas. Ultimately, livelihood insecurity fueled conflicts, which have in turn contributed to further environmental degradation and resource depletion.

Background

General Characteristics of Matabeleland North Province

Matabeleland North is one of Zimbabwe's 8 provinces, taking up 76,567 km^2 or 19 per cent of the total area of Zimbabwe (AOAD, 1992). The estimated population was 1.14 million in 1992 or about 12 per cent of Zimbabwe's total population. The province's population is currently about

half rural and half urban, with the majority of the urban population living in Zimbabwe's second largest city, Bulawayo. The rural population density is estimated at 15.5 persons per km². Most of the indigenous inhabitants in the province are Ndebele (also known as Matabele), who migrated from Zululand in the south in the early nineteenth century (AOAD, 1992).

A large portion of the land in Matabeleland North is allocated to commercial farmland, national parks, sanctuaries, and state forests (Table E2). The majority of the rural population lives on communal lands, which occupy 39 per cent of the total land area in the province.

Table E2. Land and Population Apportionment in Matabeleland North (note: population data exclude the city of Bulawayo)

	% of total land area	% of population
1. Commercial farmland	16%	7%
2. State national parks and sanctuaries	27%	0%
3. State forests	11%	3%
4. Communal lands	39%	73%
5. Resettlement areas	3%	3%
6. Other (including small urban areas)	4%	14%

(Sources: AOAD 1992; CSO 1992; Dewees 1992; GOV 1998)

Matabeleland North is mostly middleveld (915 to 1220 m elevation), characterized by limited rainfall and poor soil fertility. Mean annual rainfall in most of Matabeleland North is less than 600 mm, and as in other parts of Zimbabwe, acute shortages of water are common due to the seasonality of rainfall patterns (AOAD, 1992). The rainy season is November to March and very little rain falls between April and October. In such conditions, soil nutrients are sufficient to sustain agricultural activity for a limited time only. The communal population of Matabeleland North is confined to regions where cultivation is hindered by poor soils and low and unpredictable rainfall. Besides these environmental constraints to agricultural production, the other significant limiting factor is availability of draft power (Bradley and Dewees, 1993).

Currently, livestock husbandry is the most common form of employment. This is a result of unpredictable rainfall patterns, infertile soils, the attractive zero cost of fodder and water in communal grazing zones and a lack of alternative employment options. Most of the province is categorized as "semi-intensive livestock farming region" and used for marginal rainfed maize and semi extensive livestock farming. This zone has extensive ranch-

es averaging 5 to 10 thousand ha and supports 1 to 2 thousand head of beef cattle.

History of Land Allocation

The land appropriation laws, policies and practices during the colonial era led to the current dualism in Zimbabwe's economy and land use practices by creating two broad land use categories of state and freehold land. Indigenous peoples were settled in communal lands (state land) with usufruct rights while settler farmers occupied freehold land with title deeds. Throughout Zimbabwe, communal lands tend to be located in land-use regions characterized by poor agricultural potential. Until well after independence the large-scale commercial farmers enjoyed unparalleled access to finance, agricultural extension services, and research facilities which enabled them to prosper. By 1992, communal lands occupied 42 per cent of the total land area of Zimbabwe supporting 55 per cent of the national population. Further, at least 60 per cent of the communal areas are in the least productive regions of the country. In contrast, some 4,660 large-scale commercial farmers own 30 per cent of the total land and 70 per cent of the prime farming land (Bradley and Dewees, 1993).

Demarcated State Indigenous Forests, which were established in 1936 and 1941 under the 1930 Land Apportionment Act, are also under state control. The province of Matabeleland is unique in that it contains about 90 per cent of the country's 908,422 hectares of indigenous demarcated forests. At the time of establishment people were already living in two of the demarcated forests (Gwaai and Bemebsi), cultivating and grazing their cattle along the valleys of the Gwaai and Bembesi rivers. These communities were allowed to remain since at that time they posed no evident threat to the forests or management plans of the forest authorities. In fact, they were considered to be an asset as these communities provided a source of seasonal labour and assisted with fire fighting. However, over time, their population increased both naturally and by in-migration and began to have significant effects on the forests. In order to control the populations within the forests, forest residents were legitimized through a permit system. Permits were granted for one year at a time and could be renewed. Even with permits, those living in the forest could not keep goats. Children of forest permit holders were required to leave the forest when they got married or reached the age of majority.

Jurisdiction over the various types of land and responsibilities for resource management within those lands has been and continues to be somewhat unclear and confusing. The institutional hierarchy in Zimbabwe runs from the national level to provincial, district, and finally village level. In the communal areas the district level, or the Rural District Council (RDC), is the lowest legal entity responsible for local level resource management and

enforcement of council by-laws. It coordinates district level planning and implementation of projects. One of the strengths of the RDC is its local representation that provides a link to rural communities. However, the problem with the RDC as an institution is that it tends to sympathize with the ruling political party. This often results in a confusion of roles between the RDC, the party and traditional structures in issues such as land allocation, resource management and conflict management.

The Forestry Commission is the state agency responsible for regulating forest utilization under the Forest Act (1954) (for gazetted forests) and more recently under the Communal Land Forest Produce Act (1987) (for communal areas). This latter Act requires the RDC to seek authority of the Forestry Commission to exploit its forest resources within the area under its jurisdiction. The Act does not require the RDC to consult communities when granting concessions nor to share any of its income. This has proved to be a problem because as finances are centralized at national level, the RDCs have been forced to raise funds on their own, limiting the ability of the RDCs to manage natural resources at the local level. The Department of National Parks and Wildlife Management is responsible for national parks (Nhira and Fortmann, 1993). In total there are 12 acts dealing with natural resource management in Zimbabwe, and there is poor definition of relationships among these (Katerere *et al.*, 1999).

Resource Depletion in Communal Areas

Agricultural potential in Zimbabwe is categorized using a 1960s classification scheme based on rainfall volume and pattern (AOAD, 1992). This scheme divides the country into five agro-ecological regions, ranging from the high rainfall of regions I and II in the east and central north-east, to the drier, more erratic rainfall of regions III-V which characterize the majority of the country. The two regions with least potential to support small-scale farming as practiced by the communal farmers are regions IV and V. Yet almost 75 per cent of all communal lands are located in these two regions with the remainder in regions I to III. In comparison, 55 per cent of the large-scale commercial farms are located in the better-off natural regions I to III (Maposa, 1995). In short, the productive capacity of the communal areas has become inadequate to support the communities sustainably over the long term. Consequently, many of these areas have become overexploited, and the pressure for access to additional land and resources has increased.

Although degradation of communal lands has occurred throughout Zimbabwe, it is perhaps most substantial in regions like Matabeleland North, where the natural conditions of rainfall and soils were and remain poor. Zimbabweans in this province have traditionally survived on a low-

input, communal production system based on a combination of crops and livestock. The communal farming system in Matabeleland is characterized by privately managed arable fields and communally-managed grazing lands. As population increases, new arable fields are allocated from under-utilized arable land or sub-divided from privately-managed fields. Continued growth in demand for arable land ultimately leads to encroachment of the common grazing lands. With time, designated grazing lands are insufficient to support communal livestock. The situation is exacerbated during periods of drought, which are a frequent occurrence in Matabeleland North.

Partly due to the poor soil fertility and limited rainfall in Matabeleland North, the indigenous people of the region are particularly dependent on trees and woodlands as a source of their livelihoods and as a safety net in times of crisis. This is manifested in the following ways (adapted from Dewees, 1992):

1. *Land Productivity:* Long-term soil fertility and productivity depends on nutrient fixation by trees, on nutrients from decomposed wood material, as well as on nutrients from termites and animals (including cattle in the dry season) that feed on the trees. Hence, the clearing of trees from the communal lands severely affected the ability of the soil to remain fertile over the long-term. Trees also help maintain soil nutrients by protecting the soil surface from erosion.

2. *Direct Food Source:* Trees and woodlands provide a direct source of food such as fruit, mushrooms, and insects, as well as provide a habitat for bees which produce honey.

3. *Fuel Source:* Woody material is the main source of fuel for rural Zimbabweans.

4. *Food for Livestock:* Woodlands provide important food for livestock during the dry season, which in turn provide food and manure.

5. *Materials Source:* Trees provide raw materials for baskets and other goods that can be processed and either used or sold.

6. *Formal Employment:* Some communal areas derive employment and income from sawmills that process hardwoods.

Given the important functions of forests in the region, it is clear that communal areas require forests in order to maintain ecological and social sustainability. Unfortunately, the growing population in communal areas has run into the limits of the available land, and thus increased the pressure placed on the communities to clear their woodlands in order to maximize short-term food production.

In Matabeleland North, the risk of food shortages is very high. Stunting due to malnutrition is reported to occur in as many as 37 per cent of all children in the region aged 2 to 5 (AOAD, 1992). Studies have shown that the primary cause of deforestation throughout Zimbabwe is clearing land for agriculture (World Bank, 1991). Not surprisingly, the greatest woodland depletion and soil erosion occurs in areas with high population densities and the longest duration of settlement. Thus, over time, the communal areas have become increasingly barren and inhospitable, with fewer resources per person. In the long term, therefore, it is the poorest families that will suffer most from land clearing as they are most directly dependent on the woodland resources for survival.

In short, then, there have been three mechanisms of resource scarcity in Matabeleland North. First, the limited availability of land and poor productivity intrinsically constrain supplies of food and basic resources. Second, demand for resources has increased as a result of population growth. Third, land clearing has further degraded and depleted the natural resource base as described above. This final mechanism of scarcity can be more catastrophic in cases where land is cleared or damaged at a high rate during violent conflicts (Percival and Homer-Dixon, 1995).

To make matters worse, the state's regulatory apparatus is not able to control the use of woodland resources in communal areas. To begin with, there is an ambiguous allocation of jurisdiction over natural resources, so it is unclear which institution has the authority and responsibility for the management of these resources (Moyo, 1992). In particular, the clearing of woodlands for agricultural production and the use of forest produce for personal use remains unregulated in communal areas (Katerere *et al.*, 1999). Thus, an outdated and confusing regulatory framework combined with competing institutional mandates fuel local level social and environmental insecurity.

Furthermore, there are no leases or title to land, so there is little incentive for individuals to conserve, a classic example of the tragedy of the commons (Moyo, 1992; Hardin, 1968). Communal areas have degenerated from a traditional resource management regime for common property with rules of exclusion to open access, to one in which there are no features of exclusion. For example, the "commons" are increasingly being utilized by the urban elite as a "free good" to graze large numbers of livestock. The communal areas have also become a conduit for the urban elite to access free grazing resources in the forests. The livestock are initially brought into the communal lands to be integrated with livestock belonging to communal people. The communal people then become the front agents to demand access to forest grazing for the artificially inflated herds. The urban elite are never visible in subsequent conflicts between the forest

authorities and the communal area residents. Under the circumstances, communal livestock owners seek relief grazing in the neighbouring forests or large-scale commercial farms.

A rise in competition and conflict between different social groups has been brought about by a protracted process of dislocation of traditional resource management systems and under-valuation of traditional knowledge, the limiting of options available to communal area residents through inequitable land administrative systems, and through continued population increase.

Conflict and its Consequences

Under the colonial system, Southern Rhodesia's vision for economic development was focused on the levels of white farmers' production rather than improvement of peasant livelihoods. Thus, the colonial regulation and administration justified direct interference in the affairs of peasants including evicting them from their land (Alexander *et al.*, 2000). The brutalization of the peasantry escalated after the Second World War. The colonists introduced land-use planning and hence aided the slow transformation from traditional knowledge systems towards commercial agriculture production in the 1950s and 1960s. Shortages of natural resources in communal areas worsened, and the inequity between the indigenous people and the white commercial farmers became greater. By the late 1970s and early 1980s people began settling illegally on forest lands and commercial farms at an increasing rate. As the numbers of forest dwellers increased naturally and through incipient in-migration, the forest authorities were obliged to introduce limits on the settler population by introducing a tenant registration system and raising the rent per family from Z$1 to Z$10 per annum (at that time Z$1 ≈ US$1.30 to $1.50, whereas in May 2001 Z$55 ≈ US$1). The increase in the tenant fee resulted in a sharp fall in the number of tenants in demarcated forests from 1350 to 350.

Although the authorities were trying to reduce occupant numbers they did not try to discourage cultivation in the forests. In fact, a detailed agricultural plan was drawn up in 1975 to provide selected tenant farmers with up to 50 ha each (Dore *et al.*, 1999). This plan was never implemented because the Forestry Commission's hierarchy did not support it.

Ultimately, inequity in the distribution of land and resource scarcity in communal areas helped spark Zimbabwe's liberation struggle, which intensified in the 1970s after initial guerrilla incursions into Matabeleland North as early as 1966 (Alexander *et al.*, 2000). As the war escalated, the colonial government was unable to control the migration of people from communal areas to forest lands, especially in Matabeleland North. Control of the tenant programme in state forests finally collapsed due to the escala-

tion of the uprising, and the subsequent civil war which occurred in the early 1980s. Hence, the Forestry Commission was powerless to prevent people from continuing to settle and use forest resources. This inability to properly administer the forests was due to the weak law enforcement capacity of the government and to that of the Forestry Commission in particular.

According to Moyo (1998), despite a tough government anti-squatter policy in forest lands, illegal settlement by rural and urban poor spread across all tenure regimes during and after the civil war. Thousands of families had relocated from communal areas from around the country to settle in the demarcated forests resulting in increased pressure on forest resources. People left communal areas to occupy not only forest lands but also underutilized large scale commercial farms, especially those that had been abandoned during the war. Some commercial farmers eventually sold their farms to the government after having failed to evict the illegal settlers.

Only in 1987, when hostilities between the Ndebele and the government finally ended, was the Forestry Commission able to attempt to re-establish management in the demarcated forests. However, the initial efforts of the forest authorities to formalize the residency of those that had settled in the forest prior to 1987 failed to stem the flow of new settlers. The uncontrolled increase in the number of settlers placed tremendous pressure on forest resources. Forest was cleared for cultivation and construction of new homes. The number of livestock in the forest increased disproportionately to the number of illegal settlers. Fences were cut to allow livestock from neighbouring communal lands into the forests. The emerging Black urban elite also sought to lay claims on forest resources in the form of grazing leases and timber concessions. They expressed their frustration with the unchanged legacy of colonial rule and viewed these state controlled resources as a means to begin narrowing the income gap between the former settlers and the marginalized Black majority.

The transition to peace in Matabeleland North was not a smooth process due to lingering hostilities and feelings of insecurity among the forest dwellers and neighbouring communities seeking access into the forests. The liberation struggle should have contributed to greater access to forests resources by Blacks, especially those in Matabeleland North, yet the legacy of exclusion of people from much of the land in the province continued. As part of land redistribution, the Forestry Commission was expected to lead the challenge to the monopoly of white commercial interests over forestry, hunting safaris and tourism industries. Instead, in defending the forests against new settlers, the Forestry Commission was seen as an extension of an "oppressive" central government and not trustworthy. The heroes of the liberation struggle were now the post-colonial state enemies based on ethnic competition. Efforts at re-establishing economic activities,

re-uniting divided communities and rebuilding decimated institutional capacity, were mired by local political entrepreneurs that wanted to portray themselves as the new post independence "economic war" heroes.

The conflict in Matabeleland North started as part of a national conflict against a colonial power over gross inequities with respect to land and scarce resources. At the end of the liberation war, the conflict had taken on new dimensions based on ideological and political differences between ZANU (Zimbabwe African National Union) and ZAPU (Zimbabwe African Peoples Union)—the main liberation movements—and had raised concerns about future economic, social and political relationships between the minority Ndebele people and the ruling Shona majority.

The conflicts around the demarcated forest reserves came to symbolize the broader struggle by the Ndebele against the establishment. The forest represented a sense of local identity and pride, a symbol that not all had been lost to others. Any attempts to evict people from the forests or to prevent them from accessing forest products were seen as a direct challenge to the legitimate claims of the Ndebele to their rightful local resource endowment. It would seem that the Forestry officials and the state itself failed to appreciate the complexity of the conflict and sought to deal with it as a forestry sector matter, and then purely from a legal and technical perspective.

There were significant, long-term adverse effects on forest resources produced during the struggles of the 1970s and 1980s. These conflicts have been particularly damaging due to destruction of physical assets such as infrastructure and equipment, loss of human life, environmental degradation and disruption of economic activities. The conflict surrounding forest access has indefinitely postponed any efforts at economic development and instead extended and increased social and environmental insecurity. Between 1983 and 1987 development activities in Matabeleland North were totally paralyzed as the ruling ZANU party sought to eliminate "dissident" elements and gain greater political allegiance (Alexander *et al.*, 2000).

Current Situation in State Forests

Adverse effects on the environment and resources as a consequence of war have been common in Southern Africa. The prolonged civil war in Mozambique, for example, displaced many people who had no choice but to resettle in areas without adequate land for cultivation. As a result, the settlers were forced into intensive agriculture which led to a decline in soil quality and fertility (Dejene and Olivares, 1991). Also in Mozambique, anti-poaching stations had to be abandoned and many wildlife populations were decimated by poachers over a period of several years (Dejene and Olivares, 1991). The white rhino population in Mozambique went extinct while the elephant population was reduced from 60,000 to 15,000

(Stoddard, 2000). The war in Angola has created similar problems. War has numerous other effects as well, including wildlife mortality from land mines, and direct destruction of forests from battles. In general, the most important effects have been the inability to regulate resource use and the resource pressures associated with displacement of people.

This has been the case in Zimbabwe. As of 1998, there were 1420 squatter families residing inside ten Demarcated State Indigenous Forests in Matabeleland North (Dore *et al.*, 1999). Country-wide, there are currently about 20,000 people residing illegally in these national forests (ZDID, 1999). The Forestry Commission as the state forest authority has the legal right as a landowner to institute proceedings for the eviction of illegal settlers. Despite the Forestry Commission's legal rights, its power to enforce its rights has been severely weakened by political intervention and lack of political will by the government to enforce the law. On the one hand, the government's political rhetoric about land redistribution encourages unauthorized settlement by opportunists expressing their impatience over delays in resolving the land issue. On the other hand, the government does not want to resettle the illegal settlers for fear that it will encourage the illegal occupation of state land or forests elsewhere. There are many more squatters on commercial lands and other state lands in addition to the squatters in the DSIFs. Those squatters may relocate to the DSIFs if they perceive that they will subsequently be resettled legally elsewhere.

Pressure upon these forest lands continues to grow, through several pathways. There is considerable evidence that poaching of forest products occurs in demarcated forest reserves that share common borders with communal areas (Nhira and Fortmann, 1993). The use of wood at household and rural industry levels for brick making, beer brewing, and baking can have severe influences on forest resources. While more than 85 per cent of household energy consumption in Zimbabwe is based on woodfuel (Makoni, 1990), it is unclear on a national basis whether woodfuel use is exceeding supply. On the other hand, it is clear that the situation in and near many communal lands tends to be one of critical scarcity, due to the removal of fuelwood to supply urban markets. In both the communal lands and DSIFs, deforestation has continued in order to provide land for cultivation. Finally, uncontrolled grazing, wild animals (Zimbabwe's elephant populations have increased enormously) and both wild and deliberate fires can also contribute to the further destruction of the forest and woodland vegetation (AOAD, 1992).

The Way Forward

The history of land in Zimbabwe is a history of alienation and marginalization of the peasantry. The land acquisition process enabled the minori-

ty white settler population to designate and capture the fertile parts of the country for themselves and they continue to occupy these lands today. The failure to address the land question comprehensively and redistribute land to the Black majority, coupled with population increase has left many communal farmers with no option but to illegally settle on state forest land, as these are considered easy targets. However, the solution to land inequity will not emerge from this kind of illegal settlement. Research has shown that there is a powerful economic incentive for communal households to convert forest land into crop land (Dore *et al.*, 1999), and if the Forestry Commission relaxes current controls on illegal settlement, massive invasions will result in rapid depletion of the forest resources.

The issue of forest preservation must therefore be addressed within the broader national land question. The options available to the Forestry Commission are to either evict the illegal settlers; or, to accept forest settlement as a legitimate use of the forests. In the event of the latter scenario, the objectives of managing state forests need to be restated such that future forest plans and practices reflect the needs of such a new policy. It may be that many of these state forests should no longer be designated as protected, in recognition of how their use and function have changed over the last several decades, from one of conservation to one of providing livelihoods. Any re-designation or new designation of protected areas should not be the prerogative of the state but demand-driven. Where biodiversity is to be protected for the national and global good there must be public consultation and consensus. Where such protection results in loss of benefits, affected communities should be adequately compensated.

Current Farm Invasions in Zimbabwe

Although this paper focuses on the particular case of state forests in Matabeleland North, the problem of inequitable and unsustainable land distribution exists throughout Zimbabwe. Thousands of white-owned large scale commercial farms have been occupied by squatters across the country since March 2000. Officially the squatters are veterans of the liberation struggle who are demanding that they receive benefits in the form of land. In actuality, only a small portion of the squatters are veterans of the struggle for independence—the remaining squatters are landless peasants who are frustrated with the inequitable distribution of land in Zimbabwe. In many cases the squatters have disrupted farming and intimidated farm owners and workers in an effort to make their point.

Since independence in 1980, the laws of Zimbabwe have recognized and respected land owners. Commercial farm land was to be redistributed over time on a willing buyer—willing seller basis. Unfortunately, this approach had little effect on land distribution because farmers occupying productive

land had little desire to sell, and few buyers in Zimbabwe have the resources needed to purchase. In response to this failure, the constitution of Zimbabwe was amended in 2000 (Constitutional Amendment #16 of Year 2000) to allow the government to acquire and redistribute land of its own volition. To date several hundred commercial farms have been designated for redistribution. The unresolved issue is that of compensation for current farm owners.

The problem with distribution of commercial farmlands is representative of the broader issue of inequitable distribution of land and resources in the country. As with the occupation and use of state forests, occupation of farms is indicative of broad human insecurity resulting from scarcity of resources and means of livelihood. The challenge is to find a just and peaceful means of redistribution that also meets conservation objectives.

Lessons for the Conservation Community

This case study illustrates the relationship between environment and human security at several levels: the environmental sources of conflict, the links between colonial conflicts and conservation effectiveness, and the impacts of conflict on conservation.

An initial cause of insecurity and eventually a main cause of the war was the inequitable and unsustainable allocation of land by the colonial government. The obvious lesson from this aspect of the case is that the concept of equity—implying that people have equal chances to participate in the opportunities that society has to offer—is a necessary prerequisite for long-term stability and thus for conservation. While the pursuit of a more equitable distribution of land may seem elusive, ignoring it will not pacify the marginalized. Effectively, members of society want community, food and economic security as well as the right to participate in the management of the nation's natural resources and to benefit from their efforts. Conservationists should therefore advocate for more-equitable resource allocation structures, focusing on their potential to alleviate and to prevent conflict.

Second, an impact of the unfolding dispute over land has been the loss of the State's ability to declare and maintain certain lands as protected forests and national assets. Although there is some indication that things will change, the current government in Zimbabwe has still largely been ineffective in reducing land and resource scarcity in communal areas. IUCN and other conservation-oriented NGOs must therefore continue to advocate policies that integrate communities into decision-making regarding resource management, and should help fulfil civil society's role of separating political rhetoric from reality. Evidence throughout southern Africa shows that conservation efforts which do not involve communities and

which do not provide benefits to communities are seldom sustainable (Katerere, Hill and Moyo, 2000).

This case study also demonstrates a clear demand for conflict management skills at all levels to help parties to conflicts. The escalation of the land and agrarian struggle in Zimbabwe is likely to see a demand for conflict management. Moreover, inter and intra-country resource scarcities and resource-based conflicts remain unresolved in many other Southern African countries, offering opportunities for transborder resource-sharing arrangements to minimize conflicts. IUCN and other conservation organizations can assist in initiating and strengthening negotiation processes and resource-based conflict management skills.

The State's loss of control over protected areas contributed to new environmental problems through uncontrolled illegal settlement in the forests. This undermined the ability of the state forest authority to fulfil its technical and administrative responsibilities. The lesson here is that war creates circumstances where it is difficult to manage the environment adequately and that political, social and economic considerations prevent attention to the common interest. In the context of the current situation in Zimbabwe, the unfortunate reality is that we cannot expect management of state forests to improve in the short-term. The reason for this is that the state, as a major land owner, will experience similar pressures as other land owners until there is equitable land redistribution.

There have been considerable efforts by the World Bank and other organizations to rehabilitate economies and to clean up natural environments in the post-conflict state. We do not believe that conservation-oriented NGOs should focus on this aspect of environment and security links. Rather, we believe that it is most important that conservationists begin to focus on recognizing the resource scarcity issues and other conditions that lead to war in the first place, and advocate and act to alleviate and eliminate these conditions. However, conservationists can in post-conflict states help to prevent further conflicts by building new relationships between parties to a conflict so that there is mutual recognition of expectations and rights. Building on research of environment and security case studies, and deriving specific lessons from these studies for action, can help not only to prevent conflicts but also to resolve them.

Finally, the case study raises the question about the relevance and legitimacy of many protected areas. Most of the protected areas in sub-Saharan Africa were established during the colonial era and continue to be managed using the same outdated laws and policies. IUCN and other NGOs can contribute to research and dialogue on the future of Africa's protected areas. The lesson here is that conservationists should ensure that resource management activities take into consideration the impacts of the colonial

legacy, which may include protected areas which were created under the colonial regime without consultation with, and often to the detriment of, the indigenous peoples.

In the case of Zimbabwe, resource scarcity in communal areas has continued to increase despite the war. International pressures are against the repossession of commercial lands, partly because this might scare away foreign investors. Still, it is clear based on past experience that people on communal lands need better access to land and resources. Otherwise the country could easily return to a state of armed conflict. There remains an expectation among indigenous Zimbabweans that land will be reallocated since inequity in land distribution was the fundamental cause of the independence struggle. The consequences of another conflict for environmental management and conservation may be significant.

Thus, IUCN and other NGOs must continue to advocate for community empowerment and a policy-making and implementation process that is participatory in nature. We must engage conservation issues not in isolation but in the context of Zimbabwe's socio-political situation. Only then can we contribute to ensuring that issues of land reform are addressed comprehensively in a way that meets the needs of the people while concurrently meeting conservation needs.

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Environment and Security Brief 7:

Solomon Islands and Environmental Sources of Insecurity— Logging and Urban Sprawl

By Ted Gaulin

The Solomon Islands, a chain of islands in the southwestern Pacific, faces a number of development problems including low literacy, disease, poverty, and population growth rates that are among the highest in the world.[293] Two other problems, however, both related to the availability or degradation of resources, can be linked directly to wave of civil strife that consumed the islands in 1999 and 2000. These two problems are unsustainable logging and urban sprawl.

Intense logging in the Solomon Islands over the last decade has resulted in extensive environmental destruction. Nearly 10 per cent of the country's productive lowland forest have been harvested, and at various times throughout the 1990s timber was being logged at three times the estimated sustainable yield.[294] This has significantly disrupted life in a country where 82 per cent of the population live a subsistence lifestyle and draw on wooded areas for food, medicine, and building materials. In addition, silt from logging roads is polluting streams undermining already limited supplies of freshwater, such that today, only 64 per cent of the population have access to safe drinking water.[295] In coastal areas, soil erosion from heavily logged areas degrades coral reefs and threatens local fisheries, the island's primary source of protein.[296]

On the island of Malaita, extensive logging and high population growth rates have undermined livelihood security to such an extent that thousands of Malaitans have migrated to the larger island of Guadalcanal. Many of these immigrants, seeking employment in the capital of Honiara, have established squatter communities on the outskirts of the city. These unplanned settlements, which now comprise more than 10,000 people or 23 per cent of the city's population, spill over the town boundaries, intrude upon tribal areas, and breed resentment among the native inhabitants of this land. Moreover, these peri-urban communities have increased the environmental strain on fragile ecosystems. The absence of even basic amenities means that human waste is disposed directly into the ground, polluting local water supplies and degrading agricultural areas of indigenous tribes.[297]

Tensions between immigrants and locals over these issues has produced 18 months of civil strife in which two armed groups—the Isatabu

Freedom Movement and the Malaita Eagle Force—have attempted to lay claim to the land surrounding the capital. This conflict has resulted in the death of over a hundred people and the displacement of tens of thousands. It has engendered urban firefights, the burning of villages, summary executions, and a coup d'état. Leaders of the two sides signed a peace treaty in October 2000, but intermittent fighting continues as the primary cause of this conflict—the possession and degradation of land—has not been definitively resolved.[298]

From a sustainable development perspective, the case of the Solomon Islands brings a number of issues into focus. First, it highlights the potential dangers of globalization for it was Indonesian logging companies backed by Japanese and Korean buyers that pushed log production to unsustainable levels. Only the Asian economic crisis, and the resulting crash of the tropical timber market, has slowed logging.[299]

Second, the case points to the importance of state capacity because the weak, corrupt, and generally undemocratic nature of the Solomon Islands government has exacerbated the country's environmental problems. The government lacks the institutions necessary for urban planning around the capital and it has taken few steps to slow internal migration.[300] In addition, a close association between elites and foreign logging companies has allowed these companies to harvest timber far beyond that allowed by law, and allegations of bribery by logging companies are widespread.[301] When the government agency responsible for enforcing forestry laws criticized logging practices as unsustainable, it was disbanded.[302] In a further affront to democracy, the government has imposed news blackouts on the forced relocation of islanders displaced by logging.[303]

Finally, the case demonstrates how quickly disputes over resources can be transformed into ethnic conflict. Until recently, Malaitans and the indigenous people of Guadalcanal identified few differences between themselves. Indeed, both groups are Melanesian in origin. However, under conditions of environmental stress and resource scarcity, elites were able to manipulate tribal differences such that the ensuing conflict appeared to be based on ethnic cleavages.[304]

These three conclusions suggest that conservation management aimed at creating and maintaining sustainable livelihoods could dramatically reduce the likelihood of conflict and instability.

Endnotes

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**Overview B
Environmental degradation and
Regional Vulnerability:
Lessons From Hurricane Mitch**

Pascal O. Girot

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Abstract

The factors and processes that shape disaster vulnerability are often the product of complex interactions between natural and social systems. The impact of Hurricane Mitch in October 1998 provided a dramatic reminder of this vulnerability in Central America, and demonstrated how decades of environmental degradation had weakened the natural resilience and buffering capacity of the affected ecosystems. An understanding of the linkages between environmental stewardship and disaster vulnerability requires an appraisal of the structure and function of the social systems that influence access to and uses of environmental resources. Thus, issues such as war, population growth, forced migration, marginalization, urbanization, and foreign debt all contribute to or compound the effects of deforestation, biodiversity loss, and land degradation, which can in turn intensify the effects of natural disasters. As such, disaster risk can be mitigated through modified land use practices, the enhancement of the role of wetlands and mountain ecosystems in mitigating flood and landslide risks, and through local participation of stakeholders in resource management decisions.

Introduction

"Every society is constructed as a complicated 'negotiation' between artifice and nature, a two-way flow of materials, control and mutual adjustments." (Hewitt, 1997: 71)

Risk is inherent to the Central American isthmus. Born from a violent land, recurrently destroyed by earthquakes and volcanoes, flogged by hurricanes and awash with floods, Mesoamerican societies seem to have replicated this violence in countless conflicts, wars and policies of denial. The relationship between environmental factors and security is a particularly complex one in Central America. Many rural communities have co-evolved with their environment in a process of mutual adjustment. As a result, the extraordinary biodiversity of Mesoamerica is matched by its rich cultural diversity. A long history of natural disasters, cultural clashes, and natural resource wealth and scarcity has made Central America a particularly compelling region in which to explore the relationship between natural and social systems in the context of disaster risk.

This paper explores the social and environmental context of endangerment for Central American societies. As such is provides a new look at the relationship between environment and security in an evolving context. It seeks to identify the factors and processes that shape risk, loss, and human response in the environmental context of Central America. It addresses the growing concern about the link between disasters and environmental stewardship, which is a function of the structure and operation of social systems. In particular, this case study will explore the origins and facets of the vulnerability of human settlements and ecosystems in Central America to natural hazards, thereby exploring the environmental and social configuration of disaster risk.

This paper begins with a brief conceptual introduction to the relationship between hazards, vulnerability and disaster risk. As a primer it centers on the idea that "natural" disasters are a misnomer, and that most disaster related loss of life and property can be attributed to the human allocation of endangerment. This is referred to in this chapter as the social construction of risk. This first section is followed by an appraisal of the root causes and macro-forces at work in Central America which have contributed over the past decades to the social construction of risk in the region. A review of the recurrence of natural disasters in Central America, and a brief appraisal of the processes of exclusion, denial and repression which have marked the social history of this tormented region of the world, reveal how vulnerable various Mesoamerican social institutions and practices are to hazards. This second section will provide us with a background for understanding the differential impacts of Hurricane Mitch in 1998. The third section of this chapter assesses the impact of Mitch, and suggests how this

impact was the result of cumulative and compounding effects of population growth, environmental degradation, urban sprawl and increases in the human allocation of endangerment and vulnerability in the Central American region over the last decades. A fourth and final section addresses possible actions that could potentially enhance resilience and security in Central America. This case suggests that conserving the integrity and diversity of nature, and ensuring the sustainable and equitable use of natural resources may be a significant factor in mitigating disaster risk.

I. A Conceptual Primer on Hazards, Vulnerability and the Social Construction of Risk

1.1 A Model for Mitigating Disaster Risk

The linkages between risk, security and resilience illustrate some of the major challenges facing societies throughout the world today. Blaikie *et al.* (1994) have provided us with the Disaster Pressure and Release Model (PAR), taking into account a combination of global factors, dynamic national pressures and local conditions which generate vulnerability to disasters (See Fig. 1). In the PAR model, root causes are often linked to global forces over which local communities have little or no influence, but which determine access to power, land and resources. Root causes emerge from the economic and political spheres, where policies and structures are enacted that promote social exclusion, concentration of wealth and targeted use of force against marginalized groups through military or police structures. Root causes also determine to a large degree the tenure over land and resources.
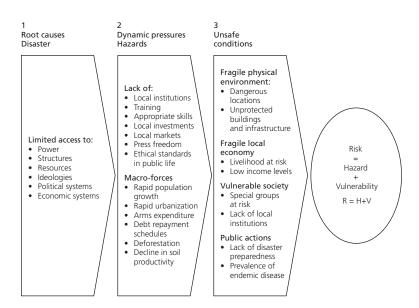
Dynamic pressures are seen as linkages between larger structural causes and local conditions, "translat[ing] the effects of root causes into the vulnerability of unsafe conditions" (Blaikie, P., 1994:24). Dynamic pressures are those which determine the basic health and nutritional status as well as the access to education and job opportunities of a population, its resource tenure security and the state of its surrounding environment. Macro-level dynamic pressures include population growth, rapid urbanization, deforestation and loss of biodiversity, decline in soil fertility and the relative scarcity of key resources such as water.

All these dynamic pressures contribute to create unsafe conditions, including a fragile physical environment, a fragile economy, vulnerable social groups and inadequate public action due to low income, limited access to resources and weak local institutions. As a result, natural hazards can result in major damage through such agents as floods, droughts or earthquakes.

The PAR model is an analytical tool that illustrates how disasters occur when these pressures, both global and dynamic, compounded by unsafe

conditions, are released by natural hazards. This model also serves to identify the policies and measures that must be taken to reduce the risk of disasters. An analysis of the social construction of risk (Lavell, A., 1996) reveals how well (or ill) adapted and resilient social institutions and practices are to hazards. Hewitt (1997:27) defines resilience as "capability to avoid, withstand or offset and recover from disaster." An important set of factors in resilience to disaster is the relative vulnerability of livelihoods, in terms of access to land, resources and wealth (Blaikie *et al.*, 1994). Achieving safe conditions at the local level therefore hinges on creating more resilient environments, sustainable livelihoods, healthy and capable people. That said, while communities throughout the world have developed coping mechanisms and local institutions which enable them to improve their co-existence amidst natural hazards, there are processes and root causes which can only be addressed on a broader scale.

In their effort to devise policy advice for disaster reduction, Blaikie *et al.* (1994) provide us with key guidelines for making mitigation measures more effective (see Box 8A). The model presented here argues for deepening our understanding of the contribution non-structural hazard mitigation measures—in particular, targeted environmental conservation initiatives—can have in lessening the impacts of extreme meteorological and hydrological events like Hurricane Mitch in Central America.

Figure F1. Blaikie, P. et al. 1994 Disaster Pressure and Release Model

The Progession of Vulnerability

1 Root causes Disaster	2 Dynamic pressures Hazards	3 Unsafe conditions	
Limited access to: • Power • Structures • Resources • Ideologies • Political systems • Economic systems	Lack of: • Local institutions • Training • Appropriate skills • Local investments • Local markets • Press freedom • Ethical standards in public life Macro-forces • Rapid population growth • Rapid urbanization • Arms expenditure • Debt repayment schedules • Deforestation • Decline in soil productivity	Fragile physical environment: • Dangerous locations • Unprotected buildings and infrastructure Fragile local economy • Livelihood at risk • Low income levels Vulnerable society • Special groups at risk • Lack of local institutions Public actions • Lack of disaster preparedness • Prevalence of endemic disease	Risk = Hazard + Vulnerability R = H+V

Box 5A: Twelve Steps to Mitigate Risk
1.   Manage mitigation
2.   Integrate the elements of mitigation
3.   Capitalize on a disaster to initiate or to develop mitigation
4.   Monitor and modify to suit new conditions
5.   Focus attention on protection of the most vulnerable
6.   Focus on the protection of lives and livelihoods of the vulnerable
7.   Focus on active rather than passive approaches
8.   Focus on protecting priority sectors
9.   Measures must be sustainable over time
10.   Assimilate mitigation into normal practices
11.   Incorporate mitigation into specific development projects
12.   Maintain political commitment

Source: Blaikie, P. *et al.*, 1994

Vulnerability is closely linked to environmental degradation according to the PAR model. Figure F1 represents an integrated approach which enables cross-scale linkages, thereby allowing for an improved understanding of the inter-relationship between environmental factors (biodiversity, upper watersheds, aquifer recharge areas, slope stability, buffer role of wetlands) and macro forces affecting society (population growth, migration, urban sprawl, agricultural frontier expansion, external market demands on local resources, access to land and resources). Addressing these forces also demands the capacity to set forth changes in many of the factors which generate unsafe conditions, including non structural mitigation through sound environmental planning.

According to Blaikie *et al.*, adaptability is key to risk mitigation, but this often hinges on the capacity of local populations to understand and inter-pret their habitat and associated hazards and risks. For this to be achieved, it is necessary not only to understand the range and intensity of natural hazards and their probable occurrence, but also, more importantly, to develop policies which effectively attack those dynamic forces which pro-duce vulnerability. As Hewitt (1997: 153) suggests: "Empowerment may be much more critical to reducing the vulnerability of such people than any particular tools, information or regulations to combat a hazard." It is

also a key factor in prompt recovery following a disaster, as coping strategies are often conditioned by access to resources, employment and safety.

Coping strategies are those practices adopted by individuals and groups in the face of trends and shocks that affect the viability of their livelihoods, as in the case of a major disaster. Such strategies include changing the mix of livelihoods upon which individuals and communities depend, creating new livelihoods, intensifying competition for existing resources, finding new resources bases (by force of arms or otherwise), or migrating elsewhere in search of greater livelihood security. In the wake of Hurricane Mitch, many responded to the emergency through outmigration, competition for foreign assistance, and innovative coping strategies, such as local solidarity movements, community organizations and political lobbying. Out-migration is often attributed to the collapse of livelihood systems, the impact of armed conflicts, and the loss of adaptive mechanisms which enable local populations and institutions to be more resilient to violent changes, such as those associated with wars and natural disasters. These problems in turn further degrade a country or region's productive capacity in negative feedback loops, particularly in the form of weakened public institutions.

This conceptual primer provides us with an adequate framework within which to analyze, in the next section, the factors contributing to the social construction of risk in Central America. Its seeks to reveal the linkages between processes of social exclusion, environmental degradation and heightened vulnerability to natural disasters, as was tragically illustrated by Hurricane Mitch.

2. Central America: A Territory at Risk

> "Desde esta América, encarnada y encendida, Mi América de rabia, la Central." – Ana Istarú.

The immediate reaction to a humanitarian tragedy the size of one left behind by Hurricane Mitch, late October 1998 in Central America, is one of disbelief. How could such a disaster produce over 10,000 deaths, directly impacting one tenth of all Central Americans, paralyzing entire countries like Honduras, and require one of the largest international humanitarian responses in Central American history? In order to begin answering this question, other contextual questions must first be addressed. Firstly, how vulnerable is Central America to severe weather systems such as depressions, storms and hurricanes? Furthermore, what is the relationship between environmental degradation and the compounded vulnerability of impoverished societies recovering from decades of war and civil strife? Finally, can any examples of sound environmental stewardship be identified which may provide insights into linking environmental management to the broader humanitarian and security concerns of the Central American Region?

The following section reviews the factors involved in Central America´s social and environmental history which have shaped conditions of vulnerability. It seeks to identify those ecosystems most crucial to mitigating disaster risk, and examines how alternative livelihood systems have responded to the impact of destructive agents. Finally, it reflects on environmental and institutional resilience in Central America at the dawn of the twenty-first century.

2.1   The History and Geography of Disasters in Central America

A single disaster like Mitch cannot be properly understood without taking into account the cumulative and interacting effects of many cyclical, natural and anthropogenic hazards. These include weather-related storms and flooding, drought, earthquakes and landslides, the climatic variations induced by the El Niño effect as well as the history of conflict and insecurity in the region.

The Central American isthmus, located at the crossroads of the Americas, has historically been shaped by calamity. It is one of the most geo-dynamic regions of the world, marked by recurrent seismic and volcanic activity, as well as hurricanes, forest fires and drought. Central American societies have co-existed in highly hazard-prone areas for centuries, even millennia. The agrarian societies settled on some of the most fertile soils of the region, particularly those derived from volcanic ash in the highlands and from alluvial deposits in the lower valleys and coastal plains. These settlement patterns have determined the urban and regional structure of most Central American countries.

This structure has undergone several episodes of dramatic change over time. All of the colonial capitals of Central America's five nations (Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua) were destroyed and relocated at some point in time over the past centuries. For instance, recurrent earthquakes and mudflows destroyed the colonial capital of Guatemala, Antigua, several times during the colonial period (1541, 1575, 1607, 1651, 1689, 1717). A major earth tremor in 1773 damaged several of the city's buildings, leading to its relocation to its current site in 1775 (Musset, A., 1996). San Salvador, the capital of El Salvador, suffered similar earthquake episodes, but was never relocated from its original setting (Romano, L., 1996). Similarly, Cartago, the colonial capital of Costa Rica, was destroyed in 1911, and the new capital is now located in San José. In addition to natural disasters, the region underwent periods of dramatic human-generated biophysical change, or "ecocide," which were characterized by massive deforestation and the draining of wetlands and waterbodies.

The figures in Table 1 reflect the impact of hurricanes in Central America between 1961 and 2001. Adding to these official figures produced by the CEPREDENAC (regional Committee of National Civil Defense and

Table F1: Humanitarian and Economic Losses from Hurricanes in Central America 1961–2001

Month and year	Event	Extent/ region and countries affected	Dead	Wounded	Displaced	Economic losses (in US$)
October 1961	Hurricane Hattie	Belize and Northern Guatemala	275			150,000,000
September 1969	Hurricane Francelia	Guatemala, Belize, El Salvador E and SE Honduras	296	248	18,200	35,600,000
September 1971	Hurricane Edith	Nicaragua, Honduran Mosquitia	35		2800	2,968,000,000
September 1974	Hurricane Fifi	Honduras Belize	8000 (all in Hond- uras)		670,000	3,478,000,000
September 1978	Hurricane Greta	Honduran and Nicaraguan Mosquitia, Eastern Guatemala and Belize			2,000	
October 1988	Hurricane Joan	Nicaragua, indirect effects in Costa Rica and Panama	156	182	427,000	460,000,000
July 1996	Hurricane Cesar	Costa Rica and Nicaragua	49	50	681,367	53,000,000

Month and year	Event	Extent/ region and countries affected	Dead	Wounded	Displaced	Economic losses (in US$)
October 1998	Hurricane Mitch	All seven countries in the Central America Region, hardest hit Honduras and Nicaragua	9,977	13,440	1,981,912	6,009,000,000
October 2000	Hurricane Keith	Belize	8			250,000,000
October 2001	Hurricane Iris	Belize and Guatemala	20			220,000,000
Total	10		18,816	13,920	3,783,279	13,623,600,000

Source: CEPREDENAC Web site—www.cepredenac.org -, 2002; Government of Belize, National Emergency Management Organization, web site-www.nemo.org -, 2002

Emergency Commissions) all losses due to weather related and seismic and volcanic hazards since the 1960s, the total death toll attributed to disasters has been 56,669 persons, leaving 123,346 wounded and 10,247,330 displaced or evacuated. The economic burden of disasters in the region has also been high, estimated at a total of US$15,535 million over a 40-year span (CEPREDENAC, 2000).

Latin America has also undergone an urban explosion over the past 30 years, and today hosts at least two of the largest cities in the world—Sao Paulo and Mexico City. These cities are located in high risk areas, as the 1985 Earthquake in Mexico revealed. The Pan American Health Organization (PAHO) has estimated that in Latin America, some 100,000 people have died in earthquakes during the twentieth century (IDNDR, 1999).

A recent study published by Oxfam-U.K., provides an assessment of the degree to which the Mesoamerican population is exposed to natural hazards. According to this survey, the most frequent cause of disaster in Central America over the past century has been extreme weather systems such as hurricanes and tropical storms. At least one third of disasters affecting Nicaragua, Honduras and Belize, have been due to hurricanes and

tropical storms, affecting an estimated exposed population close to 8 million inhabitants (Ordóñez, A., 1999:18) The study also estimates that 5.4 million inhabitants of the region are exposed to potential flood risk, while the total population exposed to volcanic risk is half that amount, with 7.5 million inhabitants (Ordóñez, A., 1999:21).

The ENSO (El Niño Southern Oscillation) phenomenon (commonly known as El Niño) produced months of drought in parts of Central Honduras, Guatemala, El Salvador and Northern Nicaragua during 1997–1998. Massive forest fires destroyed over 1.5 million hectares of forests throughout the region (an area amounting to 3/4 the size of El Salvador) between May and December 1997 (Rodriguez, J., A. Salas and R. Pasos, 1998). Recurrent drought episodes are not always linked to the El Niño phenomenon. As recently as 2001, southern Guatemala, El Salvador, Honduras and Nicaragua experienced rainfall well below monthly averages, causing episodes of famine and outmigration in isolated drought stricken rural communities in Nicaragua and Guatemala.

The perennial nature of risk scenarios present in the region has also fostered a wide variety of natural and cultural responses. Adaptation by ecosystems to a hazard prone context has produced an extraordinary biological diversity in Central America (Myers, N., 1994). Similarly, societies in the region have, over time, developed a broad diversity of coping mechanisms and mitigation measures to reduce risk and minimize the impact of recurrent flooding and earthquakes. Many Caribbean settlements of Central America developed housing on stilts in order to better withstand flooding events. Likewise, Spanish colonial authorities often adopted structural mitigation measures to reduce the impact of flooding in cities located near lakes. This was the case of Mexico City, where Lake Texcoco was completely drained by the end of the nineteenth century, and San Salvador where Lake Ilopango was also drained and dried during the 1920s (Musset, A., 1996). These engineering feats also provided additional space for growing cities. However, while successful in mitigating flood risk, these flat lake beds contributed to intensifying seismic waves, as was made evident during the earthquakes of San Salvador (1965) and Mexico City (1985) (Hewitt, K., 1997).

As in most other regions of the world, the most recurrent type of damaging agents are linked to severe weather and its impact on land in the form of hurricanes, tropical storms and associated flooding and landslides. But by far the most destructive single events in terms of human lives are earthquakes, with the 1976 Guatemala earthquake at the top of the list with over 23,000 deaths, followed by the 1972 Managua earthquake which resulted in 10,000 deaths.

In order to fully understand the differentiated impact of extreme weather events in the Central American isthmus, one must analyze the interrelation

between population growth, changes in land use, settlement patterns and forest cover in Central America over the past three decades. The relationships between these factors and broader macroeconomic and social trends create and modify disaster vulnerability.

2.2 Root Causes of Disaster Vulnerability and Macro Forces at Work in Central America

Central America has in 50 years undergone rapid demographic growth, coupled with increasingly inequitable access to resources and land. In 1950, the region's total population was 11 million inhabitants. By the end of the century, Central America's population had more than tripled to 35 million. Prior to the war-torn decade of the 1980s, concentration of land in the hands of the few caused massive migrations and subsequent expansion of agricultural and settlement frontiers into areas of higher rainfall. According to Utting (1996:18), extensive cattle ranches constituted 10 per cent of the total number of farms in the early 1990s, but covered 46 per cent of total agricultural land. Conversely, small holder farmers represented 44 per cent of the total number of farms covering only 6 per cent of total farm land. This *latifundio*[305]-*minifundio*[306] binome has profoundly marked environmental history in Central America. It constitutes one of the most relevant factors in increased conditions of vulnerability in the region.

The overall process of environmental degradation, forest and biodiversity loss and soil erosion also tends to intensify the impact of extreme climatic and teluric events. For example, the continuous expansion of the agricultural frontier into more fragile ecosystems—eliminating stabilizing forest cover from steeper and unstable terrain—has caused a clear increase in flash floods, mudflows and landslides. This was most clearly demonstrated in Honduras during Hurricane Mitch in the *minifundio* centered in the highlands and steep terrain, and the *latifundio* in the valleys, where plantation agriculture and shrimp farms occupy the best agricultural lands. Flash floods were the leading cause of death and destruction during Hurricane Mitch. While landslides and mudflows hit hillside small farmer areas the hardest, floods were most prevalent in the lowlands and floodplains where most of the large scale farming takes place.

The settlement of agricultural frontiers is particularly demonstrative of the linkages between policies of exclusion, environmental degradation, social conflict and disaster vulnerability. As in many other countries of Latin America, the process of national integration in Central America was tardy and subject to the fluctuations of world commodity prices. In several countries, vast regions, particularly the Caribbean lowlands of the Mosquito Coast, still remain isolated from their respective national economies because of lack of access. The famous dichotomy between the

Pacific Heartland and Caribbean Rimland formulated three decades ago by West and Augelli (1966,1989) still applies, although with important exceptions. The dominant national cultures are generally based in Pacific and Intermontane regions, while much of the Caribbean rim is still considered peripheral, both culturally and economically. This gap between the Caribbean rim and the Pacific heartland has recently been recognized as a major structural reality in Central America´s current situation in terms of Sustainable Human Development (UNDP/Proyecto Estado de la Región, 1999).

The contrast between densely populated highlands and sparsely inhabited Caribbean lowlands is evolving fast, and the process of agricultural colonization which began in the 1960s is reaching some of the most remote reaches of national territories. While the agricultural frontier in El Salvador is estimated to have reached the political boundaries of the country in the 1930s, in Costa Rica the agricultural frontier only drew to a close during the 1990s (Pasos, R., 1994; Augelli, J., 1989). In Panama, Honduras, and Nicaragua, the agricultural frontier is alive and well, and constitutes a key safety valve for preventing agrarian conflicts over access to land. This is the case for many other South American nations.

The frontier lands undergoing agricultural colonization are, in many cases, located along peripheral border regions. These regions, long neglected due to difficult access, inhospitable climate and rough terrain, have functioned for centuries as refuges for displaced populations fleeing war, political persecution, economic indigence and land dispossession. Their function as refuges has fostered a unique combination of cultural and biological diversity. The co-existence between indigenous people and tropical forests in Central America often coincides with forested areas, as illustrated by Mac Chapin's map for National Geographic's Research and Exploration Division (1992). Indigenous peoples are thus also custodians of some of the most biologically diverse natural ecosystems, either montane (Cuchumatanes, Guatemala), lowland tropical forest (Emberá-Darién Panama) or coastal ecosystem (Miskito, Garifuna, Nicaragua, Honduras, Belize). These remote regions constitute the setting for border parks and indigenous territories, under increasing encroachment by ladino settlers.

In this sense, the promised "open lands" for settlers often coincides with the ancestral territories of indigenous peoples. Often referred to as "the poor among the poor," Central America's indigenous population is estimated at 6 million, of which 85 per cent are found in Guatemala (Proyecto Estado de la Región, 1999). However, many of the border regions of Central America coincide with the last remnants of indigenous lands, including the Toledo Maya in southern Belize, the Xicaque, Lenca, Garifuna and Miskito of Honduras, the Miskito and Sumos of Nicaragua, the Bri-bri, Cabécar and Guaymis of southern Costa Rica, and finally the

Ngobe-Bugle, Kuna and Emberá-Woonan in Panamá. These transboundary ethnic groups have learned to adapt, as border societies do, to the realities of bi-national life. They have also suffered the brunt of wars and policies of exclusion and denial. As a result of their longstanding condition of structural disadvantage, they show the greatest vulnerability to natural disasters.

This structural vulnerability stems from the combination of settlement on marginal lands (steep slopes, difficult climate), subsistence dependence, lack of alternatives, degree of isolation, lack of transport infrastructure, and lack of government or other support to enhance the resilience of buildings, infrastructure and livelihoods. For instance, in the Kekchi communities of Alta Verapaz, Eastern Guatemala, the impact from Hurricane Mitch in terms of flood damages and loss of crops was compounded by the lack of access to alternative sources of income and subsistence. Many Kekchi had to rely on food aid or else migrate to other regions as seasonal labourers.

Many traditional societies have developed conflict and disaster coping mechanisms. These may include the development of united and tight-knit cultures with political recognition, reciprocal social arrangements, smaller settlements, elevated constructions, light materials, distribution of risk in land use and sustainable livelihoods, most of which have been profoundly modified over the past decades. While some communities still nurture systems of reciprocal labour exchanges between households and joint labour for community works such as building roads, schools and irrigation systems, many others are losing these mechanisms of solidarity in favour of more individualistic social paradigms.

On the other hand, there are increasing signs that a resurgence of cultural identity and political mobilization is occurring among indigenous groups throughout the region. Conflicts between indigenous territorial claims, ladino settlers, mining and timber concessions are very likely in the next decade. Both the extension of the territories involved, and especially the resources they contain, will be the object of future contention. There has been a sharp increase in large infrastructure, mining and tourism-related investment in remote regions, such as in the Petén region and in Southern Belize. This may explain why many indigenous people in the region are striving to secure firm legal recognition over their land, and a degree of territorial autonomy to defend their lands against outside encroachment. Although these factors may at times stimulate conflict, they are also crucial in empowering local communities to mitigate their own disaster risk. By building upon existing social networks, disaster preparedness, evacuation and even mitigation measures can be introduced/integrated into community structures. There are encouraging examples of post-disaster assistance which have incorporated risk management into community-based organization as a form of local empowerment to reduce vulnerability (British Red Cross, 1999).

3. Risk Perpetuated by War, Internally Displaced and Resettled Populations

All Central American nations were marked by war in the 1980s, even those which did not engage directly in armed conflict. The cost of attending to the thousands of displaced populations and refugees placed a particular burden on neighbouring countries such as Belize, Honduras and Costa Rica. While the war-torn regions of Guatemala, El Salvador and Nicaragua have finally found peace, there are still enduring conflicts linked to the spontaneous and planned repatriation, resettlement and assimilation of refugees into their country of origin. With over 150,000 persons forced to emigrate during the 1980s throughout Central America, and an additional 400,000 internally displaced people, the humanitarian toll of the past wars is daunting. The resettlement of these displaced populations has compounded disaster risk, as many of these returning migrants have settled in hazard-prone areas. The sociological intricacies of many of these recently established settlements are thus important to take into account when understanding the sources of vulnerability to disaster.

Disaster vulnerability may have been increased by the results of forced migration and resettlement on marginal lands, partly as a result of exclusionary politics in which particular social groups have been excluded from decision-making and public services. This situation is illustrated in the case of the Lower Lempa Valley in El Salvador and Suchitepéque and Retalhuleu in Guatemala. The peace process in both El Salvador and Guatemala has led to the resettlement of displaced, repatriated and other highly vulnerable populations in several rural areas, many of them in high-risk flood-prone areas. Many of the resettled groups are comprised of former armed opponents to existing governments and in some cases they have been systematically excluded from government programs. Many of these resettled groups are composed of mixed ethnic and geographic origin, a factor which affects community building, trust and solidarity, essential ingredients of successful coping strategies.

The regions settled by the returning populations were among the most devastated by the armed conflict of the early 1980s. Some of the areas chosen for resettlement were allegedly marked by landmines, and constitute a continuous threat for the rural populations settled there. The most critical problems however are linked to agrarian conflicts over land tenure and titling. Indeed, the return of refugees to their lands left in the midst of war 10 years prior has created increasing tensions in many of these rural areas.

Many major projects, funded by the United Nations system, such as the PRODERE project in Nicaragua, El Salvador and Guatemala, sought to provide pre-emptive aid to defuse the most critical agrarian conflicts in resettlement zones. While some experiences were successful, others pro-

vided the returnees with alternative land grants, most of them in newly set-
tled areas in the lowlands (such as the Petén and Suchitepeque in
Guatemala, Bajo Lempa in El Salvador,Siuna in Nicaragua) generally
located on poorer soils, steep slopes or flood-prone plains.

In a clear reference to the environmental impact of the post-war era in
Central America, Jaime Incer, then Minister of the Environment of
Nicaragua (Director of IRENA), was quoted as saying in 1991 "It is a
strange fact that the war has been benevolent with our forest while peace
is destroying it" (Utting, P., 1996:47). Paradoxically, war contributed to
forest conservation, while peace is reactivating the agricultural frontier and
hence deforestation (Nietschmann, B., 1991). Thousands of campesino
families are returning to their original settlements, left during the past
decade of war, as either returning refugees (or *retornados*) or as demobilized
regular and irregular forces. Many of these resettled populations were not
previously employed in agriculture, since they spent most of their early
adult life in arms; as such, they are dismally prepared for eking out a liv-
ing on marginal lands. This fact contributes greatly to predatory uses of
natural resources, primarily through deforestation, wildlife trade and
unsustainable extractive activities like gold mining, illicit contraband and
drug trafficking, much of which can be currently found in border regions
and coastal areas. (Nietschmann, B., 1995).

4. Macro-forces and the Social Construction of Risk: Urban Sprawl and Economic Slump

By the end of the 1980s, civil war had profoundly changed the nature and
spatial distribution of populations in Central America. Armed conflict
between government and revolutionary forces occurred in many remote
regions of Central America, where indigenous populations—such as the
Miskito in Honduras and Nicaragua and the Quiché and Mam in
Guatemala—suffered the brunt of these wars. These conflicts produced
large contingents of internally displaced people, out-migration and the
swelling of urban shantytowns. Today, over 64 per cent of Nicaragua's pop-
ulation lives in cities, whereas a generation ago it was a predominantly
rural society. In fact, half of Central America's population now lives in
cities, one fifth in cities larger than 100,000 inhabitants (CCAD, 1998,
Proyecto Estado de la Nación, 1999). Future projections forecast the
growth of the total urban population of the region from 16 million inhab-
itants today to 22 million by 2007, and it is expected to reach some 35
million in 2025 (World Resources Institute, 1999).

These processes have produced a corollary increase in risk. Most national
governments emerged from the 80s with far greater external debts to serv-
ice, and all adopted stringent structural adjustment policies during the

1990s, as the next section will illustrate. Already limited public expenditures on social programs were further curtailed to satisfy the conditions and mandates of international lending institutions. As a result, high levels of ill health, exclusion and indigence among both the rural and urban poor have compounded levels of vulnerability. Uncontrolled urban sprawl and speculative land markets have pushed many marginal settlements into high-risk areas, such as river canyons and flood-prone coastal areas. Without a doubt, the environmental dimension has become, and will continue to be a major issue in disaster prevention and mitigation in Central America. As population pressure increases, compounded by skewed land distribution and urban sprawl, key natural resources are dwindling. As will be illustrated in the following section, the impact of resource capture and relative scarcity of key resources such as water and fuelwood create not only conditions of heightened vulnerability, but also exacerbates tensions between communities and countries vying over scarce resources. This rapid depletion of resources occurred in a context of negative economic growth and increasing poverty, both urban and rural.

All of the region's countries experienced negative growth rates during the 1980s, most dramatically those which were immersed in civil war. In Nicaragua, the GNP in 1985 was $2,136 million but only $1,792 million in 1993, a contraction of 16 per cent or 2 per cent per year. At the same time, the Central American population has continued to grow at an average rate of 2.7 per cent annually, from 22 million in 1980 to 28.3 Million in 1990, and an estimated 32 Million in 1995. As a result, Per Capita GNP has tended to drop from $1039 in 1980 to $919 in 1985, to $883 in 1990.

By the end of the 1980s, over 80 per cent of the rural population of Central America were in conditions of poverty, and 50 per cent in extreme poverty, particularly in Guatemala, El Salvador, Honduras and Nicaragua (Lucke and Cussianovitch, 1996). Life expectancy in Guatemala is 64.2 years, and 68.2 for Nicaragua whereas it is 74 for Panama and 76.5 for Costa Rica. Infant mortality rates also reflect the sad fact that one out of four Central Americans are malnourished, and hunger kills 12 of every thousand Costa Ricans, and 46 of every thousand Guatemalans. But in spite of these dismal figures, Central America, for the first time since the 1960s, reached the end of a decade in better macro-economic shape than when it began (Proyecto Estado de la Región, 1999).

A major aspect increasing vulnerability in the 1990s was the economic after-effects of the wars of the 1980s. In Table F2, the evolution of the GDP of the regions' countries since 1920 is shown. The combination of habitat and livelihood destruction due to armed conflict and extensive infrastructure damage, economic recession and more recently structural adjustment policies, have left a Central America that is poorer and unsustainable by any standards.

Table F2: Average Annual Gross Domestic Product Growth per capita in Central America 1950-1996

Decade	Annual GDP growth per capita for the region	Annual GDP growth per capita for countries with no war*	Annual GDP growth per capita for countries at war**
1950–1960	1.7	2.1	1.7
1960–1970	2.9	2.6	3.1
1970–1980	1.7	2.1	0.5
1980–1990	-2.0	-1.1	-3.2
1990–1996	1.7	1.1	2.0

(*) Including Panama, Costa Rica, Honduras
(**) Including Nicaragua, El Salvador, Guatemala

Source: Proyecto Estado de la Nación, 1999, Cuadro 1.3

In terms of land use, the entire region witnessed a dramatic increase in conversion of "unused" land to pastures, which grew from 6.9 million hectares in 1970 to 10.5 million hectares in 1983. At the same time, the crisis of livestock and beef export industry has led to the abandonment of unprofitable pastures, meaning that the area dedicated to annual crops and food production has actually stagnated. Annual deforestation rates in Central America have been estimated at between 324,000 Ha and 431,000 Ha for the 1980s (Kaimowitz, D., 1996). In the 1990s, deforestation rates continued unabated with an average annual loss of over 388,000 ha for 1997 (CCAD, 1998) A more subtle change has been the progressive growth in "other uses" of land during the 1990s, which according to FAO are areas not under permanent or annual crops or pastures or forests. This refers to abandoned lands, secondary regrowth and fallow, which grew from 9.1 million hectares to 12.1 million hectares between 1976 and 1991, excluding El Salvador (Lucke and Cussianovitch, 1996:17). This confirms estimates that there could be up to 13 million hectares of secondary forests in the region. In sum, these figures suggest that almost a quarter of the lands in Central America are under-utilized, abandoned or in fallow.

These figures must also be put into the context of trade liberalization and structural adjustment which most countries in the region have attempted during the 1990s, with serious implications for food security in the region. The results have been a sharp increase in food imports and a correspondingly steady decrease in the areas cultivated for food production for national markets as well as a continuous reduction in the size of the rural popu-

lation involved in basic grains production (maize and beans) (Proyecto Estado de la Nación, 1999). This raises concerns about the future food security of the majority Central American populations, for whom competition in a global market is a daunting perspective. The 1990's was marked by the opening up of Central American economies to world trade, each with extremely differentiated social, political and economic conditions. While many governments passed legislation reducing tariff barriers and import taxes, few had the resources to improve the infrastructure, education and information upon which national and regional businesses could expand. This brought about a parallel increase in economic vulnerability of the national economies in the region. Trade liberalization without the corollary public and private investments in infrastructure only contributed to expose national industries and producers to outside competition, eroding their share of internal markets.

Increasing attention has been put on the function of trade corridors and their importance the regional economies of Central American. INCAE, with the Harvard University, have proposed the concept of the Central American Logistical Corridor which consists in the major trade routes, airports and port facilities in the region. Geared to a faster insertion of Central American economies into a globalized setting, their recommendations are the basis for improved transport infrastructure, modernized ports and customs reform. During Hurricane Mitch, this logistical corridor was literally split in half since all the bridges in southern Honduras was destroyed, thus stopping traffic between Costa Rica and Nicaragua and their northern neighbours. Thus even the key regional infrastructure—and hence international trade as a source of foreign capital—is vulnerable to environmental degradation and mismanaged urban sprawl

5. Environmental Scarcity and Resource Capture in Central America

A strong relationship exists between the demand for increasingly scarce natural resources and increased conditions of disaster risk. The causal factors underlying environmental scarcity are very much present in Central America.[307] We find structural scarcity in the skewed distribution of land use; demand-induced scarcity in the expanding cycles of primary resource extraction linked to exports of raw materials and agricultural foodstuffs; and supply-induced scarcity stemming from the degradation of the physical resource base in the most densely populated regions of isthmus.

Other concepts developed by Homer Dixon (1999) can also be distinguished in Central America. A long history of "resource capture"[308] by the landed elite has had a particular impact on the availability of land. This has been the motor behind much of the expansion of the agricultural frontier since the 1960s, in which "ecological marginalization"[309] has forced the

poor to settle onto more fragile and hazard-prone land. Most migrants, both in rural and in urban areas, have tended to settle on steeper land, poorer soils and areas of higher rainfall. Changes in land use have had a direct impact on the distribution of forest cover in upper watersheds, on urban sprawl and on the distribution of wetlands and coastal forests, increasing vulnerability to natural hazards such as hurricanes. Among the most threatened forest ecosystems in the region are coastal mangroves, which have been cut to make way for urban settlement, shrimp farms and tourist resorts.

These increasing pressures on natural resources and protected areas are a direct result of skewed land and income distribution. Natural ecosystems, particularly wetlands, can play an important role in non-structural mitigation of disasters. In order to maintain wetlands and coastal forests, enduring and stable institutional arrangements for conservation are vital. Such arrangements can only be made enduring by involving local communities and stakeholders in natural resource management schemes.

Box 5B: Water Scarcity in Central America

Depletion of reliable freshwater resources in Central America has been a growing concern. As in other water-scarce regions of the world, "hydropolitics" is an important part of political discourse, as conflicts emerge between nation-states over the use and access to water resources for hydropower, irrigation or canal projects (Girot, P. and Nietschmann, B., 1992; Girot. P., 1994). As illustrated in the figure below, the disparities between freshwater resources availability among Central American countries are severe and are reaching critical thresholds. The accelerated depletion of this lifeline will no doubt exacerbate hostility between neighbouring states in the next century.

There are several examples of emerging hydropolitical conflicts. The Río Lempa is the single most important source of freshwater and hydroelectric power for El Salvador, and its drainage basin spans the Guatemalan and Honduran border. Due in major part to deforestation in its upper tributaries, the volume of available surface water in the Lempa dropped from 11,260 m^3 to 4482 m^3 between 1985 and 1993 (Ordóñez, A. *et al.*, 1999). El Salvador has an average of 3,500 m^3 of freshwater available per capita, in contrast with the 11,900 m^3 and 11,600 m^3 per capita available annually in Guatemala and Honduras respectively.

Another case of potential conflict over water resources, albeit less critical than in El Salvador, is that of the San Juan river between Costa Rica and Nicaragua. There is a clear gap in freshwater availability between the north (excluding Belize) and south of the Central American isthmus, with significantly higher per capita averages in Nicaragua, Costa Rica and Panamá.

Historically, the Lake Nicaragua-Río San Juan route for a planned "interoceanic canal" was the source of relentless litigations and arbitrations during the second half of the nineteenth century (Girot, P., 1994). In recent years, the focus of dispute is no longer over rights to a hypothetical canal route, but rather over access to the river by tour operators, and over the impacts of water pollution from banana plantations. The 1980s were marked by several litigations concerning the contamination of tributaries flowing from Costa Rica into Nicaragua. The Nicaraguan State sued Costa Rica for allegedly contributing to the pollution with pesticide residue of the Sarapiquí river, a major tributary of the San Juan. The case has remained unresolved, but rights of access and uses of the Río San Juan still constitutes a major item in the binational agenda clearly marked by the immigration/deportation issue. This has been referred to as the "Sanjuanización" of bilateral relations between Costa Rica and Nicaragua (Solís, 2000).[310]

Access to water itself is unlikely to constitute the source of conflict in the foreseeable future. Instead, the use and pollution of waterways are likely to cause conflict.
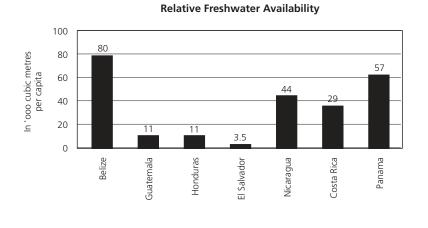
Figure F2. Per Capita Water Availability in Central America

Relative Freshwater Availability

Source: CCAD, 1997

Box 5C: Illegal Transboundary Harvesting of Forest Products

Another key natural resource under ever-increasing pressure are forests, both as sources of timber, fuelwood and non-timber forest products.

Recent studies of the forest sector, as illustrated in the figure, below, reveal that 92 per cent of all timber and forest products consumed yearly in Central America are destined for fuelwood consumption. This strong dependence on natural resources for basic energy needs exerts exceedingly strong pressure on dwindling forest resources.

Per capita fuelwood consumption of Honduras is well over twice that of El Salvador. Honduras' annual fuelwood consumption totaled 7.5 million cubic meters in 1997, twice that of Nicaragua, four times that of Costa Rica and 100 times that of Belize. In all countries except Belize, Panama and Costa Rica, over 90 per cent of the forest products literally end up in smoke as fuelwood (CCAD, 1998).

Similar contrasts exist between Costa Rica and Nicaragua, not as much for fuelwood use but for access to lucrative hardwood stands. With the rapid depletion of timber availability in El Salvador and Costa Rica, the market for legal and illegal sources of timber is growing. There will be probably ever growing conflicts over illegal transboundary resource extraction activities, as the high market prices for timber products in Costa Rica and El Salvador justify taking the risks. These are clearly conditions which foment future conflicts over scarce resources.

Table F3. Total Firewood Use, Per Capita Use, as Percentage of Total Wood and Timber Use in Central America, 1997

Country	Use of firewood, in millions of cubic meter/ year	Per capita firewood use in cubic meters/ year	Per cent of firewood out of total wood and timber usage (%)
Belize	0.07	0.34	54
Guatemala	7.11	0.85	96
El Salvador	5.3	0.68	94
Honduras	7.5	1.58	91
Nicaragua	3.7	0.95	93
Costa Rica	1.69	0.55	78
Panama	0.93	0.4	95
Total (mean)	26.3	0.76 (mean)	92 (mean)

Source: Diagnósticos Forestales de Belice, Guatemala, Honduras, EL Salvador, Nicaragua, Costa Rica y Panamá, CCAD/CCAB-CCAP,1997

3.   Hurricane Mitch: Onset, Path and Impact

In this final section, we take a closer look at the impact of Hurricane Mitch, in October 1998, on the Central American region. By its magnitude and the regional scale of its impact, Mitch has been considered the twentieth century's worst disaster in Central America. Many of the factors and macro forces described in the previous section contributed to make Hurricane Mitch a devastating disaster, not only in terms of the massive loss of human lives and livelihoods, but also in terms of its enduring impact on the relationship between Central American societies and their surrounding environment. Things aren't quite the same as they used to be in Central America since October 1998.

3.1   Mitch´s Path of Destruction

Hurricane Mitch started as a tropical depression 560 kms east-northeast of Limon, Costa Rica, on the evening of 21 October 1998. High temperatures in the Caribbean contributed to intensify this weather system. At the Gulf of Mexico, a high pressure cold front from the United States made Mitch stray from the north-northwest path Caribbean hurricanes normally take. The storm brewed for four days just off the coast of Honduras roiling up to Category Five with winds over 285 kilometres an hour, one of four hurricanes of such force during the twentieth century. (See Fig. 6), Meanwhile, Mitch's low pressure system attracted cloud systems from the Pacific to make what would become a deadly weather combination over western Honduras and northern Nicaragua. By this time, most civil defense institutions in the region had been put on alert.

On October 28th, Mitch made an unusual southwestward swing toward central Honduras, heading south in an erratic manner. As it neared the continent, Mitch downgraded to Category Three and by the time it touched land near Trujillo on the north coast of Honduras, it had slowed to a tropical storm (see Fig.3). As the wind slowed, the hurricane's center passed over Tegucigalpa, the Honduran capital, and travelled south into El Salvador. As Mitch inched south—a rare move for Caribbean hurricanes, which commonly head north— heavy rainfalls pummelled the dryer Pacific Coast (See Fig.4). Whereas low-lying areas along Central America's Caribbean coast and the north and north-eastern parts of Honduras were accustomed to and prepared for hurricanes, other regions were not as well prepared. Belize was able to evacuate 75,000 people from low-lying coastal areas (a staggering 32 per cent of the country's population), including 40,000 from Belize City alone. Southwestern Honduras was not nearly as prepared nor as fortunate. Mitch was stationed over this country for five days. Heavy rains and record river discharge flooded the Sula Valley cities of El Progreso, Tela and San Pedro Sula in the northern plain. The storm moved south and flooded the Choluteca Valley and hit the

cities of Comayagua, Tegucigalpa and Choluteca in the Gulf of Fonseca. (See Fig.7). Chinandega in Northwestern Nicaragua received close to 1,600 mm falling in ten days (more than the average yearly precipitation). The result was mass wasting, landslides, mudflows and flash floods, particularly in the Choluteca valley, as the debris-choked river flooded Tegucigalpa and tore through the town of Choluteca, near the Gulf of Fonseca.

Across the Gulf of Fonseca in Nicaragua, Mitch hit hardest in the north, causing floods and mudflows in the Departments of Chinandega, Estelí, Madriz, Nueva Segovia, and Matagalpa. Large sections of the Coco River and Caribbean Coast were flooded and Lake Managua rose rapidly, flooding parts of the capital. But by far the deadliest of all events occurred in Chinandega, where the entire side of the Casitas Volcano near Posoltega collapsed. This collapse turned into a mudslide a mile wide and three meters high, reaching speeds of up to 130 miles per hour, covering three entire villages and killing an estimated 2,000 people. Mitch hit the Gulf of Fonseca Region and the Lempa valley area hardest, as well as parts of La Union and San Miguel, particularly in the Chilanguera River where most of the deaths in El Salvador occurred.

Hurricane Mitch had downgraded to a tropical storm category by the time it reached Guatemala. Fortunately, it spared the populous (over 10 million) and in many ways the most vulnerable country in Central America. The storm subsequently crossed the Yucatan Peninsula and traveled to Florida, where it was absorbed by a cold front on November 5th and became an extra-tropical storm. While large amounts of rain severely damaged infrastructure, evacuations saved many lives. This was not the case however, for poor neighbourhoods settled on steep slopes in marginal areas around the capital, Guatemala City. Heavy rainfall over these deforested and eroded hillsides generated deadly floods and mudslides, destroying and burying anything in their path. This was particularly the case in the Berrinche neighbourhood in Tegucigalpa, Honduras, in which marginal urban settlements on steep slopes were destroyed by a large landslide. Similarly, the entire village of Morolica and a large portion of Choluteca, Honduras, were destroyed by floodwaters of the Choluteca River.

3.2   The primary impact of Hurricane Mitch

Mitch's first impacts were the direct results of severe geomorphic activity such as sheet erosion, flash floods, landform collapses, landslides and mudslides. Satellite imagery analysis by the U.S. Geological Service (USGS) indicated that Mitch caused over one million landslides in the disaster's first days in Honduras—a country 112,000 square kilometres in size. Mud and debris-choked rivers raged down the streets and throughout neighbouring towns and cities. Floods destroyed thousands of homes, damaged or obliterated hundreds of bridges, highways and piped water systems, in addition to wiping out

Table F4. Humanitarian Impact of Hurricane Mitch, October 1998[311]

Country	Deaths	Missing	Wounded	Displaced	Evacuated	Destroyed and damaged housing	Destroyed and damaged bridges	Damaged water mains
Honduras	5,657	8,058	12,272	1,482,659	2,100,721	*	215	1,683
Nicaragua	2,863	970	388	368,261	_	41,430	63	79
Guatemala	268	121	280	105,055	106,604	21,000	121	60
El Salvador	240	29	_	28,452	49,000	10,372	10	155
Costa Rica	5	4	_	3,007	5,500	965	69	12
Panama	2	_	_	8,408	602	1,933	1	_
Belize	_	_	_	_	75,000	_	_	_
Total	9,035	9,182	12,930	1,995,842	2,335,427	*75,490	479	1,989

power and telecommunications systems. (see Table F4). It is estimated that
the hurricane directly affected one in ten Central Americans, or at least 3.5
million people(Caballeros, R. 1999; HIID-INCAE, 1999)

The majority of affected people were from the very poorest groups.
Inequitable land policies and skewed incomes led to the urban and rural
maginalization of these groups, where they were left with little choice but to
build their houses on precarious, disaster-prone areas such as steep hillsides,
river canyons and floodplains (Maskrey, A. 1994; Wisner, 2001). In rural
areas, protective forest covers were cleared for subsistence crops, while simul-
taneously exposing the land to increased erosion and run-off. As a result, the
likelihood and impact of destructive landslides and floods was increased,
effectively exposing the most socially and economically vulnerable groups to
disaster risk. In fact, Mitch's impact was worst in coastal flood plains and
near river courses—lands naturally predisposed to flooding.

High winds, floods and landslides killed over 18,000 people (taking into
account the missing as well as the dead) and seriously injured 12,930 oth-
ers. As storm-induced flooding and landslides wiped out over 2,000
potable water systems within Honduras and Nicaragua, a large portion of
the population in these countries were left without dependable drinking
water. In addition, Mitch destroyed or seriously damaged almost 80,000
homes, leaving up to 300,000 people homeless. Two million others had to
abandon their homes and belongings, and many were left stranded with-
out access to shelter or relief in waterlogged areas of northern Honduras.
In the days and weeks following Mitch, thousands needed rescuing and
immediate medical care, and millions needed humanitarian relief aid, in
the form of water, food, shelter, clothing and tools.

Mitch also destroyed or severely damaged 25 sewage and drainage systems
and 130,000 latrines, as floods and landslides left lakes of standing water
in many low-lying areas. For example, in the Honduran capital of
Tegucigalpa, damages to sewer systems by the Cerro del Berrinche land-
slide created a septic lake two kilometres long, 72 metres wide and 2
metres deep in the centre of the city, with fecal coliform counts of
1,080,000 (OPS/OMS, 1999). Large numbers of refugees had to co-exist
in crowded shelters. These unsanitary conditions and a lack of clean water
and food contributed to the spread of diseases in the weeks following the
storm. Serious damages to 30 per cent of Central America's hospitals,
health units and other social service units made responding to these sec-
ondary impacts even more difficult.

3.3 Secondary and Tertiary Impacts

Mitch hit subsistence crop production hard, inflicting US$155 million in
damages to this vital sector in Honduras alone (maize and bean stocks were

already low in the region due to El Niño's effects). Mitch also inflicted substantial damages on small and medium-scale livestock production and destroyed countless kitchen gardens and orchards. Farmers saw their crops devastated, livestock lost or drowned, and their land stripped of soil or covered by sterile sediments. In this sense, Hurricane Mitch destroyed the livelihoods of thousands, for in a matter of hours or days, the widespread destruction of crops, roads and cities brought severe long-term economic consequences. These conditions compounded the immediate impacts felt by the survivors, who were already faced with inadequate services, dwindling food supplies and limited seed availability for replanting.

The storm inflicted an estimated US$4 billion in direct damages on Central America's productive sector (agriculture, forestry, fisheries, industry and commerce) (Caballeros, R., 1999; SICA-SG, 1999) Damages to the productive capacity of these already debt-ridden, impoverished nations caused secondary catastrophes for public health, unemployment, labour migrations, reduction of available social services and general poverty. Mitch's damages to some of the primary components of Central America's productive capacity included: the destruction of two-thirds of Honduras and Nicaragua's precarious infrastructure; US$1.2 billion in damages to Central America's overall physical infrastructure; over US$800 million in damages to housing, health and education; and US$3 billion in losses in raw materials and plantation production (especially in Guatemala) (Caballeros, R., 1999) Assistance was—and continues to be—needed to rebuild or repair housing, make micro-loans to small businesses, replace tools, and rehabilitate hospitals, clinics, and other areas of the social and productive sectors. Aggravating factors such as foreign debt also needed— and still need—to be addressed.

4. Lessons Drawn: Resilience-Building Mitigation in Central America in the Twenty-First Century

4.1 Central American Disaster Vulnerability—Recommendations for Action

Central America's near and distant past has been marked by recurrent disasters. This very recurrence has constituted a constant reminder of the geography of risk in the region. This continuity is such that most Central American societies have co-evolved with areas exposed to seismic and volcanic risk. The perennial nature of these hazards in many localities has allowed for the emergence of a culture of risk prevention and mitigation. Many of the forest fallow systems, elevated housing and wise use of wetlands were historical ways in which Mesoamerican societies mitigated risk through cultural adaptation. It is clear that the region's extraordinary biological and cultural diversity have constituted some of its most effective

mechanisms for distributing and mitigating risk. However, most of these traditional natural resource management systems have faced increasing pressure from macro-forces such as growing populations, speculative markets and the degradation of natural resources and services.

Among some of the most pressing challenges Central American societies face at the onset of the twenty-first century is to reduce the levels of vulnerability to disasters. To achieve this implies several steps which we can itemize as follows:

Empower Local Communities to Mitigate Their Own Disaster Vulnerability. There are key lessons to be learned from the past in terms of mitigating risk. One is to empower local communities to manage their own risk by increasing the resilience of traditional institutions and local ecosystems. This can be achieved through a variety of ways, but by far the most effective is to build on local governance systems to ensure equitable access to resources, manage conflicts and strengthen inter-communal cooperation, particularly between up-stream and down-stream communities through local early warning systems. There have been interesting examples of community-based flood warning systems which have contributed to save lives in Guatemala and Honduras (Lavell, A., 1999).

Traditional social institutions, which have survived for generations through the tumultuous political history of Central America, are often geared to regulating and supervising the wise use of natural resources. Often linked to indigenous and communal land tenure systems, these stable, diverse and versatile livelihood systems were key to maintaining a steady flow of goods and services from natural ecosystems, while adapting to sudden changes over many hundreds of years.

This is the case for many indigenous communities, such as those in Totonicapan in Highland Guatemala, or the forest Ejidos of Quintana Roo, Mexico. In the Kekchi communities of the Polochic Valley in Eastern Guatemala, most of the highlands and hill country is settled by indigenous villagers, most of whom work in the coffee plantations or cattle ranches in the valley. Hurricane Mitch hit hardest in the valley, but many highland villages were isolated by mudslides. For the most part, it was community organizations and existing communication networks which brought emergency aid to these communities, through church and civil society groups with the support of international humanitarian organizations such as Oxfam U.K. and Action Aid (British Red Cross, 1999; DEC, 2000). Traditional community support and reciprocity were cited as key factors in the effectiveness of post disaster recovery (Quarentelly and Dynes, 1976; Blaikie, P. *et al.*, 1994)

Adaptation here is the key to determining how resilient a society is in the face of natural hazards. Enduring livelihood systems require community-

based institutions capable of adapting to changes in market orientation, land and resource availability. Resilience, when related to disaster preparedness, is linked to the capacity to predict, prepare for and recover from damaging agents. But it also means the capacity to identify the thresholds which constitute the limit of a system's capacity to absorb sudden climatic, geological or biological shifts. Traditional societies have shown a greater adaptation to cycles of environmental change, by enforcing flexible resource use regimes (Berkes, F., 1997). More research should be conducted on these traditional knowledge systems, in order to apply them to sound environmental management elsewhere.

Identify and Protect "Mitigating" Ecosystems. There are particular ecosystems and life zones which contribute directly to risk mitigation by protecting/enhancing their buffering functions linked to the hydrological cycle (such as precipitation capture and aquifer recharge, maintenance of river baseflow and flood storage by wetlands). These ecosystems include the cloud forests and montane forest ecosystems of the upper Chagres in the Panama Canal basin, the cloudforests of Rio Macho/Tapantí as well as the Cordillera Volcánica Central in Costa Rica. Much of the water which supplies Managua in Nicaragua comes from volcanic lakes and montane forests such as the Laguna de Apoyo. La Tigra National Park in Honduras protects one of the tributaries of the Río Choluteca, which caused much damage in Tegucigalpa and Choluteca during Hurricane Mitch. Similarly, Honduras' second largest city and its economic capital, San Pedro Sula, obtains much of its domestic water from the Sierra de Omoa, but is also prone to flooding from larger watersheds such as the Chamelecón and the Ulúa Rivers.

Preservation and restoration of mangrove forests also emerge as part of a sound risk mitigation strategy. A recent report on the hidden costs of coastal hazards confirms the crucial role played by barrier reefs, barrier islands and mangrove in the mitigation of hurricane risk (John Heinz III Center, 2000). For example, the coastal ecosystems of the Estero Negro, Gulf of Fonseca and some of the only remaining forests in El Salvador are mangroves. Although these mangroves have contributed to absorbing the inordinately high discharge and sediment loads from the runoff from Hurricane Mitch, these mangroves are under increasing pressure from shrimp farms as well as being used for firewood and as a source of basic subsistence for thousands. While the impact of hurricane on coastal ecosystem has yet to be assessed in detail, there is evidence that the mangroves have helped to buffer the high influx of sediments and debris by increasing land area (USGS, 1999). In Belize, a country endowed with the second largest barrier reef in the world, it has been established that the combination of coral reefs and mangrove provide key coastal protection during storms and tidal surges (UNDP, 1999).

Agricultural practices and soil conservation measures also have the potential
to reduce disaster risk. Much of the impact of Mitch was blamed on the
large-scale clearing of forest cover for extensive cattle ranches and subsistence
farming (Rocha and Christoplos, 2001). Such unsustainable use of land and
forest resources removed protective environmental services and increased the
destructive capacity of landslides and floods. Furthermore, recent El Niño
droughts and forest fires had exacerbated the precarious ecological resilience
in the region. In the wake of Mitch, agro-ecological practices have been pro-
moted as disaster mitigation measures. A recent study involving some 2,000
farmers in Guatemala, Honduras, and Nicaragua, and field tests in a num-
ber of sites found that farmers who practiced soil conservation reported less
damage as a result of Hurricane Mitch (World Neighbours, 2000).
Institutions long involved in promoting agro-ecological techniques are now
orienting their work towards disaster mitigation, although further research is
needed to assess the effectiveness of these techniques in the face of extreme
conditions such as those associated with Mitch.

Other authors have questioned the linkage between farm level soil conser-
vation and forest management practices and changes in the watershed dis-
charge and flooding in Central America. (Kaimowitz, D., 2000). Scaling-
up becomes a crucial element to produce palpable results in watershed
management and hazard abatement.

Support Innovative Partnerships. Indigenous communities can work in
partnership with urban communities in mutually beneficial risk mitigation
activities. Indigenous community forestry in Totonicapan, in the
Highlands of Guatemala, have for decades guaranteed a steady supply of
wood and water to surrounding settlements (UICN, 2000). Other such
partnerships that contribute to the preservation of a city's watershed forest
cover and upstream wetlands deserve careful consideration.

Over the years, the distinct episodes of Central American integration have
emerged from the recurrent concern for seeking common solutions to
common problems. The relative small scale of these countries provides key
incentives to seek a larger regional institutionality. A key component of
early integration efforts was the completion of the Panamerican Highway
System which links Canada, the United States and Mexico to Central
America through a regional trade corridor. This trade corridor, called the
logistical corridor by Harvard University/INCAE specialists, is of key
importance for intra-regional trade. (SICA/SG, 1999; Bender, S., 1997)
However, the growing vulnerability of this trade corridor was clearly demon-
strated during Hurricane Mitch, when hundreds of damaged bridges and
thousands of miles of roads were destroyed, interrupting traffic between
and within countries for weeks. This in turn directly affected the region's
economies, increasing costs and spurring inflation.

The linkage between the resilience of the regional trade corridor and the conservation and active management of the biological corridor remains one of the major challenges in the Central American region in the coming decades. Many of the upper tributaries of the rivers which tore through Choluteca, Tegucigalpa or San Pedro Sula, are located in or near protected areas. These biological corridors, if adequately conceived and managed, could provide local communities with very real mitigation opportunities. Providing far more than biodiversity protection, they also are sources of firewood, water and protection against flash floods.

Flood protection will no doubt become an environmental service of increasing value to communities downstream. There are encouraging examples throughout the region of local early warning system for floods which involve communities in Belize, in Guatemala, Honduras and Costa Rica (Relsat/CEPREDENAC). One of the key examples of the impact of sound land management in upper tributaries comes from southern Belize. Of all the Central America countries, Belize suffered the least impact from Hurricane Mitch. It also happens to be the only country with over 75 per cent forest cover and a country capable of mobilizing and evacuating a third of its total population from coastal settlements. However, Figure F2 reminds us that Belize has a long history of hurricane-related destruction, and its institutional preparedness may reflect a greater conscience about the need for early warning systems and civil defense.

How can we link these local initiatives to the growing number of projects involving community forestry, collaborative management of protected areas and ecotourism, and make risk abatement an integral part of sound environmental stewardship? This is not impossible to conceive in Central America, in spite of the extreme odds we have described in the first section of this study.

During the 1990s, *in situ* conservation efforts have enabled the creation of the Central American Protected Areas System, which covers practically a fifth of the regional territory. Other *in situ* efforts include several World Heritage sites, such as Tikal and the Mayan Biosphere Reserve, Bosawas, Río Platano, Talamanca and Darien, and over 400 protected areas throughout the area. The current launching of the GEF-funded Mesoamerican Biological Corridor reflects the concern in linking and integrating protected areas throughout the Central American isthmus. While the Biological Corridor provides for continuity through ecosystem connectivity, it may also go a long way to protect transport and production infrastructure from untimely damage, reducing the vulnerability of this crucial regional trade corridor.

One of the leading foci for regional cooperation is the Central American Commission on Environment and Development (CCAD). Recently

restructured as part of the reforms to the SICA (Central American
Integration System), the CCAD has probably been the most dynamic
expression of the new integration effort of the 1990s. In an effort to har-
monize public policy, share experiences and pool resources, CCAD has
created several technical bodies such as the Consejo Centroamericano de
Bosques y Areas Protegidas (CCAB/AP), which groups the region's
Directors of Forests and National Parks Systems Directors, along with a
broad spectrum of representatives from civil society (peasant and indige-
nous groups, environmental organizations, technical staff from interna-
tional organizations and regional projects, etc.). Among the most notable
achievement of this integration effort has been the completion of up-to-
date studies of the forestry and national parks systems in the region. And
it is likely here that much of the regional effort towards disaster risk miti-
gation through investment in conservation could be stimulated.

Box 5D: The Role of Protected Areas in Central America in Environmental Security

The spectacular growth in the number of parks and protected areas in
Central America has been an outstanding feature of the 1990s. Indeed,
the number of protected areas in Central America has grown exponen-
tially during the 1990s, from 25 in 1969 to 391 in 1996, of which 184
were declared between 1990 and 1996. Today there are over 400
declared protected areas in Central America. These protected areas cover
a wide-ranging array of ecosystems, and harbour some of the region`s
most extraordinary natural heritage sites, totalling over 9.5 million
hectares (approximately 18 per cent of the region's land area).[308] Many
of the larger parks and biosphere reserves are located in border regions,
such as the Maya Biosphere Reserve in Petén, Rio Plátano Biosphere
Reserve in Honduras, Bosawas Biosphere Reserve in northern
Nicaragua, La Amistad International Park between Costa Rica and
Panamá, and the Darien National Park on the border with Colombia.

The creation of most of these border parks coincided with the pacifica-
tion process initiated in Central America after 1987 (Arias, O. and J.
Nations, 1992). In spite of efforts throughout the region to created
truly co-administered border parks, the only protected area along a bor-
der which has become Law on both sides of the border, and is run bi-
nationally is the International La Amistad Park, also a World Heritage
Site, between Panama and Costa Rica.

However, the creation of parks in Latin America has been a major
source of social/environmental conflicts, as documented in Borel, R.
(1999). Over three quarters of the region's protected areas do not have
any permanent institutional presence (UICN, 1997). The creation of

protected areas, often dubbed "paper parks," without the staff to patrol and control access has favoured increased poaching, land grabs and timber contraband. Transboundary pressures however may present scenarios for future conflicts, as in the case of the Darien Gap between Colombia and Panama which is subject to increasing encroachment by Colombian settlers, traffickers and irregular troops. These incursions have less to do with contrasts in resource availability than with the spillover of the Colombia civil war, which is raging in the Atrato and Chocó regions of northern Colombia.

In Central America, over half of the region's 400 declared protected areas were created since 1990 with little or no regards to the active participation of local populations. This has produced frequent conflicts between local landowners and peasant organizations over the way parks are created. The diminishment of state capacities and manpower in the wake of structural adjustment policies has opened the door to an increase in collaborative management of protected areas. An IUCN survey, conducted in 1997, revealed over 80 collaborative management initiative in the region's protected areas, including the Sierra de Las Minas in Guatemala, and Isla Cañas in Panama (Girot, P. *et al.*, 1998).

There have also been encouraging experiences in environmental management in Central America, and a conspicuous increase in the role of non-consumptive uses of natural resources, such as eco-tourism. This has also coincided with a boom in community based natural resource management, and more particularly community forestry. This is the case of Totonicapan, in highland Guatemala, where over 63 indigenous communities have sustainably managed and defended a 21,000 ha pine forest, to supply over 32,000 people with freshwater and wood (UICN, 2000). Similar experiences were recently documented by IUCN in Central America. There are a growing number of local forest management initiatives geared to providing environmental goods and services to local stakeholders. In some cases, they have contributed significantly to reducing the levels of vulnerability of local populations, while increasing ecosystem resilience.

4.2 Conclusion: Confronting The Growing Vulnerability of Central American Societies

 Since 1960 in Central America, at least 200,000 people have perished as a result of civil war, over 50,000 died in disasters and an increasing number are dying from citizen insecurity and crime. There also has been a major shift in the geographic distribution of the population. As changes increase in speed, and populations tend to concentrate, conditions of risk

augment commensurably. A major challenge to disaster prevention and mitigation in Central America has been the dramatic increase in the rate of change on all fronts. Population has more than tripled in 50 years and urban population is fast becoming the majority in these rural societies. Marked by a violent past, most Central American societies have undergone years of civil strife and military rule. The skewed distribution of land and wealth has continued to produce conditions of extreme vulnerability. Today 3 out of 5 Central Americans are poor. And these figures of poverty are on the rise.

As most of the disaster and ecosystem literature indicates, it is precisely during these period of rapid change and transformation that disasters strike. Changes in land use, forest cover, wetlands distribution and watershed degradation have combined with social vulnerabilities to create larger and more complex scenarios of risk. But what are the thresholds, beyond which changes in population distribution, wealth concentration, ecosystem modification, lead to irreversible changes in the provision of key resources? Homer-Dixon (1999) has demonstrated convincingly the linkages between environmental scarcity and social violence. While the link is strong one in Central America, the ancient tradition of armed conflict and political struggle pre-dates most of the current degradation of resources. However, there are clear indications that in certain key regions, the rapid growth in urban population, the accelerated deterioration of soil, forest and water resources have created circumstances which can be considered as resource scarcity, and that this scarcity not only can lead to violence but also to increased disaster risk.

A safer Central America in the twenty-first century will depend on a careful review of the development model adopted so far in the region. There is an urgent need to redirect resources, both public and private, in order to increase the environmental services and institutional capacities that prevent and mitigate natural hazard risk. During the last Presidential Summit of Central America in October 1999 in Guatemala, the topic of disaster prevention was the first item on the agenda. For the first time, Central American governments took on the challenge of reducing risk. They signed a commitment for a 5 Year-Plan (Quinquienio) for Disaster Reduction. However, much of the discussion on disaster prevention and mitigation remains a marginal part of the reconstruction agendas. In Honduras and Nicaragua, for example, infrastructure development, road repair and other megaprojects get the lion's share of some of the US$ 11 Billion in international aid and debt rescheduling which was granted at the Stockholm summit in May 1999.

While, millions of dollars are currently being spent on building dikes and levies to protect human settlements, little is being channeled to attack the

root causes of vulnerability, or to contribute to the non-structural mitigation of disasters through sound environmental management. The 1998 winter following Mitch brought about more floods and landslides, and in many cases bridges and housing rebuilt in the wake of Mitch were again destroyed.

In a recent article about the links between forests, soil conservation and water in Central America, David Kaimowitz (2000:25) reaches the following conclusion: "The slow, steady, and diffuse degradation of Central America's hillsides has no easy solution…. Sporadic short-term efforts to promote soil conservation and reforestation in individual plots selected on the basis of farmer interest are unlikely to have any discernible effect at the watershed level. In many cases they will not even increase farmers' yields or improve their incomes. They do provide much needed investments and services to the rural areas, but at a high cost, with limited effectiveness, and little prospect of sustainability."

For these issues to be addressed, there is a need to integrate risk management into environmental policy and the converse. How do healthy ecosystems contribute to abating risk? What has been the environmental impact of land concentration, misuse of wetlands and massive deforestation? What are the growing urban risks linked to accelerated urban sprawl into the periphery of the city lands markets?

A sustainable vision for a safer twenty-first century needs to involve a new assessment of collective security arrangements, vulnerability and sovereignty in the face of regional disasters. There has been a growth in environmental concerns in the region and the 1990s marked a high tide for the environmental movement in the region. More than most integration efforts in place since the Esquipulas Peace Treaty of 1987, the efforts led by the CCAD in harmonizing legislation, brokering regional projects and defining joint policies for the seven member states have been the most enduring. Recent efforts also include the growth of regional agendas on disaster prevention (CEPREDENAC) water resources and climate change (CRRH), and Forests and Protected Areas (CCAB/CCAP). There still remains an urgent need for systematic research on the linkages between environmental stewardship, watershed management and risk reduction in Central America, as part of a regional environmental agenda.

This paper began with a history of the interaction between civilizations and their environment in Central America, and concludes by looking towards the future. Whether it is to be punctuated by conflict or by cooperation, by increasing prosperity or growing poverty, disasters will continue to shape the destiny of Mesoamericans.

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Climate Change and Security in the Pacific Islands

While the Pacific Islands have contributed discernably little to the onset of climate change, the anticipated impacts of a 1.5–6 ºC rise in global temperatures will be felt most readily by these small, oftentimes remote landmasses scattered throughout the world's largest ocean.[312] Fragile ecosystems, limited natural resource bases, high demographic pressures, and relatively weak and restricted economies already render these islands biophysically and socially vulnerable to environmental changes and the vagaries of globalization. Because security is in many respects, "an accentuated discourse on vulnerability," climate change effects such as sea-level rise, increased sea-surface temperatures, and greater climatic variability and frequency of extreme weather events has made climate change a leading security concern in the Pacific Islands.[313]

The estimated 50 cm rise in sea level by 2100 will lead to the loss of productive and inhabitable lands through direct submergence, inundation, accelerated coastal erosion and salinization of aquifers and soils. The socio-economic implications of this loss for the Pacific Islands are profound. For these predominantly agrarian societies, decreased agricultural output will translate into lost incomes and employment, and overall economic decline, undermining efforts to achieve economic self-reliance and attract overseas investors. Under these circumstances, governments may seek revenues through environmentally unsound activities such as forest clearing and nuclear waste storage, further compromising the livelihoods of Islanders. The evacuation/forced relocation of coastal communities may prompt higher rates of urban to rural migration, compounding those problems already associated with urban growth (i.e., pollution, unemployment, the growth of squatter settlements, crime, and increased health risks). In some cases, such as in Tuvalu, entire nations of people may have to abandon their homelands and relocate to foreign countries.[314] Loss of land area may also force changes in land-tenure systems—an already politically and culturally sensitive issues in the Pacific Islands—so as to allow more people access to smaller areas of land.[315]

In addition to agriculture, the majority of Pacific Islanders are also dependent on fishing for food, income and cultural preservation. This is particularly relevant to concerns surrounding the impacts of climate change, as increased sea-surface temperatures will result in frequent episodes of coral bleaching and subsequent coral mortality. Tourism—

an important economic sector and source of foreign exchange for many island nations—will be jeopardized, as natural attractions are lost. The damage to fisheries and reduced catches will similarly undermine economic security, as well as possibly affect the health of many Islanders, as their protein intake is lowered.[316] The loss of coastal protection provided by barrier reefs will increase vulnerability of coastal lands to erosion and the impacts of increased storm activity. In fact, changing weather patterns will compound many of the socio-economic impacts of climate change, as higher frequency and intensity of extreme weather events will be coupled with heightened vulnerability to their impacts.

With climate change threatening livelihood security, and even national sovereignty, throughout the Pacific Islands, the potential for political instability and ethnic unrest may also be rising. As Islanders face losses in incomes, employment, food sources, land, and cultural identity, and the prospect of being forced to leave their homes and countries, tensions will mount and frustrations may spark conflict between nations, between government and civil society, and amid different tribal and/or ethnic groups. While such conflict may be indicative of more fundamental problems and inequities (i.e., poverty, indebtedness, institutional resilience, and state legitimacy), the impacts of climate change will simply exacerbate these factors and bring them to the fore of Pacific Island Societies.

Recognizing all of this, migration and resettlement planning, foreshore stabilization, economic decentralization and increased infrastructure resiliency will all be key components of an overall adaptation strategy. To advance the cause of these nations, the conservation community—in addition to ensuring the implementation of greenhouse gas emissions commitments—should aid in the development of adaptation plans that include environmental priorities, monitor the effects of climate change and provide early warning of dangers, and promote international cooperation between islands on issues of coastal management, and livelihood security.

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Environmental Sources of Vulnerability to Disaster

The protective value of natural systems—acting as "shock absorbers" in the face of extreme climatic events such as hurricanes—may be consistently undervalued in development decision-making. Worldwatch Institute's Janet Abramovitz (2001) argues that the destruction of coastal wetlands, dunes, and mangroves may eliminate vital natural "shock absorbers" for storms, while deforestation, urbanization and river "straightening" can increase the likelihood of flooding.

Some hypothesized links include:

- *Deforestation and Landslides:* The loss of vegetative cover on steep hillsides contributes to runoff and slope failure due to the loss of stabilizing root structures.[317] Trees in a mixed forest also catch snow and hold it, preventing avalanches.[318]

- *Draining of wetlands and Floods:* The draining of swamps and clearing of mangrove wetlands may disrupt natural runoff patterns and magnify flood hazards.[319]

- *Loss of vegetation and Droughts:* Local clearing of cover vegetation can prolong dry periods, changing the reflectivity of the land surface and accelerating soil loss.[320]

- *Urbanization and Floods:* Paving of surfaces decreases infiltration and increases runoff, exacerbating the impacts of high rainfall events on river flow regimes.[321]

- *Structural Mitigation and Risk:* River levees that are built to provide flood protection can destroy riparian habitat and heighten downstream floods.[322] Forest fire suppression may increase the magnitude of fires, when they escape control.[323]

Switzerland learned the importance of conserving its high mountain forests over 100 years ago. Widespread flooding, avalanches and landslides in the late nineteenth century demonstrated the link between deforestation and these catastrophic events and led to the passage in 1876 of an historic law aimed at conserving forested areas. The protective value of these forests in safeguarding villages, towns, infrastructure and tourism, and thus the economy as a whole, was estimated in the mid-1980s at US$2–3.5 billion per year.[324] The Swiss government provides US$25–35 million per year in subsidies for conservation of "protective" forests.[325]

Likewise, in Bangladesh it is recognized that the Sundarbans, one of the world's largest mangrove forests, protect several communities from otherwise-devastating tropical cyclones. An estimate by the Bangladeshi government suggests that the storm protection provided by the mangrove area has saved the public purse nearly half a billion dollars in avoided costs of structural mitigation and relocation.[326]

In Central America, the seven disaster-prone countries of the region are collaborating to protect a Mesoamerican Biological Corridor along the Atlantic coast of the isthmus, from Mexico to Panama. The corridor aims to preserve watersheds and forests, while attracting over US$100 million per year in international greenhouse gas offset funds.[327]

In the wake of the Yangtze River basin floods of 1998, which reportedly affected an area of nearly 26 million square kilometres and forced the relocation of nearly 14 million people, China is putting measures into place to tackle the environmental sources of vulnerability.[328] China is today seeking to restore natural forests, wetlands and grasslands along the river.

Experts have long called for the integration of enhanced natural resource management to reduce disaster vulnerability. In 1994, international experts assembled for the UN Decade for Natural Disaster Reduction (IDNDR) concluded, "Environmental protection… is imperative to the prevention and mitigation of natural disasters."[329] If so, conservation of natural systems may have a vital role to play in protecting societies from disaster, particularly in the face of our changing climate. The conservation community needs to better understand the links between the sustainable and equitable management of natural resources, and the security of societies in the face of disaster.
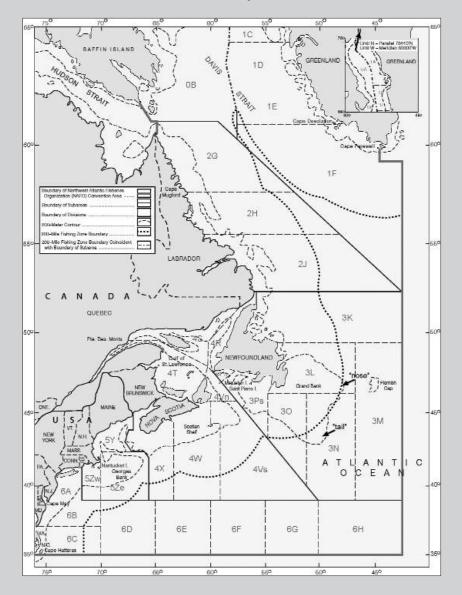
Endnotes

305. Small landholding, usually dependent on subsistence-level agriculture.

306. Large Land holdings, usually involving plantation agriculture or livestock ranching.

307. T.F. Homer-Dixon (1999:15) defines three primary sources of environmental scarcity. These are structural scarcity, which is the imbalance in distribution of a resource due to underlying inequities of wealth and power. Demand-induced scarcity is the growth in need for a resource stemming from population or consumption pattern growth. Supply induced scarcity is the decrease in the actual size of the quantity or quality of resource available due to depletion or degradation.

308. Homer-Dixon (1999:15) defines resource capture as the action by dominant groups in a society to shift in their favor the laws and institutions governing distribution of a scarce resource.

309. According to Homer-Dixon (1999:16) ecological marginalization occurs when a structural imbalance in resource distribution joins with rapid population growth to drive resource-poor people onto ecologically marginal areas.

310. L.G. Solis, personal communication with author.

311. Source: CEPAL, 16 April 1999, *Revista MASICA*, February 1999, Special Edition on Mitch, p. 9.

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NAFO map, Northwest Atlantic Fisheries Organization (NAFO)

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Abstract

While the "Turbot War" between Canada and Spain is an instance of violent conflict over an increasingly scarce resource, it represents a departure from traditional environmental conflict scenarios. Economic interests did not drive the dispute, since the resource in question was of marginal economic importance to both parties, but by broader national interest considerations, namely "environmental nationalism." Moreover, the conflict took place despite the existence of a multilateral environmental agreement that governed the management and harvesting of the resource in question. The failure of this agreement in addressing disputes over fishing rights and quotas led Canada to take enforcement measures into its own hands. The resulting crisis ultimately led to a greater protection of the resource by forcing parties to remedy institutional weaknesses. Conservation organizations can assist in preventing similar environmental resource disputes by providing a forum in which to air grievances and find solutions, by monitoring and identifying international agreements that are in trouble, and by building and disseminating information on the types of environmental degradation that lead to security issues.

Introduction

Canada and Spain, allies who had never fought each other, found themselves in a diplomatic conflict in the spring of 1995 that ultimately resulted in the firing of shots. Nationals of both states were engaged in fishing in the Grand Banks, off Newfoundland, for Greenland halibut. Stocks of this fish species, more commonly known as turbot, had recently been in decline. Canada claimed that Spanish fishers were taking more fish than the fishery could sustain. After an escalation of diplomatic actions over the course of nearly a month and a chase that lasted four hours, a Canadian fisheries patrol vessel fired shots over the bow of a Spanish fishing trawler on the high seas just outside of Canada's Exclusive Economic Zone (EEZ). The boat, which had previously cut its nets, was boarded and seized.

The "turbot war" between Canada and Spain is certainly an instance of violent conflict between two states resulting from the scarcity of a resource that both countries valued. Without this scarcity the two countries would not have been concerned with the equitability of the distribution of catches, and would not ultimately have come to diplomatic blows and military threats. Three elements of this case are notable in terms of the environment and security framework. First, the resulting conflict took place through broader national interest considerations; states were engaged for a variety of reasons, none of which involved simple subsistence or dependence on the resource in question. Second, the conflict took place despite the existence of a multilateral organization engaged in trying to manage the resource. Third, the conflict led to what might be considered a useful resolution for protection of the stock and international management of fisheries more generally; such a resolution might not have happened without the conflict. While the resource may be better protected after the conflict than before, that was by no means an inevitable outcome. It is important to figure out how to resolve—or prevent—such crises without resorting to violence. It is also important to become aware of the conditions under which such common pool resource-based conflicts can be harnessed to improve environmental management and mutual security.

Turbot Timeline

1977	Canada declares its Exclusive Economic Zone
1979	NAFO formed
1994	UNCLOS enters into force (without ratifications from either Canada or Spain)
	Canada declares moratorium on fishing within its EEZ
	Canadian Parliament passes law authorizing extraterritorial enforcement of fishing quotas

1995	Feb.	Canadian government begins actively publicizing the turbot issue
	March 3	Tobin (Canadian fisheries minister) calls for a moratorium on turbot fishing
	March 6	Canadian cabinet authorizes capture of fishing vessels outside Canada's EEZ
	March 9	*Cape Roger* captures *Estai*
	March 16	Canadian fisheries officials cut nets of *Pescamero Uno*
	March 28	Spanish bring the turbot case before the International Court of Justice
	April	Tentative deal reached between Canada and the EU
		UNCLOS straddling stocks conference convenes
	August	Straddling stocks agreement signed

The Context

Fisheries have provided important aspects of people's livelihoods for centuries. They are a source of both employment and food, critical to the well-being and culture of the populations of traditional maritime countries. Fishing, however, has increasingly been done unsustainably, particularly on the open ocean. Fish stocks are available to anyone with sufficient technology to get to where they are, and fishing easily falls into what Garrett Hardin (1968) deemed the "tragedy of the commons." With a resource that can be depleted and that anyone can gain access to, each state, or even individual fisher, knows that any other may be able to fish in the area. If one actor restricts fishing for the good of the fishery but others do not, the conservation-minded actor both pays the cost of foregoing the benefits of fishing and fails to protect the resource if the other actors do not restrict their actions.

Any agreement to restrict ocean fishing needs to be undertaken internationally, and states can decide not to participate. And when states do participate in international fishery agreements, they often negotiate clauses that allow them to "opt out" of specific regulations undertaken by the constituent conservation organization. Even when states have every intention of following the mandates of the management organization, individual fishers may find a way around the rules. Non-compliance can be difficult to monitor on the open ocean, and fishers can easily re-flag their vessels in states that refuse to join regulatory agreements.

Moreover, the level of uncertainty about the condition of a given fish stock is often high. Natural (but irregular) fluctuations in fish stocks make it dif-

ficult to determine whether a bad fishing season is due to over-exploitation of the resource or some factor outside human control. Gathering information about the health of a fishery almost always involves relying on catch reports from fishers, who may face incentives to give false information.[330] Scientific uncertainty about how great a yield a fishery can sustain over the long term may make cooperative regulatory outcomes less likely, as fishers are unwilling to pay a certain present cost for a possible (but uncertain) future benefit.

Adding to the problem of inadequate or contradictory information is uncertainty about whether all fishers will follow the same rules of conduct. The cost-benefit analysis of individual fishers is distorted from accounting for the true costs of depleting a stock towards seeking rapid payoffs. This is because countries often subsidize their fishing fleets, spurring an international race for dwindling stocks. Moreover, financing the debt on fishing vessels requires a steady stream of payments in the present deepening the need for quick profits by individual fishers.

The fishery off of the Atlantic Coast of Canada has traditionally been one of the world's most productive. The Grand Banks is a shallow ocean area on the continental shelf where the warm Gulf stream intersects with the cool Labrador current, providing a varied and nutrient-rich environment for many types of marine species (Kurlansky, 1997). In the first half of the 1900s, local fishers caught more than a quarter of a million tonnes of fish per year, and by the 1960s both Canadian and foreign fishers caught more than 1.4 million tonnes in the groundfish fishery off of Canada's Atlantic Coast alone (Felt and Locke, 1995). Although the fish in this area had once seemed impossible to deplete, improved technological capabilities, particularly the use of trawlers, increased the efficiency with which fish could be caught and began to threaten groundfish stocks off the Grand Banks.

Canada declared a 200-mile Fisheries Zone (later an Exclusive Economic Zone) in 1977 in an effort to deal with fisheries management issues in the region. Most of the Grand Banks falls within this zone, although the areas referred to as the "nose" and the "tail" of the Banks do not, and remain in international waters. This declaration was largely in response to overfishing by the fleet of factory trawlers, many of them European, that had grown dramatically over the course of the previous decade and a half. As a result of this growth, catches of the major fish stock in the region, cod, declined from 730,00 tonnes in 1968 to 126,000 tonnes per year a decade later. Estimates of the total biomass available in the fishery declined 82 per cent between 1962 and 1977 (Hutchings and Myers, 1995). Coincident with the declaration of the extended fisheries zone, Canada, which has a long history of subsidizing the fishing industry, undertook to support its small-vessel fishery at the expense of larger vessels. These measures were an

effort to remedy unemployment and poverty in the region, where fishing had always been the traditional source of income. The combination of actions led to some signs of recovery in fish stocks, but these signs were to prove short-lived, and soon signs of decline were once again clear. The Canadian government, however, focused on the short-term employment benefits of an active small-boat fishery rather than the long-term costs of overfishing (Hall-Arber and Finlayson, 1997). It failed to take significant action to protect the cod stock until it was too late, and finally had to declare a fishing moratorium in 1994. More than 50,000 Canadian workers in the fishery industry, primarily in Newfoundland, lost their jobs in the wake of the decline in fish stocks as well as the new conservation decision (Darnton, 1995). Faced with a decline and eventual ban on fishing their traditional stock, Canadian fishers sought other groundfish, such as turbot. The bulk of Canada's fishing fleet is capable only of fishing within—or just barely outside—its national waters (Beaudry and Fulsom, 1993), and thus was especially concerned about the health of the groundfish stocks in this region.

The fishing industry in Spain, particularly in the Basque area and Gallicia in the North which accounts for half of the national fishing fleet, has also been central to that region's economic well-being and cultural identity. Basques have been fishing as long as recorded history, and may have fished in the area of the Grand Banks for more than a millennium (Kurlansky, 1997). The fishing industry employs more than 50,000 people in the region, and fishing alone accounts for more than 4 per cent of the region's jobs (White, 1995b); in the major port cities, fishing accounts for 35 per cent of all employment (White, 1995a). Because of poor fishery resources close to home, the Spanish have developed a distant-water fishing fleet. And, as they fish mostly in foreign and international waters, Spanish fishers have a particular history of being involved in international fishery disputes. The Spanish and Portuguese fishing fleets have been heavily subsidized by their respective governments and by the European Union (Springer, 1997).

Fishing had been regulated internationally in the area in question since 1950 under the terms of the International Convention for the Norwest Atlantic Fisheries (ICNAF). With the general acceptance of EEZs the regulatory function of this organization had to change dramatically, as much previously international area became domestic. Eight of the previous ICNAF members, including Canada and the then European Economic Community, negotiated the Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries, creating a new institution: The Northwest Atlantic Fisheries Organization (NAFO). This organization began operating in 1979 (NAFO "From ICNAF to NAFO," n.d.).

NAFO operates as do many fisheries organizations. A Scientific Council conducts and gathers research on the state of the fishery generally and performs assessments on specific stocks. It can make recommendations for overall catch limits (NAFO, "The NAFO Model," n.d.). Ultimately, the Fisheries Commission, in which all parties to the agreement have one vote, decides on a total allowable catch (TAC). It is interesting to note in this context that the EU is a single member, so that even though it represented 12 countries at the time, it only gets one vote. The TAC is then divided into individual quotas for each contracting party. The acceptance of the TAC as well as national (or in the case of the European Union, regional) quotas is by majority vote. Decisions made by the Commission apply to all members. Like other international agreements that call for binding decisions to be taken by less than unanimous voting, however, the agreement has a provision that allows parties to lodge an objection to a measure within sixty days of its adoption and thus not be bound by it (Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries 1978, Articles 6, 14(2), 11(7), 12(1)).

Because cod was the most important groundfish in NAFO waters and turbot had not been widely fished until the decline of the cod stocks, NAFO had not concerned itself with turbot until the mid-1990s. The turbot fishery had originally developed in the mid-1960s, increasing from commercially negligible amounts in the early 1960s to the 30,000–40,000 tonne range by the late 1960s. Catches gradually declined to the 20,000-tonne range by the late 1980s. Most of this catch was in the area that later came to be within the Canadian EEZ. In 1990, Spanish and Portuguese vessels began fishing for turbot in deeper waters outside of Canada's EEZ, sending total catch figures into the 60,000-tonne range in the early 1990s (NAFO, 2000). The resulting decline in the stock of mature fish put the issue on NAFO's agenda in 1995. For that fishing season NAFO decided to set the TAC at 27,000 tonnes (Canadian Department of Fisheries and Oceans, 1995a). The division of the TAC into national quotas, however, was contentious. The Convention requires that allocation of the TAC "take into account the interests of Commission members whose vessels have traditionally fished" in the region (Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries 1978, Article 11(4)), but there were competing interpretations of this mandate in the turbot context. Canada requested the highest allocation based on a traditional turbot fishery in the area and proximity to the stock. The European Union argued on behalf of Spain that it had taken the largest percentage of the catch of the species during the previous two years. A slim majority of six to five, with two abstentions, voted to divide the quota by allocating 16,300 tonnes to Canada and 3,400 tonnes to the EU. The European Union lodged an objection, not to the overall TAC, but to the national

quotas, and thus was not bound by them. The EU indicated that it would abide by a self-imposed quota of 19,000 tonnes, which would constitute nearly three-quarters of the overall quota (Canadian Department of Fisheries and Oceans, 1995a). If all states in the region caught the quotas of fish they agreed to, the fish stock would become severely depleted, by all scientific estimates. But because the EU followed the official objections procedure, NAFO was powerless to do anything about the situation.

NAFO was a weak organization in other ways. European vessels have routinely overfished even the quotas they have agreed to (Canadian Department of Fisheries and Oceans, 1995b). Although the agreement calls for states to implement "a scheme of joint international enforcement" (Convention 1978, Article 18), only six of 49 European vessels charged in 1993 with use of illegal nets or misreporting of catch statistics were prosecuted by the NAFO member states in which they were registered (Kedziora, 1996/7).[331] The situation is even worse when fishing vessels register in states that are not members of the organization. Such registrations are often called flags of convenience, because states require little in the way of obligation from shipowners in order to lure new ship registrations. This practice was becoming a real problem for NAFO by the mid-1990s. Vessels flagged in such non-member states as Honduras and Belize fished in the area, only to be re-flagged in other locations such as Sierra Leone and Sao Tomé e Principe when official NAFO dispatches complained to their flag states and implored them to stop these vessels from fishing in NAFO regulatory areas. Estimates suggest that in 1994 fishing by non-contracting party vessels accounted for more than 22,500 tons of groundfish caught in the NAFO regulatory area (NAFO, 1995). In response, the Canadian Parliament in 1994 passed a law allowing Canadian authorities to enforce NAFO rules and quotas on ships flying flags of convenience in the NAFO regulatory area, *outside* of Canada's EEZ (Springer, 1997). There were official protests lodged against this new Canadian law, because it did not set clear limits to the authority that Canada was claiming (e.g., "New Canadian Law," 1994). But on the whole, other member governments of NAFO did not mind having Canada police the NAFO area to protect fish stocks against non-members. This situation continued to be satisfactory as long as the Canadian government applied the law only to ships flying flags of convenience.

The Crisis

By mid-February of 1995, Spanish and Portuguese trawlers had already taken more than the original EU allocation of 3,400 tonnes, and showed no signs of stopping. By the end of February, Spanish fishers had already caught 5,000 tonnes of turbot ('Flatfish with the High Profile,' 1995). In late February, the Canadian government decided to make a public issue of

turbot overfishing, and by the beginning of March most major Canadian newspapers were covering the issue extensively. Turbot, which several months earlier few people had heard of, became a major national issue.

In early March, the Canadian Minister of Fisheries and Oceans, Brian Tobin, in response to the EU lodging an objection to its NAFO quota, called for a moratorium on fishing for turbot in the NAFO regulatory area until the quota issue was resolved, in order to prevent further overfishing (Cox, 1995). Predictably, the call was ignored by the European Commission, which was acting within the letter of international law and of its treaty commitments. The bulk of the Spanish and Portuguese fleets similarly ignored the call. The Canadian federal cabinet expected that the call for a moratorium would be ignored and saw that it could draw upon broad public support on the issue. Claiming a need to act unilaterally to protect a threatened resource, it decided to expand its authority under the regulations passed the previous year that allowed it to police NAFO rules in international waters. It amended the regulations and announced that it would henceforth interpret its law to allow it to police the actions not only of ships flying flags of convenience, but also those flying Spanish and Portuguese flags (Springer, 1997).[332] This set the stage for confrontation.

On March 6th, (1995) Fisheries Minister Tobin announced that Canada would use this new authority to enforce the proposed moratorium on the turbot fishery (Springer, 1997). This announcement, again predictably, was roundly denounced by European authorities. Spain went so far as to threaten to send warships to the region to protect its fishing fleet ('Ceasefire in the Turbot War,' 1995). However, the Canadian announcement was much more effective than the original suggestion of a moratorium. More than half of the foreign trawler fleet in the affected area, including some 25 Spanish and Portuguese trawlers, promptly left. Many ships that remained moved farther away from the Canadian EEZ (Cox, 1995). But those that remained continued to fish actively.

Three days later the Canadian government decided to push the issue further by authorizing the arrest of a European trawler outside of Canada's EEZ. The Canadian Department of Fisheries and Oceans settled on a Spanish Trawler called the *Estai*, and on the next day, March 9th, a Coast Guard ship spotted the *Estai* and ordered it to surrender. The *Estai* cut its nets and ran, but after a four hour chase followed by the firing of warning shots, it finally surrendered. It was boarded and seized; the ship was impounded and the captain arrested (Stewart, 1995). The Coast Guard had chosen its target well; the *Estai* was in violation of a wide range of NAFO rules. Canadian authorities claimed that 79 per cent of the turbot found on board were juveniles, smaller than would be caught by nets with legal mesh sizes. They also claimed that the *Estai* had hidden storage holds,

which contained species, such as American Plaice, that were under an international moratorium and thus should not have been on board in any quantity at all. The Department of Fisheries and Oceans also recovered the fishing nets that the *Estai's* crew had cut, and found the mesh size of the nets to be smaller than the minimum allowed under NAFO rules (Beesley and Rowe, 1995). The next day, the Captain of the vessel was released on CDN$8,000 bail, and the trawler was returned to its owners upon the posting of a half-million dollar bond.

The Canadian government justified its actions as environmentally necessary. It claimed that its extraterritorial use of force was in support of a multilateral agreement to conserve a valuable natural resource, and that it had to use force because the Spanish and Portuguese governments were not living up to their obligations to enforce the rules of the conservation organization. The European Commission saw the seizure of the *Estai* as a clear and unjustifiable breach of international law, and claimed that it undermined NAFO because a cooperative multilateral organization could not function effectively when faced by unilateral uses of force by its members. In other words, both sides to the dispute justified their positions as supporting NAFO, yet managed to come to opposite conclusions as to what actions would best support effective multilateral management of the Northwest Atlantic fishery.

Following the seizure of the *Estai* the Canadian government reiterated its commitment to enforcing a moratorium on the turbot fishery until an agreement was reached on a sustainable quota. Canada also used the evidence of illegal fishing practices on the *Estai* to broaden its position and demand that existing NAFO rules be tightened and more effectively enforced. The show of force successfully communicated Canada's commitment; most trawlers promptly left the region. Many of those that remained left after March 26, when Canadian forces cut the nets of another Spanish trawler, the *Pescamaro Uno*. Following this incident, the Spanish Navy sent a patrol boat to escort the fishing fleet (Todd, 1995), and Canada responded by sending in larger naval vessels to enforce the moratorium (Nickerson, 1995). Meanwhile, the Spanish government announced that in retaliation it would henceforth require visas of all Canadians trying to enter the country, and would begin the process of taking the issue to the International Court of Justice. The EU looked into the possibility of some kind of retaliation, but in the end took no action.

The crisis aroused popular passions in both Canada and Spain, and the positions of both governments were hugely popular within their respective populations. Both governments also tried to make their case internationally, with limited success. Brian Tobin, the Canadian Minister of Fisheries, went to New York to make the Canadian case both to the United Nations

and to the international media. The Spanish government demanded the support of its partners in the European Union. The United States remained studiously neutral on the issue, and the EU was less enthusiastically supportive than the Spanish government had hoped. Some EU members, most notably Portugal, supported Spain's accusations. Other EU members which had had fisheries disputes with Spain in the past, most notably the United Kingdom and Ireland, did not ('EU and Canada Sign Easter Deal,' 1995).

The Resolution

The parties involved pursued several approaches to resolving the conflict. Spain appealed to the International Court of Justice (ICJ). At the same time, the EU and Canada worked to negotiate a new division of the total catch limit of turbot. They also negotiated a set of more restrictive rules for monitoring and inspecting catches. In addition, the United Nations negotiations on how to implement the Law of the Sea for straddling and highly migratory fish stocks, already scheduled for that spring, provided an opportunity for further resolution of the issues brought up by the turbot conflict.

Despite the ongoing diplomatic negotiations to re-allocate the turbot quota, Spain asked the ICJ to rule against Canada's use of force in the conflict. The ICJ decided in December 1998 that it did not have jurisdiction to hear the case (ICJ, 1998). In the meantime, however, Canada and the EU reached a compromise for dividing the national quotas more equitably. The EU was allowed to catch an extra 5,000 tonnes for the current fishing year (Ryan, 1995). In the following fishing year, the EU would get 41 per cent of the quota and Canada 37 per cent (NAFO, 1996).[333] It was understood that future allocations would be divided similarly. The TAC and national division remained the same for the following two years, and the national quota allocation has stayed constant as the overall TAC has increased slighlty since then (NAFO Annual Reports 1995 through 2000).

These parties also agreed to more restrictive regulations on minimum mesh sizes for nets and for fish, and most importantly for increased independent observer coverage and satellite tracking of fishing vessels in the NAFO regulatory area (NAFO, 1995). Previously member state inspection vessels had the right to board and inspect NAFO vessels and report non-compliance to the flag state, a system that was rarely implemented successfully. A new system was created that required that all NAFO member vessels be equipped with a satellite tracking device and that all NAFO vessels fishing in the regulatory area have independent and impartial observers on board by January 2001. These observers undertake a variety of functions, including recording and reporting on the fishing activities of

the vessel, observing and estimating catches and catch locations, recording the type of gear and mesh sized used, and verifying entries made in log-books. They are required to report any potential infringement of Conservation and Enforcement measures to a NAFO inspection vessel (NAFO, 2001). While the states themselves are responsible for hiring, housing, and feeding the observers, the observers are only allowed to provide the functions described above and those suggested by the Commission. Additionally, member states with ports provide inspectors to be present when catches by member states are offloaded, to "verify the species and quantities caught (NAFO, 2001)."

NAFO took further steps to improve enforcement, with the adoption of a "Scheme to Promote Compliance by Non-Contracting Party vessels with the Conservation and Enforcement Measures Established by NAFO." This regulation was designed to stop fishing in the area by vessels flagged in states that are not NAFO members through inspections and the possible prohibition on landings of fish caught by such vessels, as well as diplomatic pressure on non-member states whose vessels were fishing in the regulatory area (NAFO, 1997).

Canada also agreed to repeal the regulation that allowed enforcement of quotas outside its EEZ on NAFO member vessels ("EU and Canada Sign Easter Deal on Fishing Rights," 1995). This new agreement granted both parties victories they could take home to their national constituents, although the Spanish government was less than enthusiastic and acceded to it only under pressure from other EU governments (White, 1995c). Each side was able to claim that its most important goals had been met. Spain gained an increased percentage of the TAC and the implicit admission that it had been right to object to such a low allocation in the first place. Canada, which argued that better enforcement had always been the goal of its action, gained a system in which cheating was made less likely, and in which Spain was much more likely to fish within its national allocation. This system, negotiated bilaterally, had to be accepted by the other members of NAFO, and in September it was, although not without concern on the part of some of the members for the precedent set by member state side deals ('Turbot Pact Ratified,' 1995).

In April of 1995 the United Nations negotiated an agreement for how to deal with highly migratory fish or those fish stocks (such as turbot) that straddle national or international boundaries. The conflict over turbot was in the press as the negotiations were underway, and Canada participated actively in the negotiations. The agreement that resulted indicates that states have a "duty" to participate fully and in good faith in fisheries agreements and that member states of multilateral fisheries organizations have the right to inspect the vessels of other states if these states are not fully

enforcing the agreements. In addition to suggesting that member states have an obligation to accept organization quotas even when legally allowed to opt out, this agreement legitimates the rights of inspection NAFO has since incorporated against non-member states.

The new NAFO observation and inspections process seems to be working. Allegations of illegal fishing practices have dropped from nearly 60 per year before the new system was put in place to only one or two per year. Violators are also now more likely to be caught through international inspections processes. For instance, in April 2000, a Canadian Fisheries Patrol vessel inspected a Portuguese vessel fishing for cod in the NAFO regulatory area. It determined that the vessel, the *Santa Mafalda*, had misreported its catches of cod, and contacted EU and Portuguese authorities, which ordered the vessel back to its home port for inspection. John Mercer, of the Canadian Department of Fisheries and Oceans explained that "we have no reason to believe NAFO is not working… This incident is actually an example that shows it works ("Portuguese Fishing Vessel Nets Violation Charge"). In addition, no party has objected to the turbot quota or its national allocation since the resolution of the conflict. Perhaps as a result, stocks of turbot have recovered significantly, more than doubling from the pre-regulatory low in the 1990s (NAFO Scientific Council, 1998; NAFO, 2000).

Relevance to Environment and Security

This case is an important one for discussions of environment and security because of the context in which it happened. The literature on environment and security leads us to expect that environmental conflict should be more likely the poorer the populations in question, the more economically central the environmental resource in question is to them (Homer-Dixon, 1999), and the less institutionalized the setting in which it happens (Matthew, 1999). The Turbot War developed between two rich, industrialized countries, over a resource that was of marginal importance to their overall economies, and the harvesting of which was governed by an existing multilateral environmental agreement. Given these circumstances, why did the confrontation devolve into a diplomatic, and nearly military, confrontation?

The literature on environment and security outlines two general situations in which environmental degradation is likely to result in international security issues. The first is when environmental scarcity removes the livelihoods of actors, undermining social structure and leading to civil unrest. The second is when countries have disputes about resources that are critical to their economic well-being, like petroleum or freshwater (Homer-Dixon, 1999). This case does not match either of these pathways.

Although it is true that the depletion of Grand Banks fisheries did threaten the livelihoods of individual fishers and fishing communities in Newfoundland and Northern Spain, it was not these fishers who pursued the conflict but the governments of Canada and Spain. In addition, the turbot fishery was not particularly important in aggregate to either economy as a whole. The annual economic value of the fish under dispute was on the order of one ten-thousandth of the national product of the protagonists. Both countries might actually have ended up economically better off if they had gotten rid of their Grand Banks fisheries and the large volume of government subsidies given to them. In any case, the costs of engaging in the dispute may have approached the economic value of the resource (Koring and Milner, 1995). So the driving force of the dispute was not, in the end, economic.

Why then did the two governments pursue the dispute to the degree that they did? It became a question not of economic interest *per se*, but of national politics more broadly defined. To a significant extent, the dispute was driven by national pride. The general populations of both Canada and Spain, most of whom had never been to Newfoundland or the Galician or Basque regions, turned out to be receptive audiences to claims by their leaders that they were acting to protect national heritage, and, coincidentally, international law. The Canadian government was clearly playing to the Canadian popular self-image as an environmentally and internationally responsible people. It claimed to be enforcing its laws on the high sea not to protect its economy, but to protect an international environmental resource. This is a new twist to the link between environment and security. It is not only environmental degradation, but also environmental nationalism (albeit one born, perhaps, from previous environmental failures), that can lead to conflict.

The problem with this particular kind of environmental nationalism and the enthusiasm for regulation that its proponents can generate is that it can display the "new convert" phenomenon. In environmental issues, the phenomenon happens when a country, after many years of abusing an environmental resource, sees the unsustainability of what it is doing, and changes policy suddenly and radically. We see this phenomenon in issues as widespread as sea turtle protection and nuclear testing. From the perspective of these "new converts," having been convinced that the environment needs to be protected, they are eager to ensure that it is protected as well as possible and are the most rigid of believers. From the perspective of other users of the resource, however, it smacks of hypocrisy. From the outside, it seems that the country used the resource until it became threatened, and then attempts to prevent everyone else from getting their fair share. This dynamic was certainly present in the turbot dispute.

The second way in which the Turbot War does not fit the normal pattern of environmental security issues is that it happened within the context of a multilateral environmental agreement. The Convention on Future Cooperation in the Northwest Atlantic Fishery was ratified by both of the parties to the dispute and had been designed specifically to prevent both the depletion of fish stocks in the region and disputes over fishing rights. Yet in this case, the presence of NAFO arguably exacerbated the dispute for without it, the Canadian government would have had much more difficulty justifying its actions. Without the NAFO agreement, the Canadians would not have been able to point to a formal Spanish commitment to fishery conservation. In other words, without NAFO the turbot would probably have continued to be overfished but there may well not have been a conflict. If NAFO rules had been stricter, however, the crisis would again probably not have occurred. If, for example, the rules of the organization had allowed for more than limited third-party inspection of trawlers and not allowed members to object to specific quotas, Spanish fishers would not likely have attempted to overfish to the same degree in the first place, nor cheated even on the rules Spain had agreed to.

These apparent loopholes in NAFO suggest that, as a multilateral environmental agreement, it was weak. There are three aspects of this weakness that are relevant to the turbot crisis. First, the existence of the objection clause that allows countries to opt out of specific quotas, second, the relatively weak inspection procedures, and third, the slow, sometimes ponderous, process of scientific review that can delay regulation of a fishery until it is too late. The objection clause means that NAFO cannot in the end require that a country do something that it does not want to do. But countries are loath to sign fisheries agreements that give the final say over national fishery policy to international bodies. In fisheries agreements in particular, there is an advantage to empowering a commission to make annual decisions about catch limits as information on previous catches and stock sizes becomes available. Doing so would be impossible if a new agreement had to be fully negotiated and re-ratified each time a new catch limit or regulation were imposed. Instead, most such agreements allow a commission to make non-unanimous decisions that are then implemented by all participants. However, in international law no state can be bound without its consent, and the participant governments would likely have seen NAFO as an infringement of their sovereignty if decisions could be imposed on them that they did not agree to. Few would therefore have joined the institution without a process that allowed them to opt out of commission decisions to which they were severely opposed.

Countries prefer weaker inspection procedures not only because stronger ones might infringe on sovereignty, but also because strong inspections procedures can lead to international embarrassment. The better the inspec-

tion procedure, the more likely it is that governments that are not adequately enforcing quotas and rules are going to get caught. This means that governments that are less enthusiastic about strict enforcement of quotas and rules either have to police their own fishers more thoroughly and effectively than they want to, or risk the international embarrassment of being identified as countries that do not live up to their treaty obligations. Since countries do not know when they sign agreements of this sort how strongly they will apply the rules to their own national fishing industries several years down the road, it is often safest to design agreements with weak inspection procedures, to avoid the possibility of being made to look bad (or incompetent) in front of an international audience.

The slowness of the regulatory process also helped create the circumstances for the crisis. Note that, although there was evidence that the turbot stock was declining, there had been no regulation of the stock before the 1995 fishing season. This slowness to restrict catches is also a hallmark of fishery and other conservation agreements. The NAFO fisheries commission exists to protect the interests of fishers, by imposing short run costs to protect the health of the resource in the long run. But because the short-term costs of fishery conservation measures are palpable and the uncertainty about the necessity of regulation high during the times when it would be most usefully imposed, even fishery commissions are unlikely to impose costly restrictions until signs of stock decline are incontrovertible. By then it is often too late to protect the stock except by implementing drastic measures, which are both politically untenable and leave a smaller catch limit to divide among interested parties. This scientific and political caution can thus lead to crisis.

This particular security crisis, then, can trace some of its origin to an international institution that was weak, both in terms of making and of enforcing its rules. This weakness points to a dilemma often faced by those designing multilateral environmental agreements; weaker agreements are less effective at protecting a resource, but stronger agreements are less likely to be accepted by the community of countries using the resource. This dilemma helps to explain the three features discussed here: the objection clause, the limited inspection procedures, and the slow scientific process. Without these three features, the treaty would have done a much better job of regulating the fisheries of those countries that signed it. But without these features, many of the major participants in the Northwest Atlantic fishery would not have signed the agreement in the first place. So in order to get all the major fishers in the northwest Atlantic to sign on, NAFO had to be designed with its flaws, even though they were recognized as flaws at the time.

Finally, and perhaps most disturbingly, the crisis appears to have led to greater protection of the resource, largely by remedying some of the weak-

nesses of NAFO. Had Spain not led the European Union into objecting to a quota it did not like, it would not have been able to get what ultimately was a more politically acceptable share of the catch. Had Canadian fisheries ministers not "gotten religion" after nearly destroying fish stocks within Canadian waters and been willing to take on this environmental cause, the turbot stock would have continued to be depleted and the agreement would have continued to allow fishing vessels to get around both the letter and the spirit of the law.

There is a limit to how strong an institution NAFO can be. Since states are unlikely to join an agreement where they can be bound without their consent, this element of the NAFO regulatory process is unlikely to disappear. But the expanded inspections system, the NAFO-wide effort to bring non-member states into the regulatory process, and a more equitable division of national allocations that decreases the likelihood that states will use that objections procedure, does suggest that the fisheries resources of the Northwest Atlantic may be better protected after the conflict than they were before. Given the danger of escalation inherent in any threat or use of force, it would be a depressing conclusion indeed if this were the only way this resource could have been protected.

Conclusion

What role does this leave for IUCN in this sort of dispute? The departures from the normal pattern of environmental security issues in this case all point to weaknesses in the international institutional structure with respect to fisheries issues, and these weaknesses point to gaps that IUCN can fill. Potential roles for IUCN in preventing fisheries and other environmental commons problems from becoming security issues include as a forum, as a watchdog, and as a knowledge builder. These roles would help, respectively, to diffuse crises at the outset, to identify situations where crises are brewing, and to understand the sorts of situations in which resource depletion is likely to lead to confrontation.

As a forum, IUCN might have been able to diffuse the Turbot War before it began. It was clear well before shots were fired that a crisis was brewing. There was almost a week between the announcement by the Canadian government that it would enforce a moratorium on turbot fishing, and the taking of the *Estai*. It was clear throughout this week that neither the Canadian nor Spanish governments, nor the European Commission, were going to back down in the absence of third-party mediation. But there was no third party well-placed to mediate. There was little incentive for other states, such as the United States, to get involved. NAFO could not act as a neutral arbitrator, because it directly represented the interests of its member governments in the issue. IUCN, however, acting as an entrepreneur-

ial forum, might have successfully arbitrated the dispute before it escalated. It could have identified during the first week of March that the parties were on a path to escalation of the dispute and recommended that they meet under IUCN auspices to negotiate. Such arbitration may well have resulted in an outcome similar to the one that the parties to the dispute eventually agreed to a month and a half later. We refer to this role as an entrepreneurial forum because it would call on IUCN not only to act as a neutral mediator, but to actively track budding environmental disputes and nip them by pre-emptively suggesting its services. This would help deal with the "recent convert" phenomenon by providing an impartial but environmentally responsible view of the condition and needs of the resource in question.

The second role that this case suggests for IUCN is as a watchdog. The Northwest Atlantic fishery had been showing signs of conflict for some time. On the one hand, it was governed by a multilateral environmental agreement. On the other hand, this agreement was showing signs of severe strain. While the objection clause in the treaty was designed to allow governments to get out of specific quota allocation, it was not designed to allow governments to avoid their quota allocations most of the time, which is how the European Commission was using it by the mid-1990s. Similarly, much of the European fleet was chronically breaking NAFO regulations on fishing practices, and member governments, particularly Spain, were clearly not interested in enforcing these regulations. Many of the participant countries had histories of chronic overfishing. In short, then, by the mid-1990s NAFO was in a situation of chronic noncompliance and ineffectiveness. IUCN acting as a watchdog might have identified NAFO as an agreement in trouble, and recommended that the parties to the agreement get together and rethink the terms of their cooperation. In other words, IUCN could help alleviate the dilemma facing designers of this sort of institution by identifying when weaknesses in institutional design are being abused by the countries involved.

The third role that this case suggests for IUCN is as a knowledge builder. The watchdog role can tell us that specific multilateral environmental agreements are getting into trouble, but it cannot help us predict in a broader sense where trouble is likely to brew. Many disputes are settled through negotiation without any threat of escalation, whereas others seem destined for conflict. What sorts of international fishery situations, for example, are likely to generate confrontation, and which are not? Recent research suggests, for example, that situations involving national fishing fleets with very different types of vessels are likely to be more conflictual than situations involving national fishing fleets that use broadly similar types of vessels (Barkin and DeSombre, 2000). But there is no organization that guides, organizes, collates, and disseminated this sort of research.

IUCN, by acting both as a builder and a disseminator of information, can help to identify the sorts of environmental degradation that are likely to lead to security situations, and the sorts that are not.

The introduction to this chapter identifies three notable elements to this case: that the conflict took place through broad national interest considerations, that it happened in the context of an existing multilateral organization, and that it resulted in a greater level of protection of the resource than had previously been the case. These elements are notable, but are by no means unique to this case. As environmental degradation proceeds, as multilateral organizations come under increasing strain as a result of this degradation, and as states as a result increasingly feel the need to deal with environmental threats unilaterally, we can expect that these elements will become more common. The three roles suggested here for IUCN could perhaps help prevent this from happening. The forum role can help to prevent the escalation of environmental conflict into broader patterns of conflict that acquire undertones of nationalism. The watchdog role can help to make existing international institutions work better, and help to fix them when their design is not suitable to their role. And the knowledge builder role makes it easier for both individuals and states that are interested in more environmental management of the Earth's resources to create effective management regimes without having to resort to the use or threat of force. This would create an important and potentially productive place for IUCN in issues of environment and security.

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Environment and Security Brief 10

Environment and Security in Australia: Uranium Mining in Kakadu National Park

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Introduction

The Kakadu region in Australia's Northern Territory can be described as a place where the Nuclear Age has collided with the Stone Age, the fall-out from which has generated social tension and instability. Home to a unique array of natural ecosystems and a rich indigenous culture, it also possesses several valuable uranium ore deposits. The juxtaposition of large-scale hazardous developments with one of the most remarkable wild landscapes on the Australian continent has become a source of conflict between three competing sets of interests: those of the traditional owners and inhabitants of the region, the uranium industry, and environmental conservationists. The proposed development of the Jabiluka mine has ignited the most recent confrontation in the region. On-site protests, the arrest of traditional owners for trespassing on their own land, international awards to traditional owners/activists, public inquiries, and more recently the direct involvement of the UNESCO World Heritage Committee are just some of the events that have shaped this conflict. While far from resolved, this conflict provides some important lessons on the problems associated with land use planning and geographic compromises that seek to accommodate seemingly irreconcilable interests.

Kakadu's Natural and Cultural Heritage

Kakadu National Park was established in three stages, with each stage followed by a nomination for World Heritage Listing.

	National park establishment	World heritage listing
Stage 1	1979	1981
Stage 2	1984	1987
Stage 3	1987/89/91	1992

One of the few World Heritage Sites inscribed for both its natural and cultural significance, Kakadu's indigenous inhabitants have maintained a relatively high degree of cultural integrity and retain a strong sense of belonging to the land. Some scientists believe the Kakadu region to be the first place where original human inhabitants entered the continent, continuing to arrive until the last rise in sea level. The region has yielded the oldest evidence of continuous human occupation—at least 50,000 years—on the Australian continent, and the escarpment showcases of one of the most extensive and spectacular outdoor galleries of traditional indigenous art in the world. The region is therefore of great importance not only to its contemporary traditional owners, but also to our understanding of human development.

Kakadu's natural significance rests with its complex of ecosystems such as tidal flats, floodplains, lowlands, and plateau, as well as its wide range of endemic species. The productive freshwater wetlands on the coastal plain, especially the Magela wetlands, are a primary focus for conservation efforts. These wetlands are valued because of the large populations of wildlife species that depend upon them, especially bird life. Moreover, the Magela wetlands were, and continue to be, important to surrounding indigenous communities, as they are used for hunting and gathering of food.

Because of these unique natural and cultural qualities, traditional inhabitants and conservationists have worked to protect the region from damage and degradation. The first proposal to establish a national park in the Kakadu region was put forth in 1965, a time when environmental conservation issues and Aboriginal land claims were coming to the fore. Four years later, the first major uranium deposit—the Ranger ore body—was discovered in the region. This simultaneous initiation of three sets of interests—conservation, Aboriginal rights, and uranium prospecting—laid the foundations for a complex and prolonged conflict that has attracted international attention in recent years.

The Geographic subdivision of Kakadu: Accommodating conflicting interests

Aboriginal people occupied their traditional lands until the 1970s, yet few had legal title to their land. In 1973, the Australian Government commissioned an inquiry (called the Woodward Inquiry) into Aboriginal land rights in the Northern Territory and concluded that Aboriginal title, coupled with national park status and joint management would be as a fair and effective way of protecting both the natural environment and Aboriginal land rights.[334] Meanwhile, shortly after the discovery of the Ranger deposit in the Kakadu region, several other uranium ore bodies and prospects were identified, including Koongara and Jabiluka. Because of growing concern over the environmental

effects of uranium mining and the proposal to develop the Ranger deposit, in 1975 the Australian Government commissioned an inquiry to examine the impacts of the uranium mining. The Inquiry, later known as the Ranger or Fox Inquiry, gave conditional approval for the sequential development of the Ranger and Jabiluka projects—in spite of their being situated within the proposed national park region—and strongly advised against a third mine in the Kakadu region at Koongara. The Government also accepted most of the Inquiry's other recommendations, including the granting of Aboriginal title and establishing a major national park in stages.

Upon being granted title over land in the area in 1978, the Kakadu Aboriginal Land Trust entered into an agreement for their land to be leased back to the Australian Government and managed as a national park. Stage 1 of Kakadu National Park was therefore established the following year, based on the Woodward Inquiry's vision, and was managed jointly between the Aboriginal landholders and the Australian National Parks and Wildlife Service. Mining interests were also accommodated, as Aboriginal landholders negotiated and eventually granted separate mineral leases to mining companies, although Aboriginal leaders today claim these agreements were signed under duress. Each stage of Park establishment and extension involved the incorporation of a mining lease, either at Koongara, Ranger or Jabiluka, creating uranium enclaves within the Park/World Heritage area. Thus, while each enclave occupied land within the eastern boundary of Kakadu, the mines were legally excised from the Park/World Heritage property.

Mining Activities in the Region and the Jabiluka Proposal

The Ranger Uranium Mine, the lease for which was granted in 1978, is the third largest uranium mine in the world and has been operating continuously since 1980. The social impacts of such a large project, which included the building of a new town, Jabiru, could be readily predicted. The mine brought ready access to and for outsiders through a massive highway transport system, connecting Kakadu to the city of Darwin, to export facilities, and to the outside world in general. Unprecedented financial earnings were accompanied by social disruption through the introduction of alcohol and technology. The environmental impacts were less understood, however, and policies and procedures tended to evolve in response to events, planned and unplanned. The spillage of radioactive contaminated water into the catchment of Magela wetlands, for example, has led indigenous users to lose confidence in the safety of their food supply.[335]

Following the granting of the Ranger lease, the Jabiluka mining lease was granted in 1982. Its development, however, was curtailed by the

policies of a newly elected government that same year. The Government's "Three Mines" policy restricted Australia's uranium mining activities to those mines that were already operational. Another change of government in 1996 resulted in lifting all export restrictions on uranium mining in Australia. Valued at close to US$4 billion, the Jabiluka uranium deposit was considered once again for development and the project was granted conditional approval to proceed. In June 1998, Energy Resources of Australia (ERA) commenced work in the area.

After more than ten years of experiencing the impacts of the Ranger mine's activities and after a change in traditional leadership, The Mirrar, the traditional owners of the Jabiluka uranium mine site, were—and continue to be—strongly opposed to the mine, consistently and actively campaigning against its development. On site protests and police action have characterized some of this campaigning. The Mirrar claim that permission for mining, given by a former traditional owner, was obtained through unfair means and inadmissible pressure. Moreover, they feel that the Jabilkula mining project threatens the integrity of their sacred cultural and natural heritage—the same values which made Kakadu eligible for World Heritage Listing. Although the project has been subject to an extensive environmental impact assessment (EIA), traditional inhabitants and conservationists have deemed them insufficient, hasty or inadequate. In short, the continued persistence to forge ahead with the Jabiluka project is seen to constitute nothing less than a fundamental disregard and/or infringement of Aboriginal rights and conservation principles.

The Jabiluka conflict exemplifies how the geographic subdivision of the land to accommodate competing interests has served to entrench opposing positions. The Ranger uranium mine was established in the Magela wetlands catchment, and Jabiluka is poised to be the second. Also, the Jabiluka mine is within a well-defined band of art and archaeological sites of undisputed global significance. The Malakananja II sacred cultural site, arguably the most important archaeological site in the region, was a major element in the Australian Government's second and third stage World Heritage nomination. However, the site was subsequently found to be outside of the protected Kakadu National Park/World Heritage Area and instead, within the Jabiluka mining lease.

Citing these examples and others, opponents of Jabiluka argue that such artificial boundaries in the region are in many ways irrelevant to traditional owners, wildlife, water flows and many other natural processes. Rather, the legally excised mining enclaves occupy small pockets of a

larger, complex, and interdependent ecosystem. Contaminated run-off, radioactive leaching into the water system, and other impacts cannot be contained to the area of the mining leases and thus have much broader social and ecological implications. Thus, the World Heritage values associated with Kakadu National Park have not been fully protected and as a consequence are vulnerable and threatened.

It was for these reasons that in 1998, conservation groups, supported by the Mirrar, requested that Kakadu National Park be placed on the List of World Heritage in Danger. The use of such an embarrassing sanction would threaten the Park's World Heritage designation, and calls attention to its plight. The Committee responded by dispatching a mission to Kakadu in October of that year in order to ascertain the threats of mining activities and the relevant views of all stakeholders. The mission presented its report to the Committee in November, with strong recommendations against the Jabiluka mine proceeding. The matter was deferred to another meeting. The World Heritage Committee reconvened in July of 1999 for an extraordinary session to discuss the mission's recommendations. Under strong appeal from the Australian Government however, the Committee decided not to inscribe Kakadu as a "World Heritage in Danger," although the threats to World Heritage values were recognized.

A subsequent report from the Australian Government to the World Heritage Bureau in October 1999 claimed progress in the implementation of the Kakadu Regional Social Impact Study as well as the establishment of a Cultural Heritage Management Plan. However, traditional owners have contradicted these claims of progress and the conflict remains unresolved. In the meantime, the mining company has decided not to proceed with ore production at Jabiluka for the time being, citing Indigenous opposition and economic concerns as the basis for their decision.

Lessons Learned

The Kakadu conflict is a glaring example of the difficulty in addressing development, Indigenous and environmental interests concurrently. The natural and cultural values of the Kakadu region only became an issue with the threat of uranium mining and all of its environmental and ethical connotations. However, by the time these issues were forcibly raised, it was too late for an unconditional hand-back of the land to the traditional owners or for a conservation regime fitting of this outstanding landscape. Uranium prospecting and mining titles were being issued on a continuous basis for many years. With the economic success of the first mines in the 1970s, continued mining in the region seemed a foregone conclusion.

Those areas allocated for uranium mining, Aboriginal ownership and national park status were each achieved through the geographic subdivision of the landscape, based on the belief that subdivision represented a resolution to the conflict. In reality, it had the opposite effect. With each of the three key players in the region—uranium miners, traditional owners and nature conservationists—progressively reinforcing their presence in the Kakadu catchments, the overall result is deadlock. Some of the lessons from the conflict include:

- Understanding the dangers of adopting an incremental or reductionist approach to land use and development issues. In some cases, simplistic local geographic compromises—in this case, carving out "enclaves"—can create more problems than they solve;

- Recognizing the potential value of regional-scale environmental planning in minimizing land-use conflicts of the Kakadu type, by better accounting for the sustainability needs of natural systems—in this case, the wetlands catchments;

- The need to carefully consider the implications of fundamentally incompatible land uses, such as conservation, Indigenous values, and mining.

The global significance of the heritage values of Kakadu National Park, as well as the whole of the Kakadu catchments, and the perceived injustices imposed on the Mirrar people only serves to emphasize the importance of seeking a long-term resolution of the wider "Kakadu Conflict." How the Jabiluka component of the wider conflict is resolved will have major implications for future uranium mines planned for the Kakadu catchments, as well for the many other mines being proposed in areas of global cultural and natural significance.

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EU-West African Fisheries

Poor management of West African fisheries is leading to the over-exploitation of fish stocks by distant water fishing fleets (DWFs), translating into lost revenue and livelihoods for the peoples of Mauritania and Senegal. The European Union is subsidizing its offshore fleets to fish off of West Africa in order to move them out of over-fished European waters.[336] These fleets effectively compete for fish with local artisanal and industrial fisherman, thereby threatening their livelihood security, and undermine the economic development of poorer West African nations who lack the resources to monitor fishing activities and enforce regulations. These management limitations lead to under-reporting and illegal fishing, which result in the loss of revenue from taxes and license fees. Longer-term consequences include over fishing and lack of accurate statistics for ascertaining the level of stocks.[337]

Ironically, the relatively good management of fisheries in other parts of the world, especially in developed countries, is compounding the problem. While effective management schemes in developed countries yield healthier domestic fish stocks, they can encourage fishing in foreign waters, particularly those near less-developed countries, where fleets encounter few restrictions and are able to exploit less-managed stocks.[338]

Yet some West African nations are attempting to take matters into their own hands by establishing marine protected areas in their territorial waters. According to a recent WWF report, Mauritania is banning all fishing, except traditional non-motorized fishing by local communities, in the Banc d'Arguin National Park, a 12,000 km^2 coastal wetland. Guinea Buissau is announcing the creation of the Joao Viera/Poilao National Park, a 500 km^2 marine protected area in the southern part of the Bijagos Archipelago. Senegal, too, is due to announce a project that would develop its own marine protected areas.[339] The creation of protected marine areas would not only help to conserve national fish stocks and ensure their sustainable management, but it could generate international pressure against the European DWFs that fish there.

The EU itself has the responsibility to assist these nations in conserving their natural resources. Julie Cator, WWF's European Fisheries expert, summed up the EU's precarious position: "If developing countries in West Africa can invest precious resources in safeguarding fish stocks, why can't the European Union stop over fishing in West African waters?"[340]

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Dams and Conflict: The South Eastern Anatolia Project (GAP)

The South Eastern Anatolia Project (GAP), Turkey's $32 billion water development scheme involving 22 dams, 19 hydroelectric power plants and a network of irrigation canals for the Tigris and Euphrates Rivers, has generated a considerable amount of political tension and has the potential to trigger armed conflict.[341] The project was launched in the early 1980s by the Turkish government in an effort to promote economic growth and prosperity in the underdeveloped Southeast Anatolia region. With Turkey in the dominant headwater position, however, both Syria and Iraq are dependent on Turkish cooperation for the quantity of water they receive. Thus, management of the Tigris-Euphrates river basin has brought to the fore a complex range of issues that threaten peaceful relations between Turkey, Syria and Iraq, while also drawing international pressure from environmental activists.

Some of the most serious direct social and environmental impacts of the Project are those associated with large-scale damming, whereby reservoirs flood towns, villages and hamlets. So far an estimated 200,000 people have been displaced through such activities.[342] Government compensation to displaced persons are said to perpetuate economic disparities, as promises to rebuild modern villages are replaced with offers of cash that are easily spent in urban centres. Moreover, reservoir developments have had adverse human health effects, as modified biophysical environments have eased the transmission of some vector-borne diseases and increased the presence of certain toxins. Such impacts have created internal resistance and opposition to further GAP-related projects.

Apart from domestic concerns, tensions between Turkey and the downstream riparian states of Syria and Iraq have been mounting. Each country's steadfast insistence on owning and controlling nearly all water resources within their respective national boundaries has fueled political conflict.[343] Turkey, controlling the majority of the Tigris-Euphrates headwaters, claims "absolute territorial sovereignty"[344] over those water resources. Former Turkish president Suleyman Demirel's speech at the opening of the Ataturk Dam exemplified this stance when he stated, "This is a matter of sovereignty. We have a right to do anything we like. The water resources are Turkey's and oil resources are theirs [Syria and Iraq]. We don't say we share their oil resources, and they cannot say they share our water resources."[345] Meanwhile, Syria, who is unhappy not

only with the amount of water that the Turkish dams release downstream but also with the quality of the water (as it is often recycled many times in irrigational use), has called for Turkey to release flows of water that can adequately sustain hydroelectric production and irrigation.[346] This demand has been characterized by Turkish authorities as hypocritical, as Syria, who is in the dominant headwater position along the Al-Asi River, releases only 10 per cent of the flow to Turkey, with plans for further reductions.

Hostility between these countries has existed outside of the GAP issue. However, decisions surrounding the development scheme have become another venue through which to air historical grievances and exert political pressure. For example, both Syria and Iraq have been accused of supporting the terrorist independence struggle of the minority Kurdish Workers' Party (PKK), prompting Turkey to threaten to cut off the flow of water to both states on more than one occasion.[347] At the same time, the PKK alleges that the Turkish government is drowning Kurdish towns and orchards with their large-scale damming projects, displacing thousands of rebel Kurds and allowing the government to better control them.[348] Iraqi authorities maintain that they possess "acquired rights" to the Tigris and Euphrates Rivers based on their "ancestral irrigations," whereby existing irrigations and water installations, some of which date back to Sumerian times, should be guaranteed their access to relevant water resources.

Amidst the deep-seated interests of Turkey, Syria and Iraq, there is much room for negotiation, mediation and creative problem solving. First, transparency must be added to the various levels of intergovernmental mediation in order to allow many of the GAP/dam-related issues to become depoliticised.[349] Second, conservationists can raise the profile of environmental issues at relevant negotiations and promote the long-term advantages of sound ecosystem protection and management. Third, the shared interest these countries have in resolving their GAP-related conflicts must underscore all discussions and negotiations. Furthermore, conservationists can recommend a more encompassing decision-making process that considers both the interests of affected groups as well as the shared benefits of hydromodifications across societies.[350]

Endnotes

330. If the fishing season is ended when an overall catch limit is reached, for example, fishers who underreport their catches extend the fishing season and thereby their opportunity to catch more fish. False reporting is also likely in the case of noncompliance.

331. Referrals of oceanic mis-deeds to flag states rarely result in states taking action against their own vessels, unless international agreements compel them to, and NAFO did not provide any way to ensure that they would.

332. The specific change was to the Coastal Fisheries Protection Regulations, Section 21, Table IV, and was made on 3 March, 1995. The Canadian federal government had amended its Criminal Code (Section 25) to give Canadian enforcement officers the authority to enforce the new fisheries regulations. This was done on 12 May, 1994, the same day as the original changes to the Coastal Fisheries Protection Act became law (ICJ 1998, paragraphs 14–16).

333. The quota of 27,000 tonnes had been for turbot in a region that straddled the boundary of the Canadian EEZ. For the 1996, this was divided into a 7,000 tonne quota within Canada's EEZ, all of which accrued to Canada, and a 20,000 tonne quota in international waters, of which Canada got 3,000, the EU 11,070, Japan 2,050 and Russia 2,2550, with the remaining 1,330 tonnes divided up among various other NAFO members.

334. A.E. Woodward, "Aboriginal Land Rights Commission, First Report," Parliamentary Paper No. 138 of 1973, (AGPS, Canberra, 1973).

335. Gundjehmi Corporation, Personal Communication.

Box 11: EU-West African Fisheries.

336. "West Africa puts EU to Shame," Creating a Sea Change for Fisheries in West Africa, August 3, 2001, WWF web site: http://www.panda.org/endangeredseas/westafrica/news.htm

337. "Case Study: DWFs off Mauritania and Senegal," The footprint of distant water fleets on world fisheries (2001), pp. 36–37. Available at: http://www.panda.org/resources/publications/water/footprint/action.html

338. *Ibid*, p. 37.

339. "West Africa puts EU to Shame," WWF (2001), Available at: http://www.panda.org/endangeredseas/westafrica/news.htm

340. *Ibid*.

341. Green Cross International, *National sovereignty and international watercourses* (Geneva: Green Cross International, March 2000), p. 95.

342. Export Credits Guarantee Department (ECGD), "Stakeholders' attitudes to involuntary resettlement in the context of the Ilisu Dam Project, Turkey," Report prepared for the U.K. government by an independent expert in resettlement and social development (22 December 2000). Available at: www.ecgd.gov.uk/downloads/ILISUfinal.pdf

343. "Water is behind Turkey Syria Border Tension," Mideastnews and A. Darwish 6 October 1998. Available at: www.mideastnews.com/water001.html

344. Green Cross International (2000), p. 95.

345. A. K. Biswas, *International waters of the Middle East: From Euphrates-Tigris to Nile* (Bombay; New York: Oxford University Press, 1994), p. 53.

346. A. Darwish (1998), p. 2.

347. "Inventory of Conflict and Environment Case Studies: Tigris-Euphrates River Dispute," Trade and Environment Database (2002). Available at: http://www.american.edu/ted/ice.tigris.htm

348. A. Darwish (1998), p. 2.

349. *Ibid.*

350. F. M. Fisher and H. Askari, "Optimal Water Management in the Middle East and Other Regions", *Finance and Development* (a quarterly magazine of the IMF) 38(3) (September 2001). Available at: http://www.imf.org/external/pubs/ft/fandd/2001/09/fisher.htm

Overview C
Conservation in Times of War

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Abstract

The main impacts of armed conflict on natural resources, biodiversity and protected areas are destruction of habitats and wildlife, over-exploitation of natural resources, and pollution. Resource extraction, for both survival and commercial profit during the conflict, and afterwards to finance reconstruction, are critical issues that need to be addressed. Environmental groups need to be aware of the relevance of conflict to their mission, recognizing actions that can be taken in planning for and continuing conservation activities before, during and after conflict situations. Small investments can provide benefits for the environment and longer-term social stability. Although they should continue to work towards their long-term goals, they may have to adopt new strategies and activities in light of changing circumstances. Conservation organizations should become better attuned to shifting social and political contexts and plan for contingencies. During conflict, they should maintain a presence where possible, but ensure that risks to personnel are minimized. The immediate post-conflict period often represents a window of opportunity for substantial policy change, and can therefore be a time for conservationists to enhance the integration of environmental management strategies into development planning. Where appropriate, they should become more vocal in advocating against the arms trade and other activities that fuel conflict and deplete resources. The paper includes recommendations for government and non-government IUCN members, IUCN commissions, IUCN regional and national offices, and IUCN headquarters.

Introduction

Armed conflict is unfortunately all too common in many parts of the world. Over a third of African countries have been engaged in conflict within the last 10 years, and the impact on human lives has been catastrophic. Millions of people have been killed during the last decade, and many have died of war-related disease and starvation. Others have been permanently disabled and millions have been displaced. In addition to these direct human consequences, armed conflict has multiple environmental impacts that affect people in the short and long term.

Some impacts on the environment may be positive: for example, vegetation and wildlife may flourish in areas where access by people is limited,[351] such as demilitarized zones. Often impacts are highly variable, and may be positive in some areas and negative in others.[352] They may affect different resources in different ways: for example, wildlife may be hunted heavily by troops while logging stops because armed conflict disrupts access by loggers. All too often, however, the impacts have adverse effects on the environment, biodiversity, natural resources and people's long-term livelihoods. Where conflict seriously affects the future livelihoods of long-term residents of a region and reduces opportunities for sustainable development, there is a major risk of continued environmental degradation and political instability.

This paper focuses on the negative impacts of armed conflict on the environment and looks at possible ways to mitigate them in order to promote long-term conservation, sustainable development and stability. While many environmental impacts are unavoidable, certain actions can be taken by various stakeholders before, during and after armed conflict to lessen some impacts and avoid others. IUCN and its members are often well placed to take a wide range of actions in this respect.

Impacts of Armed Conflict on the Environment

The main direct impacts of armed conflict on the environment occur through habitat destruction, over-exploitation of natural resources and pollution.

Habitat destruction and loss of wildlife

Habitats are sometimes directly affected during armed conflict. For example, vegetation may be cut, burnt or defoliated to improve mobility or visibility for troops. Temporary settlement of large numbers of displaced people in an area can result in deforestation and erosion, sometimes worsened by clearing of vegetation for agriculture and clear-felling for fuelwood. Since refugees and internally displaced persons (IDPs) are often located in

ecologically marginal and vulnerable areas, the ability of the environment to recover afterwards may be limited. Protected areas may be affected if settlement occurs inside them or in adjacent areas. Vegetation may also be destroyed during extraction of valuable minerals such as diamonds and gold, as environmental controls are usually absent during times of conflict, and much greater damage can occur.

With habitat destruction, certain plant and animal species may become locally threatened or extinct, and species with limited ranges can be particularly susceptible. Although on a relatively small scale, large wild mammals may also be killed or injured by landmines (e.g., elephants).

Over-exploitation of natural resources

Over-exploitation can occur for both subsistence and commercial reasons. Local people in rural areas are often unable to grow crops during wartime due to political instability, and are therefore increasingly forced to depend on wild foods such as bushmeat and wild food plants for their survival. Displaced people often hunt and collect firewood, food plants and other natural resources in the areas they have moved to, and such increased volumes of extraction may be unsustainable even in the short term. The situation may be made worse if these displaced persons lack local knowledge of optimal resource management practices. When displaced people return to their homelands they are often forced to rely heavily on natural resources before other forms of livelihood such as agriculture are re-established. All this can result in resource and species scarcity or extinction, and may seriously affect livelihoods of long-term residents in these areas.

In all cases, the breakdown of law enforcement and traditional local controls make the situation worse. Even in areas not directly affected, incentives for local communities to conserve areas and species decrease when economic benefits from them decline (for example, when ecotourism ceases because of insecurity). Uncertainty over future access rights encourages unsustainable resource use for shorter-term gain.

In areas where fighting is occurring, large mammals are often hunted on a major scale to feed troops. And this can have a devastating impact on wildlife populations,[353] especially if military action continues for a long time in the same area. The larger species with slow reproductive rates are particularly vulnerable, and tend to disappear first.

Commercial extraction of natural resources such as timber, ivory and diamonds often occurs during periods of conflict to raise funds for military supplies and activities. When access to resources opens up again immediately post-conflict, private sector operators often move in and extract resources illegally. This is a phase when peacetime control measures are often still weak or absent. In addition, those in power are often in need of

immediate revenue, and so they sell extraction rights to which they may have only temporary or in fact no legal rights at all.

Once governmental authority is re-established on a firmer footing, governments are often forced to exploit renewable resources unsustainably to kickstart national economies bankrupted by conflict. This is a quick fix with relatively little investment compared with the slower pace of rehabilitating the agriculture and industry sectors. International financial institutions and other creditors may indirectly promote overexploitation of natural resources by demanding debt repayment.

Pollution

Pollution can be both a direct and indirect consequence of armed conflict. The 1990–91 Persian Gulf War provided dramatic examples of pollution resulting directly from armed conflict, when huge volumes of oil were deliberately released into the Persian Gulf to discourage amphibious landings, and Kuwaiti oil wells were later set on fire as Iraqi troops fled that country.[354] The spraying of defoliants in Indochina during the Vietnam War and the resulting toxic contamination of soil, water and vegetation has had enormous environmental as well as human consequences.

The pollution that results indirectly from conflict is often less obvious. For example, the presence of large concentrations of refugees and internally displaced persons living without adequate sanitary facilities or waste removal services can lead to contamination of water sources, with severe consequences for both local biodiversity as well as short- and longer-term human livelihoods. In addition, unregulated mining and other forms of resource extraction that occur in post-conflict settings can contribute greatly to soil, water and air pollution.

Consequences for the conservation sector

Infrastructure and equipment is often damaged in conservation areas. Conservation staff may be forced to abandon conservation areas or, in some cases, even killed. Senior staff often leave first, and relatively inexperienced junior staff can be left holding extremely responsible positions in very difficult situations for which they have had little or no training. "Brain-drain" may occur, where nationals with higher education in environmental fields flee the country, and do not always return. This can leave relatively few well-educated people in the sector, resulting in low capacity for post-conflict reconstruction with due regard for the environment.

Even if staff remain in conservation areas, the ability to continue conservation work is often hampered by lack of funding. Donors in many cases suspend or withdraw support from countries in conflict. Experience has shown that at certain points during conflict windows of opportunity open

for conservation activities, if flexible and quickly disbursed funding is available. Donors are traditionally slow to fund the conservation sector during conflict and the transition to peace, a time when they are focusing on humanitarian relief activities. However, this can be a crucial time when relatively small amounts of strategic funding can make a big difference for the environment, and natural resource and biodiversity conservation.

Broader consequences

Depletion of environmental quality, biodiversity and the natural resource base because of armed conflict can weaken the chances of lasting peace and sustainable livelihoods for long-term residents of a region. Although conflicts may start initially for other reasons, there is a strong risk that resource depletion and environmental degradation will drag the region back into a vicious circle of greater poverty, further political instability, more armed conflict, greater environmental degradation, and even greater poverty. Any actions that can be taken to mitigate environmental impacts early on in the cycle are very important.

What Can Be Done?

Conservation organizations can take action at many different levels, and from different institutional sectors and geographical locations.

Some (but by no means all) conservation organizations and workers have traditionally had a relatively narrow perspective, enhanced by the fact that they often work in isolated areas. It is important that they have good awareness of and involvement in broad developmental, socio-economic and political issues and challenges as they relate to conservation. These issues often change rapidly in unstable political conditions, and conservation organizations need to be well informed in order to respond as windows of opportunity open up and new threats emerge.

One advantage of the current trend away from working in isolated protected areas towards working in broader landscapes is enhanced collaboration with many other sectors, which enables better integration of conservation in other sectoral activities. An important example of collaboration is with the relief sector. While it is important that urgent humanitarian relief during crises not be delayed by environmental concerns, it is possible to integrate sound environmental practices into relief operations. Many relief organizations are currently producing environmental guidelines and providing staff training, and the environment sector should collaborate more in these efforts, especially at the field level, to ensure that local conditions are taken into account.

There are three main phases when actions can be taken: before, during and after conflict. Priority actions change with timing.

Before conflict

In regions where there is a possibility of future political instability, strategic contingency planning should review possible impacts of armed conflict and opportunities for mitigation, along with likelihood of impacts occurring (the level of risk may well change over time). Impact mitigation should be incorporated into local and regional planning in an integrated and foresighted way, at a level appropriate for the degree of risk. Certain preparatory actions can be taken before disasters occur, such as developing working relationships with other sectors (e.g., relief, development, military) and providing them with appropriate information (e.g., location of protected area boundaries; and key species, natural systems and ecological processes which are critical to conserve). Provisions may be made to conserve species and habitats in a network of locations, rather than gambling everything on only one major location. Corridors may be planned so that if, for example, large mammals in one area are devastated during conflict, they can repopulate that area by in-migration from neighbouring areas. The capacity of junior staff should be built, not only for management and technical skills, but also in cross-sectoral collaboration and in playing an ambassadorial role for conservation.

During conflict

During conflict, it is very important for conservation organizations to maintain a presence where possible, even if the level of operation is greatly reduced. In the recent conflicts in Rwanda and the Democratic Republic of Congo, protected areas where projects continued suffered less damage to biodiversity.[355] Material and moral support to field staff including good communications are critical in enabling conservation to continue, and should be a high priority. However, organizations need to assess realistically the risks to staff, and be prepared to evacuate them when necessary. Field staff may be too close to the situation to make this decision on their own.

When a presence is maintained, developments can be tracked more closely, and conservation organizations can be ready to undertake or facilitate short-term activities when opportunities arise. Organizations working at a regional level can relocate personnel, equipment and offices within a region (sometimes across international borders) when certain areas become too dangerous to work in. During long-term and relatively static conflicts, conservation organizations can help to prevent "brain drain" and loss of technical capacity by usefully employing staff in other more stable parts of the region until they can return. Capacity can be built to prepare for peacetime by providing training for nationals outside the country. Conservation training may also be provided to staff of organizations in other sectors, in order to promote closer collaboration in the future.

As in the pre-conflict phase, promotion of strong partnerships across sectors is very important. Dialogue should be developed and maintained with all stakeholders, as much as possible.[356] For international NGOs, identifying appropriate local partners through whom to channel funds can be critical.[357] Contact with military personnel can often help to lessen impacts by troops on the ground. This can be a very repetitive process due to frequent changes in military personnel. However, conservation workers should be very careful to remain neutral, or they may put themselves and their programs at risk. Finally, during conflict much policy development and planning can often be done to prepare for times of peace.

After conflict

It is often during transition times to new sets of rules when considerable change and uncertainty exist that the greatest threats to natural resources occur.[358] The period immediately after conflict is therefore a very vulnerable and critical time, as already mentioned above. By maintaining a presence during conflict, conservation organizations are poised to expand operations immediately when peace returns. After conflicts, they can restart work at site level, including rehabilitation work if necessary.

On a broad landscape level, conservation organizations can collaborate with the key players in various sectors to minimize adverse environmental impacts as displaced people are resettled and economic activities restart. Collaboration with the relief sector has already been mentioned and is very important to continue immediately after conflict; this should phase into working with development organizations that replace the relief sector to promote longer term rehabilitation and development. Raising awareness of potential environmental impacts and ways to mitigate them can make a very large contribution to sustainable development.

Sweeping new reforms and policies are often formulated during the post-war era which can have large impacts on natural resources, biodiversity and livelihoods of rural people for many years to come (for example, land policy was totally rewritten in Mozambique after the last conflict). The post-war era can be a time of great rehabilitation activity and national development, especially if new political conditions attract large amounts of donor funding. If not carefully planned, however, this phase can have very large environmental impacts. The post-war phase can also be a time of confusion and poor communication across sectors. Often there is a different group of people in control, who may have little technical training or experience in government and governance. Yet the decisions they make and the control they exert in early post-war times will have great influence for many years to come.

Information exchange and technical assistance across sectors at this time can make a big difference. Capacity building is also important, in order to

build up an adequate skills base across different institutional sectors. The conservation sector can play a very important role in enhancing integration of environmental governance, conservation and sustainable use concepts into national and local policy and development plans. This includes the reconciliation of short-term needs with long-term sustainable development.

What Can IUCN and its Members Do?

The IUCN Secretariat, commissions and members are well placed to take a wide range of actions at many different levels and from different geographical locations to mitigate some of the adverse impacts of armed conflict. IUCN's unique position as a membership organization for governments and NGOs enables it to play a facilitatory and brokering role which few other organizations can do. This section contains lists of key actions that can be undertaken in the right circumstances by IUCN and its members. It is not possible to avoid all impacts, but it is possible to avoid or at least mitigate some of them. Different opportunities open up at different times and it is important to be alert to these opportunities. At other times there is little to do but wait and be patient.

Governments in Affected Countries

Affected countries include those both directly affected by armed conflict, and indirectly affected, for example, by refugees and resource pressures as a result of conflict elsewhere.

- *Develop contingency plans for before, during and especially immediately after conflict* (including for conflict which may occur in nearby countries). This includes exchanging useful information across sectors to those that need it for contingency planning purposes; making contingency plans for management of protected areas and natural resources in times of crisis; and planning ahead for the coming of peace, in order to prepare for post-conflict economic developments and short-term resource mining.

- *Build conservation sector capacity to maintain a field presence during and especially immediately after conflict.* Increase the autonomy and self-reliance of local offices and strengthen their institutional capacity by training junior field staff who may have to assume responsibilities in the absence of senior staff. These steps can help ensure that local offices have the minimum capacity to remain on-site. It is important to maintain flexibility (both organizational and programmatic) during and, especially, immediately after conflict to adjust to rapidly shifting needs.

- *Build capacity to regulate the private sector* in relation to natural resources and the environment, especially during transition periods. The worst excesses of natural resource grabbing by the private sector

usually occur during periods when controls are weak, especially immediately following armed conflict. Building the capacity to regulate the private sector as soon as possible following a conflict can go a long way toward minimizing impacts.

- *Promote cross-sectoral collaboration within government and with civil society.* Inter-sectoral collaboration often becomes vitally important during conflict. Cross-sectoral collaboration within government and with civil society can help maintain the flow of information, and find collaborative solutions to common problems. Conservation is often achieved indirectly during conflict, for example in programs that support human livelihoods through wise natural resource use.

- *Ensure appropriate inputs of environmental information and expertise in redefining national policy and legislation.* There are often good opportunities for post-war policy reform which, if well planned, can help to promote sustainable rural livelihoods and conservation. However, new policies can also be detrimental, and participation in policy reform by the environment sector is very important. There is often a good window of opportunity for countries to update old, out-of-date or inappropriate policies in a new climate of openness to adopting different systems and policy models. This includes natural resource, conservation and environmental policies as well as other sector and development policies which can impact directly or indirectly on the environment.

- *Promote sound environmental governance for long-term peace and security.* Transparency, accountability, devolution of power and authority to decentralized, democratic institutions, progress in rule of law, a participatory process, and increased attention to environmental protection legislation and enforcement can all promote sound environmental governance and promote long-term peace and security.

- *Make employment of demobilized soldiers a high priority after conflict, and control the supply of arms.* Assimilating large numbers of demobilized soldiers into the workforce and society is a major challenge after conflict. Employment opportunities are often limited, and ex-soldiers may be unwilling to return to subsistence agriculture—if indeed they have access to land. If they do not have land or employment, they may resort to banditry and pose a serious threat to security and fragile post-war stability. They may establish themselves in groups in rural areas and mine natural resources unsustainably (e.g., commercial fish and charcoal production), to the detriment of local communities dependent on those resources for their long-term livelihoods. The conservation sector should play its part in helping to overcome this problem by hiring demobilized soldiers as appropriate.

Governments in Other Countries

Donor countries:

- *Provide flexible support* during and immediately after conflict for opportunistic activities which while not guaranteed to succeed, have the potential to make a big difference (consider establishment of funds for emergency support). Where feasible, donor organizations should adopt more flexible mechanisms to increase their responsiveness in this type of situation. For example, permit reallocation of funds for different purposes within a project budget or within a partner organization; extend deadlines for expenditure of funds; and develop mechanisms for quick disbursement of small amounts of funding.

- *Provide funding for rehabilitation* of the environment sector (e.g., policy, institutions) and damaged locations as soon as possible after conflict. It is particularly important for donors to plan for contingency environmental funding during the transition to peace, when the risk of environmental damage is high.

- *Encourage good environmental governance* during post-war recovery, through donor projects and other means. As noted above, transparency, accountability, devolution of power and authority to decentralized, democratic institutions, progress in rule of law, a participatory process, and increased attention for environmental protection legislation and enforcement can all promote sound environmental governance and promote long-term peace and security.

All countries:

- *Encourage socially and environmentally responsible practices* by the private sector, particularly companies operating from other countries. When access to resources opens up again immediately post-conflict, certain unscrupulous private sector operators often move in and extract resources illegally. This is a phase when peacetime control measures are often still weak or absent. In addition, those in power are often in need of immediate revenue, and so sell extraction rights to which they may have only temporary or in fact no legal rights at all.

- *Consider social and environmental implications of providing arms* and other military support. The availability of arms, and the exploitation of diamonds, timber, ivory and other natural resources are parts of a vicious circle in which these resources are used to purchase or barter for arms. These weapons, in turn, enable armed groups to maintain control over source areas and their resources, and also to develop and control illegal trading networks. Proliferation of arms from conflicts is

also a major cause of increased illegal hunting in many countries. Countries that provide arms and other military support need to consider the social and environmental implications of such support.

- *Encourage international policy mechanisms* to help mitigate negative environmental impacts in affected areas, including sanctions on resources whose extraction is fueling wars, and compensation for environmental damage. In the aftermath of armed conflict, there have been increasing calls for ad hoc legal mechanisms that could hold governments and individuals financially accountable for damages to natural resources and wildlife. These actions require information, and proof of who the responsible actors are.

Non-governmental Organizations

- *Develop contingency plans* for before, during and after conflict (including conflict which may occur in nearby countries). Ensure that communications systems are in place to maintain effective and up-to-date flows of information between HQ and the field during times of conflict. Develop staff security guidelines to facilitate decision-making during crises, e.g., how to decide when to pull out of an area. Who decides? How are local staff kept vigilant? How are HQ staff kept from overreacting? How is it determined when it is safe to return? Practice general crisis preparedness.

- *Raise awareness within the donor community to ensure ongoing and flexible support during and especially immediately after conflicts.* Enhance links with the donor community to try to ensure continuing support, including foundations particularly where bilateral/multilateral funding is difficult. Shifting and unpredictable policy environments often deter or discourage donors and potential investors. But even modest amounts of support to pay park staff and cover basic operating expenses and field equipment may be enough to maintain a site-level presence and some level of deterrent. Donors need to identify reliable local partners through which to channel funds during times of crisis, and to establish long-term funding mechanisms.

- *Promote improved collaboration with other conservation organizations and with relief, development and planning sectors.* It is important to build a relationship of trust with the relief and development community. But while cross-sectoral collaboration may be desirable, it can be extremely difficult. Improving communication, increasing consultation, joint planning through development of a disaster plan, clearly identifying the niches filled by every organization with their respective roles and mandates, can all help to overcome these difficulties. Sometimes it may be necessary to partially subsume identities in order

to avoid competition and overcome perceived threats from increased coordination. Often, modifying language, for example changing "biodiversity conservation" to "natural resource use for sustainable livelihoods" can help organizations to better "market" conservation and work with those coming from different perspectives.

• *Strengthen capacity to maintain a presence during and especially immediately after conflict*. Increase the autonomy and self-reliance of local NGOs and strengthen their institutional capacity by training junior field staff who may have to assume responsibilities in the absence of senior staff. These steps can help ensure that local NGOs have the minimum capacity to remain on-site. In addition, it is important to maintain flexibility (both organizational and programmatic) during and immediately after conflict to adjust to rapidly shifting needs. Maintain neutrality and impartiality in order to increase the likelihood of being able to work on both sides of a conflict, if necessary.

• *Document the impacts of armed conflict on the environment*. Facilitate information collection and sharing and networking across sectors; act as a clearinghouse for information, experiences and lessons learned; communicate results to policy-makers and implementers and provide technical inputs to post-war policy formulation and implementation.

• *Promote good environmental governance*. Enhance the voice of local communities if necessary. Where possible, especially after conflict, promote transparency, devolution of power and authority to decentralized, democratic institutions, progress in rule of law, accountability, and increased attention for environmental protection.

• *Forge links with the private sector* to promote responsible practices, as outlined above.

• *Promote consumer awareness and responsible behaviour* to reduce consumption of resources whose extraction is fueling wars. In order to hold the private sector accountable, conservation organizations may need to partner with advocacy groups to leverage knowledge of activities on the ground and help develop a transnational network to obtain and share information about businesses engaged in illegal trading of natural resources and their products. By raising international awareness about these businesses, this information can be used to "name and shame," enabling consumers to choose to avoid products that support conflict. Advocate the development of a system of certification of product origin where this does not exist.

IUCN Commissions, Research and Educational Organizations

- *Undertake applied social, economic and environmental studies* on impacts of armed conflict on the environment, in collaboration with stakeholders, to enhance understanding of impacts and possible mitigating interventions. This subject falls within the scope of a number of IUCN Commissions, which should collaborate together as appropriate to find optimum solutions.

- *Communicate results to policy-makers and implementers*, so that findings and lessons can be applied in practice. It is important to bridge the two-way communication gap that often exists between field practitioners and academics: results from studies should be communicated to those who need them, but policy-makers and practitioners should also communicate their priorities for future applied research to those who will undertake studies.

- *Build capacity for applied research and monitoring* in this field, including capacity to cover social, economic and political fields as well as biological and environmental aspects.

IUCN Country Offices

Some of the actions outlined above for governments and NGOs may also be relevant for country offices, depending on circumstances. For example, if the NGO sector is weak or absent, an IUCN country office may act as an NGO. In addition, the following specific actions may be appropriate:

- *Help to identify appropriate mitigating activities and organizations*, with the advantage of being able to assess the current situation from a national rather than a local perspective. Offer advice to governments and NGOs as appropriate.

- *Facilitate information collection and sharing, and networking across sectors*, for example, by providing a reliable central location for information if one does not exist nationally, and including IUCN members in the exchanges.

- *Act as broker between government and NGO community* if necessary, and promote collaboration between them. New partnerships often become very important during conflict.

- *Contribute to new policy and legislation formulation* if appropriate, drawing on the IUCN network for outside expertise and experiences in other countries.

- *Raise awareness within the donor community* of importance and opportunities for funding, and put donors in touch with conservation

organizations that require funding. IUCN may play a role building capacity of local organizations to fundraise, manage donor funding and report to donors.

- *Encourage action* among members who are positioned to achieve mitigation.

IUCN Regional Offices

IUCN regional offices may be able to play some of the roles mentioned above. In addition, they may be well placed to undertake the following:

- *Provide technical support* for policy formulation at regional level, for example, by creating or supporting regional policy forums to tackle issues arising from conflict at a regional level.

- *Promote networking and collaboration* at regional level, for example, by facilitating collaboration to deal with transboundary conflict issues

- *Raise awareness within the donor community* of importance and opportunities for funding. If donors withdraw from a country that is directly affected by conflict, funding may still be possible from a regional donor office, or from a national office in a neighbouring country that is affected indirectly by conflict.

- *Assume the roles of an IUCN country office,* if necessary, where no country office exists and there is a clear need to step in. If a country office in the region has to evacuate, accommodate it and try to maintain its capacity so that it can return as soon as possible. Where possible support any activities which can still be done from a distance.

- *Draw on conservation experiences in armed conflict across the region* and communicate lessons learned to IUCN members and others.

- *Encourage action* among members who are positioned to achieve mitigation.

IUCN Headquarters

IUCN Headquarters may be able to assume a few of the roles already mentioned above. In addition it should undertake the following:

- *Continue the current initiative to integrate environmental security into IUCN programs*, including armed conflict aspects.

- *Promote incorporation of environmental aspects of armed conflict at international policy level*, such as international conventions and through the United Nations.

- *Raise awareness (including within IUCN offices) and act as global clearinghouse* for information, experiences and lessons learned. It is crucial

that lessons continue to be learned and shared. IUCN is uniquely positioned to play a role in sharing lessons with government and NGO members.

- *Broker and improve coordination among national agencies* in a position to mitigate impacts.

- *Encourage action* among members who are positioned to achieve mitigation.

Conclusion

Armed conflict presents conservationists with a new set of challenges often far outside their previous experiences. Natural resources and biodiversity that have been carefully managed and nurtured over many years in peacetime can suddenly be at risk in an outbreak of conflict. In order to prevent or mitigate adverse impacts, conservationists have to learn and adapt fast to rapidly changing conditions where the ground rules can fluctuate wildly. They have to seize unexpected opportunities when they arise, but at other times remain patient and maintain sight of long-term goals when direct action is not possible in the shorter term. They often find themselves collaborating with unlikely partners in new technical fields, and becoming much more involved in holistic approaches to human livelihoods and use of natural resources.

This paper has attempted to outline some of the major impacts and possible mitigation measures. Lessons on successful interventions are still emerging, and it is very important that they continue to be analyzed, documented and communicated. While each conflict situation is unique, there are some general trends and lessons that can be applied in different situations. Armed conflict tends to isolate people in difficult and dangerous circumstances. Yet this is the time when they could most benefit from lessons learned elsewhere, as well as from outside moral support. Continued networking, learning and sharing of armed conflict lessons is crucial for conservation.

Acknowledgements

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The International Ombudsman Centre
for the Environment and Development

Many regions possessing unexploited natural resources of agricultural or industrial value are often biodiversity-rich and home to traditional subsistence communities. Under these circumstances, development projects can pose serious threats to the integrity of valuable ecosystems and to the livelihoods and well being of local communities. Moreover, vast cultural and geographic distances frequently separate the beneficiaries of these projects from those who are directly impacted, and the latter are oftentimes politically or economically marginalized. This combustible mixture of resource wealth, inequity and cultural contrast can be a recipe for conflict. In an effort to address such situations, IUCN and the Earth Council Foundation joined forces to establish the International Ombudsman Centre for the Environment and Development (OmCED) in July of 2000. Above all, the Centre was a response to the long-perceived need for a non-adversarial, non-judicial, but well-respected international mechanism to prevent and resolve conflicts concerning environment, natural resources and sustainable development.[359]

The OmCED identifies, investigates and mediates actual or potential conflicts relating to individual and group rights of access to land, resources and benefits from those resources. Cases are usually referred to the OmCED by National Councils for Sustainable Development, other professional bodies, NGOs, governments, international organizations or, when directly affected, individuals and communities.[360] The decision to undertake a case is based on a number of relevant factors, including:

- the importance of the issue, especially to the interests of the poor and disadvantaged;

- the availability of other dispute resolution mechanisms;

- attitudes of the concerned parties with respect to the role of OmCED;

- the capacity of OmCED to mobilize the required expertise; and

- the availability of the funds necessary to undertake the case.[361]

Upon accepting a case, the OmCED chooses it own methodology for handling the dispute, whether it is through convening panels or assign-

ing issues and tasks to one or more individuals. The Centre relies on relevant national and international legal, social and economic instruments and standards in formulating recommendations. While its decisions are not legally binding (unless parties agree to such an arrangement beforehand), it can facilitate and influence a resolution. Moreover, the Centre derives substantial authority from the extensive membership network of its co-founding organizations, IUCN and the Earth Council, as well as from its location at the United Nations affiliated University for Peace campus in San José, Costa Rica.362

The OmCED has been operating on a trial basis and will undergo an evaluation in due course in order to ascertain its effectiveness. The following is a short overview of OmCED's recent activities:

1. Inter-American Development Bank (IDB) – Bolivia: OmCED, upon request of the Inter-American Development Bank and the Government of Bolivia, formed a panel of experts to advise on a minimal set of social/environmental measures to be taken to mitigate the possible negative effects of the upgrading of the road between Santa Cruz and Puerto Suarez.

2. OmCED was requested to form part of a small working group to look into the possibilities of forming *citizen-coalitions* on both sides of a disputed frontier area particularly rich in biodiversity. Progress is very slow mainly as a result of the political situation in the respective countries.

3. OmCED has commissioned a desk study to identify potential or actual conflictive situations involving indigenous and tribal peoples.

4. OmCED is in correspondence with a coalition of NGOs who may formulate a request to investigate some areas of concern related to the Mexican-Central American development plan known as Plan Pueblo-Panama.

5. OmCED has been requested to facilitate between local indigenous communities and an electricity company on the issue of complaints and compensatory measures related to the construction of a dam. Discussions are under way.

6. OmCED has been looking into the matter of a possible complaint by an indigenous community in Chile related to an international logging company. No formal request has been made to date.

OmCED generally acts where legitimate development clashes or threatens to clash with equally legitimate environmental or social concerns.

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Conclusion

Mark Halle, Richard Matthew and Jason Switzer

Conserving the Peace

If environment is an important security issue in the twenty-first century, then conservation of nature can be a force for peace.

Our goal through this book has been to test whether conservation could be a cost-effective tool for preventing, managing and resolving social tensions that lead to conflict. An affirmative answer would provide the conservation movement with a powerful argument in favour of preserving biodiversity, and guidance in targeting resource management interventions in support of communities in danger. It would present an economic opportunity as well—the costs of conflict to a country are substantial, as are the opportunity costs of investors taking their funds to safer shores.

Towards this end, we asked authors to think about the various ways in which the environment, conflict and security were connected in their regions, and then to consider the extent to which conservation practices might succeed as relatively low cost approaches to reducing the severity of these connections. We also invited specialists to submit related chapters on the links between resource mismanagement and disaster, the mixed effects of war on the environment and on the challenges of maintaining conservation programs during times of violent conflict. We felt that these chapters would add context to the case studies and be of practical utility to members of the conservation community.

Second, we hoped to make a contribution to the literature on environment and security by providing a series of case studies of several regions of the world, researched and written by individuals with extensive experience in, and knowledge of, these regions.

This is an important addition for several reasons, not least being the broad geographic scope of the examples presented. In March 2000, leading experts in the field of environment and security participated in a workshop organized by the Woodrow Wilson Center's Environmental Change and Security Project (ECSP) and the University of California at Irvine's Global Environmental Change and Human Security Research Office (GECHS-UCI).[363] This workshop urged the further development of case studies on the links between environment and security, and that such development involve those individuals from countries where these linkages are often most evident, and who have extensive ground-truthed experience and knowledge. The contributors to this volume meet these criteria and hence, in a modest way, add to a vibrant and growing literature.

Third, through this work we wanted to create linkages between academic research that we believed was exciting and important, and the conservation community, which is ideally situated to take insights from academic literature and adapt and apply them to activities on the ground. During the

1990s, the debates over linking environment and security attracted significant attention from policy-makers and a range of international institutions around the world, but made very few inroads into the world of biodiversity conservation practice.

Amid all the fanfare, therefore, we felt that an opportunity was being missed to connect some of the insights of the academic work to that practitioner group that was perhaps best positioned to evaluate and use them. With this in mind we tried to design a modest research project that might attract attention among the global conservation community and deliver some innovative insights.

Finally, we hoped that, if this work sparked interest within the conservation community, some of its conclusions and suggestions would lay the groundwork for further debate and experimentation in the years ahead. As we pointed out in the introduction, we have only begun to identify and investigate the possible linkages among environmental change, conflict, security and conservation practices. There is a need to take the lessons emerging from this effort and turn them into useful tools, and we hope this book acts as a catalyst for doing so. Otherwise it risks joining many others like it, on dusty bookshelves and discard racks.

Based on the state of the research in this field,[364] and on the work undertaken by the IISD/IUCN Task Force, we feel there are important connections, and hence real opportunities for conservation practices to be used as tools for conflict reduction and peace-building—and significant consequences if conservationists fail to integrate conflict analysis within their interventions.

While this subject has not received its final and authoritative treatment, the ideas presented here resonate with our own experiences in the field, and have a logic that is readily grasped. The materials are not comprehensive in their treatment of the broad sweep of environment and conflict links, nor do they purport to be the final word on the individual situations presented. They were conceived as advocacy papers, designed to convince their readers that conflict is highly relevant to the work of conservation, and creates threats and opportunities for practice. Discussion, experimentation and feedback from the conservation community are the logical—and necessary—next steps.

We believe that the publication of this book represents one of many nascent efforts to bring the lessons emerging from the study of environment and conflict to the hands of those whose activities can make a difference on the ground. In this light, we offer below an account of the general findings that emerge from the case studies, our thoughts about how these findings can contribute to the formulation of high-value conservation policies and

actions, and, finally, our thoughts on the ways in which this work can now be moved forward most effectively.

A Summary of Findings

The case studies and other materials we have gathered and reviewed here present several distinctive patterns through which environment and security are related. It is well known that conflict can emerge over how a resource is used or allocated, and over who benefits from those process-es.[365] This book also suggests that environmental stress or contention—a product of rising demand, unsustainable use and inequitable access to resources—can undermine livelihoods. As one like-minded study con-cluded recently, "whether deliberately or not, resources may be used by some in ways that undermine the livelihoods of others."[366]

This loss of livelihood security can lead to or feed tensions within and between communities and increase vulnerability to disaster. Exploitation of weakly-governed, resource-rich spaces can fuel conflict as well. Conflict and disaster destroy lives, infrastructure, and trust, and chase away much-needed investment. For these reasons, addressing the role of environment in insecurity is critical for sustainable development.

Five basic scenarios are suggested by the case studies, though several apply to particular cases:

1. unsustainable use of resources and ecological services contributing to scarcity, undermining livelihoods and contributing to insecurity and conflict;

2. inequitable access to resources and ecological services driving unsus-tainable use and loss of livelihoods, ultimately contributing to insecu-rity and conflict;

3. use of natural resources and ecological services to finance conflict;

4. incompatible resource and ecological service uses leading to conflict over irreconcilable value systems; and

5. unsustainable use of resources contributing to vulnerability to disasters by undermining ecological services (in particular through loss of nat-ural buffer systems).

Each of the scenarios above can create reinforcing cycles that deepen social instability and resource mismanagement. Population displacement, for example, places pressure on other parts of the environment and risks recre-ating the problem that led to the migration in the first place. When pub-lic resources are diverted to address crises, less is left to deal with develop-ment and poverty alleviation. Conflict, instability and recurrent disaster

create an unsatisfactory environment for foreign investment, trapping a nation in a state of chronic emergency.

The alchemy transforming competing resource uses, poverty, ethnic rivalry and political power struggles into widespread violence remains mysterious. Key determinants are the idiosyncrasies of local context, which can only be learned through personal experience and from the local people themselves.[367] The ecological sources of social tension are at work amidst other factors, such as identity, ideology and ambition. Further obscuring the lines of causality are the many pre-existing conditions working for and against peace, including the systems configuring property rights and commerce, historical internal and external relationships (e.g., colonialism), political systems, cultural norms, and family and community structures.[368]

As a consequence of this complexity, some argue that the environment's role in insecurity results primarily from political, economic and social factors, with "environmental conflict" thus a symptom of the deeper malaise of poor governance. To these we stress that the river runs both ways: many environmental trends operate independently of human institutions, and thus shape those institutions substantially.[369] Better governance will solve many—but not all—environmental security problems.

A certain level of conflict is "normal," even characteristic of healthy societies. Conflict may be necessary in overthrowing outmoded institutions and social relationships that constrain adaptation to changing conditions.[370] Perhaps in contributing to social instability and complex emergency, our mismanagement of natural resources is triggering crisis and thus forcing adaptation to the reality of a world with limits. Yet the human cost of the current path is unnecessary.

We have other options. Conservationists have sought for years to operationalize ecosystem management through an iterative process of information gathering leading to modification of activities leading to further monitoring and fine-tuning—a process known as "adaptive management." Adaptation, like conflict, need not be violent.

Particularly in today's security-obsessed world, all sectors of society need to understand how their activities can fuel instability and vulnerability, and how they can contribute towards human security.

Conservationists Can Enhance Human Security

Both because of their immersion in local communities and their rich knowledge of the local environment, conservationists—and here we include all those who manage and use natural resources to meet the needs of today with more than a passing view to the needs of tomorrow—are well-placed to make a positive contribution to peace and security.

Conservationists can help conflicting parties recognize and forge mutual security around shared management of resources. They are on the ground for many years at a time, often members of the communities whose lives they affect. They represent many sectors, from government and civil society through private sector and academia. And they often have access to leverage—international treaties and institutions, foreign powers, media campaigns—unavailable to local actors.

The conservation "community," for its part, needs to be well-informed on the ways conflict can undermine the pursuit of sustainability and prosperity, and on the tools that can be applied to prevent and resolve conflict.

Towards Conserving the Peace

Our cases and the Task Force deliberations suggest to us several areas through which conservationists might contribute more directly to human security. These can be categorized as:

- *Precautionary measures*, taken in advance of crisis, and with the objectives of building robust communities with sustainable livelihoods, and of removing the incentives driving conflict.

- *Crisis measures*, taken during a conflict to try to protect the environment from severe damage, to bring together opposing groups and to build confidence.

- *Post-conflict measures*, taken after a conflict has ended but while the considerable challenge of rebuilding a robust, sustainable society remains.

Precautionary Measures

This book advocates a precautionary approach to war and disaster through environmental action. Prevention means tackling the underlying forces that create tensions and the triggering events that permit their eruption in violence.

Peace and Conflict Impact Assessment

Allocating between competing demands for natural resources creates winners and losers, and therefore the potential for conflict. The creation and maintenance of protected areas has frequently been cited as a source of social unrest.[371] But these interventions can also have unanticipated peacebuilding benefits which have hitherto been largely undocumented.[372]

Given the role of protected areas in the past in generating conflict, practitioners should at least seek to "do no harm" to the social fabric while striving to protect nature. To that end, the emerging practice of Peace and

Conflict Impact Assessment (PCIA) for development interventions should become a standard tool in the conservationist's kit.[373] It should be stressed here that this is indeed an emerging practice.

A PCIA is "a means of systematically considering the positive and negative impacts of development projects on peace and conflict dynamics in conflict-prone regions."[374] A PCIA could be applied at the level of individual projects, programs or regional strategies, in order to enhance project design, monitoring and evaluation.[375]

According to one of the PCIA's leading proponents, in relation to natural resource management interventions, issues that should be considered include:[376]

- context in which project is entering, including history of conflict in the region;

- impact on capacity of relevant individuals and institutions to manage or resolve conflict peacefully;

- impact on formal and informal political structures and processes within the state and among key actors;

- impact on human security, in terms of political, economic, physical and food security at the level of communities; and

- impact on social ties and relationships, including mutual acceptance, creation of spaces for dialogue and promotion of social equity.

The main criticisms of PCIAs are related to the difficulty of attributing positive or negative outcomes to a particular intervention or program; and to the problem of mainstreaming their practice amidst many other issues (e.g., gender, human rights, etc.) that development practitioners face.[377] In spite of these growing pains, conservationists active in conflict-prone regions should weigh carefully the applicability of the PCIA to their efforts, and contribute to their refinement and field-testing.

Value and Restore Natural Systems that Buffer Communities from Disaster

Environmental degradation likely plays an important role in increasing the vulnerability of communities and nations to natural disasters, as was demonstrated by the experiences of Central American communities facing Hurricane Mitch in 1998. In the context of an increasingly variable climate, there are perhaps great human and economic dividends to be reaped by integrating the protective function of natural systems—particularly wetlands and mountain ecosystems—into flood and landslide prevention and into

land-use planning decisions. These benefits come from directly reducing the extremes (e.g., absorbing storm surges) and by providing emergency resources such as food and shelter in times of emergency (disaster or otherwise).

Given the perverse role of large-scale disasters in triggering conflict, such investments can have benefits far beyond preserving biodiversity and reducing immediate humanitarian costs. Moreover, reducing disaster presents a compelling new argument for conserving nature. But what is the comparative value of natural systems in preventing disaster relative to the other options, and how should the results be communicated to the disaster reduction and climate change adaptation communities in a way that affects practice?

Based on this assessment, there is a need for further research into the effectiveness of targeted protection of natural systems in reducing the vulnerability of communities to extreme natural events.

Protect and Supplement Resource Dispute Resolution Mechanisms

As the loss of the *adat* system for dispute resolution in much of Indonesia suggests, traditional non-violent mechanisms for conflict management over natural resources are an endangered species.[378] Conservationists should do their part in helping to defend and reinforce these tools, and to document and share their practice internationally.

In extreme instances, the rising scarcity of particular resources can overwhelm non-violent tools for resolving disputes, and the social cohesion necessary for more sustainable development. In the case of the Rwanda genocide, long-standing rivalries over access to land and resources between the Hutu and the Tutsi appear to have been a large part of the explosive mix in that country. The rivalries became more difficult to manage as competition for ever-scarcer resources built up. Sorting out these rivalries and restoring trust will be the work of generations.

The overloading of traditional channels of communication in times of scarcity is equally true among developed countries, as the case of the turbot fishery indicates. There was no conflict between Spain and Canada when the fishery was abundant. Tensions began to emerge between fishing fleets, and between their countries, only after the lack of environmental management had allowed the depletion of the stocks. But environmental collaboration was the best way to manage the conflict, as the alternatives were untenable.

Where formal dispute resolution processes are non-existent or fail, the creation of independent mediation processes, exemplified by the Ombudsman Centre for Environment and Development, and by multilateral river basin commissions, may be vital to ensuring that contention over the environment does not lead to violence. Conservationists have many potential roles in such a situation. But what are the factors for successful mediation of a resource-

based conflict? And how can these skills become a part of the professional formation of conservation and development practitioners?

Mediation and Dispute Resolution

Conflict resolution processes have been widely studied, both at an academic level and in operation.[379] The basic premise of such processes is that they are "alternatives" to traditional means for resolving conflict, i.e., by force of arms. Typically, they require one party, whose interests are not directly affected by the conflict, to act as convener or initiator of meetings between representatives of the parties. When issues are complex or when parties are difficult to identify or fairly represent, and stakes are high, these meetings may be assisted by a process expert—a third party (or mediator), whose role is to assist the parties in identifying and communicating their interests, and developing packaged agreements that meet most or all of the interests of both parties. Parties work together to develop options, devise criteria for evaluation of these options and construct multi-issue proposals for resolving the conflict. While parties may not be in accord with every aspect of a proposal, they have achieved "consensus" when no one strongly objects to the package as a whole.

Among the issues frequently cited as especially important in the design of conflict resolution processes are:

- neutrality of the convener;

- sufficient financing and time;

- identification and representation of key stakeholders;

- ripeness for resolution;

- implementation and monitoring of agreement;

- selection and qualifications of a "third party" process expert (mediator, arbitrator…);

- lack of experience with negotiation/consensus-building processes;

- stakeholders' lack of institutional capacity and resources;

- opposition by powerful stakeholders; and

- lack of good faith and the presence of significant power imbalances between parties.

These challenges are not insurmountable. What is frequently lacking in emerging conflicts is someone whom the parties trust—or, at least, do not mistrust—who can act as a bridge to help them begin a dialogue and who can be seen as impartial to the interests at stake. As one recent study by

IUCN indicated, "whenever there is multiple uses of a natural resource, there is a potential for…conflict…[I]f several users are competing with each other and the conflict is great, their motivation to solve the problem will probably also be great."[380] Learning to seize these opportunities requires systematically learning from, and sharing experience with, the emerging field and practice of dispute resolution.

Socially-marginal groups often lack representation in decision-making processes that affect their access to vital natural resources. Here, conservationists can help in bridging communications between affected communities and decision-makers. In some cases—as with uranium mining in Kakadu—they can help open up such decision processes through the application of international pressures, as emerged through the threat of withdrawal of World Heritage status from the Kakadu National Park in Australia.

Some conflicts over natural resources may be irreconcilable in the near future, if what are really in conflict are incompatible value systems. "Values run deeper than interests," notes John Forester, dispute resolution expert. "When we give up one interest… we often try to make up for that by gaining on another interest… But when we give up something we value, we often feel we give up part of ourselves… hardly compensated by gain somewhere else."[381] Traditional communities, when confronted with large-scale industrial development such as dams or uranium mines, may simply see themselves as having nothing to gain and everything to lose. What are the best means for dealing with inevitable conflicts in such cases?

Identifying a conflict as being rooted in values does not necessarily equate with it being unresolvable. Appealing to shared "overarching values" may permit the foundations of an agreement to be lain.[382]

A convergence in tools is evolving from the fields of conflict resolution and natural resource management, particularly in efforts to integrate development and conservation objectives in order to deliver economic benefits to the local community for the preservation of biodiversity.[383] Efforts to systematize and share knowledge between these two fields are nascent[384] and should be encouraged.

Understand How Governance Failures and Trade in Natural Resources Create Conflict

While resource scarcity figures prominently in the cases we present here, the old motivations for conflict loom large. Greed is cited as a key driver of the rapid clearing of Indonesia's forests, where illegal harvest far exceeds the legally-sanctioned cut. Contributing to rapid resource exploitation are global debt pressures and trade rules, as well as international development

assistance that props up predatory governments in the name of commercial stability and political interests.

Domestic politics are a key ingredient in understanding why subsidies continue to flow towards overseas fishing fleets active in North Africa, creating surplus capacity and undermining livelihoods in the region. And, as is suggested by the Canada-Spain conflict, a nation or group's self-image, when harnessed in the name of personal political ambitions, can create an explosive cocktail. Last, perverse synergies stemming from resource trade can escalate conflict, as exemplified by the link between illicit trade in natural resources and the importation of small arms.

The conservation community needs to better understand the links between aid, trade in natural resources and conflict, and identify areas where it can make a positive contribution towards peace. Examples where conservationists have developed tools with particular relevance to efforts to stem harmful resource trade include the Convention on International Trade in Endangered Species (CITES) and the Forest Stewardship Council (FSC). A systematic effort to identify the areas where conservationists could make a positive contribution to reining in perverse resource trade and aid would be a valuable contribution to human security.

Demonstrate the Link Between Biodiversity and National Security

At its heart, this book describes the relationship between natural resources and livelihoods, the sustained loss of which can sometimes lead to violence. In northern Pakistan, the interacting forces of polluted water and drought, unsustainable forestry and land scarcity, have combined with a rising population, refugees and political crises, to lock the region's inhabitants into a tailspin of insecurity.

In such an environment, the millions who are unemployed or unable to eke out a living have turned to drug trafficking, fundamentalism and blame-casting. "The Taliban," Matthew and Zaidi allege in this volume, "[were Pakistan-based] educators who ran conservative religious schools for Afghan refugees, [and]… in the mid-1990s would gain control over most of Afghanistan" with global implications.

Perhaps more than any other, this case demonstrates that the conservation community needs to do a better job of bridging the observations of rising tensions over natural resources in the field to policy decisions at the international level. If environment is indeed an emerging security concern, then those responsible for security need to listen to the resource experts. Yet the mutual distrust between these disparate spheres will require skillful diplomacy to overcome.

Crisis Measures

Conservation During Conflict

The world is indeed becoming a smaller space, and once-remote natural spaces are today under the pressures of industrial development, of refugees displaced by conflict, and of people searching for land to call their own. As a result, many conservationists are likely to find themselves operating in conflict-prone regions.

The practice of conservation during conflict poses many ethical and practical challenges. Practically, how do you know if a nation is disintegrating, and what can you do to prepare for it? Ethically, is conservation about protecting trees over people, preserving a fragile resource for the future, or helping to reduce a source of tensions? What constitutes an acceptable risk to personnel? Can and should armed groups—perhaps future political leaders—be engaged in the process of protecting nature during conflict? This volume offers no easy answers, for none exist, yet offers the beginnings of a framework for thinking these questions through. It proposes that conservationists and decision-makers begin by understanding the social context that creates conditions for conflict and preparing resources—human and financial—for the cessation of hostilities.

Working with Sub-state Armed Groups[385]

Over 85 per cent of conflicts in the last decade were fought inside national borders.[386] As McNeely persuasively argues in this volume, the environmental impacts of such conflicts on biodiversity "can be direct—such as hunting and habitat destruction by armies—or indirect, for example through the activities of refugees." For this reason, conservationists should seek safe and effective means for working with sub-state armed groups in an effort to protect the natural environment during conflict situations.

The experience of human rights organizations in developing tools for ensuring and enhancing respect for human rights in conflict situations may provide conservationists with some important lessons for continuing their own operations during such times. For example, a study by the International Council on Human Rights Policy (ICHRP) notes, "armed groups that are not under government control are a key feature of these conflicts and are responsible for many, sometimes extreme abuses of human rights." Examining the successful and unsuccessful activities of national and international human rights organizations on the ground in conflict zones, the study seeks to answer the question: "how can armed groups be influenced to reduce or stop the abuses they commit?"

Many of the report's conclusions have direct relevance for conservation-related activities. In an effort to provide some insight on the nature of sub-state armed groups, the ICHRP states that the behaviour of these groups is influenced by the governments they oppose, and vice versa. Moreover, armed groups take many forms, ranging from small cells to armies controlling large territories, with a few of them controlling more resources than entire states.

The ability of civil society organizations to act effectively depends on the degree to which both states and armed groups tolerate NGO actions. ICHRP concludes that several contextual factors critically influence the willingness and capacity of armed groups to respect international norms, as well as the capacity of civil society to apply leverage on them. These include:

- aims and Ideology;

- nature, style and accountability of leadership;

- openness to dissent and reform;

- degree of military discipline;

- presence and nature of foreign sponsors; and

- constituencies supporting the armed group.

In terms of those factors affecting the capacity of civil society organizations to promote particular norms, ICHRP notes that international organizations are often better placed to draw international attention, and face fewer physical risks, since they have greater ability to leave a country. Direct assistance poses particular risks for the organization, since it may invite reprisals from the state or rival groups. The Council urges organizations to take into consideration:

- nature of civil society in the country;

- safety from attack or intimidation;

- role of "insiders" close to armed group leadership; and

- coordination with other relevant actors.

Actions that an organization can seek in order to change the behaviour of an armed group include:

- punishment through national courts or international mechanisms;

- international sanctions;

- monitoring, reporting and denunciation;

- use of media;

- engaging with armed group's constituency;

- direct dialogue;

- assistance with internal reform; and

- development of codes of conduct and quasi-legal mechanisms for dispute resolution.

The parallels between promotion of human rights and of protection of critical natural systems and species in times of conflict indicate a need for dialogue and lesson-sharing between the human rights and conservation communities.

Post-Conflict

Forge Collaboration Around Shared Environmental Concerns

The growing success of international Peace Parks at helping to foster cooperation between states in Africa and Latin America most notably suggests that mutual environmental actions can deepen ties and strengthen mechanisms for peaceful co-existence.[387]

In this sense, a shared vital resource might provide an impetus for building bridges between parties who might otherwise not sit at the same table. The Israeli and Palestinian water authorities, for example, agreed as late as spring 2001 to work together to protect water resources in the region in spite of the ongoing conflict, asking protesters and soldiers to avoid damaging sensitive infrastructure.[388] Likewise, the Mekong River Basin Commission has given the states of southeast Asia a space for dialogue and fostered a spirit of "good neighbourliness" and regional identity between them in spite of political tensions.[389] As Kader Asmal, Chair of the World Commission on Dams, remarked: "While some see in our scarcity a harbinger of troubled waters to come… Our Commission… sees water as an instrument, a catalyst for peace."[390]

The conservation community can be instrumental in identifying and brokering dialogue around these shared resources and spaces, helping forge slender ties between those groups within opposing camps that recognize the need to preserve something for the future. One commentator suggests that cross-border and regional cooperation on environmental matters be built in stages, from exchanges of technical information to joint monitoring systems to non-violent means of regional conflict resolution.[391] The key, according to Daniel Buckles of the International Development Research Centre, "is to learn to manage conflict so that it achieves change instead of leading to violence."[392]

But where to begin? One avenue for future research lies in documenting the experiences of collaborative action to conserve or restore environmental resources, where such efforts have built social cohesion, reinforced mechanisms for collaboration and dissipated social pressures.

Harness the Opportunity for Change

The post-conflict space presents an exceptional challenge, where not only must a society be rebuilt and trust restored, but also a fragile peace buttressed so that it does not collapse amid resurgent hostility. This is a delicate task, one that the world faces in numerous locations, from Rwanda and Sierra Leone to the Balkans, and—most prominently—Afghanistan.

Pointing out the irony that market forces may be more destructive to nature than military forces, McNeely in this volume notes that in the postwar reconstruction phase, the pressure to kick-start development and earn foreign exchange can lead to rapid pillaging of natural resources at suboptimal prices. Clearly, there is a need to recover from the past while preparing more robustly for the future.

"Times of crisis are also times for rapid change in attitudes, institutions, and, sometimes, in the alacrity and openness of decision-making," notes Art Hanson, IISD's Senior Scientist, echoing the results of the Biodiversity Support Program study included in this volume. "It is not enough simply to call for a return to the status quo, or to defer action on sustainable development and environment priorities until better times return. To do so guarantees that the better times will never fully return and that a country's ecological debt will expand, with fewer options to derive full economic and social value from natural resources."[393]

The mobilization of international attention and the rapid turnover of people and institutions at this time represent a window of opportunity to drive quantum leaps in the national policy framework to support more-sustainable development. Hanson recommends that government officials:

- integrate sustainable development into crisis response at the earliest stage possible;

- rethink environmental governance to take advantage of advances in understanding of effective public regulation, e.g., market-based approaches that respect incentives facing key actors;

- face external drivers that prevent or can promote change, e.g., international trade rules, government corruption, etc.;

- seek internal and external concessions, e.g., by reducing domestic subsidies;

- build capacity for more sustainable development within key sectors by investing strategically in monitoring, enforcement and private sector environmental management; and

- fund the changes through increased efficiency and direct revenue collection, e.g., park fees, elimination of subsidies, etc.

Recommendations of the IISD/IUCN Task Force

In formulating its recommendations to conservation practitioners, the IISD/IUCN Task Force on Environment and Security drew upon the extensive knowledge of its members, the case studies and the interventions of participants at its presentations to the 2000 World Conservation Congress. In sum, the Task Force urges conservation action on three fronts:

1. **Plan for surprises.** Decisions are often made without adequate knowledge of downstream effects—too narrow a range of factors are used for decision-making and, as a result, trade-offs are misframed or mishandled. Even where better options are available, they may not even be taken into consideration.

   - Take into account natural resources critical to local livelihoods in the design of conservation and resource exploitation activities. Dialogue with affected communities and participatory decision-making are vital.

   - Implement contingency planning for conflict and disaster within development and conservation project design.

2. **Use environmental management to promote human security.** In many cases of conflict, environment may be the area most amenable to resolution. Common environmental interests can bring disputants together in dialogue and innovative problem solving.

   - Preserve and protect natural buffer systems that protect communities from disaster.

   - Identify scope for international or inter-ethnic cooperation on environmental conservation in otherwise conflicted situations.

   - Assist refuges and internally-displaced people in resettlement and livelihood generation, while seeking to minimize environmental consequences that impact host communities' livelihoods.

   - Identify and preserve traditional tools for resource-based conflict management and resolution.

3. **Bring new stakeholders into the environmental domain.** Many of the institutions playing a vital role in the processes that exacerbate environmental sources of insecurity, or who are responsible for security of the state and its individuals, operate without awareness of the environment-security link.

- Work with the private sector to identify win-win opportunities for ensuring that resource extraction and industrial development contribute to environmental security.

- Foster dialogue between traditional security actors, the trade policy and development assistance communities, based around enhancement of human security.

Mohamed Sahnoun, chair of the Task Force and member of the World Commission on Environment and Development, urged the strengthening of international mechanisms of accountability, to bring decision-makers to account for their actions in wartime, in particular for human rights violations and for destruction of the environment. "We need to create a global culture of peace," he stressed, if we are to achieve sustainable development.

Where to Go From Here

We began a journey in early 2000 to investigate the relationship between the environment and insecurity. We came to it with preconceptions about where it would lead, and have been led down several surprising and, we think very, exciting new paths.

Some will feel that we have not demonstrated the link between environmental degradation and conflict. We are acutely conscious of the dangers inherent in over-selling the link between natural resources and insecurity. We feel it would be foolish to disregard these links, however, in particular at the local level, where people depend on natural resources for their livelihoods. As the cases illustrated, moreover, there is an important role for conservationists to play in conflict prevention and peace-building, as well as in reducing community vulnerability to disaster. Therein lie promising avenues to make conservation more relevant to current policy agendas as well as to people on the ground.

We have learned that the security perspective is potentially a useful *analytical tool* for conservation—allowing conservationists to identify those environmental investments with the greatest social "added value"; and a powerful *rhetorical tool*, buttressing the argument that appropriate attention to environment is a question of survival, and not merely of ethics. Framing environment as a question of human security will strengthen the case for sustainable development.

Last, we feel cooperation over shared environmental aims is an aspiration that *can bring otherwise-divergent groups together*. Through the environmental security argument, actors that have hitherto remained outside of the sustainable development movement can be drawn in, and people who are otherwise opposed might find some common ground.

So where do we go from here? The IISD/IUCN Initiative on Environment and Security will carry forward on several fronts in the coming years. First, we will seek to build our knowledge base on the links between natural resource management and vulnerability to disaster. Second, we will seek to unpack the linkages between trade in natural resources, and conflict, and see how best to contribute from a conservation perspective to nascent efforts to tackle these links in support of peace-building. Last, we will seek to further our preliminary effort here at developing tools for practitioners, drawing from the best insights of academia to inform natural resource management decisions not only in the conservation community but with development professionals and private sector field managers in the resource extractive sectors.

Whether environmental issues do become the defining security issue of the twenty-first century, there can be no doubt that peace and sustainability have a close inter-relationship, and a relationship within which conservationists—the experts in natural resource management—have a vital role to play. In that spirit, we hope this book acts as a modest yet useful milestone on the road towards a more sustainable and secure future for all.

Environment and Security Brief 14

Cooperative Efforts in the Nile Basin

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The growing demand for water in the Nile Basin is confronted with finite freshwater. Large areas of the Nile Basin are arid or semi-arid, and water is unevenly distributed both in the space and time. Shared by 10 countries (Burundi, D.R. of Congo, Egypt, Eritrea, Ethiopia, Kenya, Rwanda, Sudan, Tanzania and Uganda) the basin is home to more than 250 million people with an average annual population growth rate of about three per cent. Irrigated agriculture—in other words, food—is the main water consumer. According to the FAO, large parts of the populations of the Nile countries are undernourished (1995–97 estimates: Sudan 20 per cent, Uganda 30 per cent, Rwanda 35 per cent, Tanzania 40 per cent, Kenya 40 per cent, Ethiopia 45 per cent, D.R. Congo 45 per cent, Burundi 60 per cent, Eritrea 60 per cent). Besides water scarcity, high erosion rates and reservoir sedimentation are major environmental issues. Nevertheless, both from the point of view of water and land there is still great potential to further develop agriculture and industry in the Nile Basin. Thus resource distribution and management is a primary challenge. Downstream countries see the possibility of inappropriate development upstream impeding the river's flow, while upstream countries worry that downstream countries could try to block upstream development. As yet there is no basin-wide water agreement that is accepted by all the Nile countries. Furthermore, on the national level, political instability and internal conflicts in some of the countries mean that sustainable resource management is difficult. The lack of an adequate livelihood basis in its own turn is often also conducive to this political instability.

Since international cooperation can enhance the development of shared resources in the Nile Basin it can help prevent crises internationally (mainly of diplomatic nature) and internally (poverty and conflicts related therewith). Recent steps towards cooperation over natural resources are the Ethiopian-Sudanese agreement of 1991, the Egyptian-Ethiopian framework of cooperation of 1993 and, on a basin-wide level, the Nile Basin Initiative (NBI), launched in 1999. The NBI is special because Ethiopia—source of 86 per cent of the main Nile flow

—is an active member of a basin-wide framework for the first time. Even if it is still of a transitional nature, the NBI enables dialogue. Joint "win-win" projects are foreseen (NBI web site: http://www.nilebasin.org).

At the Nile 2002 Conference in Addis Ababa in June 2000, representatives from both downstream and upstream countries were talking about a new "Spirit of Cooperation." Some of the main factors influencing this process are: 1) political interests of the regimes in power; 2) increasing pressure of environmental and socio-economic issues that can only be addressed cooperatively; 3) co-ordinated third-party assistance and financing. The World Bank, for example, urges basin countries to cooperate before financing international river development projects. In sum, economic strength downstream and the potential control over water resources upstream means that there is a balance of power in the Nile Basin that is conducive to cooperation.

Whether the term "environmental security" or "sustainable development" is used, the Nile Basin demonstrates what lies at the core of these concepts: humanity's dependency on natural resources. Efforts—such as the cooperative ones in the Nile Basin—are needed to influence political and socio-economic factors so as to translate this dependency into peace, rather than war.

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Conserving the Peace is a collection of case studies illustrating the relationships among security, the environment and human well-being. Collectively, the studies make the case that conservation activities can motivate peace-building, thereby creating a stable future for all.

From the Preface of Conserving the Peace…

"We present this book to the world at a time when international relations are being convulsed by a war on terrorism. Issues of conflict and security are once again at the top of the policy agenda, if indeed they ever left. While the vast consequences of this latest conflict figure prominently in such discussions, the underlying forces of poverty, inequity and unmet expectations as causes are being widely acknowledged as well. These forces drive, and are at least in part driven by, environmental change and degradation in many parts of the world. Indeed, recent events underscore how important these relationships are to preventing instability and conflict."

– *Mohammed Sahnoun, Chair, IISD/IUCN Task Force on Environment and Security*

"… a persuasive argument that preemptive contributions to the sustainable and equitable management of natural resources are more effective for biodiversity and society than post-war humanitarian and environmental interventions."

– *Arthur H. Westing, Environmental Security Consultant and former Director of the UNEP project on Peace, Security and the Environment*

"Conserving the Peace offers a clearer understanding of why the environment is closely linked to social stability and economic security, and what options emerge for influencing this equation in the real world and on the ground."

– *Achim Steiner, Director General, IUCN - The World Conservation Union*