Political and Institutional Responses to TransboundaryWater Disputes in the Middle East

by Miriam R. Lowi

THERE ARE THREE MAJOR, OUTSTANDING DISPUTES OVER THE DISTRIBUTION AND MANAGEMENT OF TRANSBOUNDARY waters in the Middle East. They concern: 1) the Euphrates River basin among Iraq, Syria, and Turkey; 2) the Jordan River basin among Israel, Jordan, Syria and the Palestinians; and 3) West Bank groundwater between Israel and the Palestinians. In the three cases, aridity or semi-aridity characterizes the climate and hydrology of the region, hence undisturbed access to water is essential for continued survival. In the three cases, as well, political tensions among the concerned riparians aggravate the water disputes.

Let me begin by briefly outlining the nature of the problem in each of the cases and the stakes involved in failing to resolve the disputes. Next, I will highlight the minimum conditions that must be met before a water dispute can be resolved in a protracted conflict setting. Finally, I will describe some of the institutional mechanisms that could be effective in promoting a mutually satisfactory solution. In doing so, I note what seems to have worked in similar situations in the past, and what seems to be working currently under the auspices of the water resources working group of the multilateral track of the Middle East peace process.

The Problem

In the Euphrates basin, the central problem can be described thus: the river rises in Turkey and flows southward into Syria and then into Iraq. The two downstream riparians are highly dependent upon the river flow for agricultural development, while Turkey upstream has become increasingly dependent upon the river since the mid-1960s by virtue of the GAP (Southeast Anatolia Development) project, a massive water management scheme that includes dam-building and diversions.[1] In the absence of a basin-wide agreement that stipulates who gets what from the river, when and how, Turkey, as the upstream riparian and the strongest state in the basin, is able to requisition what it wants from the river system; Syria and Iraq must suffer the consequences. On a number of occasions, in fact, the flow entering the two countries was reduced considerably, and although Syria and Iraq complained vociferously about this, Turkey was not contractually bound to behave otherwise. Moreover, relations in the basin are such that Syria and Iraq, who have the most to lose from the *status quo*, are engaged in a protracted conflict: there is virtually no official interaction between the two regimes, hence a bilateral alliance vis-à-vis Turkey is out of the question in the prevailing political environment. It is also fair to say that the international community has not shown much concern about this conflict and its resolution; there have not been significant efforts at third party mediation.

In the case of the Jordan basin, the river system rises in four tributaries: the Yarmouk in Syria, the Banias in Israeli-occupied Syria, the Hasbani in Israeli-occupied Lebanon, and the Dan in Israel. The Banias, Hasbani and Dan meet in northern Israel to form the Upper Jordan River that flows into Lake Tiberias and then the Lower Jordan; the Yarmouk flows in a southwesterly direction, forming the border between Jordan and Syria, then Jordan and Israel, before flowing into the Lower Jordan that forms the boundary between Jordan and the West

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Miriam R. Lowi is an Assistant Professor of Political Science at Trenton State College. Her book, Water and Power: The Politics of a Scarce Resource in the Jordan River Basin, *was published by Cambridge University Press in 1993 and 1995. Her articles have appeared in edited volumes and journals that include* International Security *and the* Journal of International Affairs. *Her latest research is on oil and the politics of development in Algeria, Iran and Indonesia.*

Bank, and then Jordan and Israel. By virtue of both the 1967 war and the establishment of the "security zone" in South Lebanon in the early 1980s, Israel has become the upstream riparian on the Upper Jordan system; Syria is upstream on the Yarmouk. Jordan and the Palestinians, as downstream riparians vis–à-vis both Israel and Syria, have remained in the worst possible positions in the basin. Moreover, Jordan's dependence on the river system is great; apart from a few wadis,[2] there are no other important sources of fresh water available to Jordan.

Approximately eighty percent of West Bank water is exploited in Israel and by Israeli settlers in the territory, leaving only twenty percent for the Palestinian population.

On three occasions, efforts were made to resolve the water dispute in the Jordan River basin and establish an "international regime" that would oversee the distribution and management of the water among the riparians. In 1953-55, 1976-81, and 1987-90, the United States government was engaged in trying to secure an agreement: among all four riparians on the first occasion, among all except for Lebanon on the second, and between Israel and Jordan on the third. In the three attempts, outcomes fell short of the objectives; it was clear that in the absence of a political settlement of the Arab-Israeli conflict, the parties were not going to come to an agreement.[3]

It is important to note that by virtue of the Middle East peace process that was initiated in 1991, the *status quo* in the Jordan basin is in flux. Indeed, a water resources working group has been meeting under the auspices of the multilateral track, and a peace treaty has already been signed between Israel and Jordan. While that treaty lays out an agreement on sharing and managing water resources, it is not a basin-wide agreement: not only are Syria, Lebanon and the Palestinians not signatories of the document, there is absolutely no mention of them. Nonetheless, continued progress in the peace process holds out hope that a basin-wide agreement may eventually be reached.

The situation with regard to the groundwater sources of the West Bank is equally complex. About one-half of Israel's annual supply of groundwater and one-quarter of its total renewable supply of fresh water originate in two subterranean basins in the West Bank. Those waters flow naturally across the "Green Line" (the 1949 Armistice Demarcation Line) into Israel. Moreover, by virtue of its occupation of the West Bank, Israel has been controlling water use in the territory. The result has been that approximately eighty percent of West Bank water is exploited in Israel and by Israeli settlers in the territory, leaving only twenty percent for the Palestinian population.[4] No doubt, negotiations on the final status of the occupied territories will have to consider arrangements for the distribution and management of this precious resource.

Resolving Water Disputes

The *sine qua non* of resolving a transboundary water dispute in a protracted conflict setting is the prior resolution of the political conflict. The history of the water disputes in the Jordan River basin and in the Indus basin (between India and Pakistan)—both of which have been deeply intertwined with a protracted political conflict—instructs us that states involved in "high politics" conflicts that provoke wars and engage the visceral issues of territorial sovereignty and the recognition of identities, are not inclined to collaborate in seemingly technical matters that concern economic development and human welfare.[5]

This being so, it would be fair to assume that there will not be a truly basin-wide accord regarding the Jordan waters prior to the successful completion of final status negotiations between Israel and the Palestinian Authority, and the signing of peace treaties between Israel and Lebanon, and Israel and Syria. Similarly, it is unlikely that Turkey, Syria and Iraq will come to an agreement regarding the Euphrates waters prior to a mutually satisfactory resolution of the differences between the two downstream belligerents. Indeed, it has been very difficult up to now for the three parties even to appear together at meetings.

The other precondition for resolving transboundary water disputes is that the active support and involvement of a Third Party be enlisted, or at least accepted, by the concerned parties. It is critically important that the mediator be perceived as being both impartial and firmly committed to a successful resolution of the dispute. In the case of the Indus waters conflict, for example, the World Bank mediated more-or-less continuous negotiations between India and Pakistan from 1952 until September 1960, when the *Indus Waters Treaty* was signed. It was thanks to the positive involvement of an impartial mediator that both states perceived an equitable distribution of benefits and sufficient inducements to bring them to the negotiating table.

In contrast, the perception of impartiality on the part of the mediator has not characterized the negotiation process in the Jordan basin until very recently. In the 1950s, when the Eisenhower Administration of the United States government took charge of the Jordan water dispute and appointed Eric Johnston as "Personal Representative of the President" and chief negotiator, the Arab riparians insisted outright that the United States government was not an impartial Third Party; in fact, their perception of a pro-Israel

bias was reiterated throughout the two years of negotiations and influenced the outcome of that process. It is only since the inception of the current Middle East peace process—and the creation of a truly multilateral track (composed of delegations from 29 countries excluding the Middle East and North Africa) under the leadership of the United States—that the importance of impartiality has been properly addressed. This had been a very significant development in our understanding of effective mediation.

In the case of the Euphrates River basin, the question of impartiality is premature; there has been minimal input from the international community toward resolving the conflict. There have been only a few very brief and fairly haphazard efforts at Third Party involvement, and to the best of my knowledge, none of significance since the mid-1970s.

Institutional Mechanisms

As adversaries make progress toward settling their political conflict, they can also take steps toward resolving their water dispute. It is important to realize, however, that the implementation of a water agreement will not be effected until the political conflict has reached closure. Nonetheless, projects and arrangements can certainly be discussed, their details elaborated, and some relatively non-compromising proposals initiated in anticipation of a political settlement. This is precisely what we were seeing in the Middle East peace process in 1995 and early 1996.

The water resources working group was established within the framework of the multilateral track to complement the political negotiations in the bilateral track and make progress in technical matters. The hope was that the two tracks would draw inspiration from each other, and that technical projects could be formulated and prepared for implementation if and when a political settlement were reached.[6] To date, the group has met seven times. In recent months, the Arab and Israeli delegations have agreed to the implementation of a number of projects, overseen by the American, Canadian and European delegations. Most notable among them is a project to help the Arabs and Israelis collect, analyze, and archive data in national data banks in such a way that they could eventually collaborate in the creation of a regional data bank and use the data to elaborate joint water projects. This is only one of several projects in which those who exercise a mediating role share their expertise and work with technical experts from the Arab and Israeli delegations. No doubt, the end-goals of a regional data bank and joint water projects await a political settlement.

The interim period is characterized by tremendous fragility and uncertainty. Under the circumstances, it is crucial that third parties show a commitment to working closely, and in an advisory capacity, with local expertise. I should emphasize that local expertise and ingenuity in the water resource domain is not lacking among the Israelis, Jordanians, and Palestinians; to wit, the three parties have had no difficulty putting together effective delegations to the water resources working group. It is true, however, that local expertise is not housed in a single institution; in all three cases, it is spread out in a variety of ministries, research institutes, and non-governmental organizations. While the "diffusion" of expertise could conceivably pose difficulties for effective problem-solving, governments need to be able to locate and draw upon local expertise whenever that is required. Moreover, they must empower technical experts and involve them directly in efforts toward solving the problems of scarcity and of resource distribution.

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Conclusion

To summarize, the effective resolution of water disputes requires that political conflicts be resolved first. Impartial and committed mediators need to be engaged, and they must work closely with the expertise "on the ground." Local expertise—whether in the form of private individuals, research institutes, NGOs, or governmental bodies—needs to be tapped.

With the resolution of conflict, governments, with their experts, need to address the pressing issues of how to share, develop, and manage the scarce water resources. In tackling the thorny issue of sharing, the growing literature on how to calculate fair and reasonable entitlements may be useful in drawing up objective criteria for determining water "rights".[7] Developing water resources in the arid and semi-arid Middle East requires a focus on technological solutions for increasing water supplies, such as cloud-seeding, desalination, waste-water reuse, and "importing" water from relatively wet zones. Some of these solutions are already being carried out independently by states in the region. However, they would probably be so much more effective if implemented at the regional level. And of course, water management would be carried out in an optimal fashion at the level of the basin and under the auspices of an international regime. ❑

Endnotes

1. See John Kolars and William A. Mitchell, *The Euphrates River and the Southeast Anatolia Development Project* (Carbondale: Southern Illinois University Press, 1991).

2.Wadi refers to a valley, river, gully, or riverbed that remains dry except during the rainy season.

3. See Miriam R. Lowi, *Water and Power: The Politics of a Scarce Resource in the Jordan River Basin* (Cambridge University Press, 1993/95).

4. See Stephen Lonergan and David Brooks, *Watershed: the Role of Fresh Water in the Israeli-Palestinian Conflict* (Ottawa: International Development Research Centre, 1994); Miriam R. Lowi, "Bridging the Divide: Transboundary Resource Disputes and the Case of West Bank Water," *International Security* 18:1 (summer 1993); and, "Transboundary Resource Disputes and Their Resolution," in *Contested Ground: Security and Conflict in the New Environmental Politics*, eds. Daniel Deudney and Richard Matthew (Albany: State University of New York Press, forthcoming).

5. For further elaboration of this argument and for evidence from both the Indus and the Jordan River basins see, Lowi, *Water and Power*.

6. See Miriam R. Lowi, "Rivers of Conflict, Rivers of Peace," *Journal of International Affairs* 49:1 (summer 1995).

7. See among others, James W. Moore, "Parting the Waters: Calculating Israeli and Palestinian Entitlements to the West Bank Aquifers and the Jordan River Basin," *Middle East Policy* 3:2 (1994); H. Zarour and J. Isaac, "Nature's Apportionment and the Open Market: A Promising Solution to the Arab-Israeli Water Conflict," *Water International* 18:1 (1993).

Microsecurity: Disease Organisms and Human Well-Being

by Dennis Pirages

The recent spate of books, articles, and even movies threatening a future of plagues and pestilence would seemingly indicate that the human race is on the verge of being extinguished by a platoon of novel microorganisms.[1] Aside from the media hype and related sensational predictions, there does indeed seem to be an expanding body of evidence that new and resurgent diseases represent a growing threat to human well-being. The obvious question is why, in the midst of a medical and biotechnological revolution, threats from microbes are receiving such prominent media attention.

Threats from microorganisms are certainly not new. History is littered with the remains of societies that have succumbed to attacks from various small organisms. But the nagging contemporary question is why, during a period of major scientific breakthroughs, when claims have been made that major diseases would soon be totally eradicated, there is such concern over new threats from small organisms.

Homo sapiens shares a global ecosystem with many creatures great and small. Unfortunately the human race is well on its way to eliminating some of the great ones—the so-called vanishing species—while some of the very tiny ones seem to be having their way with us. This is a case where small is not necessarily beautiful, but instead can be quite lethal. Over the last three years in the United States there have been at least six major publicized bouts with nasty microbes and there have been several other grisly events—such as the rampage of "flesh-eating" bacteria—that have not received widespread attention. During this period, there was a major outbreak of the water-borne cryptosporidium virus in Milwaukee, killing 104 persons, a lethal episode of hantavirus in the Four Corners area of the Southwest, an outbreak of antibiotic-resistant intestinal disease in New York, two widespread cases of food poisoning, a major flu epidemic, and the emergence of drug-resistant bacteria in many day care centers and hospitals. The situation has been just as worrisome in other parts of the world, most notably in Africa, where the rapid spread of the AIDS virus and a resurgence of the Ebola virus in Zaire have created crisis situations.

Why, in the face of scientific advance, does the human race seem to be particularly at risk in 1995? Not only are apparently novel microbes on the attack, but many "traditional" diseases seem to be making a comeback. Much of the answer to these puzzling questions lies in better understanding the delicate ecological equilibrium that exists between Homo sapiens and millions of microorganisms. Human beings and these small organisms, some of which are very pathogenic, have coevolved over time in a shared environment. Disease microbes have temporarily gained an upper hand at various times in history and the resulting plagues have wiped out large numbers of human beings.[2] The populations that have emerged from these periodic ravages of disease have, for the most part, been immune to future attacks. Thus, our genetic heritage has been shaped by continuous interaction with the microbial world. When human populations encounter "novel" pathogenic organisms, however, naive bodies have few defenses and significant deaths result.

These threats from microorganisms have been a persistent human security problem and a wary truce has

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Dennis Pirages is Professor of Government and Politics and Director of the Harrison Center on the Future Global Agenda at the University of Maryland, College Park. *This article first appeared in* The Washington Quarterly *18:4 and is reprinted with permission from MIT Press.*

existed with them throughout much of human history. Most of the great plagues that have trimmed human numbers substantially have been triggered by some change in the environment or change in human behavior that has tipped the balance between human beings and disease organisms. The number of battlefield deaths in World War I, for example, was easily outstripped by the deaths in the major influenza epidemic that originated in Kansas in 1918 and spread rapidly with the military. Best estimates are that the influenza virus killed about 25 million people.[3]

Microencounters

Most of the great plagues that have trimmed human numbers substantially have been triggered by some change in the environment or change in human behavior that has tipped the balance between human beings and disease organisms.

There are numerous ways in which human populations can become exposed to novel, threatening microorganisms. Historically, microbe exchanges have been part of relationships between conquerors and conquered. Thus, smallpox came to America with troops and settlers and syphilis possibly worked its way back to Europe from the New World. In the contemporary world similar exchanges take place in the international mixing bowls of people moving rapidly from one airport to another. Serious outbreaks of disease also occur when people trespass into new ecosystems. Significant numbers of people are moving into the Amazon in Latin America and into the tropical rain forests of Africa where they encounter organisms with which there has been little human experience. Environments themselves can change, with temperature and rainfall shifts creating new habitats for migrating microorganisms. Finally, microorganisms themselves can mutate and become more mobile and lethal.

Keeping these things in mind, why does it appear that the world is so afflicted by novel and resurgent diseases at this time? One obvious reason is that news travels swiftly through the emerging global village. Fifty years ago nobody would have taken much notice of odd happenings on the Ebola River in Africa. With CNN now acting as the town crier, even a few dozen deaths in a remote corner of the planetary village become newsworthy. Thus, even if nothing had changed, people would still feel that the world was becoming a more virulent place.

Beyond the obvious, however, there are four major transformations underway that seem to be strengthening the microbes' hands. Rapid population growth and urbanization are creating situations that lead to the rapid spread of diseases. Changes in human behavior are weakening disease resistance and making people more susceptible to various illnesses. Regional environmental changes, and perhaps future global ones, are creating ecosystem shifts conducive to the acceleration of mutations and greater exposure to novel maladies. Finally, a host of technological innovations is indirectly accelerating the impact of various viruses and bacteria.

Demographic Dislocations

Patterns of world population growth are well documented, but the epidemiological impact of these increasing numbers is not always understood. World population will likely grow from the present 5.6 billion to approximately 11 billion over the next 40 years. And the bulk of these new additions will be living in teeming megacities located in the Global South. Put simply, the more people there are living under conditions of squalor in urban areas, the greater the opportunity for viruses, bacteria, and larger parasites to spread rapidly from person to person. Fortunately, there have been no significant outbreaks of the very fatal new viruses in these dense urban areas, but numerous lesser maladies are now at work.

Cities in the industrialized world have recently been spared the tragedy of serious plagues, although traditional diseases such as tuberculosis are staging a comeback. This is probably due to the fact that industrial city dwellers generally have better diets and access to medical care. Thus, when a variant of the Ebola virus spread from monkeys to humans in Reston, Virginia, there were no fatalities and the spread was contained. Part of the reason might be that it was a different strain of the virus, but it is also likely that good nutrition and medical care played a role in checking its spread.

A second population-related factor in the potential spread of disease is that in many of those areas of the world where population growth has been most rapid there has been little economic growth to accompany it. It is no secret that there are nearly two dozen countries, mainly in Africa, that have experienced per capita declines in income over the last 20 years. This means that the health and sanitation infrastructure necessary to prevent diseases does not really exist. Many of the poorer countries of Africa are now extremely vulnerable to disease, and some countries in Latin America are similarly at risk. The decline of the Russian economy during its current period of transition is related to a significant deterioration of the epidemiological environment in that country.

The contemporary large-scale movement of refugees is another factor that is changing the balance between human beings and microorganisms. At

present large numbers of people find themselves displaced after various kinds of violence and conflict. Refugee camps are ideal locations for the propagation of disease. Thus, the refugees in Rwanda had to make a bitter choice between possible death from cholera in refugee camps or likely retribution from ethnic enemies if they went home.

Finally, the pressure of rapid population growth is forcing migration into marginal and previously remote areas of the world. Both in Africa and Latin America the previously isolated rain forests are giving way to the steady advances of human populations. Experts estimate that there are still millions of unknown organisms in these habitats. It is certainly reasonable to assume that there are at least a few dozen lethal microorganisms in this mix. This explains the periodic but brief appearances of killer viruses among people living on the fringes of rain forests who come in contact with forest animals. The Ebola outbreak in Zaire and recent outbreaks of hemorrhagic fever in Bolivia could also be due to forest trespass.

As the forests continue to fall before the ax and plow, viruses continue to migrate into human populations. It seems surprising that humanity has thus far been spared a major plague from these liberated viruses. The most logical reason is that the highly deadly viruses, such as the Ebola virus, are not good candidates for causing a widespread epidemic. The more worrisome viruses are those that do not kill their victims in a quick and obvious way. The Ebola virus has obvious symptoms and kills its victims in a matter of a few days. Thus, there is little opportunity for the host to spread the virus to a large number of people. If victims can be kept in isolation, outbreaks can be quickly contained. The AIDS virus, by contrast, spreads much more effectively. It does not kill its victims immediately. In fact, it can incubate over a long period without the victim being aware of it. Thus, it can multiply and spread from one victim to another before leaving a trail of debilitated corpses.

One of the major concerns about these viruses is the possibility of mutations that could change their way of operating. The spread of Ebola and AIDS requires close personal contact with victims. But it is possible that new strains might develop that could spread from person to person much more easily. Or, in the case of those viruses that kill obviously and immediately, a new strain could emerge that kills more slowly. Thus, emergence of new strains of these viruses must be constantly monitored in order to avoid a plague.

Changes in Human Behavior

Changing patterns of human behavior are also responsible for the spread of new and old diseases. Viewed from an ecological perspective, certain host lifestyle changes can make human beings more or less susceptible to the ravages of microorganisms. Major changes in human behavior have medical consequences. Almost every sexual revolution in history has had significant disease consequences for the populations breaking free of sociocultural constraints.[4] Obviously the more sexual contacts people have, the more likely it is that sexually transmitted diseases will spread. Although this may seem like unpleasant news, over the last 25 years worldwide changes in sexual behavior have led to the proliferation of sexually transmitted diseases such as herpes, syphilis, gonorrhea, and AIDS.

As the forests continue to fall before the ax and plow, viruses continue to migrate into human populations.

Widespread use of drugs, particularly those injected with commonly shared needles, represents another modification in human behavior that has changed the balance between Homo sapiens and viruses. It is difficult to think of a more efficient mechanism for transferring diseases from one person to another. This novel variation in human behavior in the late twentieth century has little precedent in human history. But recent increases in hepatitis and AIDS indicate that a heavy human toll is paid for such behavior.

Other recent changes in the way that people live are contributing to the resurgence of traditional diseases. Squalid living conditions in urban slums and overcrowded prisons are both contributing to a resurgence of tuberculosis, much of it resistant to most antibiotics. The cost of treating a case of tuberculosis is about $12,000 for a drug-susceptible strain and rises to $180,000 for a strain resistant to several drugs.[5]

Microbes with Mobility

Environmental change, either the transformation of existing environments or the rapid movement of potential pests to new environments, also serves to upset the delicate balance between Homo sapiens and other organisms. There is general scientific agreement that significant global warming will take place over the next 50 years and this will have both local and regional impacts on the spread of diseases. The concomitant climate changes could result in many dry areas receiving excess rainfall and currently damp regions becoming deserts. Aside from causing major dislocations in agricultural production, these environmental changes can give at least a temporary advantage to resident microbes. The recent fatal outbreak of hanta-virus in the desert

Southwest of the United States was likely triggered by unusually heavy rainfall, which facilitated greater reproduction among the rodents that carry the virus.

These are not the only threats projected climate changes present to human well-being. Warming will directly affect the aged and infirm with heat-related maladies, and in addition tropical pests and diseases might well migrate north into previously more temperate territory. Recent episodes of warm summers and winters in the United States have been correlated with the migration of so-called killer bees into areas that previously were thought to be too cold for their survival. And there are fears that tropical yellow fever might soon make inroads into the United States.

Future atmospheric changes might have additional impacts on the humankind-microbe balance. Carbon dioxide buildup, rising temperatures, and thinning of the ozone layer with related increases in ultraviolet radiation reaching the Earth's surface could affect human health directly through increased incidence of cancer and other diseases and might also accelerate mutations among microorganisms.

The Dark Side of Technology

Technological innovation is obviously a major factor affecting the coevolution of human populations and microorganisms. Innovations in medicine have perhaps given a false impression that it is simply a matter of time before "stubborn" maladies such as AIDS and cancer yield to medical treatment. Both have appeared to be remarkably resistant to new technologies and there still seem to be no imminent cures for a host of other viruses ranging from the common cold to Ebola-type viruses.

Innovations in other areas, however, are dramatically changing the environments within which microbes can spread. Aircraft cabins, for example, are an excellent place for a rendezvous with cosmopolitan world-traveling viruses and bacteria. A packed 747 flight from New York to Seoul exposes dried sinuses to 14 hours of assaults from the maladies carried by other passengers. The world's airports are also a popular spot for encounters with traveling microbes. Even subway systems can be excellent incubators, spreading colds and flu from one hapless victim to another.

Infectious diseases are potentially the largest threat to human security lurking in the post-Cold War world.

The fact is that technological innovations really have created a global village through which people and products are moving rapidly 24 hours each day. Thus, diseases such as the "Hong Kong" flu or the "Seoul" virus might originate in geographically remote locations, but spread very quickly to the rest of the world. And people in Hong Kong or Seoul might be much less affected by such diseases than people who have much less evolutionary experience with these viruses.

Rapid large-scale movement of people and products has created a host of global hitchhikers—viruses, bacteria, and pests—that sneak rides into new environments. At the viral end of the scale, Seoul virus (hemorrhagic fever) has appeared in Baltimore. What is the mechanism by which this cultural exchange has taken place? Apparently the virus has been transported by the proverbial wharf rats boarding cargo ships in Korea and settling in Baltimore upon disembarkation.

At the other end of the scale, larger migrant organisms have for some time been transforming the environment in the United States. The Great Lakes and many related rivers and streams have been afflicted by zebra mussels, which have hitchhiked from Europe in ballast water in cargo ships. The mussels are doing billions of dollars of damage as they clog water intakes and disrupt aquatic ecosystems with their rapid growth rates and voracious appetites.[6] Dozens of other migrants, ranging from Dutch elm disease to California's "superbugs" (Bemisia tabaci) have had a great impact when transplanted into novel environments.

Mass production and distribution of food is another technological change that may well be a double-edged sword. People no longer take trips to the countryside to buy milk and eggs but now get such supplies from the neighborhood supermarket. Agricultural products are increasingly coming from megafarms via food factories. And people are eating less frequently at home and more often at fast food emporiums. Not surprisingly, there have recently been two large-scale (and many minor) outbreaks of disease from bacterial food contamination in the United States. Contaminated fast food hamburgers in the Northwest and ice-cream from Wisconsin were responsible for nasty and widespread outbreaks of an influenza-like illness. Greater reliance on mass production and distribution systems means a greater risk of future large-scale food disasters.

Even innovations intended to control diseases can rebound with detrimental effects. A flood of antibiotics has reshaped the microbial world in both positive and negative ways. Slow mutations of viruses and bacteria are part of the evolutionary process. But indiscriminate or careless use of antibiotics is changing the nature of bacterial threats and developing resistant bacterial strains. Needless prescriptions for antibiotics, failure to complete prescribed doses, or even the introduction of antibiotics into animal feed can have a significant impact on the direction of mutations and development of drug resistance.

The dynamics of drug resistance are easy to understand. Suppose that widespread use of tetracycline results in a "kill rate" for the targeted bacteria in excess of 99 percent. The minuscule portion that survives is likely to possess characteristics that make it resistant to the antibiotic. Over hundreds of generations of rapid reproduction the resistant strains soon crowd out those that can be cured with tetracycline. There are now unfortunately many bacteria, and even viruses, that are becoming drug-resistant. One of the first obvious cases of drug resistance was found in a strain of gonorrhea that emerged in the Philippines. Only one drug is now left that can treat the disease. There is a lengthening list of bacteria, such as staphylococcus, pneumonia, streptococcus, tuberculosis, and dysentery, as well as many viruses, that are becoming drug resistant.

Additional fragmentary evidence suggests that viruses and bacteria are "smarter" than commonly thought. Not that they plan strategic offensives against potential victims, but it appears that some of these microbes may have greater flexibility in their responses. In other words, they may be able to adapt to different situations without solely relying on differential reproduction. There are very few studies of this phenomenon, but the emergence of more adaptable organisms could mean that future drug manufacturers will be shooting at more rapidly moving targets. The AIDS virus may be one of these more versatile organisms that mutate frequently and adapt to new situations. It seems to be developing considerable resistance to AZT and other compounds used to treat it.

Remedies and Prescriptions

Developing an adequate understanding of the link between human activities and the threat of future plagues is obviously a first step in beginning to deal with the problem. Infectious diseases are potentially the largest threat to human security lurking in the post-Cold War world. Internationally, more than a half billion people are now infected with tropical diseases. There are approximately 270 million people with malaria, 200 million people with schistosomiasis, and 90 million people with lymphatic filariasis. Recently nearly 20 million people a year have been dying from infectious diseases, including 6.9 million from acute respiratory infections, 4.2 million from diarrheal diseases, and 3.3 million from tuberculosis. The AIDS epidemic has rapidly spread and there are now about 5 million full-blown cases worldwide, an increasing number of them in poverty-stricken countries.

It is useful to think of these infections and deaths in military terms. The infected are analogous to wounded and the dead to battlefield casualties. If all of the casualties of military combat in this decade, both international and domestic, are added together, their numbers do not begin to approach the annual toll from infectious diseases. Yet, with the exception of remedial programs like Medicare and Medicaid in the United States, global public expenditures on the war against disease are a pittance compared to military expenditures. This is not to argue that the Pentagon's budget should be devoted entirely to medical research. The world is still a heavily armed place. But diversion of funds from just one B-2 bomber could have a major impact on research on new diseases.

Emerging from the Cold-War era, it is understandably difficult to reprogram security thinking to take account of non-military threats. But a new focus that included microsecurity issues could lead to interesting cost-benefit thinking. Take the case of U.S. intervention in Haiti as an example. A very costly military operation saved perhaps a few hundred lives. But think what could have been done if the same amount of funding had been used to fight malnutrition and infectious diseases there.

Winning the war against new and reemerging infectious diseases requires both long-term and immediate changes. Educating people to think about this struggle with microbes in an evolutionary way is the ultimate solution.[7] But this can be accomplished only across decades of educational efforts. In the short term, policymakers need to understand the potential seriousness of the problem and reallocate resources accordingly. But it is extremely difficult to convince members of Congress that unseen microorganisms represent a serious threat to human well-being, particularly during times of massive budget cuts.

The good news is that the public health community and several professional associations are now very much aware of the problem. A significant report on emerging and reemerging infectious diseases has been drafted by a sizable governmental interagency working group and will soon be released. But the bad news is that the organizations established to deal with infectious diseases, such as the World Health Organization and the Centers for Disease Control and Prevention, have woefully inadequate funding for future emergencies. As recently as 1993 the World Health Organization reportedly had only $25,000 in its annual budget for emergency response to viral outbreaks. The tough economic times that governments and international organizations are now facing are an integral part of the disease problem and a significant rethinking of missions and funding is clearly long overdue. ❑

Endnotes

1. Among the bestsellers are Richard Preston, *The Hot Zone* (New York, NY: Random House, 1994); and, Laurie Garrett, *The Coming Plague: Newly Emerging Diseases in a World Out of Balance* (New York, NY: Farrar, Straus, and Giroux, 1994). The former is more

sensational and easy-reading while the latter gives much more extensive and scholarly coverage to the topic.

2. See, William H. McNeill, *Plagues and Peoples* (New York, NY: Doubleday, 1976); and, Frederick F. Cartwright, *Disease and History* (New York, NY: Thomas Y. Crowell, 1972).

3. See, Alfred Crosby, *America's Forgotten Pandemic: The Influenza of 1918* (Cambridge: Cambridge University Press, 1990).

4. See, Theodore Rosebury, *Microbes and Morals* (New York, NY: Viking Press, 1971).

5. Mitchell L. Cohen, "Epidemiology of Drug Resistance: Implications for a Post-Antimicrobial Era," *Science* 257 (21 August 1992): 1053.

6. "Zebra Mussel Invasion Threatens U.S. Waters," *Science* 249 (September 1990); See "Biological Immigrants Under Fire," *Science* 254 (6 December 1991).

7. A good example of this kind of thinking is found in Marc Lappe, *Evolutionary Medecine: Rethinking the Origins of Disease* (San Francisco, Calif.: Sierra Club Books, 1994).

Overseas Contamination: An Open Sore in the Pentagon's Improving Environmental Record

by Lenny Siegel

Back in the 1960s, my friends and I joked, "Join the world, see the Army!" Indeed, there is scarcely a region in the world, outside of the former "Communist Bloc," where the U.S. has not maintained a military presence. Even during the relatively peaceful 1980s, there were about half a million U.S. troops stationed abroad at nearly 400 installations in 36 countries.

U.S. troop deployments have repeatedly engendered controversy, not only over their military and political actions, but also over their interaction with host populations. The recent rape, by U.S. troops, of an Okinawan girl is one of a long line of incidents.

However, with the end of the Cold War, the U.S. is pulling back on many fronts. From 1990 to 1993, the U.S. closed about half of its foreign bases, reducing foreign troop strength by 220,000, eliminating 20,000 U.S. civilian positions abroad, and laying off 41,000 local nationals.[1] By far the largest reduction has been in Germany. The bases in the Philippines were closed in 1992, after the Philippine Senate voted against a proposed bases treaty with the U.S. And in Panama, the U.S. is midway through a pull-out which is scheduled to be completed by the year 2000.

Base closures abroad, like similar shutdowns in the U.S., create controversies of their own. The most persistent conflict, at most locations, concerns the industrial hazardous wastes and unexploded munitions that the U.S. leaves behind.

By now the problem should be a surprise to no one. Domestically—including U.S. island territories such as Guam and Puerto Rico—the Pentagon identified at least 25,000 potential contamination sites at 4,000 active, closing, and former properties. Since the armed services used the same materials and technologies and followed the same practices abroad as at home, the damage offshore is similar.[2]

There are major differences, however. Domestic bases are now required to follow U.S. laws and heed the regulatory authority of the U.S. EPA and its state counterparts. Clean-up at domestic bases is directly funded by Congress. While it is becoming hard for clean-up programs at active bases to compete with "readiness" in a smaller Defense budget, the Republican Congress actually increased (above the President's request) funding for environmental restoration at closing domestic bases this year (fiscal year 1996).

Within the U.S., the Defense Department has significantly improved its reputation over the past few years, from the nation's largest polluter to a leader in the development of partnerships, the implementation of innovative technologies, and the establishment of genuine two-way communications with host communities. Each year, the DOD publishes a detailed list of its contaminated facilities within the U.S., along with data on anticipated clean-up spending at each. For closing bases and many of the most contaminated facilities—at more than 200 locations—DOD has brought in representatives of local communities to help oversee environmental restoration through Restoration Advisory Boards.

Abroad, however, there are no advisory boards. In many countries, there is no external regulation. And

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Lenny Siegel is the Director of CAREER/PRO, a project of San Francisco State University's San Francisco Urban Institute, and the Pacific Studies Center, in Mountain View, California.

there is rarely any official information. In fact, a January 1991 General Accounting Office report on the subject was classified secret, reportedly at the insistence of the Department of State. When the report finally emerged, the names of the countries and installations were deleted.[3] However, since it's often hard to hide contamination, the truth, in many cases, has literally leaked out. Here are a few examples:

- In 1992, U.S. Air Force officials in Europe reported it would cost $423 million to restore three Air Force bases in Germany, Rhein-Main, Bitburg, and Ramstein.[4] Judging from similar bases in the U.S., that was by far a low-ball estimate.

- In Iceland, ground water beneath a former U.S. radar tracking station is extremely contaminated. Despite repeated attempts, the current landowners cannot ever get a day in court.[5]

- At Subic Bay in the Philippines, "Lead and other heavy metals from the ship repair facility's sandblasting site drain directly into the bay or are buried in the landfill. Neither procedure complies with U.S. standards, which require that lead and heavy metals be handled and disposed of as hazardous waste."[6]

- In Panama, U.S. forces have used the New Empire (Nuevo Emperador) bombing range since at least World War II. "In some cases, live munitions have been picked up by children playing or by adults looking for metal to recycle, leading to explosions and injuries, even death."[7]

The official position of the U.S. government is that it is not generally obligated to clean up hazardous wastes at foreign military bases unless there is an "imminent and substantial endangerment to human health and safety."[8] In fact, only when it is obligated by treaty or a "Status of Forces Agreement" does it take action against other hazardous wastes.[9] In no foreign country, however, has the Pentagon systematically identified contamination sites, as it has within the U.S. and its territories.

This view is not limited to the executive branch. In 1992, liberal Democratic Congresswoman Pat Schroeder (D-Colorado) proposed legislation that would have shifted the clean-up burden to the host country. She felt that U.S. funds were needed more at domestic bases, such as the extremely polluted Rocky Mountain Arsenal in her home town.

To some degree, these environmental nationalists were reacting to the fact that the real victors in the Cold War were the defeated axis powers of World War II, Japan and Germany. They not only benefited from the security that U.S. occupation brought, but from the dollars spent in both countries, particularly in the two or three decades after the war. Paying for clean-up, they believed, would just be one more subsidy.

In Panama, the Philippines, and elsewhere, the U.S. military presence has produced limited benefits. For this reason, in both Panama and the Philippines, there are active movements to hold the U.S. accountable for its pollution. Unfortunately, the U.S. reaction remains decidedly shortsighted.

In the Philippines, President Ramos directly raised the issue of base clean-up with President Clinton when the latter visited Manila in November, 1994. Ramos told reporters that Clinton had promised to share environmental expertise and technical information, but thus far, nothing has happened.

In Panama, the U.S. is committed by treaty to clean up wastes "as far as practicable," but continues to argue that there is nothing it can do about the unexploded munitions that litter or lie beneath the surface of several impact ranges and exercise areas.

Particularly in poor countries, the U.S. should reverse its position. As in the U.S., the polluter should pay. The U.S. may have paid hundreds of millions of dollars of rent to these countries, but more often than not the money did not help the people who are left to cope with the contamination. In fact, it probably ended up in the foreign bank accounts of leaders like Ferdinand Marcos and Manuel Noriega. Not only is the U.S. policy unfair, but it heightens anti-American feeling in countries already smarting from U.S. political and cultural domination. Furthermore, the U.S. failure to accept its international environmental responsibilities will only make it more difficult to get Third World nations to protect the ozone layer, prevent global warning, or conserve shared fish resources.

It might cost several billion dollars, but in the long run promising to restore foreign bases is a sound investment. I envision a three step commitment:

1. The U.S. should identify contamination that its forces created. As in the U.S., this means full disclosure of existing records, the interviewing of base workers and troops that served at the bases, and active sampling. Ideally, the U.S. would establish overseas the same type of Restoration Advisory Boards that it has created in the U.S., so that the affected communities are not only made aware of contamination, health risks, and clean-up activity, but also have an opportunity to help determine standards, remedies, and priorities.

2. The U.S. should build the regulatory capacity of host governments. In some countries, this means fundamental technical training. In others, it merely means teaching academic scientists how to oversee site characterization and clean-up. There is already a good model for this program. The Administration for Na-

tive Americans provides grants—using money transferred from the Defense budget for this purpose—to sovereign Indian and Native Alaskan nations within our borders. This form of technical assiatance should bear fruit long after the bases are cleaned up.

3. The U.S. should promote partnerships in which American environmental technology companies work with local enterprises and workers to do the actual investigation and remediation. U.S. remediation contractors need a larger market. Foreign firms need to learn how to do work which, if their economies improve, will be in great demand. Programs at closing bases in the U.S. have shown that it is possible for both outside firms and local interests to benefit at the same time. At the closing Mare Island Naval Shipyard, in Vallejo, California, for example, the Navy has "retained and retrained" base workers to do clean-up in coordination with its environmental clean-up contractor. At Ford Ord, in Monterey County, California, the Army's prime remediation contractor is now subcontracting out about a quarter of its work to local businesses.

I don't oppose negotiating with countries that have become rich through American military presence, but that negotiation should deal only with the issue of who pays. Clean-up, as in the U.S., should be based upon the need to protect public health, restore the environment, and rebuild local economies hurt by the end of the Cold War.

Finally, a successful international military clean-up program can be used elsewhere as a model for global environmental cooperation, technology transfer, and diplomatic success. If international mechanisms for cost-sharing can be established, then the removal of land mines from battlefields on virtually every continent or the clean-up of base contamination left by other great powers—particularly the former Soviet Union—can and should be targeted with the same model. Perhaps the race to clean up after the Cold War—and all its little hot wars—will turn out to be as important to our national security as the Cold War itself.

Endnotes

1."More U.S. Overseas Bases to End Operations," News Release, Office of the Assistant Secretary of Defense, Public Affairs, 1 July 1993.

2. Since most foreign bases are operational (such as airfields) rather than industrial (such as aircraft overhaul complexes), a greater share of the foreign contamination consists of fuel, as opposed to paints, solvents, and plating wastes.

3. The cover letter explained, "This is an unclassified version of our classified report. We have deleted all references to specific organizations that generate hazardous waste during their operations, names of installations and countries where they are located, and all photographs." "Hazardous Waste: Management Problems Continue at Overseas Military Bases," General Accounting Office (GAO/NSIAD-91-231, August, 1991): 1.

4. Michael Satchell, "The Mess We've Left Behind," *U.S. News & World Report* (30 November 1992): 30.

5. See,"Iceland Uncovers U.S. Wastes," *World Water and Environmental Engineer* (June 1992): 8.

6. "Military Base Closures: U.S. Financial Obligations in the Philippines," U.S. General Accounting Office (GAO/NSIAD-92-51, January 1992): 27.

7. "Economic Conversion of U.S. Military Bases in Panama." Report of the Fellowship of Reconciliation Dialogue Delegation (11-12 December 1993): 12.

8. Deputy Secretary of Defense John F. White, "Environmental Remediation Policy for DOD Activities Overseas," Memorandum for Secretaries of the Military Department (18 October 1995).

9. The Status of Forces Agreement with Germany has an environmental clause that "makes the German government responsible for 25% of the cost for any clean-up and mandates that any contract for clean-up be given to a German firm." Sharon Weiner, "Environmental Concerns at U.S. Overseas Military Installations," MIT Defense and Arms Control Studies ProgramWorking Paper (July 1992): 25.

An Action Plan for Population, Development and the Environment

by Alene H. Gelbard

The world is currently experiencing the most rapid population increases in history. Scientists and policymakers alike are concerned about the impact of this growth and of current resource consumption patterns on the environment and the quality of life now and in the future. While research findings do not consistently substantiate this concern, they do indicate that population growth and resource consumption patterns are important factors linked to environmental degradation and environmental security.

In 1994, the world community met to address these global issues and defined a set of actions that received the broadest consensus ever achieved about the nature of these issues and what to do about them. The resulting program of action of the *International Conference on Population and Development (ICPD)* makes clear that there is no single solution that will address current challenges of population growth, development and environmental degradation for all countries, but identifies a set of actions that each country can draw upon to help it achieve its own path to sustainable development.

World Population Trends, Development and The Environment

About 88 million people are added each year to the world's population, which now totals 5.7 billion. This is the largest annual increase in numbers of people that the world has ever seen. These increases are occurring even though the global *rate* of population growth has been declining since the late 1960s, due to dramatic declines in birth rates that followed earlier declines in death rates. The increases result from the relatively young age structures of most developing countries. Although women are having fewer children today than their mothers had, there are more women and men entering the childbearing years.

Population experts do not expect to see such large annual increases in absolute numbers again, though the world's population will continue to grow. Most of this growth will take place in developing countries, where 95% of current population growth is taking place. Populations will become older and increasingly concentrated in urban areas as well (Lutz, 1994).

How much world population will continue to grow and how fast depends largely upon future trends and levels of childbearing. These in turn are influenced by three factors: the degree to which individuals and couples can realize their goals for the number of children they choose to have and when to have them; the extent to which family size preferences exceed "replacement level" fertility, i.e. about two children per couple; and the age at which most women begin childbearing in combination with the spacing of their children. Early childbearing is a major factor contributing to the pace and magnitude of future population growth (Bongaarts, 1994).

The potential impact of this growth on the environment is of concern to many, but not all, scientists. Similarly, the contribution of rapid population growth to conflicts over valuable natural resources is of increasing concern to many, but not all, foreign policy experts. Disagreement over whether we should be concerned about

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Alene H. Gelbard is the Director of International Programs at the Population Reference Bureau. She participated in the 1994 International Conference on Population and Development in Cairo, and was a member of the UN delegation to the 1995 World Summit for Social Development and the Fourth World Conference on Women held in Beijing.

the impact of population growth on development and the environment stems from the complexity of the relationships and the mixed research findings about the nature of the relationships.

Although more recent research findings are still not conclusive about how population, environmental change and global security interact, they have led to more specific conclusions about the conditions under which population growth can have a detrimental effect on development. There is little dispute that at both the macro and micro level, rapid population growth hinders the ability of poor countries and poor families to advance economically and improve their standards of living (NAS, 1986, Cassen, 1994, World Bank, 1994).

There is less understanding and agreement about how population, development and the environment interact. Scientists disagree about the optimal population size that can be sustained on earth, i.e. the earth's "carrying capacity." In 1994, estimates of sustainable population ranged from less than 3 billion to over 44 billion, depending on assumptions about the kind of life to be sustained, among others (Cohen, 1996). Despite these differences, most scientists agree that both population (its size, composition and distribution) and the nature of resource consumption are important to sustainable development.

In 1993, national academies of science from 58 countries called upon governments worldwide to "take incisive action now and to adopt an integrated policy on population and sustainable development on a global scale" (NAS, 1994). This appeal was based on the academies' concern that while all countries can legitimately expect a higher quality of life, this is not possible under current trends of population growth and resource use.

The appeal of the national science academies was made in anticipation of the 1994 UN International Conference on Population and Development (ICPD) held in Cairo, Egypt. The academies called for actions to reduce fertility (i.e. the average number of children per woman) and raise the quality of life through increased access to family planning and other reproductive health services, increased equality between men and women in their sexual, social and economic life and development policies that address basic health and education needs (NAS, 1994). "The adoption of a smaller family norm, with consequent decline in total fertility.... means that children are born by choice, not by chance, and that births are better planned; and it means that families are able to invest relatively more in a smaller number of...children, trying to prepare them for a better future" (ibid.).

The academies also called upon industrialized and developing countries alike to incorporate environmental goals into legislative and development planning. Observing that the wealth and technological advances of industrialized countries give them both greater opportunities and responsibilities to address environmental problems worldwide, the academies called upon developed countries to become more efficient in resource use and environmental protection and to reject wasteful consumption. The appeals of the academies were consistent with the concerns of many governments and nongovernmental organizations from around the world, and the program of action adopted at the conference reflected these common concerns.

An Action Plan

The ICPD program of action represents the broadest consensus ever achieved on population and development, both in terms of the definition of the issues and what to do about them. Over 180 countries agreed to a set of actions for the next twenty years to stabilize global population growth and achieve sustainable development.

A number of factors contributed to this consensus. Among them was the willingness of industrialized countries to acknowledge that their own resource consumption and production patterns have a major impact on global human welfare and sustainable development. Another was the recognition that investing in human development with a focus on empowering women is key to achieving both population stabilization and economic development. The consensus put family planning into the broader context of health, especially reproductive health, as a means to achieve sustainable development rather than as a means to simply reduce population growth. The active participation of nongovernmental organizations throughout the three year preparatory process and during the conference itself helped to ensure that the interests and needs felt at local levels were incorporated into the conference deliberations and subsequent recommendations.

The conference called upon governments and the private sector to:

- promote greater equality between men and women and promote fuller participation of women in development;
- eliminate unsustainable production and consumption patterns; develop and integrate population policies into social and economic development;
- move toward poverty eradication; provide universal access to reproductive health care, including family planning;
- improve infant and child health;
- achieve universal access to education with special emphasis on closing the gap between boys and girls;
- address the special education and health needs of

adolescents regarding their sexuality and reproduction; and
- promote greater male involvement in the family (Ashford, 1995).

The program of action highlighted five specific quantifiable goals to be achieved by the year 2015: universal access to reproductive health including family planning; reductions in infant and child health; reductions in maternal mortality (deaths related to childbearing); increases in life expectancy; and universal access to education (ibid.).

In addressing population, development and environmental links explicitly, the program of action calls upon governments to integrate demographic variables into sustainable development policies, plans and programs, environment impact assessments and sustainable resource management efforts. It calls for changes in unsustainable consumption and production patterns through legislative, economic and administrative measures. It calls for full participation of relevant groups, especially women, in population and environmental decision-making (UN, 1994, 1995).

The ICPD consensus was remarkable in that it was supported by so many delegations with such diverse cultural, religious and political backgrounds. Even delegations that took issue with some of its content, such as the Vatican, agreed to the overall program of action. And although elements of the consensus continued to be challenged at subsequent world conferences, e.g., the World Summit on Social Development (WSSD) held in Copenhagen, Denmark in March 1995 and the Fourth World Conference on Women (FWCW) held in Beijing, China in September 1995, the key components of the ICPD program of action were sustained.

Challenges to Implementing the ICPD Program of Action

The challenge now is to implement the program of action; a little more than a year after the conference, this is proving to be a formidable challenge. The current political and financial situation in the United States illustrates the various arenas in which the ICPD program of action can be challenged at the national level.

Part of the challenge of implementing actions to address global and national population issues is getting people to pay attention to them. Population changes are slow-moving. They are rarely seen in the short-term, the time frame of most policymakers. Environmental issues face similar challenges. Both are hard to appreciate unless individuals and communities feel the impact of these changes directly.

Another challenge is the contentious nature of some of the key elements of the program of action. The recommendations supported in Cairo were not endorsed by all U.S. groups that participated, and since the Cairo meeting, groups that did not support the consensus have been committed to blocking its implementation in specific areas. Reproductive health is a case in point. The ICPD program of action includes a range of services in its definition of "reproductive health" services: prenatal and postnatal care, medical attention at birth, services to prevent and treat sexually transmitted diseases (STDs), and cancer detection. It also calls for safe abortion services where they are already legal. It explicitly states that "in no case should abortion be promoted as a method of family planning." However, many who oppose abortion were not in agreement with this language (the Vatican and some countries expressed formal reservations over this language while agreeing to the overall program of action). Antiabortion groups in the United States have been active politically since the Conference to restrict allocation of U.S. funds for international population programs that they charge will support abortion internationally.

Population changes are slow-moving. They are rarely seen in the short-term, the time frame of most policymakers.

The increasing numbers of people to be served by the reproductive health programs called for in the ICPD agenda require increasingly larger financial commitments by governments and the international donor community. In addition, the range of actions to address population stabilization called for in the ICPD program of action is now much broader. Two-thirds of the resources to implement the ICPD program of action are expected to come from developing countries. The remainder is to be provided by donor countries and international donor organizations. Neither developing countries nor donors will easily find the resources to meet the resource needs.

In the United States, the international population program of the U.S. Agency for International Development (USAID) faces serious challenges from Congress. Many members are hostile both to family planning programs and USAID's overall programs in a time of shrinking resources for many government programs. Congress recently singled out international population/reproductive health/family planning programs for particularly dramatic budgets cuts and spending restrictions. The combination will result in a drop in new funding from $547 million in 1995 to $72 million in 1996 (PRB, 1996). Both the hostility and financial constraints put pressure on USAID's population program from outside as well as within the Agency, as all programs compete for fewer resources. This at a time when demand for these resources internationally

is steadily increasing.

The processes needed to carry out the recommendations of the ICPD program of action pose additional challenges. The program of action calls for new partnerships between governments and the private sector, especially nongovernmental organizations. This will be a challenge for both. It calls for greater involvement on the part of recipients of program services, e.g., women at the local community level, in the design, implementation and evaluation of efforts. Many governments and donor institutions, e.g., the United States and the Development Assistance Committee (DAC) of the Organization for Economic Cooperation and Development (OECD) to name two, have made commitments to engage local communities and organizations in the formulation, implementation and evaluation of development programs. They have defined steps such as "legal literacy" and efforts to strengthen local administrative and management capabilities, but the actual transfer of responsibility and authority to the local level will pose one of the most significant challenges for both national governments and international agencies and for organizations at the receiving end.

Neither individual countries nor donors will be able to overcome all of these constraints to implementation at the same time, but the range of choices included in the action plan make it a powerful tool to help each country select the most appropriate mix. In the United States, for example, some of the key areas of domestic concern include resource consumption patterns and teen pregnancy and childbearing (which is the highest in the industrialized world). Sustaining an adequate level of funding to maintain our leadership role in helping developing countries advance toward sustainable development through population stabilization and economic development is of major concern to our donor partners and recipients of development assistance alike.

Efforts by all those with a stake in these issues will be needed to maintain the consensus achieved a little over a year ago and move it forward in the face of changing political, social, economic and environmental conditions. This can be done if the scientific community, nongovernmental organizations, government agencies and others dedicated to the specific goals set forth at the ICPD keep a firm hold on the vision that helped over 180 delegations reach such an unprecedented degree of consensus on such difficult global issues; improving the quality of life for all of humanity to achieve and maintain sustainable peace and security. ❑

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National Security, the Environment and DOD

by Kent Butts

In recent years there has been a growing interest in the impact of environmental change on national security. Nevertheless, controversy exists concerning the term environmental security. Much recent literature on environmental security criticizes the term either because it undermines the traditional view that national security refers primarily to military threats against a nation, or because it is rooted in the nation-state paradigm and fails to seek solutions at the global security level. This paper suggests that these criticisms are rooted in the way things were and not the way things are today. The term environmental security reflects the national policy maker's view of current threats to U.S. security. This paper also posits that while global security mechanisms *are* a desirable outcome, pursuing them to the exclusion of short-term state-centric options for addressing environmental problems is short-sighted. This essay therefore advocates using the established U.S. interagency-based national security system, in partnership with other states, international organizations and private industry, to address environmental problems, which the system already recognizes as security threats (NSS 1991, 1993, 1994). Because the Department of Defense (DOD) is one of the key elements of national power traditionally used to address security issues, it is appropriate that DOD address the current threats posed to national security by environmental change. It is time to accept this established concept, operationalize it, and demonstrate that it can bring positive results before domestic public support for international affairs further erodes.

Trends

Today's security environment is arguably less stable and predictable than that of the Cold War era. Previously constrained national, ideological, ethnic, and religious variables now create regional instability that threatens U.S. and global security interests. In examining this phenomenon, the late Secretary of Defense, Les Aspin, identified four dangers to U.S. national security interests that would defy easy management in the decade ahead: regional instability, nuclear proliferation, dangers to democracy, and threats to our economy (Aspin 1993). Events in the Middle East, Haiti, and Somalia underscore Aspin's predictions and challenge policy makers to establish means of cooperation that would foster remediation of these destabilizing problems. Overpopulation, resource scarcity and failed agricultural practices constrain the economies of newly democratic regional regimes, resulting in major refugee migrations across national borders and promoting tensions that may encourage the acquisition of weapons of mass destruction.

In spite of the Nuclear Nonproliferation Treaty and other nonproliferation strategies, nuclear weapons programs have multiplied. Resentment of Western cultural penetration, ethnic, religious and cultural differences, and environmental issues creates tensions which motivate regional states to acquire nuclear and other weapons of mass destruction (WMD). Complicating this is the breakdown of political control in the former Soviet Union, and economic and political chaos in Russia. Poor management of nuclear chemical and biological

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Kent Butts is a Professor of Political Military Strategy at the Center for Strategic Leadership, U.S. Army War College. A former John M. Olin Post Doctoral Fellow in National Security at the Center for International Affairs, Harvard University, he is the War College Environmental Course Professor. The views expressed in this study are those of the author and do not necessarily reflect the official policy or position of the Department of the Army, the Department of Defense, or the U.S. Government. This report is cleared for public release; distribution is unlimited.

weapons production led to widespread environmental degradation, a 1,200 metric ton inventory of bomb grade uranium and over 40,000, difficult to account for nuclear warheads (Broad 1993, Feshbach 1995). These conditions make it difficult to achieve Cooperative Threat Reduction objectives, maintain the necessary WMD safeguards, secure nuclear materials, and provide the economic incentives necessary to discourage weapons acquisition. Add to this the fact that Russia and China openly sell nuclear technology into the politically unstable Middle East and the nuclear danger becomes clear. Strategies for addressing this problem include a supply-side focus, acting to make these materials less available, and taking actions to reduce the regional tensions that motivate their acquisition, many of which are environmental (Gleick 1995).

Regional instability has supplanted the Soviet military threat as the dominant threat to world peace. Many regions of the developing world have artificial political borders imposed upon them by agreements largely designed and implemented by outside powers. Local dissatisfaction with these borders, long suppressed by forced client status and super-power influence during the Cold War, has already led to conflict involving U.S. forces. Borders that divide national groups give rise to ethnic tensions that complicate the efforts of any government, totalitarian or democratic, to maintain its legitimacy. The spread of democracy to these countries forfeits oppressive government options for controlling popular discontent and amplifies the possibility of governmental change. These regional tensions are often exacerbated by a scarcity of natural resources (water, fuel, arable land) and ecological degradation resulting from failed agricultural and economic policies. The demands on these governments will only become worse with the increased demands of a burgeoning world population, expected to escalate from 5.6 billion today to an estimated 8 billion by the year 2025. The potential for further regional conflicts looms large. It is a far less expensive and a more sound policy to actively engage in programs which address the underlying causes of regional tensions, than to send U.S. forces to prevent conflicts.

The global economy has become increasingly interdependent. More than ever before, the U.S. economy depends upon natural resource and industrial component imports, and access to foreign markets. Today's communications technology, the rationalization of industrial production, and the growth of multinational corporations has multiplied information and materials flows across borders to bind distant areas of the globe into functional regions and create new levels of economic interdependence. As Keohane and Nye made clear in their definitive work on the subject, when states are involved in economically interdependent relationships with other states, then they are vulnerable to decisions made by these states, particularly when such relationships are asymmetrical (Keohane and Nye, 1977). For example, the dependence of the industrialized countries on the conventional Middle East oil reserves makes Arab and Israeli political decisions extremely important to industrialized countries.

Moreover, population increases are making economic growth more important for developing countries, whose expanding market economies could create demand for U.S. exports. Recognizing the importance of growing regional trade to U.S. economic prosperity, the Clinton Administration has pursued the new GATT agreement, as well as the North American Free Trade Agreement (NAFTA) and the Organization for Asia Pacific Economic Cooperation, in an effort to encourage open trade and the growth of market economies. However, this economic growth is threatened by regional instability, resource tensions and environmental problems that can prevent developing economies from establishing economic viability and deny the U.S. access to new markets. This problem also has a political component.

The survival of newly democratic regimes is linked closely to economic growth. The United States has done much to promote democratization and the growth of democratic reform worldwide. As a result, many governments in the Americas, Central Europe, Asia, and Africa have recently established democratic forms of government. However, democratic regimes must meet the demands placed on them by their constituencies. Meeting these demands provides legitimacy and the continuation of power. The opposite is also true. For many developing states, democracy places a difficult burden on the government, which often faces high population growth rates, widespread illiteracy, and artificial political borders that incorporate multiple national ethnic groups within the state border. Such a population places substantial demands on a newly democratic regime and leaves the government vulnerable to even small dislocations in economic productivity and growth. For these countries, scarce arable land, dependence upon foreign watersheds, severe limits on the availability of firewood or other sources of energy, and other environmental problems can topple governments. The re-

Because the Department of Defense is one of the key elements of national power traditionally used to address security issues, it is appropriate that DOD address the current threats posed to national security by environmental change.

gimes of these countries must find immediate solutions to environmental problems that could limit economic growth, promote internal and external tensions and reduce their ability to meet systemic demands. Environmental change makes policy management of these four dangers more complicated and threatens U.S. national security interests.

The National Security Strategy

The United States needs a national security strategy in order to function in such an uncertain global environment. This strategy should define national interests, the objectives necessary to achieve those interests, and the means or resources with which they are to be pursued. In 1986, the Goldwater/Nichols Department of Defense Reorganization Act amended the National Security Act of 1947 to ensure just such a strategy. As required by Goldwater/Nichols, the President transmits to the Congress a comprehensive annual report that defines the U.S. national security strategy, as well as the global interests, goals and objectives vital to U.S. security (DOD Reorganization Act 1986). This National Security Strategy (NSS) must also define the U.S. foreign policy, global commitments, and defense capabilities necessary to implement the NSS. Also required are proposed short and long-term uses of the various elements of national power (political, economic, military) necessary to protect or further U.S. interests and achieve stated objectives (Jablonsky 1995). The NSS document is intended to be a clear articulation of the elements necessary to ensure the survival of vital U.S. interests, and a strategic vision that allows other nations to understand U.S. priorities.

The NSS drafters do not have the luxury of engaging in theoretical debate; they must produce a pragmatic document that articulates current and long-term U.S. national security interests and a strategy for protecting them in a state-centric world of weak international organizations with questionable enforcement mechanisms, and multiple and dynamic threats. During the Cold War, the National Security Strategy documents reflected the primacy of the military threat from the Soviet Union. These documents emphasized military resources and were designed to ensure that strategic nuclear weapons did not destroy the United States. The documents were therefore in consonance with academics who believed that security studies should revolve around the military and its use to deter aggression and defend national territory and interests (Morgenthau 1985, Waltz 1979). With the end of the Cold War however, the National Security Strategies changed to reflect the waning of the strategic nuclear threat and the ascendance of regional, economic, democratic and environmental threats to U.S. interests. Thus, in the 1991 NSS, the focus of U.S. military capabilities became regional conflict, America's economy was recognized as a vital interest, and environmental issues were given credit for being a source of conflict that threatened U.S. interests (NSS 1991). All subsequent National Security Strategy documents have included environmental issues for their importance to U.S. national interests.

Thus the grand strategy of the United States, as articulated by the foremost interagency policy makers, shifted from containing communism to collective engagement at the regional level, and now to engagement and enlargement. It is important to understand that the NSS has made this transition because current and U.S. core values and national interests are now threatened by a *new* set of variables that require a different application of the political, economic, and military elements of national power. These definitive documents clarify any issue articulated in the NSS as threatening U.S. interests is by definition, a national security issue. And by association, issues that threaten U.S. national security are an appropriate focus of the various elements of national power, DOD included. Debates that suggest that security studies and the term national security should only be applied to military threats fail to recognize the transition from a military dominant threat to one of a regional, economic, social, and environmental nature.

The United States has not been alone in recognizing the change in threat to core security interests and the importance of environmental issues. In November 1991, for example, the North Atlantic Treaty Organization (NATO) modified its Strategic Concept and elevated economic, social, ethnic, and environmental problems to major importance as significant new threats to Alliance security. This change reflected in part the threats to European security posed by environmental problems in the former East Bloc, Middle East and Africa. As a result, NATO's missions were changed to include mitigating environmental problems that threaten democracy and political stability (NATO 1991). Given that the leadership of the European Union and the United States has recognized environmental threats to their current security interests and is willing to dedicate the various elements of power to addressing these issues, it is time to move beyond the academic debates and address how best to solve these problems.

Although there has been a transition of grand strategy and national security threats, a transition from the nation state paradigm to a global security paradigm has yet to occur. Perhaps it never will. A state's national security interests are clear, relatively easy to frame, and reflect a definitive culture. Global security interests are more difficult to articulate, as is a global security strategy that could be universally supported. Would for example, the South agree with the North on resource scarcity issues or pollution? What

is the likelihood of Russia or China agreeing to divert resources to environmental cleanup when their economies are struggling, and the success of their economies will determine the future of their transitional regimes? Even the European community with its intentionally interlinked economy, struggles with the surrender of national sovereignty, and a common monetary policy seems beyond reach. The nation-state remains the dominant paradigm, as transnational actors (corporations) realized when their plants were nationalized, and the United Nations is discovering, when its policies diverge from those of its leading members. All too often, globalist concepts and transnational organizations fall victim to complicated domestic political priorities or the appeal of isolationist rhetoric. Indeed, many of the leading candidates for the '96 elections and many members of the U.S. Congress emphasize the domestic agenda to the virtual exclusion of international affairs, and question the value of international organizations (such as the United Nations or NAFTA) and international environmental programs. It *is* desirable to champion the concept of global security and invest, as the Clinton Administration has done, in such critical long-term environmental issues as population growth. However, it also seems logical that one should recognize the current limitations of global security organizations and accept the opportunity which the already established national security system and resources of the world's leading power present. This system has formally recognized the environment as a security issue, and it would be prudent to encourage this system to address current environmental threats in a timely fashion. One of the resources within this system is the Department of Defense.

The military has unique capabilities that allow it to predict, plan for and attend to environmental security problems.

Military Element of Power

Many reasons argue against using military power to address environmental security problems. First, many domestic and foreign military leaders are reluctant to assume non-military roles and missions out of concern for sacrificing operational readiness. Moreover, performing "non-military" missions runs counter to the military culture, which sees its primary function as using military force to defend national interests from military threats. In a different vein, many environmentalists whose support is critical to a military contribution to the environment, have an antipathy for the military, or believe that it represents a state-centric solution when global approaches are more appropriate. And of course, the military has despoiled the environment, through training, combat and more significantly, by producing weapon systems; estimates of U.S. defense sector environmental clean-up costs reach hundreds of billions of dollars.

While there are tradeoffs and risks, it is nevertheless difficult to name any organization with a greater capability to address domestic and international environmental problems than the Department of Defense. With a budget of $250 billion, even a reduced environmental posture in the U.S. Department of Defense provides important resources that may be dedicated to environmental improvement. As Congress demonstrated with the Soviet Nuclear Threat Reduction Act (Nunn-Lugar), the military has unique capabilities that allow it to predict, plan for and attend to environmental security problems. Also, in many countries the military is a substantial asset that is or could be used to address critical environmental problems for which few, if any, monetary resources exist. Functionally and institutionally, it is well-suited for the task.

Although using the military in environmental arenas is sometimes deemed inappropriate because of its requirement for secrecy and intelligence capabilities, these very attributes have been quite valuable in solving global and environmental problems. The scientific community has benefited from the Administration's decision to provide scientists studying diverse and important global issues, such as climatic change, oceanography, and marine and fish stock management, with information from the Naval Oceanographic Data Distribution System (NODDS) and data from the undersea Sound Surveillance System (SOSUS). DOD intelligence assets have also been directed against illegal fishing. To support the moratorium on large-scale drift net fishing, U.S. aircraft, satellites, and ships have been used to detect illegal fishing and provide this data to those responsible for enforcement (Center 1995). Intelligence assets have also played an important role in Non Governmental Organizations' (NGOs) successful efforts to bring food and water to famine and war victims and refugees in Somalia and Rwanda. It is possible to achieve even greater use of DOD intelligence assets for the good of the environment, such as providing data for an environmental crisis monitoring system (in conjunction with other elements of the intelligence community) designed to provide policy makers with early warning of threats to the environment. Such a mechanism would only be successful however, if policy makers task the intelligence community to direct capabilities against these problems.

DOD's logistical, technical, and industrial resources are vast. The technology and organizational skills inherent in these functional areas have been brought to bear with great effectiveness on domestic and international environmental problems. In just five years, DOD reduced its toxic and hazardous waste

disposals by 50 percent. DOD has worked closely with the EPA and Department of Energy to establish a Research and Development (R&D) program that has successfully developed new toxic and hazardous waste clean-up technologies, which have been applied to Superfund sites nationwide. It has also been a leader in developing alternatives to ozone depleting substances in support of the Montreal Protocol. At Norway's request, DOD has entered into a tri-lateral arrangement with Russia and Norway to address Russian nuclear waste management in the Arctic seas. Because of DOD's extensive installation and industrial plant ownership, it has developed management expertise that translates easily to overseas urban and industrial site clean-up and management. Thus, DOD can offer such critical environmental functions as remediation planning, threat management, water resource management, environmental measurement and assessment, management training, environmental education, organizational planning, base restoration, geographic information systems, economic and environmental infrastructure design, planning, and construction, as well as the ability to provide disaster relief.

These skills and capabilities are transferable to developing countries and countries with severe environmental problems through the already existing Military-to-Military Contact Program and the Security Assistance Program. Under the first program DOD has established military-to-military contacts throughout East and Central Europe. Specifically, DOD has sent teams to Estonia and Lithuania to help restore former Russian military bases. This program's managers indicate that in these countries the greatest single need for environmental assistance is the common environmental testing methodology of the Department of Defense (Carson 1994). Providing DOD's environmental assessment technology, technical procedures and management skills through the Military-to-Military Program helps resolve environmental problems and allows struggling democratic regimes to develop economic resources from former military sites. Such visits also promote good will and understanding between former antagonists and may contribute to Partnership for Peace initiatives.

The most comprehensive method to apply DOD resources to regional environmental security objectives is through the joint State Department/DOD Security Assistance Program. In cooperation with the Unified Commanders (CINCS), who have regional responsibilities, Ambassadors, the State Department, U.S. Agency for International Development (USAID), other donor countries and the private sector, this interagency program has been effective in addressing environmental programs, particularly in Africa, where poverty, the chief cause of political instability, is a chronic and widespread phenomenon. Under this program, the U.S. military has been assisting African countries to promote sustainable development and maintain their natural resource base. Nearly 20 countries received military assistance for the diverse environmental activities of fisheries management, game park preservation, wildlife management, anti-poaching programs, water resource management and conservation activities. In addition to providing timely assistance for such current environmental problems as the inability of African littoral states to protect their coastal waters from over-fishing by foreign flag trawlers, the program assists the host government military to develop environmental management capabilities and to become a resource that governments may use to address future environmental problems.

Conclusion

The Department of Defense has substantial technical and managerial resources with which to address environmental security threats. Its effectiveness, however, in addressing these threats could be enhanced if the United States had an environmental security strategy that delineated a desired end-state and clear objectives, and established a plan for coordinating U.S. interagency resources to accomplish these objectives. In the absence of a guiding strategy and resulting synergistic effects, the efforts of the United States are destined to be piecemeal, often ad hoc, and unable to achieve their full potential in addressing immediate as well as long-term environmental threats to national and global security. Although DOD has been unusually proactive and successful in its efforts to address international environmental problems, it need not be the lead agency. If the full power and resources of the interagency process are to be dedicated to this effort, the National Security Council (NSC) must become involved. The NSC should convene an interagency working group, possibly led by State, charged with developing a Presidential Decision Directive (PDD) that would enunciate U.S. environmental security policy. The PDD would direct interagency cooperation among such agencies as EPA, Department of State, DOE, DOD, the National Oceanic and Atmospheric Administration (NOAA) and the intelligence community in developing implementation plans. Moreover, a PDD demon-

The NSC should convene an interagency working group, possibly led by State, charged with developing a Presidential Decision Directive (PDD) that would enunciate U.S. environmental security policy.

strates the highest level policy interest, clarifies responsibilities for all agencies and, therefore, has the best chance of obtaining meaningful funding. The current Administration has done visionary work on global environmental problems and has done so during a time of budgetary constraints, and with lessened public interest in international affairs. However, it is time to address the environmental problems that pose a significant threat to the immediate U.S. security interests of regional stability, economic enlargement, and democratization. Such an effort would be visionary because it recognizes that environmental issues are a common problem in which most states have a vested interest, and the process of addressing these problems may itself be used to establish cooperation and understanding, overcome barriers to communication and promote regional stability. ❑

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From Deep Black to Green? Demystifying the Military Monitoring of the Environment

by Ronald J. Deibert

Over the course of the 20th century, Planet Earth has gradually and with increasing intensity become an object of surveillance, something to be managed, manipulated, and above all, *watched*. This development has come about not so much as the result of a single concerted decision as from the convergence of successive waves of social forces and technological innovations that put into orbit overlapping webs of inward-focused surveillance systems. The first wave can be traced back to the late 19th century, to the shifts in thinking opened up by developments in transportation and communication technologies arising out of the Industrial Revolution. Reflecting on the geopolitical implications of these inventions, theorists such as Halfred Mackinder and Nicholas Spykman were perhaps the first to boost military doctrine and strategic thinking to a planetary level.[1] This wave built momentum through the First and Second World Wars, reaching its apogee during the Cold War with the worldwide competition for global dominance between the two Superpowers that both generated, and was fueled by, technological developments in ballistic missiles and space-based reconnaissance systems.[2]

The next two waves came more or less simultaneously, though reflecting diametrically opposing interests. The application of satellite surveillance systems for commercial purposes was a natural outgrowth of the globalization of production, as was the application of these systems for understanding and controlling the ecological excesses unleashed by that expansion. While corporate executives salivated over LANDSAT and SPOT images of "virgin forests" awaiting cultivation, environmentalists were using the same systems to monitor with consternation the ecological impacts of the clear-cuts left in their wake. So-called "high politics" being what they were during the Cold War, however, commercial and environmental applications of these systems were constrained by political-security barriers.

All three waves have grown in intensity and complexity such that today the earth is blanketed by a dense web of national, regional, and internationally operated military, commercial, and environmental space-based reconnaissance systems. These systems monitor the planet in every conceivable spectral mode, from infra-red to optical to radar, from the macro-perspective down to resolutions measured in the centimetres, from real-time images to 3-D simulations. With a great deal of overlap and increasingly less elbow-room to maneuver (quite literally, when it comes to allocating spots in the geostationary orbit!) it is no surprise that thorny questions and discordances resulting from competing interests and contested visions have emerged, particularly with the confusion engendered by the end of the Cold War. These questions and discordances are defining a new field of inquiry for those interested in global governance, one that is perhaps best capsulated by the terms *the politics of planetary surveillance*.

If we lower our orbit and undertake a high-resolution interpretation of this field, one potentially important discursive landmark can be readily identified: in recent years, a kind of social momentum has gathered strength fueled by a convergence of interests among parts of each of these groups. With the collapse of the Cold War, the

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Ronald J. Deibert is presently the Assistant Director of the Institute of International Relations at the University of British Columbia, specializing in communication technologies and international relations. In July 1996, he will join the Department of Political Science at the University of Toronto as Assistant Professor. *Parts of this paper are based on Ronald J. Deibert,* "The Politics of Planetary Surveillance," *University of British Columbia Working Paper, forthcoming 1996; and Ronald J. Deibert,* "Out of Focus: U.S. Military Satellites and Environmental Rescue," *in* Contested Ground: Security and Conflict in the New Environmental Politics, *eds. Daniel Deudney and Richard Matthew (New York: SUNY Press, 1996).* *My thanks to Allan Castle for providing comments on an earlier draft.*

ensuing corporate restructuring, and the continuing surge of interest in environmental monitoring, the idea of refocusing military satellites to environmental missions has been receiving serious attention, particularly in the United States. Championed by Vice-President Al Gore and underwritten by modest but increasingly significant budget appropriations, the information derived from military surveillance systems is being put to use in the service of environmental rescue.

The roots of this refocusing can be traced back to multiple sources. The gradual broadening of the notion of "security" to incorporate nontraditional threats and issues that occurred during the 1980s and 1990s was important in providing a potential rationale for the cross-over.[3] With high-profile studies pointing to environmental causes of violence, the idea that the military should be engaged in environmental monitoring began to attract serious attention.[4] Of course, the U.S. military had been monitoring agricultural production within the Soviet Union and elsewhere throughout the Cold War. But traditionally this environmental surveillance was undertaken as a function of the military competition. In other words, the "environment" was not considered to be important in its own right, but only insofar as it provided a window on the military capacities of geopolitical foes. Once environmental causes of military conflict were identified, however, a potential new "enemy" was introduced into the security scheme of things. Image analysts accustomed to identifying the latest Soviet submarines would now have to monitor the depletion of fresh water resources in "strategic" areas—though not without a fair bit of grumbling.

With the collapse of the Cold War, a second rationale for refocusing emerged that both complemented and provided a boost to the first. This was the idea that the military was the source of both technologies and expertise that could now, after the Cold War, be used in the service of environmental rescue.[5] The logic of the argument was compellingly tight and had the additional benefit of being attractive to a constellation of different interests. For the environmentalists and peace activists, this was a perfect opportunity not only to gain much-needed help and resources for a problem of existential proportions and global scale, but also a chance finally to grasp in reality what had for so long been merely a quaint couplet in the minds of utopians—a chance to beat "swords into plowshares." For the large aerospace corporations and their employees that had once thrived on a steady stream of Cold War defense contracts, it meant new business and the resurrection of jobs seemingly doomed by the loss of an enemy. For the military, while it wasn't the Gulf War, it *was* a mission, and missions were getting harder to find in a "world of uncertainty." From these multiple sources and interests, then, a symbiotic relationship has emerged, forming the institutional bonds for a post-Cold War military-environmental security complex.

Within this general move to integrate military technologies and expertise in the service of environmental rescue, satellite reconnaissance systems are clearly the centerpiece. Not only do they embody some of the most advanced information technologies available today, but they are a model of dual military / environmental applicability. From a purely technical point of view, the only real difference between military and environmental satellites is in terms of the level of sophistication, so refocusing those satellites to environmental ends requires only a change in mission. Indeed, most of the current environmental satellite technologies are spin-offs from military innovations of the Cold War. The same type of reconnaissance platforms that were developed by the military to distinguish between camouflage and growing vegetation are also used by resource managers to make estimates of crop yields. In this case, then, beating swords into plowshares is as simple as shifting the focus from missile silos to old growth forests.

Despite the intuitive appeal of this logic, however, the actual scope of the refocusing that has occurred has been relatively small. While gathering momentum with each successive year, the deeply pervasive secrecy of U.S. intelligence agencies guarantees that any potential mission adjustments or "outside" intrusions into intelligence activities and priorities are met with a blanket of suspicion and institutional inertia. Until very recently, the most that supporters of this refocusing had been able to acquire was the release of once-secret archived data, such as that gathered by the Air Force's Defense Meteorological Support Program (DMSP), the Navy's Geodesy satellite, or the Corona satellite series. Since military satellites have been gathering information since the early 1960s, the archived data provides environmental researchers with a broader base-line from which to estimate trends in environmental changes. Of course environmentalists are not given full reign to roam through the military's secret archives. Instead, the practice has been that requests are made by environmental researchers to intelligence officials who determine what, if any, information will then be released.

Instead of merely supplying archived data, for the first time spy satellites will be tasked with actively monitoring specific environmental phenomena around the globe.

But in the last year a significant leap forward has occurred, with U.S. intelligence agencies taking a much more active reorientation towards environmental missions. Instead of merely supplying archived

data, for the first time spy satellites will be tasked with *actively monitoring* specific environmental phenomena around the globe. Advised by a group of scientists and environmental experts called Medea, the project will have military satellites initially monitor around two dozen sites, with as many as 500 to be added in the near future.[6] Everything from cloud covers to coastlines to deserts will be put under surveillance at predetermined intervals over a period of a number of years. Significantly, the data that is to be collected will be stored in secret archives and then released to unspecified "future generations" of scientists. Although the project only received $15 million for the first year, it does represent a significant shift in the scope of U.S. intelligence/security activities towards environmental missions. In what is perhaps an overstatement of present realities but an ominous portent, a front page article in the *New York Times* observed summarily that "With the cold war a fading memory, the nation's spy satellites are beginning to turn their attention to nature."[7]

The vast majority view this shift as a natural good thing, a perfect example of the type of swords-into-plowshares development that has for too long been just an idealist mirage. The same *New York Times* article, for example, quoted a member of Medea, Dr. Jeff Dozier, as saying that "In terms of turning swords into plowshares, this is about as good of an example as I can think of."[8] Speaking at an event marking the release of once-secret Corona satellite imagery, Vice-President Al Gore similarly remarked that "Today we have turned the swords of Cold War-era intelligence gathering into plowshares of information that will help us to better understand and analyze our global environment."[9] Such is the type of myth out of which the limits-of-the-possible are framed, path-dependencies forged, and options foreclosed. But are there no risks to this re-orientation? Is it really beneficial from an environmental perspective to have spy satellites turn their attention to nature?

One of the few consistent voices of scepticism against having military institutions involved in environmental rescue has been Daniel Deudney. In a series of articles and monographs, Deudney has presented an incisive critique of what he calls the "muddled thinking" of the environmental-security literature.[10] For Deudney, the central issue is one of compatibility —or better, fundamental incompatibility—between groups committed to protecting or rescuing the environment and groups committed to national security. At one level, according to Deudney, is a problem of mismatch between military "mind-sets" and environmental challenges. National security organizations tend to conceptualize problems and solutions in terms of a zero-sum, "winner-take-all" attitude —a drawing up of sharp boundaries between "us" and "them"— that runs against the grain of the long-term, transnational, ecologically integrated and holistic challenges of environmental degradation. At a more concrete level, however, Deudney also raises concerns about the fundamental organizational mismatch between groups committed to environmental protection and groups committed to national security—a mismatch that in the long term could lead to the "militarization" of the environment and the perpetuation of institutions that ultimately must be transcended to meet the exigencies of global environmental rescue. In Deudney's words:

> Organizations that provide protection from violence differ greatly from those in environmental protection...military organizations are secretive, extremely hierarchical and centralized, and normally deploy vastly expensive, highly specialized and advanced technologies.[11]

Perhaps no better illustration of Deudney's concerns can be found than in the institutions and organizations surrounding U.S. military satellite reconnaissance. Like other parts of the U.S. intelligence complex, the institutions associated with satellite reconnaissance are governed by a deeply pervasive secrecy that informs every aspect of daily routines and operations. In fact, so pervasive is the secrecy that the central organization in charge of satellite reconnaissance, the National Reconnaissance Office (NRO), was not even officially revealed as existing until 1992. As anyone with even a rudimentary knowledge of U.S. military reconnaissance is aware, information about systems and operations is tightly controlled and compartmentalized, blanketed by levels-upon-levels of classification and opaque jargon, such as the vague euphemism "national technical means" to refer to surveillance systems. This deep insecurity and secrecy extends beyond the strict confines of the NRO itself to include the operations of the numerous defense contractors and image processing agencies that orbit the intelligence community and who together form a kind of secret inner sanctum. As William Burrows puts it, "there is a kind of reconnaissance club, an unofficial secret society composed of 'black hats' from the various contractors, military services, and the intelligence agencies and divisions, all of whom carry the appropriate clearances and are scrupulous about remaining in deep shadow."[12]

Such extensive, deeply institutionalized secrecy is precisely the type of organizational characteristic that Deudney finds so potentially troubling when it comes to re-orienting such organizations to environmental missions. To coordinate and assess the complex data needed to understand accurately global ecological changes, openness, objectivity, and interna-

tional cooperation are of paramount importance. Yet the operational ethic of the NRO and the U.S. intelligence establishment is oriented in precisely the opposite direction, with closure, duplicity, and a paranoid distrust of "outsiders" governing everyday practice. Can environmental researchers (especially non-U.S. researchers) be fully confident that the imagery and information offered up by such organizations has not been altered or manipulated for "national security reasons?" What about those cases where there is a significant overlap between imagery intended for environmental purposes and imagery intended for national security and military strategy? Given the rather duplicitous history of U.S. intelligence, such manipulations would not be out of character. It is instructive, in this respect, for environmentalists to consider some of the more recent notorious episodes of deceit involving the NRO, including: its secretly hoarding for many years billions of unexpended funds from Congressional oversight, a deception made possible by the NRO's long-standing argument that its "budget secrecy" was a matter of "national security;"[13] or, its secret construction of a massive $310 million, 1 million square foot luxurious headquarters building in Chantilly, Virginia.[14] After the project's existence was revealed, Senator Patrick Moynihan noted angrily that "This is not the first time such a thing has happened ... nor will it be, I fear, the last .... This is an agency which has lied to Congress before. Egregiously."[15]

Of course, the secretive and duplicitous culture of the NRO and its associated intelligence agencies might not be such a worry for environmentalists if there were enough alternative sources of information, particularly from international and non-governmental organizations. And the rapid expansion of many civilian-run environmentally dedicated monitoring systems around the world provides some very important assurance. But the social momentum that has developed behind this type of re-focusing is leading to a potentially disturbing counter-trend — the gradual merging of "environmental" and "military" reconnaissance systems under one umbrella.

Apart from the refocusing of military satellites described above, this gradual merging stems from two further sources. On the one hand, it is being driven by the military's appetite for imagery and data provided by existing commercial satellite systems, such as LANDSAT and SPOT—a hunger that has often affected the operational priorities of such systems away from environmental to military concerns. Today, commercial providers of satellite imagery routinely cater to clients ranging from civilian and environmental researchers to various national military and intelligence organizations. But the latter are often coveted the most because their requirements typically demand the most sophisticated and expensive imagery.

On the other hand, this merging has also been driven by budgetary considerations and a desire to reduce overlap in the face of funding cutbacks. The Pentagon's involvement in LANDSAT operations is a case in point. Though rationalized as a means to ensure low-cost distribution of satellite imagery to researchers, it signals, according to some observers, the "formal merging of national security and environmental remote sensing activities."[16] An even more ominous example is the $1.4 billion "Amazon Surveillance System" recently purchased by Brazil and to be developed jointly by several large U.S. corporations.[17] The catch-all system—what President Clinton called "a model environmental project"—would monitor everything from borders and airspace to the environment. Could the Amazon Surveillance System, in merging military and environmental missions under one umbrella, be a sign of things to come? And if so, would the former missions take priority over the latter when the two conflict? Although the recent proliferation of environmental satellites should ensure that such a military monopolization of satellite data does not take place, environmentalists from around the globe should be wary of such trends. Should the military co-optation of environmental satellites continue, there is a real possibility that the military will become a "clearing house" for environmental data with all of the attendant problems associated with its deeply engrained secrecy culture.

Although the recent proliferation of environmental satellites should ensure that such a military monopolization of satellite data does not take place, environmentalists from around the globe should be wary of such trends.

It is often said that we live in a time of the three-second "soundbite" approach to public and foreign policy. "Star Wars", "Just-Say-No", "A Thousand Points of Light", "Three Strikes, You're Out" and "the Flat Tax" are all illustrative examples of the all too prevalent tendency to reduce complex problems to seemingly simple solutions. Yet more often than not such simple, "common-sense" approaches mask some deeper interest or ideology. The "beating swords into plowshares" myth that has trumpeted in the refocusing of military satellites to the environment is yet another example. In this paper and elsewhere I have attempted to demystify this myth by highlighting some of the risks associated with this seemingly innocuous refocusing. By inviting military institutions and organizations into environmental projects, environmentalists acquire not only advanced technologies and expertise but also all of the inevitable accoutrements and baggage that accompany such institutions—particularly the deeply engrained secrecy culture that characterizes the operations of U.S. military satellite

reconnaissance. In the long term, the inclusion of such a culture could not only hinder the open exchange of international environmental data, but it could also subtly influence the operational priorities of environmental monitoring, leading ultimately to the "militarization" of the environment. If some of the more recent developments outlined above are any indication, then the "formal merging" of environmental and military surveillance has already begun. Hopefully, the enthusiasm that has to date ushered in this development will give way to a more sober re-assessment. If not, environmentalists might soon find that beating "swords into plowshares" has left "green" politics in the "deep black." ❑

ENDNOTES

1. Halford Mackinder, "The Geographical Pivot of History," *Geographical Journal* 23 (April 1904); and Nicholas Spykman, *The Geography of Peace* (New York: Harcourt, Brace, 1944).
2. The best overview of this wave is provided by Daniel Deudney, "Whole Earth Security: A Geopolitics of Peace," Worldwatch Paper 55, July 1983.
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Saving the Environment (and Political Stability too): Institutional Responses for Developing Nations

by Jack A. Goldstone

Foreign aid must generally serve three distinct sets of interests: the short-term interests of the recipient government, the short-term interests of the donor government (or nongovernmental organizations [NGOs]),and the long-term interests of both donor and recipient in the political stability and economic development of the recipient nation. To incorporate additional concerns—such as preserving the world's environment, reducing population pressures, and conserving natural resources—would seem a luxury.

Yet in fact that "luxury" may be a necessity. To date, foreign aid programs have failed to produce either political stability (in such nations as Iran and Nicaragua) or steady economic development (in much of Africa and parts of Latin America); this suggests the need for a reexamination of the abilities and goals of traditional aid programs. I shall argue that those programs in fact *contribute* to political instability, and that a radical re-orientation of foreign aid is needed if long-term goals are to be attained.

It is increasingly recognized, as in the work of Nobel laureate Douglas North, that a stable and reliable framework for economic activity is essential to sustained economic growth. Thus a stable political system is the foundation of both avoiding geopolitical crises and achieving economic goals. "Stable," of course, should mean a political/legal system that remains roughly constant despite periodic changes in leadership—unlike, for example, one-man regimes which are highly susceptible to coups and revolutions. On what does such genuine stability depend?

As I have argued in previous works, three key "clusters" of factors must be properly arranged to produce such stability: (1) Fiscal health: The state must be free of excessive debt, and have sufficient resources to carry out its responsibilities for national defense, economic development, law enforcement, and public services. These conditions include adequate and reasonably stable state revenues, manageable debt, low and stable inflation, and a stable and reliable monetary and banking system. Failing to meet these conditions knocks one leg off the tripod of essential supports for political stability. (2) Elite support: Elites' support of the system is often connected to their confidence in finding employment and social roles that meet their qualifications. Unemployed and under-employed (but overeducated) youth have consistently been an element in the formation of radical revolutionary elites. In addition, exclusion of some elites from political or economic rewards—or corruption that similarly directs power and wealth to a favored faction at the expense of other elite groups—breeds the development of anti-government groups. Finding responsible and respectable roles for all reasonable claimants qualified for elite status is another foundation of political (and economic) stability. (3) Popular acceptance: Working people generally prefer to avoid government rather than to fight it. But persistent injustices, insecurity, and especially lack of access to the essentials for raising a family—land, housing, or jobs—can create fertile grounds for the mobilization of counter-government forces. Maintaining the basic conditions for work and family life help ensure that appeals for revolutionary mobilization fall on deaf ears.

Clearly, foreign aid programs aiming to promote political stability and economic development should

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Jack A. Goldstone is a Professor of Sociology and International Relations at the University of California at Davis, where he also directed the Center for Comparative Research on History, Societies and Culture. He recently served on Vice President Gore's Task Force on State Failure.

make sure that they contribute to the fiscal health of the state, *and the economic opportunities and environmental conditions that contribute to elite support and popular acceptance.* Yet conventional aid programs, remarkably, have done just the opposite, with predictable and regrettable results.

Conventional aid programs have generally been held hostage to the short-term interests of donor governments or agencies and recipient governments. This has often meant that foreign aid has taken the form of highly centralized, capital-intensive investments—such as electric power plants, hospitals, road/rail systems, and support for capital-intensive modes of export agricultural production. From the point of view of the donor and recipient governments and agencies, such projects have several advantages. First, the centralization allows the recipient government complete control over the project and its benefits. Second, the centralization also allows the collection of fees or revenues to repay the capital costs. Third, such projects often have an immediate, measurable impact on overall GNP. Fourth, and not least, such projects provide lucrative opportunities for financial and construction companies in the donor countries to implement the aid package, which frequently takes the form of loans to undertake these major construction projects.

Yet these large, capital-intensive, loan-financed development projects may have unintended, negative consequences on the three factors underlying political stability. First, such projects increase state debts. However well-intentioned, development loan packages still require servicing. This means that state policies must then focus on commercial development that is oriented towards producing foreign exchange. At the least, this promotes inflexibility in state policies and the appearance of subordination to foreign financial interests; at the worst, in times of untoward commodity price shifts or alternative pressing needs (such as food imports), it courts fiscal ruin.

Second, capital intensive projects provide few outlets for traditional domestic elites; indeed, the activities associated with such projects are likely to undermine or compete with these individuals. Moreover, these projects create a small technological elite, which will demand its own role in politics and the economy. Such projects thus are likely to increase elite competition and disunity, rather than create elite support for the government.

Third, capital intensive projects generally concentrate their benefits narrowly—either in urban areas, among commercially oriented export agrarian producers, or among a small industrial/entrepreneurial elite. They may reduce the opportunities for many thousands of small producers or laborers in the broader economy.

Finally, such projects often cause extensive environmental degradation, *which can decrease economic opportunities, heighten group identities, exacerbate tensions among various social strata, and undermine popular and elite acceptance for the status quo.*

But there is an alternative: decentralized labor-intensive development projects, such as aid for local commercial/subsistence farmers, increased primary education, local health-care clinics, and small-scale mechanization of rural agriculture and industry. Since these projects offer only limited direct short-term benefits to donor nations and recipient governments, they have primarily been the provenance of NGOs or modestly-funded programs such as the Peace Corps. Yet such projects offer impressive supports to political stability in recipient nations.

First, since they require only modest capital, they do not impose a large burden of debt on the state. In addition, a wide variety of local elites, if properly involved, can benefit from local improvements. Moreover, the labor-intensity of these projects provides a substantial increase in managerial positions that can provide rewards (and support) for large numbers of aspirants to elite status. And because such projects are aimed directly at providing increased opportunities and rewards for the entire population, they undermine the appeal of radical proposals calling for the deposition of current elites as a precondition for popular progress. Finally, such local labor-intensive projects are generally kinder to the environment than capital-intensive mega-constructions.

Eventually, of course, capital intensity must rise in developing nations. But for that to occur without endangering political stability, the human infrastructure must first be in place. Higher rural incomes and pervasive primary education have been shown to be the most effective means of reducing population growth rates, and have been the foundation for economic development in nations from 18th century England to 20th-century China. It is the lack of these two elements that continue to mire otherwise well-off industrializing countries—Mexico, Brazil, India—in uneven development and rising political tensions.

Of course, short-term interests are powerful, and traditional aid programs well serve those interests. It may be folly to think that long-term interests in geopolitical stability and economic development could ever really dominate aid programs. But if they ever do, we may find that decentralized, labor-intensive aid programs—which by and large are far more environmentally benign than centralized capital-intensive programs—are the best route to those long-term economic and political goals. ❑

Advancing Environment and Security Goals through "Integrated Security Resource Planning"

by Gareth Porter

Since the 1992 election, the Clinton Administration has taken a series of steps toward integrating global environmental concerns into its national security policy. In 1994, the White House national security document, *A National Security Strategy of Engagement and Enlargement*, noted that environmental degradation "will ultimately block economic growth," and that increasing competition for dwindling renewable resources "is already a very real risk to regional stability around the world."[1] In June 1995, the Defense Department and the intelligence community organized the first government-wide conference on "Environmental Security and National Security" to clarify the roles of various agencies regarding environment and security issues, and to strengthen cooperation and coordination among the agencies. At its conclusion, the conference called for a "national strategy, involving appropriate U.S. government agencies...to prioritize international environmental security issues in order to enhance U.S. national security."[2]

And in early 1996, the State Department moved to integrate environmental issues more fully into foreign policymaking. Secretary of State Warren Christopher's memorandum of 14 February 1996 to all Under and Assistant Secretaries of State, called upon all bureaus to "integrate environmental issues into their regular planning and conduct of policy." Each of the regional bureaus was asked to identify how environment, population and resource issues affect key U.S. interests in their regions and to develop appropriate policies to protect those interests.[3]

Although these steps go much farther than ever before toward incorporating environmental issues into U.S. national security policy, the Administration must still find a way to ensure that adequate resources are allocated to global environmental threats. The Secretary of State's February 1996 memorandum directed the Bureau of Oceans, Environment and Science to work with the Secretary's Office of Resources, Plans and Policy to "develop an environmental diplomacy resource plan that identifies our diplomatic personnel and financial needs." The plan is also supposed to identify steps to make the necessary resources available for conducting environmental diplomacy.[4]

But a strategy for ensuring adequate resources for environmental threats cannot be limited to the State Department. The goal must be to establish a process for allocating budgetary resources among different components of national security in a way that more objectively reflects their importance to U.S. security than the present blatantly politicized system. The existing system of allocating budget resources reflects the political clout of bureaucratic, political and private sector interests in the budgetary process rather than any objective assessment of threat. In a climate of shrinking federal budgets, military programs, which have powerful constituencies behind them, are more than maintaining their share of resources in a climate of shrinking federal budgets; meanwhile, policies and programs to respond to environmental threats to security have been hard hit by budget cuts.

What is needed in order to level the national security budgetary playing field is a system of *Integrated Security Resource Planning* (ISRP). It would parallel the use of integrated resource planning in the transportation

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Gareth Porter is the International Program Director at the Environmental and Energy Study Institute. He is the author of four books on Southeast Asian politics and co-author of Global Environmental Politics, *which was published in a second edition in 1996.*

and electric power industries to compare the costs of each unit of transport or electric power service for all available alternative investments before deciding how to allocate each new incremental investment. ISRP would begin with the assumption that the objective of national security planning should be to minimize negative impacts on the welfare of U.S. citizens from forces originating in part beyond our own borders, from whatever source. It would aim at allocating resources among different components of national security by prioritizing among competing programs responding to national security threats.

Both traditional security threats and environmental threats have a potential impact on the physical or economic well-being of Americans, whether directly or indirectly; reducing the likelihood or magnitude of the threat requires investments of resources over significant periods of time. So it should be possible to compare the threats across different issue areas on the basis of common, quantitative measures.

One way to make such objective comparisons would be to translate all types of impacts on welfare from national security threats into dollar costs. Thus not only loss of trade and damage to economic infrastructure, but loss of life, illnesses and other health impacts could be expressed in terms of their costs to the economy. Such quantification of welfare loss has already been done in analyzing the costs and benefits of responding to environmental threats to security. For example, the Environmental Protection Agency has estimated the total social benefit to the United States of a phase-out of ozone-depleting chemicals by assigning certain values to lives saved and other health benefits of reducing ozone depletion.[5] Preliminary quantitative estimates have also been done of the impact of global climate change on the U.S. economy, including its impacts on mortality and morbidity.[6]

But translating increased loss of life or illness to a monetary value ignores the fact that people generally care more about the risk of dying or of being seriously ill—whether to themselves or to their descendants—than they do about economic loss that does not involve death or illness. To avoid this problem, estimated impacts on human life and health could take the form of a separate indicator that is weighted more heavily than strictly economic losses in a final overall index of seriousness of each threat analyzed—a *national security impact index*.

Such an index of security risk would need to reflect the four main dimensions of any national security threat: the *gravity* of the potential impacts from the threat; the *probability* of the threat actually being realized; the *duration* of the threat; and the *timing* of onset of the threat. The quantitative assessment of each of these four dimensions of a particularly potential threat would represent an index of that dimension of the threat. The four indices for each threat could then be combined, with an appropriate weight given to each, to produce the national security impact index that compares the importance of each threat for which a federal program is being proposed.

Comparing environmental and traditional political-military threats with regard to the *gravity* or seriousness of the potential impacts would involve complex and difficult calculations about matters on which data is lacking and scientific uncertainty is high. But interdisciplinary teams of physical scientists, economists, social scientists and others, using scenario-building and other techniques, could produce at least order of magnitude estimates. Such quantitative indices could be a far better guide to policy-makers than the raw power of the bureaucratic, economic and political interests behind the program in question.

Comparing estimates of impacts of various threats would reveal the fact that major global environmental threats involve much more concrete potential impacts on health and livelihood of Americans than those associated with most military security threats. The potential impacts on well-being associated with major global environmental threats can be quantified in both economic and health indices. Such impacts as the weakening of the human immune system and reduced productivity of crops (from ozone depletion)[7] increased vulnerability of food crops to disease because of genetic uniformity (from biodiversity loss) and the migration of major tropical diseases to North America and salinization of water supplies (from climate change)[8] could be translated into quantitative indices of the seriousness of the impact.

Some military contingencies, such as a missile attack against the United States, obviously involve direct physical harm to American society. Others, such as an effort to cut off oil supplies, involve potential disruptions of commerce whose potential economic impact can be estimated easily. But some military contingencies, such as a conventional war in the Middle East, can be related to a quantifiable impact on U.S. welfare only by positing a complex series of political and economic linkages. To ensure that threat valuation is comparable across issue areas, it would be important to include in the estimates of costs of global environmental threats their indirect economic impacts on U.S. society by reducing the ability of the rest of the world to trade with the United States. Thus the effects of climate change on crop production, coastal flooding and health worldwide are relevant to estimating its total cost to the United States.[9]

The second dimension on which threats could be compared is the *likelihood* of the potential impacts occurring. Obviously the potential impacts of a particular contingency have to be discounted by the likelihood of their occurring, and that likelihood varies tremendously from one impact to another. Again,

quantification of the likelihood of a particular development occurring is not easy, but it is done frequently. For example, the EPA has developed estimates of the probability of various levels of sea level rise because of global warming, based on specific assumptions about carbon dioxide concentrations and the effects of sulfate and stratospheric ozone depletion. Using the technique of surveying a cross-section of climatologists, oceanographers and glaciologists with regard to their estimates of probability, the study estimated the probability of a 1-meter rise in the sea level in the next 100 years and of a 4-meter rise in the next 200 years (1 percent in both cases).[10]

A third dimension of national security threats for which an index is needed is the *duration* of their impacts. Some impacts extend much farther into the future than others, and that fact should be considered in assessing the overall importance of a threat. The impacts of environmental threats are generally many times greater in their duration than those of military threats. Conventional wars, for example, might have impacts that could continue for periods ranging from a minimum of days to a maximum of a decade or two. The consequences of climate change, on the other hand, could persist for centuries; analyses of the impacts of climate change now generally use time horizons of from 200 years to several hundred years.[11] And the loss of medicines and food crop security associated with the threat of biodiversity loss, would be, for practical purposes, irreversible. A duration index could be used as a multiplier of the product of the two previous indices. The effect of considering duration, therefore, would be to magnify significantly the values associated with some global environmental threats in relation to those associated with traditional security threats.

Finally, military and environmental threats could be compared in terms of the *timing of their onset*. Again, the contrast between the two kinds of threats is striking: military planners focus most of their attention on conflicts that could take place within a few years, although they also plan for the deployment of specific weapons systems as far as 15 years in advance. Environmental threats to security, on the other hand, involve impacts that will occur decades in the future.

When they have tried to place monetary values on future environmental threats, economic analysts have systematically and steeply discounted the value of impacts of global environmental threats that would occur many decades or centuries in the future by adopting a relatively high discount rate. The value of the loss attributed to an impact in the distant future can vary by as much as two orders of magnitude, depending on whether a low (1 percent) or high (7 percent) discount rate is used.[12] Heavy discounting implies that risks to citizens' health several decades in the future are worth only a tiny fraction of the concern given to the same risk in the short run. Some analysts have argued that the whole concept of "discounted present value" is inappropriate when multiple generations are involved in the issue.[13] One of the key political decisions that would have to be made explicitly in an ISRP exercise, therefore, is whether and how much this generation wishes to discount the consequences of environmental threats for future generations.

ISRP would require coordination by a government agency that does not have a bureaucratic stake in budgetary allocations among different types of national security programs. It might be managed by a team headed by the Office of Management and Budget or the National Security Council, assuming that the official in charge has internalized the Clinton Administration's revised conception of national security. It would have to have representation from agencies whose expertise in analyzing different kinds of national security threats would be needed—especially EPA and DOD. Initial studies for a national security impact index could be undertaken either by contractors or, where appropriate by agency personnel, under the guidance of NSC or OMB staff. The final index would be the responsibility of OMB, NSC or both.

As a tool for integrating environment and security threats fully into budgetary planning, and for rationally allocating resources across various types of threats, ISRP would represent a major leap toward operationalizing the redefinition of national security initiated by the present Administration. The political obstacles to adopting such a reform are obviously formidable. Nevertheless, it is time to debate such radical new approaches to national security budgeting. Otherwise, much of the value of the Administration's conceptual and policymaking initiatives on environment and security will be lost.

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12. U.S. Environmental Protection Agency, Policy Planning and Evaluation, *Ecological Impacts from Climate Change: An Economic Analysis of Freshwater Recreational Fishing*, EPA-R-004, 3-28.
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When Are Environmental Issues Security Issues?

by Brian R. Shaw

The impact of environmental issues, on tension and conflict, is a serious issue facing national security policy communities. This relationship is important enough to lead the Secretary of State to develop specific actions to integrate environmental issues into regular planning and conduct of policy. While there are systematic processes to identify, document and explore environmental issues, it is much more difficult to identify the linkages between the consequences of this environmental issue and security issues. This process is complicated by the numerous points of view on the extent and the need to include any given environmental problem as a security issue.

Worldwide interest in the environment and the consequences of natural resource degradation is high and the international community is increasingly focusing on the environment as an issue for diplomatic discourse and interaction. There have been numerous treaties and conventions established specifically addressing environmental issues, such as: Antarctic-Environmental Protocol (Antarctic Treaty, 1959); The Convention on the Prohibition of Military or any Other Hostile Use of Environmental Modification Techniques (1976); The Convention on Long-Range Transboundary Air Pollution (1979); Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989); The Convention on Biological Diversity (1992); and, The United Nations Framework Convention on Climate Change (1992). The Montreal Protocol on Substances that Deplete the Ozone Layer (1987) is a recent and visible result of concern over shared resources. The extent of this undertaking, with 148 parties to the agreement (which is much larger than the other agreements mentioned), indicates the seriousness with which international communities are addressing environmental protection of the global commons. With this focus it is inevitable that the relationship between national security and environmental issues is raised both in the United States and in the international community.

Linkage Between Environment and Security

There have been many attempts to be more specific in identifying the linkages between the environment and security. To date these efforts have focused on the integration of security definitions into the issue of environmentally caused scarcities and conflicts. Evidence is being developed indicating that environmental threats have international implications of not only damage to the environment, but to public health, genetic integrity, and the resulting scarcities of resources such as water, food and forest products (Homer-Dixon et al., 1993; Feshbach, 1995; Feshbach and Friendly, 1992). The displacement of people as a result of conflict is ageless, but population migration caused by overt environmental compromise is a newly recognized problem (Homer-Dixon, 1994).

Unfortunately, identifying the specific environmental cases that threaten a specific security issue is neither direct nor straightforward. Not all environmental problems are security problems. In fact, most environmental problems are decidedly not security problems. This is not to say that they are any less important or critical to national and international agendas. As pointed out by Jack Goldstone (1996), security issues are not inherently military, economic or in this case environmental. In fact, security is a response to the interplay between just such

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Brian R. Shaw is the Environmental Management Capability Group Manager in the Environmental Technology Division of Pacific Northwest National Laboratory. *This paper is a portion of a study sponsored by the Department of Energy, Office of International Policy and Analysis. The author would like to thank John Mentz, Aaron Wolfe, Marc Levy, Jean Shorette and Jim Fuller for their review and valuable comments.*

elements. Peter Gleick (1993) considers threats to security to include resource and environmental problems that reduce the quality of life and result in increased competition and tensions:

> Implicit in this argument is the notion that local or regional instability, arising from a combination of environmental, resource, and political factors, may escalate to the international level and may become violent. Thus, it is imperative to clarify the terms of debate, and to identify and analyze those cases in which environmental variables threaten security.

Environmental resource issues are significant in and of themselves, nonetheless, recognition that damage to shared resources can have major impacts on the stability of relationships between countries directs a focus on security concerns. There are three considerations for developing the relationship between environment and security. First, it is important to recognize that both security and environmental issues are contextual; the extent and impact of a given problem is relative to its location and the sensitivity of the system affected. Second, it is the security issue that provides the context for understanding the impacts of environmental issues and, third, the analysis of environmental issues must be compatible with the analyses of related security issues.

Security Context

Expanding the concept of national security to include non-military issues has been underway for some time. The recognition that the stability and safety of nations is shaped by multi-dimensional factors led Richard H. Ullman (1983) to argue for an expanded definition of security:

> A threat to national security is an action or sequence of events that: 1) threatens drastically and over a relatively brief span of time to degrade the quality of life for inhabitants of a state, or 2) threatens significantly to narrow the range of policy choices available to the government of a state or to private, non-governmental entities (persons, groups, corporations) within as state.

Many issues, such as ethnic differences, economic activity and trade barriers, political positioning, and environmental degradation affect the relationships between states; only when these issues drastically threaten national conduct over a recognizable time span do they become security issues. Thus, under Ullman's definition, the vast majority of environmental issues are not security issues because they generally do not fall in the appropriate time frame or often limit the ability of a government to respond. For example, the effects from many significant environmental problems-global climate change, ozone depletion, and population growth-do not occur over a "brief period of time" and their effects are rarely perceived to impact traditional concerns of the security community (Deudney, 1991, 1990; Matthew, 1995). Transborder pollution between the U.S. and Mexico has not limited the range of policy options for the United States. In fact the range of policy options for the U.S. and Mexico has broadened with the development of the North American Free Trade Agreement (NAFTA) which has explicitly included environmental issues. Nonetheless, there are some environmental resource issues which can and do fulfill these requirements. Thus determining which, and in what context, environmental issues are security issues is necessary.

The academic community has recently been debating the relationship between environmental issues and the cause of conflict (Levy, 1995; Homer-Dixon and Levy, 1995; Goldstone, 1996). It is becoming evident that environmental compromise is contextual; the significance of an environmental problem is dependent on the relationship between countries. Thus, a water problem between Israel and Jordan takes on decidedly different implications than a similar dispute between Canada and the United States. While the importance of the environmental problem is no less, the impact on policy options for the affected states is considerably different. Thus it becomes extremely difficult to establish a direct causality function between a generic environmental problem and the generation of violent conflict in part because the context is unique from region to region. The search for this relationship leads away from the issues that relate to policy actions. Just as in traditional political and military analysis of the developments of conflicts, it is the interaction of numerous significant issues between states that leads to mobilization and eventual armed action. The compromise of, or need for environmental resources can play a significant role in this process of escalation. The environment alone will not cause conflict, just as cultural differences, arms buildups or economic sanctions do not lead to conflict by themselves. A realistic assessment of shared environmental resources as a contributing factor is just as necessary as assessing other established variables that lead to conflict.

Specifying the Security Issue

The process of identifying the subset of environmental problems that have security dimensions can begin from either the environmental or security perspective. If one begins from the environmental

perspective, it is necessary to first establish the entire range of environmental issues, characterize their local consequences, and then determine if there are any security issues that are impacted. In this case the independent variable becomes the range of security issues because the environmental issues must first be determined. Only after these assessments are done can the security issues be addressed because it is not possible to exclude any environmental issues *prima facie* without external criteria. One is faced with prioritizing the relative importance of problems such as ozone depletion against local sanitation or radioactive contamination. Which is more important? Which has a greater effect on security issues? What security issues are relevant to which environmental problems? This process leads to the search for causal factors as the only means of reducing the number of environmental variables to a manageable level. If a causal link can be established between an environmental factor and violence or conflict, then that relationship becomes the focus of study. What this process obscures is the context for inclusion of an environmental problem as a security issue in one setting and its exclusion in another.

If on the other hand, the beginning point is a specific security issue, then the independent variables are only those environmental resources within the scope of the security definition. This leads directly to an evaluation of the impact of these conditions on the security issue. If for example, the security issue is central Asian state failure, the impact of ozone depletion will not likely be measurable. Ozone depletion does not occur in the appropriate time frame to the pressures on these newly formed republics, and it will not restrict the policy options for those states' extremely limited use of ozone-depleting substances. The drying of the Aral Sea, however, (cf. Kamalov, 1995) with associated economic collapse and potential generation of refugees will have immediate, direct consequences on the durability of these regional entities. This loss of arable land, the wind-blown distribution of dry sea-bed contaminants, and the loss of the regional fishery are measurable and of immediate importance to the failure of political will. It is only through this first step of identifying the security issue that realistic threat assessment measures can be defined for environmental variables. The contribution of an environmental resource variable to any security issue depends upon several independent factors such as location, political, cultural and economic levels within the security question.

Regional Security

While there are many security issues facing the United States in the post-Cold War era, there is one that requires the recognition of the impact of environmental resources. With the elimination of super-power tension that characterized the Cold War, local tensions and age-old disagreements are now being decoupled from the U.S.-Soviet rivalry. This increased regionalization of conflicts and the need for understanding factors in the development of these conflicts leads to the Regional Security arena. Analyzing Regional Security issues requires the appraisal of characteristic sources of instability as well as appropriate arms control analysis.

During the Cold War, stability could be characterized very simply as follows:

Stability = Superpower Military Parity

Superpower military parity had been defined by the counting of force structures and elements such as nuclear weapons, tanks, submarines, etc. With the demise of the Soviet Union and a convenient superpower to count against, it became clear that the United States had military capability which, while overwhelming in size, was not sufficient in defining the stability of any given region. Conflicts are arising in localized and regionally contained settings far from the current presence of U.S. military influence. Even areas as large as the Middle East are facing inter-regional disputes and conflict. Significant tensions exist not only between Israel and Arab states but among Arab states as well. The regionalization of conflict drivers were confirmed in the Gulf War. The initial combatants, Iraq and Kuwait, were not global powers, but regional states, augmented only after hostilities broke out by major force projection states. Thus the force parity of concern is regional and not global.

Regional military parity is also driven by the economics of selling and purchasing armaments and equipment. During the Cold War the focus of stability was on global conflict, and the ability to acquire weapons of mass destruction was indigenous to nuclear powers, with economies that could sustain the cost of developing and maintaining such weapons programs. In the current regionalized setting, an individual state's ability to acquire weapon systems is derived from its ability to purchase such weapons, or its ability to purchase the infrastructure required for the design and manufacture of such weapons. These economic factors cannot be divorced from political and cultural issues. Each has differing but significant impact on the stability of regional relationships. Thus the stability equation has become regionalized and contains several essential factors:

Regional Stability = Regional Military Parity + Economic + Political + Cultural Elements

The economies and cultures of regions are closely if not intricately connected with environmental

resources. Examples abound. For instance, in the Middle East the relationship of water to culture and politics is among the strongest links (Lowi, 1995; Hillel, 1994; Naff; 1992; Kelly and Homer-Dixon, 1995). The loss of the stabilizing effect of the Soviet system has led to the emergence of long-standing ethnic and religious clashes in former Soviet Union states. The civil conflicts in Georgia and Chechnya are immediate examples. In addition, the realization that cultural, political and economic issues are critical stability factors has changed the order of the equation, placing regional factors such as culture and politics ahead of arms parity.

In a given setting the impact of any variable, whether environmental, cultural or arms parity, is relative to its context. An analysis of the Tigris-Euphrates River system and the Turkey, Syria, Iraq political relationship might well lead to concern of a repeat of the 1975 incident in which Syria and Iraq mobilized troops over changes in river flow (Hillel, 1994). The likelihood of such an escalation could be high, not because of unresolved water problems alone, but because of the collective tensions resulting from many other issues such as the Gulf War, Iraq and Turkey's response to Kurdish issues, Syrian tensions associated with the ongoing Middle East Peace Process and many more.

It has been argued that the deterioration of environmental conditions in the Soviet Union was a major factor in its collapse (Shcherbak, 1996). This perspective alone would suggest that understanding the contribution of environmental factors is a necessary addition to the stability equation. International non-government organizations such as Greenpeace, the Sierra Club and many others have contributed to the international awareness of the responsibility of governments for care of the global commons, and by implication, how these elements contribute to the relationships between nations. The recognition of these relationships, and the development of significant diplomatic dialogue addressing environmental issues requires that the Regional Stability equation continue to evolve with the integration of environmental resource elements. Thus, the current formulation of the regional stability equation becomes:

The reason environmental resource elements was placed as a denominator in this theoretical equation is that they can impact all four variables. For example, the relationship of culture to natural resources is exemplified in the Hindu belief that the universe undergoes endless cycles of creation, preservation and dissolution. This belief has its most visible outward focus on the Ganges River as an essential element of religious significance. The politically driven Middle East peace process has specific panels addressing both water, and environmental issues. Agricultural economies are environmentally driven: soil quality, irrigation processes, crop and animal runoff pollution and airborne particulate contamination are major factors in the economics of agricultural production. Finally, serious internal and multi-lateral military issues have resulted from environmental degradation left behind with the withdrawal of former Soviet troops from Eastern Europe.

Implementing an Expanded Stability Analysis

On a practical level, environmental issues must be incorporated into the regional security analysis process. In order to implement such an analysis it is important to establish the commonality of objectives between the Regional Security and Arms Control process and impacts from environmental issues. The first critical step in integrating these issues is to recognize the congruent objectives between Regional Security assessments and response within the environmental community. This similarity requires a mapping of terminology, but the objectives remain the same, resolving conflict and implementing change. Within the Regional Security arena there are essentially four measures of redress available to address transborder instability (Table 1): 1) Redeployment, 2) Reposturing, 3) Restructuring and 4) Restriction. These redress factors have matching counterparts in the environmental resource resolution process: 1) Re-allocation, 2) Legal status change, 3) Substitution and 4) Allocation and rationing.

In the Regional Security context, redeployment is the withdrawal of forces from an area of concern. The analog measure in the environmental community is a re-allocation which is the movement of a resource from one consumer to another. Similarly, reposturing is changing the readiness of the forces by establishing transparency measures, reducing training or increas-

ing the reserve component of the force mix-making the force less capable of combat. In the environmental resource context, this is the same as changing consumers' access or rights to the resource. In the same way the resource is not as easily available. Restructuring is the establishment of ceilings for personnel or weapon types, or the actual reduction or elimination of weapon types. Substituting an alternate resource such as de-salinized sea water for ground water effects the identical change. Finally, restriction is the controlling of transfers of troops or weapons, or constraining indigenous production of such systems. In the environmental context, restriction is the rationing of natural resources.

Given this mapping, it is apparent that environmental issues can be compatibly incorporated into the regional security process. In addition, the table provides the first step in establishing the relative significance of any environmental problem to the regional stability issue: What are the redress options and to what extent are they feasible? Can resource substitution be implemented? Are there cultural impediments to these methods of redress?

Another element required in assessing the importance of environmental issues to the regional stability equation is an understanding of the stages of regional relationships and the relative impact of both the issue and potential solutions on these relationships. Relationships between states can range from recrimination to unguarded borders. These relationships are not fixed but change with time. The appropriate measures taken to address regional stabilities must be viewed in light of these stages of relationship. In confrontational stages, tension reduction measures are the most effective steps; confidence building measures are applicable only if countries are actually negotiating and implementing agreements. Environmental activities and technologies fall into distinct categories with respect to these stages. The identification and characterization of environmental problems is a tension reduction measure. Unless the issue at hand can be defined and agreed upon, looking to solutions such as clean-up and restoration are premature. Similarly, remediation and monitoring of environmental conditions are confidence building measures. These measures are a part of the implementation of agreements and, in fact, long-term arms control monitoring agreements use many environmental sensors in their implementation. Thus the measures required for a particular environmental resource problem lead directly to the relative impact and prioritization of the security issue. For example, Lipschutz (1992) pointed out that the "perception that water rights are inequitably distributed, or may prove to be a problem in the future, could be a greater incentive to conflict than the actual supply situation." Technologies that allay fears or come to an accepted characterization directly address tension over perceptions as well as actualities. Such technologies are tension reduction measures. Similarly, successful long-term management of shared resources such as the Indus River agreement or the Mekong River Commission establish channels of communication and long-term confidence building between neighbors. The threat to regional stability is clearly heightened in those situations where the resource is not subject to agreements and practice. On the other hand abrogation of agreements, whether resource or political forms the basis for increased tensions.

Conclusion

The stability of any given region can be affected by environmental resource issues. The ability of the U.S. government to respond to any regional stability issue depends on clearly prioritizing the issues according to the need for response, the practicality of intervention, and the impact on U.S. security interests. The requirement for articulating the security impact of environmental issues is the generation of a response that recognizes the integrated nature of context-driven factors and addresses preventative measures in addition to response measures.

Unless a given environmental issue meets a security definition such as Ullman's (1983), it is not a security issue. The practical outcome of establishing such an initial requirement is a clear assessment of the impact of environmental resources on a specific security issue. To be useful for the implementation of policy, government leaders must be able to differentiate between consequential actions requiring immediate political or military response and long-term consequences that require measured diplomatic response. Critical questions revolve around providing guidance for action and implementation of policy in the appropriate setting and context. Generally these questions are simple in their phrasing and difficult in their answer:

- Which issues are short-term, i.e. within the range of policy action (1-3 years)?
- Which issues are long-term, i.e. within the range of diplomacy (3-10 years)?
- Which issues are consequential to future generations?

The magnitude of the impact must be assessed:

- Which issues have the shortest term destabilization potential?
- Which issues have the broadest destabilization potential?

- Which issues require the least or most resources to address?

And finally, the impact on U.S. security and U.S. interests must be gauged:

- Will the destabilization impact U.S. security directly?
- Will the destabilization impact the security of U.S. allies?
- Will the destabilization impact broader U.S. interests in the region? ❑

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The Project on Environment, Population and Security: Key Findings of Research

by Thomas Homer-Dixon

For the past five years, an international team of analysts coordinated by the Peace and Conflict Studies Program at the University of Toronto has investigated the relationship between environmental scarcities (scarcities of renewable resources) and violent conflict in developing countries. (For the Project's contact information, see p. 129.) The Project on Environment, Population and Security (EPS), the most recent effort of the Peace and Conflict Studies Program, concluded its research in the spring of 1996. The EPS project gathered, evaluated and integrated existing data that addressed three key questions:

- What is known about the links among population growth, renewable resource scarcities, migration and violent conflict?
- What can be known about these links?
- What are the critical methodological issues affecting research on these links?

The EPS project did not explicitly address the complex root causes of renewable resource scarcities (environmental scarcities), such as the maldistribution or depletion of resources, dysfunctional markets, exploitative gender relations and the international political economy. Rather the project began its analysis with the existence of scarcity and examined the social consequences of that scarcity.

The project has published case studies on Chiapas, Mexico; Pakistan; Gaza; Rwanda; and South Africa, as well as thematic reports on urbanization and violence; research methodology; and social adaptation. These case studies and thematic reports have identified common physical, economic and social mechanisms that operate in a spectrum of contexts. The main findings generated by this research are as follows:

1. *Under certain circumstances, scarcities of renewable resources such as cropland, forests,and water produce civil conflict and instability. However, the role of this "environmental scarcity" is often obscure. Environmental scarcity acts mainly by generating social effects—such as poverty and migrations—that analysts often interpret as conflict's immediate causes.*

Environmental scarcity—in interaction with other political, economic, and social factors—can generate conflict and instability, but the causal linkages are often indirect. Scarcities deepen poverty; generate large and destabilizing population movements; aggravate tensions along ethnic, racial or religious lines; and debilitate political and social institutions. Poverty, migrations, ethnic tensions, and weak institutions in turn often appear to be the main causes of conflict (see Figure 1).

The relationship between environmental factors and violence is complex. Environmental scarcity interacts with factors such as the character of the economic system, levels of education, ethnic cleavages, class divisions, technological and infrastructural capacity and the legitimacy of the political regime. These factors, varying according to context, determine if environmental stress will produce the intermediate social effects outlined in Figure 1. Contextual factors also influence the ultimate potential for conflict or instability in a society.

Figure 1: How Environmental Stress Contributes to Conflict

Environmental Scarcity and Violent Conflict: A Synopsis

- In recent years, the causes and consequences of civil strife (conflict within states) have dominated foreign policy debates, preoccupied the United Nations and forced states to become involved in the sovereign affairs of others. National security analysts and foreign policy decisionmakers, trained to analyze and respond to interstate war, have had to rethink their assumptions about the causes of conflict and consider nontraditional threats to national security.

- On first analysis, the main causes of civil strife appear to be social disruptions, such as poverty, migrations, ethnic tension and institutional breakdown. However, scarcities of renewable resources, including water, fuelwood, cropland and fish, can precipitate these disruptions and thereby powerfully contribute to strife.

- Renewable resource scarcity (environmental scarcity) can have three sources: degradation or depletion of a resource, increased consumption of the resource (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.

- Whatever its source, environmental scarcity is never the sole cause of conflict. Yet conflict can result when scarcity powerfully interacts with economic, political and social factors.

- Environmental scarcity, in interaction with these other factors, can contribute to declining agricultural production, economic hardship, migrations of people from areas of environmental stress and tensions within and among groups.

- Environmental scarcity can also reduce the ability of states to respond to the needs of their populations. As a result, dissatisfaction rises within these populations. Moreover, declining state authority boosts opportunities for violent collective action.

- Environmental scarcity rarely, if ever, causes interstate war. Instead, it contributes to chronic and diffuse strife within countries.

- This civil strife can affect the international community if it occurs within a strategically or economically important region, if the afflicted country possesses weapons of mass destruction or if the violence results in large refugee flows across international borders. Civil strife can also provoke an insecure regime to become more authoritarian, and such regimes are often more aggressive in its external relations. In addition, it can produce complex humanitarian disasters (as in Rwanda and Somalia); rich nations are then called upon to provide humanitarian assistance and peacekeeping and peacemaking services.

2. Environmental scarcity is caused by the degradation and depletion of renewable resources the increased consumption of these resources, and their unequal distribution. Evidence suggests that these three sources of scarcity often interact and reinforce one another.

A simple "pie" metaphor illustrates the causes of renewable resource scarcity. A reduction in the quantity or quality of a resource shrinks the pie; population growth and increased per capita consumption of the resource boosts demand for the pie; and unequal distribution causes some groups to get disproportionately small slices.

3. Environmental scarcity often encourages powerful groups to capture valuable environmental resources and prompts marginal groups to migrate to ecologically sensitive areas. These two processes in turn reinforce environmental scarcity and raise the potential for social instability.

Resource Capture: The degradation and depletion of renewable resources can interact with population growth to encourage powerful groups within a society to shift resource distribution in their favour. Powerful groups secure or tighten their grip on a dwindling resource and often use this control to generate profits. As shown in Figure 2, resource capture intensifies scarcity for poorer and weaker groups.

Figure 2: The Process of Resource Capture

Ecological Marginalization: As shown in Figure 3, unequal resource access can combine with population growth to cause large-scale and long-term migrations of the poorest groups within society. They move to ecologically fragile regions such as steep upland slopes, areas at risk of desertification, tropical rain forests, and low-quality public lands within urban areas. High population densities in these regions, combined with a lack of knowledge and capital to protect the local ecosystem, cause severe environmental scarcity and chronic poverty.

Figure 3: Ecological Marginalization

4. Societies can adapt to renewable resource scarcity either by using their indigenous environmental resource more efficiently or by decoupling from their dependence on these resources. In either case, the capacity to adapt depends upon the level of social and technical "ingenuity" available in the society.

Societies can escape turmoil by adapting to scarcities of renewable resources and therefore avoiding undue suffering and social stress. Strategies for adaptation fall into two categories. First, a society can continue to rely on its indigenous environmental resources but use them more sustainably. Second, the society can sometimes decouple itself from dependence on its scarce environmental resources by producing goods and services that do not rely heavily on these resources. The country can then trade these products on the international market for natural resources it no longer produces at home because of local natural resource scarcities.

In the next decades, population growth, rising average resource consumption and persistent inequalities in access to resources ensure that scarcities will affect many environmentally sensitive regions with a severity, speed and scale unprecedented in history. Some poor countries will be ill-equipped to adapt. These countries are underendowed with key social institutions, including research centers, efficient markets, competent government bureaucracies and uncorrupt legal mechanisms. Such social institutions are essential prerequisites for an ample supply of both social and technical solutions to scarcity. Moreover, a society's ability to create and maintain these institutions may be diminished by the very environmental stress the society needs to address.

5. If social and economic adaptation is unsuccessful, environmental scarcity contributes to impoverishment and migrations.

Developing economies tend to be dependent on their resource base for economic production and employment. If the supply of social and technical ingenuity is inadequate, therefore, scarcity affects the overall health of the economy and causes economic hardship for marginal groups. To escape this impoverishment, large numbers of people migrate, most often to urban centers.

6. In the absence of adaptation, environmental scarcity weakens states.

The multiple effects of environmental scarcity, including economic decline and large population movements, may weaken the administrative capacity and legitimacy of the state in some poor countries. First, environmental scarcity increases financial and political demands on governments. Second and simultaneously, scarcity can increase the power of narrow coalitions of vested interests by increasing their incentives to use their access to scarce resources to extract excessive profits. As they become wealthier and more powerful, these coalitions can reduce tax payments on their increased wealth, and they can influence state action in their favor. A widening gap between demands on the state and state capacity to address these demands aggravates popular grievances against the state, erodes the state's legitimacy and increases rivalries among

powerful factions.

Vigorous state-society relations are crucial for social stability and prosperity. The state must respond to the demands of society, yet not be hostage to powerful social groups. Scarcities of renewable resources, and the economic problems that often ensue, threaten the delicate give and take relationship between state and society. Falling agricultural production, economic stress and migrations produce hardship, and this hardship increases demands on the state. If the state cannot meet these demands, local-level grass-roots organizations step in to respond. Since these organizations often focus exclusively on the needs of their constituents, society tends to segment into groups and social interactions among these groups decrease. This segmentation shreds the networks of trust, norms and interactions (often called social capital) generated by vigorous exchange among groups. Segmentation in turn enhances the opportunities for powerful groups to seize control of local institutions or the state and use them for their own gain.

7. In the absence of adaptation, environmental scarcity sharpens distinctions among groups and enhances their opportunities to participate in violent collective action.

Environmental scarcity can strengthen group identities based on ethnic, class or religious differences. Individuals identify with each other when they perceive they share similar hardships. This shared perception reinforces group identities and, in turn, intensifies competition among groups.

Simultaneously, environmental scarcity can change the social balance of power and thereby increase the opportunities for these groups to engage in violent collective action. Scarcity can undermine the legitimacy, fiscal stability, and ultimately the coercive power of the state. The state may then find itself vulnerable to violent challenges by groups whose power or identities have been enhanced by the very same scarcity.

8. Environmental scarcity can contribute to population movements, economic decline and weakened states, which in turn can cause ethnic conflicts, insurgencies and coups d'etat.

Migrating groups can trigger ethnic conflicts when they move to new areas. A regional decline in economic welfare can generate deprivation conflicts, such as rural insurgencies and urban riots. The likelihood of violence increases as the social balance of power shifts against the state and in favor of challenger groups. Whether violence actually occurs, however, depends on a variety of additional conditions, including the conceptions of justice held by challenger groups, the opportunities for alliances among diverse social groups and the capabilities of the leaders of the state, challenger groups and elites.

9. Environmental scarcity rarely contributes directly to interstate conflict.

Although interstate conflict has occurred over non-renewables such as oil and strategic minerals, scarcities of renewable resources rarely cause "resource wars" among states. There are two reasons for this difference. First, in general, states cannot easily or quickly convert renewable resources into assets that significantly augment their power. Second, the very countries that are most dependent on renewable resources, and which are therefore most motivated to seize resources from their neighbors, also tend to be poor, which lessens their capability for aggression.

The renewable resource most likely to stimulate interstate war is river water. However, wars over river water between upstream and downstream neighbors are likely only in a narrow set of circumstances: The downstream country must be highly dependent on the water for its national well-being; the upstream country must be able to restrict the river's flow; there must be a history of antagonism between the two countries; and, most important, the downstream country must be militarily much stronger than the upstream country. Research shows that conflict and turmoil related to river water is more often internal than international; this conflict often results from dams and other major water projects that relocate large numbers of people.

10. Conflicts generated in part by environmental scarcity can have significant indirect effects on the international community.

Environmental scarcity can contribute to diffuse, persistent subnational violence, such as ethnic and civil strife. The incidence of such conflict will probably increase as environmental scarcities worsen in some parts of the developing world. This subnational violence will not be as conspicuous or dramatic as interstate resource wars, but it may have serious repercussions for the security interests of both the developed and developing worlds.

Civil strife within states can cause refugee flows and humanitarian emergencies that not only destabilize neighboring states but also call upon human and financial resources of developed countries and international organizations. Moreover, states destabilized by environmental stress may fragment as they become enfeebled and peripheral regions are seized by renegade authorities and warlords. Such states might avoid fragmentation by becoming more authoritarian, intolerant of opposition and militarized. These regimes, however, are often abusive of human rights and more likely to generate popular support by intimidating neighboring states. ❑

Debate

*This section provides a forum for major proponents and critics of linking environmental and national security issues. Marc Levy's article, entitled "*Time for a Third Wave of Environment and Security Scholarship," *appeared in the Spring, 1995 issue of the* Report *and, in part, is the catalyst for the responses by Thomas Homer-Dixon, Gareth Porter, and Jack Goldstone. Marc Levy's reply to these critics is the fourth contribution to this ongoing debate.*

Thomas Homer-Dixon

Professor Marc Levy of Princeton University has recently published two critiques of recent scholarship on environmental security.[1] Levy discusses many issues arising from this scholarship; he gives particular attention to the results of a major research project on "Environmental Change and Acute Conflict" sponsored by the Peace and Conflict Studies Program at the University of Toronto and the American Academy of Arts and Sciences. As the lead researcher for this project and its successors, and as the sole or lead author of several articles that Levy cites,[2] I respond to his comments below.

Points of agreement

1. I largely agree with Levy's discussion of definitions of "security."[3] Many people use such a broad definition of the term that it becomes synonymous with socio-economic well-being. In our writings, we generally avoid using the word "security," and instead we focus on the links between environmental stress and violence. Violence is easier to define, identify and measure; this focus helps bound our research effort.

Levy is right that many people use "security"[4] as a rhetorical device. They hope to tap into a discourse that seems sensational and that has money and power associated with it. By talking about "security," they can make environmental problems seem like big issues in a highly competitive market for public and policymaker attention. There is an underlying dishonesty and sloppiness to some of this work. The writings of Norman Myers, in particular, are marked by an almost complete absence of empirical rigor and theoretical structure. [5]

2. I also agree with Levy that certain environmental problems are a "direct threat" to U.S. security interests.[6] Ozone depletion and climate change could eventually endanger core American values. Unfortunately, though, Levy does not adequately acknowledge that these are unlikely to be near term threats to the United States, whereas many regional environmental problems are today affecting the core values of hundreds of millions of people around the world.

This discrepancy between the environmental concerns of the North and those of the South is disheartening. In rich countries, policymakers and many scholars (such as Levy) devote a disproportionate amount of time to environmental issues with 20-or 30-year time horizons, often ignoring the grim effects of land scarcity, fuelwood scarcity, and depletion of water supplies and fish stocks right now in poor countries. In developing countries, many policymakers, intellectuals and activists are astonished that their Northern counterparts would focus so much attention on issues like climate change and ozone depletion, which seem to them to be largely secondary environmental problems.

Although Levy is right that climate change and ozone depletion might eventually affect core American values, his exclusive focus on American security interests is parochial. In the Acute Conflict project and its successors, we do not aim to identify environmental threats to the national security interests of the United States. Rather, we aim to determine if there are—or could be in the future—significant links between environmental and

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Thomas Homer-Dixon is Director of the Peace and Conflict Studies Program at the University of Toronto. He is currently principal investigator for the project on Environmental Scarcity, State Capacity, and Civil Violence, sponsored by the Progam and the American Academy of Arts and Sciences. He is also Director of the Project on Environment, Population and Security, sponsored by the Program and the American Academy for the Advancement of Science. A condensed version of this article appeared in International Security *20: 3, 1995/1996*.

demographic pressures and violence in the developing world. We recognize that an exclusive focus on American security interests would produce an impoverished research program. Moreover, Levy's research agenda would not be acceptable to the many scholars and experts in developing countries who contribute to our work.

Points of moderate disagreement

3. Levy's definition of "environment" is unhelpful.[7] He does not explain what he means by "ecological feedback." It is also a bit odd, and perhaps somewhat anthropocentric, to define environmental systems as those that-if they don't exhibit ecological feedback-are nonetheless important to the "sustenance of human life." Surely, in our energy-intensive world, petroleum deposits and the processes that form them are "physical systems characterized by . . . their importance to the sustenance of human life." Yet Levy explicitly excludes "mineral deposits"—and by extension, one must assume, petroleum deposits—from his category of environmental resources.

No definition of "environment" is entirely satisfactory. It is an inherently fuzzy concept. However, the most useful distinction is between renewable and nonrenewable resources. Environmental systems are usually characterized by stocks *and* flows—that is, by incremental renewal of their stocks over time. More fundamentally, they are usually characterized by complex and dynamic interactions among multiple system elements. Environmental systems tend to be highly interdependent systems. This may be what Levy means by "ecological feedback," but, if so, he is not at all clear. The interdependencies in environmental systems are not necessarily reciprocal (i.e., "feedback") relationships and to insist on causal reciprocity is to unnecessarily narrow his definition.

There are, of course, some exceptions: fossil aquifers (not *all* "groundwater resources" as Levy suggests) are "ecologically inert," in the sense that they do not interact with other elements or resources in an ecological system. So it may be a good idea to include some requirement in his definition that environmental resources support life. But why restrict it to just *human* life?

4. Levy's "double counting" argument confuses matters.[8] Myers, Mathews and the others are simply trying to broaden the concept of "security"; and, when they do so, double counting is not a problem (as Levy acknowledges). The real problem is that these authors sometimes twist their analysis to satisfy particular rhetorical and political agendas.

Points of serious disagreement

5. In many places Levy claims that our research findings from the Acute conflict project simply repeat conventional wisdom. Here are some key quotations:

> [The results] are virtually identical to the conventional wisdom that prevailed before the research was carried out.[9]

> By . . . taking aim at a null hypothesis that has virtually no advocates, researchers have lost the ability to say anything more than "the environment matters," something they and we knew before this work was undertaken.[10]

> Most sophisticated scholars of political conflict already knew [that the environment matters in processes of political conflict].[11]

Levy is wrong. Before we began our research, conventional wisdom did *not* hold that environmental stress was an important contributor to violent conflict in developing countries. The evidence is abundant and in varied forms.

First, there is very little literature prior to our work that analyzes the linkages between environment and conflict. Levy cites a CIA report; and in the first few footnotes of my 1991 article "On the Threshold," I cite almost all the rest of the relevant post-World War II literature. While some of this material is very good, such as Durham's book on the Soccer War,[12] none has been at the center of research or policy discourse on causes of conflict in developing countries. Instead, the vast bulk of past analysis focused on the geo-strategic sources of conflict in the South, mostly arising from the superpower rivalry and in some cases from the machinations of regional powers like South Africa and India. If the conventional wisdom has long been that environmental problems cause conflict, where is the literature reflecting this wisdom?

In fact, our preliminary findings partly contradict those of the most prominent work of the last decades linking resource scarcity and conflict-Choucri and North's *Nations in Conflict*.[13] Whereas Choucri and North suggest that internal resource scarcities will increase the chances of resource wars among countries, our work suggests this is not true in the case of renewable resources (Choucri and North did not distinguish between renewables and non-renewables).

Second, if our findings reflected conventional wisdom, people would not have paid so much attention to our work. Admittedly, a good deal of the attention has been self-reinforcing media hype, especially after Robert Kaplan's article appeared in the

Atlantic Monthly.[14] But there are many indications of more serious consideration of our work. Numerous leading scholars have told us that they regard it highly. Our publications—including my two papers in *International Security* — are assigned in graduate international relations seminars across North America and Europe; we receive many requests from students for advice and assistance. These papers have been republished in many edited volumes. [15] My monograph for the Foreign Policy Association has been one of their bestsellers.[16] We have attracted sizable audiences for our presentations at the World Economic Forum, the Woodrow Wilson Center, the Council on Foreign Relations, and the Naval War College. All of this attention, from thoughtful people, would seem odd if our research only parroted conventional wisdom.

If there is a conventional wisdom about the links between environment and conflict, it exists largely within certain narrow circles of political science scholars concerned about environmental matters.

Third, many thoughtful people have actually disputed our findings. There have been serious attacks on our work in the press: perhaps the most well-argued and substantial was an article by Marcus Gee that extended over almost two full pages of the Toronto *Globe and Mail* last April.[17] Early on in the project, some senior scholars, including Ernst Haas, were adamant that we had found little evidence for the connection between environmental stress and conflict. In August, 1992, he wrote that, although he felt there might be important linkages between environment and conflict in the future, "I continue to be a candidate for persuasion that something very telling can be demonstrated about a significant linkage in the past."[18] (Haas sounds here like an "advocate" for something close to our project's null hypothesis.) Similarly, at the recent United Nations Conference on Population and Development in Cairo, the Princeton demographer Sam Preston responded to our findings by saying that "resources aren't very important anymore," so they are not likely to be a key source of conflict. Levy may find such statements indefensible, but they are more representative of the "conventional wisdom"—especially in demography and economics—than the findings of our research.

If there is a conventional wisdom about the links between environment and conflict, it exists largely within certain narrow circles of political science scholars concerned about environmental matters. To the extent that this "conventional wisdom" is becoming more widely held, it may actually be a function of research projects such as ours.

6. Levy claims that our research has not produced useful knowledge. He writes:

> The research on environmental degradation and political conflict has failed to generate new findings . . . .[19]
>
> [The] empirical results of the effort amount to a collection of illustrations of violent conflict in which environmental resources played some important role. We have more anecdotes, but not more understanding.[20]

Again, Levy is wrong. He largely ignores the findings identified in my recent "Environmental Scarcities" article, which summarizes the results of our first stage of research. Here are some of our key findings:

> A. A focus on environmental degradation neglects two other important sources of scarcity of renewable resources (or "environmental scarcity"): increased resource demand from population growth and unequal resource distribution. The focus of researchers and policymakers should therefore shift to the general problem of environmental scarcity and away from environmental degradation. (Levy apparently missed this point, since he refers to environmental degradation through both of his pieces). This shift in focus is especially important since the most pernicious social effects of environmental scarcity result from an interaction among the three sources of scarcity. Two interactions seem to be particularly common: resource capture and ecological marginalization. These processes are affecting hundreds of millions of people around the world.[21]

Levy might respond by saying that these findings are not new. While it is true that some of the individual points above have been made by other scholars, no one has brought them together in this way. In fact, we are actually proposing a major paradigm shift. In the past, scholars have usually focused on each of the three sources of scarcity in isolation from the others. By bringing these sources of scarcity together in one analysis, we can more easily see how the effects of each source are multiplied by the effects of the others, and we can more easily identify patterns of causation common to diverse cases.

> B. Institutions like the state are vulnerable to environmental scarcities.[22]

Our research team is in the midst of further work on this issue.[23] In "Environmental Scarcities" I note that

there are strong reasons to believe that the increased demands that scarcities impose on the state, coupled with the debilitating effects of lower revenues streams and rent-seeking behavior resulting from scarcity, mobilize challengers to the state and undermine its legitimacy. Outside the work of Jack Goldstone on the historical effects of population growth on state capacity,[24] no one else has addressed this issue in recent scholarly literature.

> C. Societies can often adapt well to environmental scarcities and population pressures, but their capacity to adapt may be undermined by the scarcities themselves.[25]

This argument is briefly outlined in "Environmental Scarcities" and is elaborated in detail in my forthcoming piece in *Population and Development Review*.[26] It emphasizes the role of social and technical "ingenuity" as keys to adaptation to resource scarcity. The argument is new and important, and it has already received widespread attention as a means of moving beyond the sterile debate over resource limits between Neo-Malthusians and neoclassical economists.[27]

> D. Environmental scarcities are unlikely to cause interstate "resource wars." Rather, most of the conflict that arises from environmental scarcity will be diffuse, persistent and subnational.[28]

This is a significant-albeit preliminary-finding because, as noted above, it actually runs counter to previous thinking on the probable security implications of natural resource scarcities; international relations theorists have usually focused on the possibility of interstate conflict over resources. Moreover, this finding is important to policymakers because our military institutions are ill-equipped to deal with chronic subnational conflict.

> E. Environmental scarcities are not wholly endogenous to political, economic and social factors within society.[29]

There is a widespread tendency among skeptics to subordinate environmental problems to institutional and policy issues; these skeptics assume that if you fix the institutional and policy mistakes, you will fix the environmental problems. Our research shows clearly that there are several important reasons why this conventional wisdom is incomplete at best. As stated in "Environmental Scarcities" these reasons are: 1) that environmental scarcity often has a harmful effect on institutions and policy and that, therefore, bad institutions and policy are themselves partly endogenous to environmental factors; 2) that environmental scarcity is partly a function of the physical context in which a society is embedded and this physical context is exogenous; and 3) that once irreversible, environmental scarcity becomes, by definition, an exogenous influence on society. These points go to the heart of much of the debate surrounding environmental issues; they are certainly not conventional wisdom.

If the above five points do not add to our understanding, then Levy is imposing such a high threshold for "new knowledge" that the work of most political scientists also fails to add to our understanding.

7. Levy claims that access to resources is what people fight about in developing countries, that analysts therefore always consider the role of natural resources in regional conflict, and that most such conflict is "analytically uninteresting." He writes:

> [It] is difficult to imagine how conflict in any developing country could not involve renewable resources. Developing country elites fight over renewable resources for the same reason that Willy Sutton robbed banks-that's where the money is.[30]

> [Few] good studies of regional conflict neglect natural resources as central factors.[31]

> [In many of the Homer-Dixon et al. illustrations] environmental factors are playing fairly uninteresting roles analytically. In many cases they are simply the scarce resource over which conflict is waged-in economies dominated by natural resources rather than manufacturing, it shouldn't be surprising to find natural resources the focus of political conflict. . . . In other cases environmental degradation is clearly a secondary or tertiary phenomenon behind more fundamental forces responsible for violence.[32]

Contrary to Levy's assertion in the first quotation, there are many conflicts in developing countries that quite obviously do not involve renewable resources, except in perhaps the peripheral sense that the conflict is over territory that includes cropland. Examples include the Sri Lankan civil war, the insurgency in Kashmir, the war in Afghanistan (both when the Soviets were involved and currently), the dispute between the Polisario and Morocco over the Western Sahara (the non-renewable phosphate deposits are a factor there), the Liberian civil war, Savimbi's attempt to overturn the election results in Angola, the violence surrounding Mobutu's attempts to retain power in Zaire, the drug conflicts in Colombia, the

endless string of coups (until recently) in Bolivia, the Argentine "dirty war," the coup in Fiji, the slaughter in East Timor, and the insurgency in Myanmar. These are struggles over secession, over ethnic survival, or, most often, over control of the state. In their discussions of these conflicts, analysts quite rightly do not mention renewable resources (contrary to Levy's claim in the second quotation above), because they *are not* central factors. There are several additional problems with Levy's claims in the above quotations. First, he implies that renewable resource scarcities contribute to conflict in developing countries mainly by causing people or elites to "fight over" the resources. However, our research shows that more often the scarcities indirectly contribute to conflict by producing various forms of economic and institutional dislocation; it is only rarely that people fight directly over resources.

Second, in the last quotation Levy says that fights over resources are analytically uninteresting, and that in cases where the fight is not directly over resources, scarcities (once again he incorrectly use "degradation") are at best "secondary or tertiary" phenomena contributing to conflict. But Levy falsely dichotomizes the cases here. There are important cases where environmental scarcities do not cause fights over resources but still play a central causal role in conflict. For example, in the Bangladesh-Assam case, cropland scarcities did not lead directly to fights over resources in Bangladesh, but to economic decline and migration to Assam, which in turn produced conflicts over power relations, ethnic ascendancy and land rights within Assam. Land scarcity in Bangladesh is unquestionably a central driving factor behind these conflicts in Assam; in turn, the conflicts in Assam are not simple fights over scarce land.[33]

Third, what does Levy mean by "analytically uninteresting"? We argue that the conflicts we have studied are interesting because they represent the early indications of worse to come. We are not claiming that the types of conflict themselves are new: insurgency, ethnic clashes, and rebellion are ancient forms of violence. We are, however, claiming that because environmental scarcities are worsening, we can expect an increase in the frequency of conflicts with an environmental component. If that is not interesting to security analysts, then what is?

Fourth, Levy's use of the terms "secondary" and "tertiary" reveals a misunderstanding of the causal role of environmental scarcity that pervades his two critiques and much general writing about this issue. These terms imply that the relationship among the multiple causes of the conflicts in question is additive; the terms "secondary" and "tertiary" imply, in other words, that we can distinguish among causes by their relative weights. In actual fact, these relationships are better described as interactive or multiplicative. When several factors interact in a system to cause a given instance of conflict, it is meaningless to talk about the relative weight or the "independent contribution" of any one factor.[34]

8. Levy says that we have neglected to note that environmental factors interact with many other factors to cause conflict:

> Better research will have to face the fact that environmental factors interact with a variety of other factors to spawn violent conflict-there are no interesting mechanisms that are purely and discretely environmental.[35]

We are, in fact, acutely attentive to non-environmental factors that interact with environmental scarcities to cause conflict. We never claim that there are "mechanisms that are purely and discretely environmental." On the very first page of our *Scientific American* article—in the article's fourth paragraph!—we state that "it is important to note that the environment is but one variable in a series of political, economic and social factors that can bring about turmoil." On pages 85 to 88 of "On the Threshold" I identify a range of key intervening and interacting factors, and I say, in footnote 37, that "recognition of the role of these factors distinguishes simplistic environmental determinism from sophisticated accounts of the nature of the environmental threat posed to humankind." Several pages of "Environmental Scarcities" are devoted to identifying key "contextual factors" that must interact with environmental scarcity to cause conflict.[36]

9. Levy argues that rather than focusing on the environment as a cause of conflict, we should turn our attention to the full range of causes of regional conflict:

> We don't know much about the role of the environment in sparking regional conflict not because we have neglected the environment. . . . Rather, we don't know much about the role of the environment in causing conflict because we don't know much about what causes regional conflict overall.[37]

First, as argued above, Levy does not have a shred of justification for saying that "we don't know much about the role of the environment in sparking regional conflict." Levy is caught in a contradiction. On one hand he says that the connections between environmental pressures and conflict, as we identify them, are conventional wisdom. On the other hand, he says here that we do not know much about the connections. Actually, he is entirely wrong on both counts: many of our findings do not repeat conventional wisdom at all, and they represent real progress in our

understanding. Thanks to our research and that of others, we actually do know a fair amount about the connections between environmental pressures and conflict.

But Levy's main point here is that we should focus our research efforts on the dependent variable rather than on the independent variable. I strongly disagree. In fact, I argue in a recent methodology paper that environment-conflict research is precisely the kind of research that demands a focus on the independent variable and on the nature of the causal relationship between the independent and dependent variables.[38] As this is a key issue, I quote a few paragraphs from the paper here:

> [The environment-conflict research program] does not aim to determine the range of factors that explains the current value of the dependent variable (the incidence of violent conflict); rather, it seeks to determine if a specific independent variable (environmental scarcity) can be an important cause of changes in the dependent variable.
>
> This is not a goal generally thought to guide social scientific inquiry. Usually, researchers want to explain or understand the current causes of certain types of social events. They are interested in the factors that currently influence the value of a specific dependent variable, let's say Y. They therefore ask: What factors cause or explain changes in the value of Y? But researchers studying the links between environmental scarcity and conflict have a different goal. They are not interested in the whole range of factors that currently causes changes in the value of the dependent variable (conflict); instead they want to know whether, and how, a hypothesized independent variable *in particular* (environmental scarcity) can cause conflict. Their key question is therefore different: Can variable X, *in particular*, cause changes in the value of variable Y? Their emphasis consequently shifts from explaining the current incidence of the dependent variable (Y) to understanding the current and potential causal role of a specific hypothesized independent variable (X) and to understanding the nature of the causal relationship between the two variables.[39]
>
> This shift in focus is not uncommon. It is reasonable, for example, when two conditions hold: first, the value of a variable in a complex system is changing significantly, or is thought likely to change significantly in the future; and, second, researchers want to know if this change will affect other variables that interest them. . . . [These] conditions apply in environment-conflict research: evidence suggests that environmental scarcity is getting worse rapidly in many parts of the world; and the incidence of violent conflict around the world is of concern to many political science researchers. Therefore, these researchers might reasonably ask the following questions:
>
> 1. Can environmental scarcity contribute to violent conflict?
>
> 2. If yes, how can it contribute to conflict?
>
> 3. Is this contribution interesting?

There are many circumstances where it makes sense to focus on a particular, putative independent variable and on its causal role rather than on the whole set of explanations of the dependent variable. The environment-conflict research program is one of these circumstances. Consequently, we have addressed the three questions above. Levy would have us divert research resources in directions that are largely irrelevant to our interests and inappropriate given the nature of the subject matter. He is advocating an unnecessarily rigid and often sterile approach to social science.

10. Levy suggests[40] that rather than selecting cases for study that appear, *prima facie,* to show a link between environmental stress and conflict, we should have compared "societies facing similar environmental problems but exhibiting different levels of violent conflict." I anticipate this argument in my recent methodology paper and respond to it in detail.[41] Here, I will make only a few quick points.

First, the strategy Levy suggests does not accord with usual scientific procedure: Levy advocates holding the independent variable constant and varying the dependent variable, whereas an experimental or quasi-experimental approach would vary the independent variable and then examine subsequent changes in the dependent variable.

Second, since, I would argue, such experimental approaches are unworkable in research on complex ecological-political systems, there is some merit to the approach Levy suggests. However, a big caveat must be introduced. It is grossly inefficient to make a large investment of resources early in environment-conflict research to study "null" cases in which environmental stress is present but conflict does not occur. Before closely examining such cases, analysts need a good understanding of the scope conditions governing their hypotheses about

environment-conflict links, an understanding that can best be gained from examining cases in which environmental scarcity appears to lead to conflict. The approach Levy suggests is most effective-indeed, I would argue, can *only* be effective—at later stages of research as part of a process of progressive refinement of hypotheses and their scope conditions.

Perhaps environment-conflict research has now reached a stage where Levy's approach would be fruitful; we have, in fact, included the "null" case of Indonesia in our latest round of case studies. But it is nonsense to suggest that our early research "failed to generate new findings" because of the way we selected our cases. If we had followed Levy's strategy early on, we might have produced a study acceptable to the defenders of methodological orthodoxy, but we would have far *less* to show, in terms of substantive findings, for our efforts.

11. Levy criticizes us for not offering useful policy advice. He quotes the last sentence from our *Scientific American* article to show that our recommendations are "banal" and "bland" and that we do no more than "repeat slogans in the name of policy advice."

Levy's harsh assessment is based on an incomplete knowledge of our work. In the first drafts of our *Scientific American* article, we concluded it with several pages of policy advice. We had to cut those pages, because we were far over the maximum length for the article. I then revised the recommendations for the Canadian context and published them in *Canadian Foreign Policy*, a journal specifically designed to provide a forum for policy debate.[42] The recommendations are often specific, and some of them (for example, a call to reduce resource-extraction subsidies in Canada and to cut funding for Canada-based aid NGOs) were extremely controversial. The article has been widely read in the foreign policymaking community in Canada.

Levy might respond by saying that our recommendations are no different from those proposed by people generally concerned about sustainable development; there is nothing special about our recommendations that derives from the findings of our research. But this is a unjustifiable requirement. Why should they be any different? Our research simply identifies some new reasons for doing what many people have long known we should do anyway. Many advocates of restrictions on carbon emissions make the same kind of argument: the possibility of climate change is just one more reason why we should be doing a lot of things-such as increasing energy efficiency—that are already sensible for other reasons.

12. Finally, Levy refers to recent research by Ted Gurr that suggests that environmental factors are not strong contributors to ethnic conflict.[43] However, Gurr's work is flawed and therefore does not support Levy's conclusions.

First, Gurr introduces three key indicators that he uses as independent variables in his quantitative study of the genesis of ethnic conflict: demographic stress, ecological stress, and migration. Other than saying that the last is "usually a consequence or contributing cause of the first two," he does not suggest how these variables might be causally interrelated. Since demographic stress is often a key cause of ecological stress, there is a potentially serious multicollinearity problem here (i.e., a high correlation among independent variables) that he does not address.

Second, Gurr's ecological stress indicator measures only competition among groups over land. The land in question is not necessarily cropland; in some cases it may be just habitable land. Furthermore, Gurr includes no measure of cropland scarcity produced by, for example, degradation or population growth (which causes farm plots to drop in size); yet in many cases, such scarcity has a critical effect on the economic wellbeing of peasants without precipitating overt land competition among groups. Most significantly, while land is crucially important, there are many other ecological resources whose scarcity or depletion is having an immense effect on poor people around the world. Shortages of water and fuelwood, in particular, are not picked up by Gurr's indicators. Yet many experts think that water is the truly critical resource for human wellbeing and economic development, and over two billion people still depend on fuelwood to satisfy their basic energy needs. Gurr's measure of ecological stress is thus utterly inadequate.

Third, Gurr's demographic stress measure is in large part a relative indicator. In other words, it shows a high score when minority groups are suffering more demographic stress (i.e., higher fertility rates) than other groups in the society. This approach produces some quite absurd results: for example, of six regions listed, Western democracies show the second highest demographic stress value (2.6), while sub-Saharan Africa is tied for the lowest (0.8).[44] Yet Western democracies have some of the lowest aggregate fertility rates of the world, and sub-Saharan African countries have some of the highest.

The reason sub-Saharan Africa drops to the bottom of Gurr's list is that *all* groups in these African countries have similar fertility rates, so there is little relative difference among groups in each country. But surely this is not a useful way to measure demographic stress. Although fertility differentials may sometimes be important contributors to intergroup rivalry,[45] high fertility rates across all groups in a society can be even more disruptive. In sub-Saharan African countries, for instance, population growth

rates are often over 3 percent across all groups. Rapid population growth has swamped urban infrastructure, taxed and sometimes shattered educational and administrative institutions, and created a huge pool of embittered, unemployed and urbanized young men-an easily mobilized and socially volatile group. The economic and social problems created by these high *aggregate* fertility rates have demonstrably aggravated inter-ethnic disputes in Africa, yet this set of linkages remains invisible in Gurr's analysis because of the character of his demographic stress indicator.

This last point raises a more general problem with Gurr's assessment of the importance of demographic and ecological factors in ethnic conflict. By focusing his indicators on the material circumstances of the minority groups in question, he does not tap the *systemic* effects of demographic and ecological stress. These systemic effects sometimes include a polarization of wealth within society and an erosion of the legitimacy and capacity of the state and other institutions. In turn, these systemic consequences can stimulate a host of intra-elite and minority-majority conflicts over social position and access to state power. Thus the communal contention over state power that Gurr highlights as an important cause of inter-ethnic conflict could quite plausibly be a result, in part, of underlying ecological and demographic stresses. Certainly, it is incorrect to imply, as Levy does,[46] that the two explanations of communal conflict are mutually exclusive.

To summarize, Levy's survey of our research findings, his assessment of their importance, and his evaluation of our methodological rigor are all flawed. His comments on our work contribute little to the scholarly debate surrounding these issues. Instead, they only serve to raise a host of misleading and diversionary issues that will give facile critics the intellectual cover they need to dismiss our work. ❑

Endnotes

1. Marc Levy, "Global Environmental Degredation, National Security and U.S. Foreign Policy," Working Paper No. 9, Project on the Changing Security Environment and American National Interests, John M. Olin Institute for Strategic Studies, Harvard University, November 1994; Levy, "Time for a Third Wave of Environment and Security Scholarship?" *Environmental Change and Security Project Report* 1 (Spring 1995): 44-46.
2. Thomas Homer-Dixon, "On the Threshold: Environmental Change as Causes of Acute Conflict," *International Security* 16:2 (Fall 1991): 76-116; Homer-Dixon, Jeffrey Boutwell and George Rathjens, "Environmental Change and Violent Conflict," *Scientific American* 268:2 (February 1993): 38-45; Homer-Dixon, "Environmental Scarcities and Violent Conflict: Evidence from Cases," *International Security* 19:1 (Fall 1994): 5-40.
3. Levy, "Global Environmental Degradation," 5-7.
4. Two exceptions being Thomas Homer-Dixon, "Environmental and Demographic Threats to Canadian Security," *Canadian Foreign Policy* 2:2 (Fall 1994): 7-40; and Jeffrey Boutwell and Thomas Homer-Dixon, "Environmental Change, Global Security, and U.S. Policy," in *American Defense Annual 1994*, 9th edition, ed. Charles Hermann (New York: Mershon Center, Lexington Books, 1994): 207-224.
5. See especially Norman Myers, *Ultimate Security: The Environmental Basis of Political Stability* (New York: W.W. Norton, 1993).
6. Levy, "Global Environmental Degradation," 12-22.
7. "[The] term 'environment' will be used to connote issues involving biological or physical systems characterized either by significant ecological feedbacks or by their importance to the sustenance of human life." Levy, "Global Environmental Degradation," 5.
8. Levy contends that people arguing for including environmental problems in a broadened understanding of "security" are counting the interests affected twice, "once in their own terms, and then a second time because they constitute a 'security' interest. Levy, "Global Environmental Degradation" 9-10.
9. Levy, "Thrid Wave," 45.
10. Ibid.. Levy refers here to the null hypothesis, which guided our initial research, that environmental scarcity does not cause violent conflict. See Homer-Dixon, "Environmental Scarcities," 7.
11. Levy, "Global Environmental Degradation," 29.
12. William Durham, *Scarcity and Survival in Central America: The Ecological Origins of the Soccer War* (Stanford, CA: Stanford University Press, 1979).
13. Nazli Choucri and Robert North, *Nations in Conflict* (San Francisco: Freeman, 1975).
14. Robert Kaplan, "The Coming Anarchy," *The Atlantic Monthly* 273:2 (February 1994): 44-76.
15. For example, "On the Threshold" was republished in *The Library of International Political Economy: 2. The International Political Economy of Natural Resources* 2, ed. Mark Zacher (Edward Elgar, 1993). Versions have also appeared as "Environmental Changes as Causes of Acute Conflict," in *Conflict after the Cold War: Arguments on Causes of War and Peace*, ed. Richard K. Betts (New York: MacMillan, 1993), 425-441; as "Global Environmental Change and International Security," in *Building a New Global Order: Emerging Trends in International Security*, ed. David Dewitt et al. (Toronto: Oxford University Press, 1993), 185-228; and as "Environmental Scarcity and Intergroup Conflict," in *World Security*, ed. Michael Klare and Dan Thomas (New York: St. Martin's Press, 1993), 290-313. A version of the "Environmental Scarcities" article will appear shortly in *Green Planet Blues: Environmental Politics from Stockholm to Rio*, Ken Conca, Michael

Alberty, and Geoffrey Dabelko (Westview Press, forthcoming). Both articles have been recently republished in Sean Lynn-Jones and Steven Miller, *Global Dangers: Changing Dimension of International Security, an International Security Reader* (Cambridge, MA: MIT, 1995).
16. Thomas Homer-Dixon, "Environmental Scarcity and Global Security," Foreign Policy Association Headline Series, No. 300 (Fall 1993).
17. Marcus Gee, "Apocalypse Deferred," *The Globe and Mail*, 9 April 1994, D1-D2; my reply appeared as Homer-Dixon, "Is Anarchy Coming? A Response to the Optimists," *The Globe and Mail*, 10 May 1994, A21.
18. cited with permission
19. Levy, "Global Environmental Degradation," 25.
20. Ibid., 26.
21. Homer-Dixon, "Environmental Scarcities," 8-16.
22. Homer-Dixon, "Environmental Scarcities," 25.
23. Begun in 1994 and concluding in 1996, the project on Environmental Scarcities, State Capacity, and Civil Violence in jointly organized by the Peace and Conflict Studies Program at the University of Toronto and the American Academy of Arts and Science. It seeks to determine if environmental scarcities are decreasing the capabilities of governments in the developing world, and, if so, whether this aises the probability of widespread civil violence. The project is examining the cases of China, India, and Indonesia.
24.Jack Goldstone, *Revolution and Rebellion in the Early Modern World* (Berkeley, CA: University of California Press, 1991).
25. Homer-Dixon, "Environmental Scarcities," 16-17.
26. Homer-Dixon, "The Ingenuity Gap: Can Poor Countries Adapt to Resource Scarcity?" *Population and Development Review* 21:2 (June 1995).
27. William Stevens, "Feeding a Booming Population without Destroying the Planet," *The New York Times, Science Times*, 5 April 1994, B5-B6.
28. Homer-Dixon, "Environmental Scarcities," 18-20.
29. Homer-Dixon, "Environmental Scarcities," 35-36.
30. Levy, "Third Wave," 45.
31. Levy, "Global Environmental Degradation," 3.
32. Ibid., 24.
33. For recent accounts, see Sanjoy Hazarika, *Strangers of the Mist: Tales of War & Peace from India's Northeast* (New Delhi: Viking, 1994); and Ashok Swain, "Migrating the Conflict: Environmental Destructions in Bangladesh and Ethnic Conflicts in India," unpublished paper, Department of Peace and Conflict Research, Uppsala University, Uppsala, Sweden. The Bangladesh-Assam case refutes Astri Suhrke's claim—cited by Levy—that there is "no evidence of degradation causing migration that then causes violence." Levy, "Global Environmental Degradation," 24. See also, Astri Suhrke, "Pressure Points: Environmental Degradation, Migration and Conflict," Occasional Paper No. 3, Project on Environmental Change and Acute Conflict, March 1993.
34. Thomas Homer-Dixon, "Strategies for Studying Causation in Complex Ecological-Political Systems," Report of the Project on Environment, Population, and Security, published by the American Association for the Advancement of Science; see especially endnote 12.
35. Levy, "Global Environmental Degradation," 26.
36. Homer-Dixon, "Environmental Scarcities," 20-21 and especially 25-28.
37. Levy, "Global Environmental Degradation," 3.
38. Homer-Dixon, "Strategies."
39. Dessler similarly distinguishes between a focus on outcomes and a focus on causal factors. "The analyst interested in some phenomenon might treat is as an outcome or feature of some process or structure and search for conditions associated with its appearance. Alternatively, the researcher might choose a factor known or thought to play a role in causing the phenomenon and analyze the tendencies of this factor in isolation. Both categories of analysis link factors to outcomes, but convey different information about this link. While the first category (focus on *outcome*) tells us what configuration of conditions lead to some specified observed outcome in the world, the second one (focus on *factor*) tells us what outcomes tend to be brought about by the workings of a specified factor, whether or not these outcomes are actually produced." See David Dessler, "The Architecture of Causal Analysis," unpublished paper prepared for the Seminar for Philosophy and Methodology of the Social Sciences, Center for International Affairs, Harvard University, April 1992, 8. Dessler derives his distinction from John Stuart Mill's book *System of Logic: Ratiocinative and Inductive* (New York: Harper, 1859).
40. Levy, "Global Environmental Degradation," 25.
41. Homer-Dixon, "Strategies."
42. Homer-Dixon, "Environmental and Demographic Threats to Canadian Security," 31-40.
43. Ted Gurr, *Minorities at Risk: A Global View of Ethnopolitical Conflicts* (Washington, D.C.: United States Institute of Peace Press, 1993), 49-51.
44. Gurr, *Minorities at Risk*, 50, Table 2.4.
45. I outlined how in a lecture under the auspices of the International Union for the Scientific Study of Population (IUSSP) at the NGO Forum accompanying the United Nations Conference on Population and Development, Cairo, September 1994. See Homer-Dixon, "Population and Conflict," Distinguished Lec-

Marc Levy

I welcome the chance to reply to Professor Homer-Dixon's thoughtful and impassioned response to my article. As I said in that article, I consider the environment and security literature to suffer from a starkly low level of critical debate. I learned things from Homer-Dixon's response that I had not appreciated in his other writings, and I take that as at least *prima facie* evidence that more debate is better; that is ultimately for others to judge, however.

Before I take up Homer-Dixon's main points individually, let me state that I did not intend my article to be an attack on Homer-Dixon as a scholar. My comments on his research program were part of a sweeping review of the entire genre. In places my tone or choice of words may have been a bit extreme, and while I stand by my analytical conclusions, I apologize if I created any impression of disrespect. In fact, I consider Homer-Dixon to be a model scholar who sets very high standards worthy of emulation.

Now I will address Homer-Dixon's main criticisms; my headings are slightly different than his but I have tried to reply to each major point.

Is U.S. Security an Inappropriate Analytical Focus?

Homer-Dixon says that my focus on U.S. security interests is parochial and dismissive of the hundreds of millions of people in the developing world who face serious security problems engendered by environmental change. He would be right if I argued that U.S. security were all that mattered, but I explicitly said the opposite. My reason for focusing on the United States was that, when it comes to policy recommendations, virtually all of the environment and security writing eventually comes around to arguing for a major reorientation of U.S. policies, many of which have significant financial implications. If the United States is ever going to engage in such measures, it is reasonable to expect some explicit rationale delineating the benefits to the United States that will result. From a globalist perspective it may be unfortunate, but it remains true, that to point out that a particular foreign aid package might prevent mass violence in developing countries will not guarantee it clean sailing through Congress. I argued that the U.S. government is unlikely to be moved by arguments connecting Third World violence to U.S. security interests, but that other appeals might fare better (though surely in the short run any optimism at all rests on shaky grounds).

Will the Real Conventional Wisdom Please Stand Up?

Homer-Dixon says that I do not give enough credit to his work for breaking new ground, by claiming that it arrives at conclusions identical to the prior conventional wisdom. He says my characterization of the environmental wisdom is in fact true only of a narrow band of environment scholars. Perhaps. I may suffer from having gone to college in the late 1970s, when courses in the departments of government, sociology, history, and anthropology (in addition to environmental studies) all pointed out quite explicitly the connections among natural resource scarcity and violent conflict in the developing world. When I read Homer-Dixon's work it seems like *deja vu*.[1] Yet I confess to being shocked at the private correspondence with a leading scholar that he cited to help make his point, which I acknowledge does reveal a different view of the conventional wisdom than I averred. If Homer-Dixon's work helps persuade such scholars that they are wrong, then he indeed deserves a great deal of credit.

In the end, my critique does not hinge on whether others have made these points before, or whether it is possible to find serious adherents to the null hypothesis, because I also argue that the points made in the research program to date are too shallow to be useful.

Homer-Dixon summarizes his key results better than I did in my article, which tried to examine a much broader range of the literature than just his work. His six findings are stated clearly enough for interested readers to judge whether they add up to "a single, integrated analysis"[2] that carries us to new intellectual terrain. My

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Marc A. Levy is Instructor of Politics and International Affairs at Princeton University. "Correspondence: The Author Replies" *appeared in* International Security *20:3, 1995/1996, and is reprinted with permission from MIT Press.*

point is that these findings are not specific enough to be of much use either analytically or practically. They do not tell us what kinds of conditions are likely to trigger these dynamics and what conditions are likely to dampen them, what kinds of strategies make things worse, and what kinds make them better, what kinds of states are especially vulnerable and what kinds especially robust. The conclusions are all highly contingent, but the contingencies are not satisfactorily elaborated or explored. The closest thing to a categorical conclusion—that interstate resource wars are unlikely—is also the one that was made most clearly by an earlier work.[3] We are left with claims that sometimes environmental scarcity produces violent conflicts but not knowing what conditions matter most and what intervention points are most promising; even if it were true that we did not know that before, knowing it now does not seem all that helpful.

On humanitarian grounds, it is the violence per se that is important, not whether it was caused by environmental scarcity.

My view that the findings are shallow explains the apparent contradiction of which Homer-Dixon accuses me, when I say both that he has recreated the conventional wisdom and that we need more study of the causes of conflict generally because we do not understand it adequately. The conventional wisdom on the role of the environment in sparking violence is rather shallow; we need more work on regional violence because it is not deep enough to understand the interactions and contingencies that help explain individual cases. I am accusing Homer-Dixon of recreating a shallow conventional wisdom instead of deepening our understanding of conflict processes; that is not a contradiction.

But ultimately, what this work adds up to is an empirical matter: if readers gain new insights from these results that in turn lead them to generate useful knowledge, then Homer-Dixon is right and I will gladly concede this point. In private communication he has shared compelling evidence that this sort of dynamic is occurring. I remain skeptical about the long run, though, for reasons that are primarily methodological.

What Methodological Strategies Are Likely to Be Most Productive?

Homer-Dixon argues that the case studies carried out in his project "provided detailed supporting evidence and argument" for his findings.[4] I disputed this in my article by arguing that the selection of cases constrained the analysis, especially because all cases had both serious environmental scarcity problems and serious political violence problems.[5]

Homer-Dixon says this method is appropriate for determining whether environmental scarcity [6] is an important cause of political violence. I agree that process tracing of the sort Homer-Dixon and his colleagues have carried out is a good way for ascertaining causal pathways in complex social systems. But when it comes to identifying whether these causal pathways are "important" is to say that it has some combination of explanatory power and policy utility that is high, relevant to other causes. But it is very hard to support such a judgment with evidence when all the cases were chosen because they were thought to have strong environmental-conflict links.

For example, to label environmental scarcity an important cause of conflict is to say something about its power relative to political institutions as causes of conflict.[7] What if one held a hypothesis that, in the case of violent conflict studied by Homer-Dixon and his colleagues, weak political institutions were more "important" as causes than environmental scarcity? (Such a hypothesis might be true even if it turns out that scarcity exacerbates institutional weakness.) In principle, this is a testable proposition, but in practice Homer-Dixon's case studies do not permit the test to be carried out. Yet the claim that environmental scarcity variables are "important causes" makes a judgment about what that test would reveal.

When process tracing is done right, it is highly sensitive to counterfactuals: how might a given case of scarcity have evolved differently if political institutions were closer to the Singapore or Costa Rica model, say, than the Bangladesh model? Such questions help sharpen our quest for understanding the importance of specific variables in explaining a particular case, especially when cases are complex. But counterfactual analysis requires a grounding in reliable knowledge, either theoretical or empirical, to be valid; if we ask how things would have been different under Singapore or Costa Rica-like institutions, we have to know something about Singapore and Costa Rica. In the phenomena of interest to Homer-Dixon, it seems clear that better use of counterfactuals in making causal arguments will require empirical investigation of cases where there is more variation in the important variables' importance amount to guesswork.

Homer-Dixon seems to think I want scholars to do nothing but strictly controlled quasi-experimental case studies. Nothing could be further from the truth. Elsewhere my colleagues and I have argued strongly for methodical pluralism in a spirit that Homer-Dixon will, I think, find hospitable.[8] Yet methodological pluralism does not mean doing whatever you feel like, and any mixture of techniques is likely to have some flaws. While Homer-Dixon is

right that the research strategy he pursued had many merits, that does not mean it does not also suffer from the limits I have identified.

Let me conclude with the methodological point that I think represents the most serious difference between us: whether engaging in the research strategies I recommend would constitute a diversion of resources in a direction that would be "largely irrelevant" to scholars interested in environment and conflict.[9] I feel quite strongly that shifting the focus to conflict *per se*, rather than environmentally caused conflict, would be more appropriate for both intellectual and humanitarian reasons. My arguments on intellectual grounds are summarized above. My reasoning on humanitarian grounds is fairly straightforward. Environmental scarcity is but one cause of political violence; we do not disagree about that at all. Political violence is a very serious problem on its own terms, both for the people affected directly and those others who for a variety of reasons are concerned about preventing such violence (again, I cannot imagine that we disagree about that). On humanitarian grounds, it is the violence *per se* that is important, not whether it was caused by environmental scarcity. Therefore we would be making a grave mistake if we did not tackle head on the multiple causes of political violence. What if there are more feasible or relevant means of preventing political violence. What if there are more feasible or relevant means of preventing political violence than through intervening in the environmental domain? Or what if some environmental interventions will get overwhelmed by other factors if the latter are not addressed too? And, since it would be folly to presume that we will ever completely prevent environmental scarcity problems, do we not have an obligation to study measures for responding to violence when they break out? For these reasons I think moving to what I have called a "third wave"[10] of environment and security scholarship, in which political violence occupies center stage and the environment joins a cast of other causal agents, would go furthest in helping us achieve the important goals we share. ❑

Endnotes

1. The Brundtland Commission report, prepared in 1986 and published in book form in 1987, has an entire chapter devoted to demonstrating that "environmental stress is both a cause and an effect of political tension and military conflict." World Commission on Environment and Development, *Our Common Future* (Oxford University Press, 1987), 290. This report had political and intellectual influence that was too widespread to qualify it as "narrow."
2. Homer-Dixon letter, 192.
3. Ronnie D. Lipschutz, When Nations Clash: Raw Materials, Ideology, and Foreign Policy (Cambridge, MA: Ballinger, 1989).
4. Ibid.
5. The number of case studies is also a limiting factor. Some of his conclusions are empirically grounded in only one or two cases.
6. Homer-Dixon faults me for referring to environmental "degradation" rather than "scarcity." I did not mean the term degradation to rule out scarcity; to me, scarcity is one form of degradation. Ground water resources can be degraded, for example, by becoming scarcer in quantity, or by becoming contaminated with salts resulting from excessive fertilization.
7. The most thorough treatise on variation in political institutions as an explanation for variation in political conflict in the developing world is Samuel P. Huntington, *Political Order in Changing Societies* (New Haven, CT: Yale University Press, 1968).
8. Marc A. Levy, Oran Young, and Michael Zuern, "The Study of International Regimes," *European Journal of International Relations* 1:3 (Fall 1995), 267-330.
9. Homer-Dixon letter, 193.
10. Marc A. Levy, "Time for a Third Wave of Environment and Security Scholarship?" *Environmental Change and Security Project Report* 1 (Spring 1995), 44-46.

Gareth Porter

Thomas F. Homer-Dixon has responded in detail to Marc Levy's analysis of his work on environmental threats as causal factors in internal and international conflict.[1] But Levy's attack on proponents of linking global environmental threats and national security also deserves a detailed response. The following critique focuses on Levy's definition of national security, his attempts to discredit proponents of environmental security, his own analysis of the relationship between global environmental threats and national security, and his dismissal of the relevance of national security to response strategies for dealing with environmental threats.

Defining National Security

Levy begins by offering his own definition of "national security," ostensibly in the interest of encouraging security studies and security policy communities to seriously consider of environmental threats. But defining "national security" is not merely a formal preliminary to the main issue; it is the essence of the issue itself. International security studies as an academic field has long limited its scope to problems involving interstate violence or state perceptions of threat from other state actors. A definition of security that does not involve a threat from an external enemy would prejudice the argument in favor of the environmental security advocates, while a definition that does require such a threat would prejudice the argument in favor of the traditionalists.

Levy's discussion of the definition of "national security" has no intellectual integrity. He is less concerned with the logical or empirical drawbacks and advantages of a definition than he is with its acceptability to the "mainstream security studies community." (Richard Ullman's definition, for example, is dismissed because it has not been cited favorably in the security studies literature.) Levy's own definition—and the interpretative statements surrounding it—are self-evidently aimed at finding favor with the security studies "mainstream." While the definition itself does not require an enemy threat, Levy manages to signal to the traditionalists that he really means for it to be interpreted in that way. He defines a threat to national security as "a situation in which some of the nation's most important values are drastically degraded by external action."[2] This definition is artfully ambiguous on whether external "action" is meant to imply hostile intent or not.

But Levy places the definition within a web of statements aimed at convincing security traditionalists that he, unlike Ullman, would not allow the concept of national security to be "swamped by intruders." He notes that his definition "emphasizes protection of national values against foreign threats," thus equating "external action" with "foreign threats." Then Levy explains that "a focus on the actions of foreigners is a defining trait of security studies; one cannot expunge that from one's definition and still claim to be talking about the same subject."[3] In fact, it is threats from potential foreign enemies that are the defining trait of traditional security studies, not "external actions". By this disingenuous device, Levy implies that his definition really requires a potential enemy, as does the traditional definition.

Even more egregious is his suggestion, in a footnote, that a criterion for separating security threats from other threats is to "ask whether the values affected and the degree of degradation threatened are sufficient to provoke a military defense," adding, "For any security threat, one can ask, 'Would we fight over it?'"[4] This is an intellectually useless criterion, even in the context of traditional security issues, since it invites purely subjective judgment. Moreover, the criterion is clearly irrelevant to consideration of threats to national well-being which stem from the cumulative actions of many nations, such as ozone depletion, climate change and biodiversity loss. It would be foolish, for example, to argue that the United States should go to war over worldwide emissions of carbon dioxide that could cause climate change, even if there were universal agreement that the issue is of paramount importance to the United States: the means would simply be inappropriate to the end. Yet it is precisely this criterion that Levy later uses as his *only* argument against the inclusion of one major global environmental threat as a "security problem."

Gareth Porter is the International Program Director at the Environmental and Energy Study Institute. He is the author of four books on Southeast Asian politics and co-author of Global Environmental Politics, *which was published in a second edition in 1996.*

Levy's Environmental Security Strawman

Levy's problem is that he cannot dismiss the substantive argument for environmental security on the basis of any empirical or logical argument. So he seeks instead to discredit the whole school of thought by characterizing its major proponents as intellectually lazy and dishonest, and as having a hidden political agenda. His attack on the proponents of treating global environmental threats as national security problems is based on an egregious strawman. He alleges that proponents of linking environmental threats and national security (Jessica Tuchman Mathews, Norman Myers and Joseph Romm, among others) assert that environmental degradation is *ipso facto* a national security risk, that they have avoided "delineating precise mechanism by which U.S. interests are affected" and have failed to "propose and justify specific control measures."[5] Levy chooses to ignore the abundant evidence in the writings of Mathews and Myers that contradicts him. In fact, Mathews, Myers and Romm have offered many specific analyses of direct physical links between environmental problems and security, as well as specific policy recommendations.

The issue is not how many interests are affected by global environmental threats, but whether those interests can be legitimately included in a larger category called "security interests."

A brief summary of the physical links discussed by these authors reveals the hollowness of Levy's argument. Mathews refers to a series of physical impacts that climate change could have on the United States and other world regions: inundation of coastal regions, pollution of water supplies, flooding of the Mississippi river delta, increased hurricanes, droughts and typhoons. Myers and Romm both discuss the possibility of crop failures in the midwest and water shortages. All three note that ozone depletion will certainly result in increased cases of skin cancer, and Mathews and Myers also cite the possibility of impacts on the human immune system and on plant and animal life. Myers specifically introduces evidence that increased exposure to harmful ultraviolet radiation reduces crop yields and phytoplankton, the basis of the marine food chain. Furthermore, Myers notes that the loss of genetic diversity would affect the productivity and security of U.S. agriculture.[6]

Levy's claim that the advocates of environmental security do not offer concrete, substantive policy solutions for specific environmental threats is equally spurious. Myers, who has particular expertise on biodiversity, discusses a series of economic policy issues, all of which address the loss of biodiversity.[7] Romm presents an even more detailed array of policy recommendations on climate change involving not only taxes and subsidies but research and development policy, energy conservation in federal facilities and low-income housing and reform of regulatory policy.[8] And Levy contradicts his own argument by conceding that Mathews does indeed offer specific policy recommendations.[9]

"Double-Counting" and "Raiding the Security Issue"

Levy asserts that the proponents of environmental security are engaging "either in double counting or in rhetorical flourishes aimed at boosting public support for environmental protection, and neither is defensible."[10] Here Levy displays his own penchant for substituting a rhetorical device for facts or logic. "Double-counting," a well-known problem in quantitative research, occurs when a single phenomenon is counted under two different categories, thus leading to double counting of the number of times that particular phenomenon occurs.

But Levy defines double-counting as "count[ing] the interests affected twice, once on their own terms, and then a second time because they constitute a 'security' interest."Using the term "double-counting" to refer to the environmental security issue is absurd. The issue is not *how many* interests are affected by global environmental threats, but *whether* those interests can be legitimately included in a larger category called "security interests."

Levy's real quarrel with the proponents of environmental security, is that they are, in his words, trying to "whip up greater support for global environmental protection" and to influence the "competition for budgetary and other scarce resources." Levy implies that such a political aim is not entirely honest and straightforward and that its proponents must therefore keep this rationale "hidden from view."[11]

To anyone familiar with the history of the concept of national security in the United States, this is an astonishingly brazen argument. National security has always been both an analytical tool and a political symbol of high national priorities. To recognize that a particular interest is a "national security" interest has meant attributing to it an urgency that overrides political and financial obstacles. The national security bureaucracy and political leaders have used the term "national security" and "national security threat" over nearly five decades to promote a wide variety of policy initiatives and programs which they believed to be in the national interest.[12]

Proponents of environmental security operate within a political system in which the definition of national security has obvious policy implications. To argue that they should not try to influence the nation's policy and budget priorities by broadening the definition of national security is to suggest that they should have to operate under a set of rules that is different from that used by specialists for traditional security threats.

It is even more outrageous to suggest that efforts to influence such decisions by creating a new intellectual climate are somehow being "hidden from view." In fact, proponents of environmental security have openly called for changes in policy, institutional mechanisms or budgetary allocations to reflect the new importance they argue should be accorded to global environmental threats. Contrary to Levy's charge that the literature on environment and security does not address "large-scale tradeoffs among competing national interests,"[12] both Myers and Romm have explicitly addressed such tradeoffs. Myers gives a multitude of examples of how much can be accomplished to make the world more environmentally sustainable with just a tiny fraction of the money being spent on military security (the money needed to provide family planning facilities to all couples worldwide who want them for a year, for example, would cost about the same as a single day's military spending).[14] Romm details the possibilities for deep cuts in military spending in order to increase national security in the broader sense.[15]

These are not the tradeoffs, of course, that Levy wants the environmentalists to talk about. He insists that environmentalists focus only on the tradeoffs among various global environmental threats, not the tradeoffs between traditional military programs and response strategies for global environmental threats. Such a narrow focus would minimize the impact on the budgetary status quo. It would also be intellectually dishonest.

Global Environmental Threats and National Values

Since he blasts advocates of environmental security for allegedly failing to articulate the distinction between real security threats and environmental problems in general, one might expect Levy to analyze each major global environmental problem carefully to illustrate how such distinctions can and should be made. But he has very little to say about various global environmental problems. Levy argues that most global environmental threats, such as ocean pollution, soil erosion, over-fishing and biodiversity loss, "do not affect vital interests, or do so only indirectly, by playing a role in a more complex causal mechanism in which other factors loom important." He argues that these environmental problems, which he calls "indirect security risks" do not deserve to be included in the category of "security threats."[16]

To say that an issue affects our vital interests "only indirectly" and therefore does not qualify as a security issue, suggests that a chain of causality that is indirect cannot seriously affect the well-being of people. But this is manifestly untrue: threats are no less serious because they operate through a complex chain of causality. In fact, the distinction that Levy tries to make between the "direct security risks" (ozone depletion and climate change), on one hand, and the "indirect security risks," on the other, does not hold up under scrutiny. Neither ozone depletion nor climate change threatens the physical well-being of Americans *directly*. Instead the physical impact of both is only via indirect chains of causality, with several links.

The depletion of the ozone layer obviously does not affect human beings directly. Rather, it allows harmful ultraviolet rays to enter the atmosphere, and penetrate humans and other living organisms. Skin cancer rates and blindness may not be the most serious impacts on human beings, since there are ways of reducing the risk. The more *indirect* impacts, of ozone depletion, however, such as reducing the productivity of food crops or the reproduction of the phytoplankton in the oceans, could, in fact, be much more serious in the long run.[17]

In the case of climate change, the chain of causality is equally or even more complex: its potential impacts on human health, for example, would be the result of migrations of disease vectors in response to ecosystem shifts caused by climate change.[18] And climate change would affect water supplies via the mechanism of sea level rise, which is itself an indirect effect of climate change.

Levy dismisses biodiversity as a threat to the well-being of Americans—his only justification for the generalization that no other global environmental threat has such physical implications. His reasoning is not only entirely specious, but it also reveals his complete lack of understanding of the problem of biodiversity loss. The full text of this argument is worth careful analysis, since it is the pivotal argument in his case that ozone depletion and climate change are the only forms of global environmental degradation worthy of serious consideration as threats to Americans:

> If a foreign power somehow were able to threaten to destroy the ability to make penicillin for all time, that would surely constitute a security threat that would justify the use of force. But if a foreign power threatened to destroy its own ability to create things equally as beneficial as penicillin and

> which it could sell in the future would other powers ever consider using force to prevent that? The answer has to do with the circumstances under which the failure to save a life is morally equivalent to the taking of a life — a complex question.[19]

In this brief "note," Levy manages both to suggest a criterion for assessing the threat that is irrelevant and to use an analogy that misrepresents completely the nature of the problem of biodiversity loss! The threat of biodiversity loss is not that a single country will destroy its *own* ability to create a possible new medicine, but that all countries will destroy the ability of mankind to create that medicine, because the genetic materials that would have provided the basis for the invention will have disappeared from the earth. Again, the question of whether nations would consider using force to prevent this form of global environmental degradation could not be more irrelevant, since the problem is not traceable to a single country, and is the result of multiple economic and social factors. And the importance of biodiversity to U.S. well-being does not depend on the "would we fight?" criterion, the moral distinction between taking a life and failing to save it has nothing to do the real world problem of biodiversity loss either.

Notwithstanding Levy's bizarre reasoning, the loss of species—and of genetic diversity within species, which he fails to mention—threatens humankind's ability to respond not only to existing human and plant diseases, but to unexpected changes in disease, pests and climate in the future.[20] Biodiversity is like a vast library of books that a researcher will need to use to solve problems. If the library is destroyed, the ability to solve those problems is also destroyed. And the fact that the threat cannot be traced to a single state and that threats of force are useless does not lessen the danger to the security of mankind and of the American people.

Environmental and Military Programs as "High Politics"

Another of Levy's argument is that responses to global environmental threats are perfectly adequate without categorizing them as security threats. He cites stratospheric ozone depletion as an example of a problem that did not have to be treated as a national security issue in order to produce the measures necessary to reduce the threat. It is true that the adoption of an adequate response strategy did not require that ozone depletion be defined as a national security issue, but this does not dispose of the issue. In the absence of a political determination that they are high national priorities, U.S. responses to other environmental threats are likely to be inadequate, particularly if there is any resistance to the required response strategy by key economic interest groups.

Levy goes even further to suggest that it would have been *more* difficult to justify the costs of the actions taken to phase out chlorofluorocarbons (CFCs) had the issue been treated as a national security or "high politics" issue. "It is hard to imagine," he writes, "how we could have considered the ozone problem as gravely as the environment and security literature calls on us to do without also considering the costs as gravely as we do [with regard to] conventional security risks."[21]

He asserts that an ozone depletion response strategy was just as expensive as a "major weapon system" and less than Bush's four-year request for spending on the Strategic Defense Initiative (SDI), and that therefore it would probably have been vetoed had the expense been subject to the political scrutiny given to weapons systems. But his presentation of the relative costs of an ozone depletion mitigation policy and of the Strategic Defense Initiative (SDI) is not just inaccurate; it is wrong by orders of magnitude. It should be noted that the costs of implementing the Montreal Protocol were never budgetary costs, and therefore, would never have been the subject of the same kind of Congressional review as weapons systems, even if the issue had been considered a national security issue. Even if the costs were assumed to be comparable, it is extremely misleading to suggest that implementing the Montreal Protocol is equivalent to procuring a major weapons system—and even worse to suggest that it is more expensive. The figure cited by Levy—$49 billion for the estimated costs of implementing a 100-percent phase-out of CFCs and halons by the year 2000—is from a 1989 EPA study which calculated the costs and benefits of several response options over a period of 87 years. Thus the annual cost of this option for the entire period was $563 million annually.[22]

By way of comparison, the average annual cost of a major weapons system in FY1994 was $940 million ($245 million for the Army, over $1 billion for the Navy and more than $1.6 billion for the Air Force).[23] So major weapons systems are two to three times more expensive on average than the estimated cost of implementing the Montreal Protocol. The Bush Administration's last four-year request for the Strategic Defense Initiative was for $39 billion, i.e., nearly $9.7 billion annually.[24] So Bush's SDI project was about 20 times more expensive than the non-budgetary costs of the ozone response strategy.

Even this comparison is misleading, because it does not yet taken into account the *benefits* to society of the Montreal Protocol implementation strategy. The EPA estimated that the benefits of phasing out CFCs, based on the assumption that ozone depletion causes nearly 900,000 potentially fatal skin cancers

over the entire period, at $41 billion annually—77 times greater than the estimated social costs. This calculation of benefits did not even include any estimates of the value of avoiding damage to the human immune system, to plant species or to marine ecosystems.[25]

Contrary to Levy's assertion, then, had the ozone depletion response strategy been considered a national security issue and both benefits and costs subjected to political scrutiny, it would have had the distinct political advantage of extremely low costs and extremely high benefits, compared with the costs and benefits of weapons systems.

Levy similarly argues that treating global warming as a security issue would not significantly affect the policy response. The only evidence he advances for that argument however, is that EPA's "Green Lights" program has succeeded in reducing energy use on a shoestring budget.[26] No one familiar with the problem would suggest that voluntary programs like "Green Lights," as cost-effective as they have been, can by themselves reduce U.S. emissions of carbon dioxide sufficiently to make a dent on the problem of climate change. A successful response strategy for mitigating climate change, moreover, will have to involve both changes in economic policies that are opposed by major economic interests as well as significant public investments in energy efficiency and renewable energy development in the major developing country economies. It is reasonable to assume, therefore, that the United States will not commit itself to programs needed to reduce the threat unless if it is clearly understood by Congress and the public that the risks to American health and economy inherent in the worst potential impacts of climate change are just as serious as threats associated with traditional security issues.

Conclusion

Levy's attempt to discredit the idea that national security should conceptually broaden to include global environmental threats is lacking in intellectual substance. There is not a single coherent, logical or empirically-based argument in the entire article in support of his major contentions, and much of which are grossly inaccurate or illogical. Those who find the idea of environmental security uncongenial may wish to think twice before relying on Levy as their intellectual standard-bearer. ❑

Endnotes

1. Marc A. Levy, "Is the Environment a National Security Issue?" *International Security* 20:2 (Winter 1995): 35-62; Thomas Homer-Dixon, "Correspondence: Environment and Security," *International Security* 20:3 (Winter 1995/96): 189-194.

2. Levy, "Is the Environment a National Security Issue?", 40.

3. Ibid., 41.

4. Ibid., 41.

5. Ibid., 42, 46.

6. Jessica Tuchman Mathews, "Redefining Security," *Foreign Affairs* 68:2 (Spring 1989): 169-171; Norman Myers, *Ultimate Security: The Environmental Basis of Political Stability* (New York: W.W. Norton, 1993), 166-167, 184, 199, 205; Joseph Romm, *The Once and Future Superpower* (New York: W.W. Norton, 1993).

7. Ibid., 233-239.

8. Romm, *The Once and Future Superpower*, 139-150.

9. Levy, "Is the Environment a National Security Issue?", 42.

10. Ibid., 43.

11. Ibid.

12. See Barry Buzan, *People, States and Fear: The National Security Problem in International Relations* (Chapel Hill, NC: University of North Carolina Press, 1983): 4-9; Romm, *The Once and Future Superpower*, 52-57.

13. Levy, "Is the Environment a National Security Issue?", 52.

14. Myers, *Ultimate Security*, 219-225.

15. Romm, *The Once and Future Superpower*, 197-217.

16. Levy, "Is the Environment a National Security Issue?" 47.

17. Frank R. de Gruijl, "Impacts of a Projected Depletion of the Ozone Layer," *Consequences* 1:2 (Summer 1995): 12-21.

18. "If the Mercury Soars, So May Health Hazards," *Science* 267 (17 February 1995): 149-150.

19. Levy, "Is the Environment a National Security Issue?" 48.

20. See, for example, Jeffrey A. McNeely et al. *Conserving the World's Biological Diversity* (Gland, Switzerland and Washington, D.C.: IUCN, 1990), 25-34.

21. Levy, "Is the Environment a National Security Issue?", 50.

22. Nancy Dickson, William Clark et al., "Stratospheric Ozone Depletion in the United States: A Historical Perspective of Risk Management," Draft contribution to the project on Social Learning in the Management of Global Environmental Risks, Center for Science and International Affairs, Kennedy School of Government, Harvard University, August 1992, 3-C (2).

23. These figures are the averages for all 19 major new weapons systems under acquisition in FY 1994 and do not include three upgrade programs and one oceanographic ship. Steven Kosiak, *Analysis of the Fiscal Year 1994 Defense Budget Request* (Washington, D.C.: Defense Budget Project, 1993), Table 8.

24. Les Aspin, Report on the Bottom Up Review (Washington, D.C.: Department of Defense, 1993), 43.

25. Dickson, Clark et al, "Stratospheric Ozone Depletion," 3-C (2).

26. Levy, "Is the Environment a National Security Issue?"

Jack Goldstone

Marc Levy claims that environmentalists are misappropriating the "threatening actions" definition of national security to add glamour to their parochial concerns. Critics reply that Levy himself is offering a politically interested and parochial "militarized" view of security concerns. Nonsense on both sides, of course.[1]

Defining National Security

There is only one meaningful definition of national security, and it is not inherently military, environmental, or anything else. Variations of that definition guided us throughout the cold war, and long before. That definition goes something like this: A "national security" issue is any trend or event that (1) threatens the very survival of the nation; and / or (2) threatens to drastically reduce the welfare of the nation in a fashion that requires a centrally coordinated national mobilization of resources to mitigate or reverse. While this seems common sense, it is clear from this definition that not any threat or diminution of welfare constitutes a national security threat; what does constitute such a threat is a matter of perception, judgment, and degree—and in a democracy, a legitimate subject for national debate.

Historically, in a world in which international trade was limited, and the environmental effects of human action were generally small-scale, just about the only source of such national security threats *was* military action. But in a world in which international trade flows now create a large portion of many nations' wealth, and in which the environmental effects of human actions are increasingly noticeable, the possibility that trade and environmental issues are sources of national security threats must be seriously considered. Indeed, by the 1980s, trade issues were indisputably added to the domain of national security concerns. In the 1990s, the question of whether environmental issues should be added is being disputed. But it is NOT the definition of national security that is being assaulted. What has begun is an empirical assessment, within an existing and long-reasonable definition, of whether environmental trends, because of their threat to our survival or welfare, *must* be given attention according to this definition.

Arguments over whose definition of national security should prevail are jousts on toy horses. The only thing that matters in the real world is whether environmental trends *do* pose threats either to our survival or welfare that require large scale national efforts to avoid, mitigate, or reverse. If they do, they are *ipso facto* national security concerns. If not, then not. But that is an empirical question that requires ongoing investigation, and not dismissal or embracing on *a priori* grounds.

The Environment and National Security

We would definitely label a concerted effort by terrorists to triple or quadruple the incidence of hurricanes along the Atlantic seaboard to be a national security threat. I do not see why inadvertent actions that change climate and do the same thing (much as an accident leading to an inadvertent nuclear missile launch) would not also be considered a national security threat.

But if we are to avoid cowering at false demons, or being blindsided by genuine threats, we need to carefully inventory and examine the likely pathways by which environmental issues could affect national security.[2] There is a growing consensus that the range of *possible* security threats worthy of consideration and assessment includes the following:

[1] Global systemic environmental changes, such as temperature or climate changes that could affect the habitability or productivity of large regions, or ozone or pollution effects that could impose substantial increases in morbidity and mortality for large populations.

Jack A. Goldstone is a Professor of Sociology and International Relations at the University of California at Davis, where he also directed the Center for Comparative Research on History, Societies and Culture. He recently served on Vice President Gore's Task Force on State Failure.

[2] National or regional environmental changes, such as diminishing access to, or substantial depletion or degradation of, land, water, animal stocks, or energy by large populations, which in the absence of economic development to mitigate consequences or political institutions capable of resolving disputes, could lead to:

> (a) national or regional conflicts (civil and ethnic wars, revolts and revolutions) that destabilize national governments or international borders, and/or
>
> (b) humanitarian crises (including wars, famines, and national or international migration or refugee flows) that create pressing demands on resources of the United States.

[3] Local events or trends which threaten to destroy or degrade valuable environmental resources creating significant disruptions or irreplaceable losses to our future welfare, such as major oil spills or other severe polluting events in vulnerable ecosystems (Alaska, Caspian Sea, Lake Baikal), the elimination of old growth or tropical rainforest or other biodiversity stores, or deliberate environmental ravaging such as the Kuwait oil fires set by Iraq in the Gulf War.

It should be evident from this list that the kinds of environmental issues that pose possible security threats are varied. Just as conventional security threats have varied content, (e.g. nuclear conflict, weapons proliferation, conventional war, terrorism, ethnic conflicts) each of which can only be properly assessed with appropriate expertise, so too environmental security issues require varied expertise. One would not expect to find one author dealing with true cutting-edge concepts on global warming, tropical storm incidence, oil spills, civil wars due to resource-related conflicts, refugee flows, and humanitarian crises. Thus the first realistic principal for assessment of environmental security is to break it down.

Just as an assessment of conventional security threats would not say, *en to*, that we do or do NOT have security threats—would ask whether we currently face threats of nuclear war, conventional war, terrorism, or ethnic conflicts, and how severe each currently is or is likely to be—so we should similarly approach environmental security. That is, it is foolish to ask whether we do or do not face environmental security problems. The sensible and immensely valuable question is to ask which of these possible threats we currently face, how severe each currently is, and how severe are they likely to become. I am a political sociologist. Thus, I leave to global environmental scientists the assessment of concerns in category [1], and to ecologists the assessment of concerns in category [3]. Further, as a specialist in revolution and rebellion, I shall leave to experts in migration and humanitarian crises assessment of concerns in category [2](b). For the remainder of this essay, I will focus on assessment of the concerns in category [2](a)—whether environmental problems can and will lead to regional and national conflicts. That too is the focus of Thomas Homer-Dixon's projects, which have attracted so much controversy.

The Environment and Political Conflict

Let me state a "strong" and a "weak" position on the relationship between environment and political conflicts. The strong position would go something like this: In the future, with the passing of the Cold War, environmental issues will be the main threat to national security; even "traditional" security problems, like regional wars and revolts, will be rooted mainly in environmental change. Hence a whole new paradigm of national security is required to safeguard our future. This "strong" position appears as a possibility in some of Homer-Dixon's writings, and is strongly expressed in Robert Kaplan's famous *Atlantic* article, which in turn seems to have colored many of the current Administration's views of the environment/security nexus.[3]

In fact, there is a plausibility to the "strong" argument if one is discussing global systemic change. If we ask what—other than nuclear war—has the potential to render major parts of the U.S. uninhabitable, or destroy billions of dollars worth of property, or lead to the illness or death of millions of Americans, the only plausible answer is a major change in climate or radiation exposure due to greenhouse or ozone-depletion effects. In fact, I think most critics of the "environmental security" literature would accept that if this kind of threat were firmly demonstrated, it would indeed constitute a security threat requiring a response.

What critics like Levy object to most in the strong argument is the characterization that even traditional security issues such as regional conflicts and revolts will in the future be driven mainly by environmental concerns. To be blunt, Homer-Dixon's arguments regarding the importance of environment/security links could be read as suggesting that in the future, shortages of firewood in India and Pakistan will be a more important source of violent conflicts in those regions than nuclear proliferation, ethnic competition, or religious conflicts. Or that in that same future, state failure in Africa will more often be caused by erosion of farmland than by corrupt rulers, self-aggrandizing military elites, mismanaged economic policies, or international weapons flows.

This is a provocative and intriguing argu-

ment, and it has deservedly garnered extensive attention. Fortunately or unfortunately, it is also almost certainly wrong, as even the empirical studies carried out under the aegis of Homer-Dixon's research projects demonstrate. *Neither Homer-Dixon nor any of the scholars associated with his projects have been able to demonstrate that large scale regional conflicts, either wars or major rebellions or revolutions, directly result from the depletion or degradation of environmental resources.*

It is true that Homer-Dixon and his collaborators have been able to point to small-scale and local conflicts over environmental resources: disputes between towns over a well, or border disputes between states or provinces over pollution or migration flows, or even teapot-scale diplomatic tempests between nations over fishing or riparian rights. But such conflicts are not exactly new: ancient Egypt sent expeditions into the Sudan to protect its control of the Nile river, and nobles and commoners in early modern Europe fought over the right to fell forests vs. maintaining them as hunting preserves. But if we set aside small-scale and local violent conflicts, and we look for conflicts arising from the depletion or degradation of resources, as opposed to conflicts due to the mere existence of a valuable resource and conflicts over claims to own or exploit it, we come up empty handed. The idea of large-scale, national security-type threats to regional stability arising from environmental change remains simply an idea, and rather of the red-herring variety—the more you look for it, the less you see of it, and the less you see what is really happening in situations of violent conflict.

The idea of large-scale, national security-type threats to regional stability arising from environmental change remains simply an idea.

This is mainly because the depletion and degradation of environmental resources are virtually a prerequisite for historical patterns of economic progress. When nations become rich enough, they of course act to conserve resources and mitigate environmental damage. But in the progress from poverty to riches, virtually all states have had to deplete and/or degrade natural resources. Most of those states do not succumb to violent war or revolution in the process. Those that do succumb do not fall simply because they depleted or degraded their resources, or did so faster or more completely than others.

Rather, civil conflicts arise because during the transition from poverty to riches they develop other problems—mishandling issues of equity, of regional or ethnic competition, or squandering resources in a manner that halts their growth.

It is to Homer-Dixon's credit that he never simply advocated the strong argument; he has instead sought to find the conditions under which environmental scarcity can produce violent conflict. Moreover, in his more recent work, based on the empirical findings of his teams' research and on theoretical work by myself and others, he is moving toward a weaker but far more realistic and valuable position. This weak position does not make environmental change the prime force in national security issues. Instead, it argues that a combination of environmental and, most importantly, demographic changes may lead to major regional crises in the context of certain institutions, namely weak or inflexible states and economic regimes.[4]

While I have great admiration for Homer-Dixon's work, and the empirical findings of the research teams he has directed, I do not think he has gone far enough in developing a realistic, if weaker, position on environmental security issues that could be not a red herring, but a valuable enrichment of security thinking. Let me sketch out what such a position might look like. A further article in the next issue of this journal will develop a view of environmental/population threats to the stability of political institutions, and some appropriate institutional responses, in more detail.

Population, Environment, and Political Conflict—Advancing the Argument

If environmental depletion and degradation are to some degree a normal development on the path to economic progress, then concerns with national security issues are only affected if something goes severely wrong; that is, if the equity, competition, or resource squandering problems grow large rather than being avoided or resolved. At this point, it becomes valuable to consider an element often alluded to in discussions of environmental security, but poorly understood—the role of rapid population growth.

Population growth, by itself, is neither good nor bad. There is no evidence that such growth is generally an obstacle to development.[5] However, population growth acts as a powerful multiplier of trends within a society. If a society is reasonably well and widely educated, or has underutilized resources to which there is relatively open access, then population growth can facilitate development, acting as part of a virtuous circle of increasing productivity and national wealth. On the other hand, if a society is poorly educated and has scarce or highly concentrated resources with limited access, population growth can aggravate inequities, increase competition, and motivate a vicious cycle in which groups fight ever-more fiercely for whatever resources are within reach.

This multiplier effect of population growth can render it a powerful factor in national trajectories. A society that experiences rapid population growth at the wrong time—that is, when its resources and wealth are severely unevenly distributed, when its elites are insecure or its government institutions of questionable legitimacy; or when large portions of its youth see their paths to progress blocked by corrupt or discriminatory elites—is heading for big trouble. This is not a historically new phenomenon. I have shown elsewhere that population growth acted to amplify conflicts in early modern European monarchies and Asian Empires, from the Renaissance to the onset of industrialization.[6] But what is novel in the modern world is that progress in public health and nutrition has led to booming population growth rates at the same time that modern anti-colonial and nationalist politics have created a large number of states that remain "at the wrong" stage to benefit from such growth. Too many states in Latin America, Africa, the Middle East, and Asia have great inequality, elites who are insecure or corrupt or discriminatory, or governments of questionable legitimacy. In those circumstances the demands and competition among groups and elites that are fueled by population growth can overwhelm states, leading to political breakdowns and chaos.

Homer-Dixon is right that this view does lead to a new paradigm, what I have elsewhere called a "Poet-Malthusian" view of the impact of population growth on society.[7] In Malthusian thought, environmental resources are exhaustible and population growth relentlessly diminishes those resources, at least on a per capita if not absolute basis; population pressure on resources therefore leads directly to scarcity-induced conflict. Far from testing this hypothesis, my work and the latest version of Homer-Dixon's work seek to *replace* it with something better. In this post-Malthusian approach, issues of allocation and access to resources, state capacity to resolve conflict, and elite competition over sources of revenue and power play a far more important role than the total amount of resources or the simple population/resource ratio.[8]

For example, China's stability is thought by some writers to be challenged by a possible inability to feed itself. This is simply speculation—other countries such as Korea and Japan increased food and animal feed imports as they grew, without thereby creating political crises. But a closer examination of the links between China's agriculture, elite and state revenue streams, and access to jobs is illuminating. Over the last 15 years, agricultural growth has both created rural employment for China's growing population and generated surpluses that the state reaped to help subsidize state industries and underwrite development. But in the next twenty years, when China will add 300 million new Chinese, it is unlikely that agriculture will continue to play these roles. The current intensity of agriculture is such that additional deployment of labor is likely to meet with diminishing returns; indeed it is more likely that people will leave agriculture as China seeks to increase its efficiency of land and labor use. This means that China will experience an accelerating movement—already quite evident—of its population off the land and into rural and urban industrial jobs.

Moreover, the gains from agriculture will increasingly have to be allocated to farmers to encourage investment and increased production, rather than diverted to the state. And in any event, agriculture will become a far smaller part of national output. Where then will the state, and the elites that it supports, derive their revenues? Here is the crux of China's political problem: providing industrial jobs for its growing population will require either a massive expansion of the private sector, or massive subsidization of public industries. The first course will deprive the communist party of its reason for being and its levers of power; the second course will create inflation that aggravates inequalities and deligitimizes the regime. Changing balances of population and farmland thus do not threaten the Chinese population with starvation; but they may threaten the state with revenue starvation and political crisis unless the state can adapt to its new circumstances.[9]

As another example, we can examine the conflict in Chiapas that helped shake financial markets throughout Latin America. This was a small and easily avoidable conflict. Since 1917, Mexico had encouraged self-sufficiency among Indian populations by protecting land rights through *ejidos*, or communal land-holdings. Over the course of this century, population growth has made the *ejidos* increasingly uneconomic, leaving cultivators searching for additional sources of land or other sources of income. In the Chiapas region, population growth led to migration into the Lacandon forest, where squatters attempted to assert their rights to work the land and acquire legal rights similar to those of existing *ejidos*. But these squatter settlements came into conflict with commercially-oriented entrepreneurs, who wished to use the land for ranching. With the appearance of the North American Free Trade Agreement, the squatters of the Lacandon forest feared that the state and federal governments (who had long been distrusted by the peasantry) would inevitably favor commercial-oriented use of the land over their subsistence use, and that legal attempts to gain *ejido-like* security for their land would be doomed. Lacking other sources of livelihood, they turned to armed revolt and pleas to the world audience, calling attention to the corrupt and non-democratic government

of Chiapas (and by extension of Mexico) in the process.[10]

This revolt could have been avoided had the Mexican government better appreciated that population growth was leading to local land shortages, and that the government needed to act to peacefully resolve impending conflicts between elite and popular groups competing for control of land, in the absence of local institutions that were trusted to fairly settle elite/popular disputes. Indeed, Mexico—like many other developing countries—is facing severe political problems not because population growth is exhausting its resources, but because population growth is exacerbating multiple local conflicts over access to land and jobs *at a time when the government is not seen as having the legitimacy to fairly settle those conflicts*. Elites fighting elites, and popular groups fighting elites, are therefore more likely (as they already have) to take matters into their own hands by striking at the government or their opponents.

In this "weak" version of the environmental security argument concerning violent political conflicts, neither environmental degradation nor population growth by themselves act as the motors of regional political crises. But the depletion or degradation of resources, and particularly the growth of population, can aggravate problems of inequity, ethnic or regional competition, and governments' ability to respond to popular demands and resolve conflicts. The key to avoiding crises and state failure is anticipating the resource management and allocation changes needed to sustain incomes for varied sectors of the population as economic growth and technological change alter the relationships between the population and resources, and making sure that institutions are in place—whether private market or governmental institutions—that are considered fair means for achieving those allocation changes.

Let me offer an analogy. If you're driving a straight and smooth road, pushing the accelerator doesn't greatly raise the chances of a crash; indeed it can help you get where you are going faster. However, if the road is bumpy and has lots of tight curves, hitting the accelerator can quickly send you out of control. For those countries whose legacy of economic, political, and ethnic structures leaves them at a bumpy, twisty, place on the road to development, rapid population growth is like nailing down the accelerator. We'd better figure out how to loosen that pedal, as well as how to navigate and eventually smooth out the bumps and twists in the road, so we can get to the point where fast travel is not such a problem.

Conclusion

Discussions of environmental security are poised to advance as we gain more specific knowledge of the world's climate and its nations work. We need to determine whether global systemic environmental changes really do threaten to destroy productivity and increase morbidity and mortality on a massive scale. And we had better improve our ability to respond to local environmental catastrophes that threaten irreplaceable resources. Fortunately, scientific and government agencies are already hard at work on these issues. We probably shouldn't be too alarmed at the possibility that regional or national environmental changes will somehow replace ethnic conflicts, corruption, or failed economic policies as the sources of regional conflicts or state failures. That formulation of the problem is fundamentally misguided. But we should devote some energy to truly understanding the interactive effects of population growth and environmental depletion and degradation with the more conventional obstacles in nations' paths to stable government and prosperous economies. A considerable amount of research at least suggests that if we better understood the impacts of population/environmental issues on stability in certain kinds of countries, we could do a better job of assessing the chances of state failure, and gain more leverage in averting or mitigating those failures. Even for students of conventional security issues, that addition of environmental issues to our repertoire of security policies is important.

Levy is certainly right that we do not need more research on"whether" environmental issues are involved in conventional regional armed conflicts and rebellions. What our security requires is better research on *what kinds of states* are likely to experience increased risks of failure due to population and environmental changes, *on ways to measure and anticipate the magnitude of such risks,* and examinations of the consequences of *policy measures designed to reduce those risks*. That I believe, is a research agenda on population/environmental issues and risks of state failure that is worth pursuing. ❑

Endnotes

1. Marc Levy, "Time for a Third Wave of Environmental Security Scholarship?" *Environmental Change and Security Project Report* Issue 1 (Spring 1995): 44-46, and the replies by Gareth Porter and Thomas Homer-Dixon in this issue.

2. On this, the Intelligence and policy communities ahead of the academic debate. The intelligence services have prepared themselves to gather and assess a wide variety of environmental data that can be useful in assessing security threats, rather than getting tangled in anxieties over whether this or that environmental issue is an "appropriate" area of concern.

3. Thomas Homer-Dixon, "On the Threshold: Environmental Changes as Causes of Acute Conflict," *International Security* 16 (Fall 1991); Robert Kaplan,

"The Coming Anarchy" *The Atlantic Monthly* 273:2 (February 1994): 44-76.

4. See Thomas Homaer-Dixon, "Strategies for Studying Causation in Ecological-Political Systems," Occasional Paper, Project on Environment, Population, and Security, The Peace and Conflict Studies Program, University of Toronto, and the American Association for the Advancement of Science, March 1995; and Valerie Percival and Thomas Homer-Dixon, "Environmental Scarcity and Violent Conflict: The Rwandan Case," Occasional Paper, Project on Environment, Population, and Security, The Peace and Conflict Studies Program, University of Toronto, and the American Assocaition for the Advancement of Science, March 1995. Homer-Dixon has now, in addition to his original concern with environmental scarcity, introduced the terms "demand-induced scarcity" to bring in population growth, and "structural scarcity" to bring in inequality and limited access of certain groups to resources. And a focus on state capacities to anticipate and resolve conflicts over access to resources has moved to the ofrefront of his current, aptly titled research program, the Project on Environmental Scarcities, State Capacity, and Civil Violence of the Peace and Conflict Studies Program, University of Toronto, and the American Academy of Arts and Sciences.

5. See D. Gale Johnson and Ronald Lee, ed., *Population Growth and Economic Development: Issues and Evidence* (Madison, WI: University of Wisconsin Press, 1987); and Robert Cassen, et al., *Population and Development: Old Debates, New Conclusions* (New Brunswick, NJ and Oxford: Transaction Publishers, 1994).

6. Jack A. Goldstone, *Revolution and Rebellion in the Early Modern World* (University of California Press, 1991).

7. Ibid., 31-37. The key concepts are a "focus on the Distributional effects of relative shifts in population and resources, rather than on massive shortages for whole societies;" a realization that such changes are "not simply proportional to changes in overall population, but often many times greater, particularly for marginal groups or when combined with price changes;" and that rather than focus on "sudden or unidirectional causes for revolutions and rebellions.. .it may be more useful to examine the impact of culminating forces on inflexible institutions...at a variety of levels of society," 37.

8. The complex and varied pathways by which population can affect national security are well laid out in Alex de Sherbinin's excellent essay, "WorldPopulation Growth and U.S. National Security," *Environmental Change and Security Project* Report Issue 1 (Spring 1995): 24-39.

9. These issues are considered in greater detail in Jack A. Goldstone, "The Coming Chinese Collapse," *Foreign Policy* 99 (Summer 1995).

10. Joseph M. Whitmeyer and Rosemary L. Hopcroft, "Community, Capitalism, and Rebellion in Chiapas," forthcoming in *Sociological Perspectives.*

Official Statements and Documents

Below are excerpts from recent official statements and public documents in which environmental issues are cited in a security context. The Wilson Center encourages readers to inform the Report *of other related public statements; please send a note to the address listed on the inside cover, or E-mail us at csheehan@sivm.si.edu.*

PUBLIC DOCUMENTS

1996 U.S. National Security Strategy

Excerpts from: 1996 U.S. National Security Strategy of Engagement and Enlargement
The White House, January 1996

[Editor's Note: The bold-faced text reflects significant changes or additions to the February 1995 version.]

Preface

Protecting our nation's security—our people, our territory and our way of life—is my Administration's foremost mission and constitutional duty. America's security imperatives, however, have fundamentally changed. The central security challenge of the past half century—the threat of communist expansion—is gone. The dangers we face today are more diverse...large-scale environmental degradation, exacerbated by rapid population growth, threatens to undermine political stability in many countries and regions....

Introduction

The strategy also recognized that a number of transnational problems which once seemed quite distant, like environmental degradation, natural resource depletion, rapid population growth and refugee flows, now pose threats to our prosperity and have security implications for both present and long-term American policy....(p.1)

...In October 1994, President Clinton transmitted the United Nations Convention on the Law of the Sea to the Senate for **its advice and consent to** ratification. This was the culmination of years of negotiations to ensure an equitable balance between the rights of coastal states to control activities in adjacent, offshore areas to protect their economic, security, and environmental interests and the rights of maritime states to free and unimpeded navigation and overflight of the oceans of the world. **This included an acceptable regime to administer the mineral resources of the deep seabed, thereby protecting U.S. interests....** (p.6)

...Through NAFTA's environmental and labor side agreements, we are working actively to protect the rights of workers and to reduce air and water pollution that crosses national boundaries. (p.7)

The President developed a Climate Change Action Plan to help reduce greenhouse emissions at home and launched the U.S. Initiative on Joint Implementation to help reduce emissions abroad. The United States also takes a leading role at the international level in phasing out ozone-depleting substances. In June 1993, the United States signed the Biodiversity Treaty and one year later, the Desertification Convention. (p.7)

With strong U.S. leadership, the United Nations successfully concluded negotiations on a multilateral agreement designed to reverse the global trend of declining fish stocks. The agreement complements the UN Law of the Sea Convention, giving direction to countries for implementing their obligation under the Convention to cooperate in conserving and managing straddling and highly migratory fish stocks. (p.7)

The Administration has asserted world leadership on population issues. We played a key role during the Cairo Conference on Population and Development in developing a consensus Program of Action, including increased

availability of voluntary family planning and reproductive health services, sustainable economic development, strengthening of family ties, the empowerment of women including enhanced educational opportunities and a reduction in infant and child mortality through immunizations and other programs. (p.8)

At the Summit of the Americas, the 34 democratic nations of the hemisphere agreed to a detailed plan of cooperative action in such diverse fields as health, education, **science and technology,** counter narcotics, **counterterrorism,** environmental protection, information infrastructure and the strengthening and safeguarding of democratic institutions, in addition to mutual prosperity and sustainable development. The Summit ushered in a new era of hemispheric cooperation that would not have been possible without U.S. leadership and commitment. **In the time since the Summit, progress on strengthening democratic institutions, thwarting international criminals and terrorists and preserving natural resources have helped improve the lives of the hemisphere's residents....** (p.8)

Advancing Our Interests Through Engagement and Enlargement

...Our engagement must be selective, focusing on the challenges that are most important to our own interests and focusing our resources where we can make the most difference.... Those interests are ultimately defined by our security requirements. Such requirements start with our physical defense and economic well-being. They also include environmental security as well as the security of our values achieved through expansion of the community of democratic nations....(p.11)

...We also face security risks that are not solely military in nature. **An emerging class of transnational environmental and natural resource issues, and rapid population growth and refugee flows, are increasingly affecting international stability and consequently will present new challenges to U.S. strategy....** (p.12)

...U.S. military forces and assets are frequently called upon to provide assistance to victims of floods, storms, drought and other humanitarian disasters. Both at home and abroad, U.S. forces provide emergency food, shelter, medical care and security to those in need.... (p.17)

...Finally, to enhance the study and support of worldwide environmental, humanitarian and disaster relief activities, technical intelligence assets**—especially imagery**—must be directed to a greater degree toward collection of data on these subjects.... (p.25)

The Environment and Sustainable Development

The more clearly we understand the complex interrelationships between the different parts of our world's environment, the better we can understand the regional and even global consequences of local changes to the environment. Increasing competition for the dwindling reserves of uncontaminated air, arable land, fisheries and other food sources and water, once considered "free" goods, is already a very real risk to regional stability around the world. The range of environmental risks serious enough to jeopardize international stability extends to massive population flight from manmade or natural catastrophes, such as Chernobyl or the East African drought, and to large-scale ecosystem damage caused by industrial pollution, deforestation, loss of biodiversity, ozone depletion, desertification, ocean pollution and, ultimately, climate change. **Strategies dealing with environmental issues of this magnitude will require partnerships between governments and nongovernmental organizations, cooperation between nations and regions, sustained scientific research and a commitment to a strategically focused, long-term policy for emerging environmental risks.**

The decisions we make today regarding military force structures typically influence our ability to respond to threats 20 to 30 years in the future. **Similarly, our current decisions regarding the environment and natural resources will affect the magnitude of their security risks over at least a comparable period of time, if not longer.** The measure of our difficulties in the future will be settled by the steps we take in the present.

As a priority initiative, the U.S. successfully led efforts at the Cairo Conference to develop a consensus Program of Action to address the continuous climb in global population, including increased availability of family planning and reproductive health services, sustainable economic development, the empowerment of women to include enhanced educational opportunities and a reduction in infant and child mortality. Rapid population growth in the developing world and unsustainable consumption patterns in industrialized nations are the root of both present and potentially even greater forms of environmental degradation and resource depletion. A conservative estimate of the globe's population projects 8.5 billion people on the planet by the year 2025. Even when making the most generous allowances for advances in science and technology, one cannot help but conclude that population growth and environmental pressures will feed into immense social unrest and make

the world substantially more vulnerable to serious international frictions. (p.26)

Providing for Energy Security

...These facts show the need for continued and extended reliance on energy efficiency and conservation and development of alternative energy sources. Conservation measures notwithstanding, the United States has a vital interest in unrestricted access to this critical resource. (p.30)

Promoting Sustainable Development Abroad

Broad-based economic development not only improves the prospects for democratic development in developing countries but also expands the demands for U.S. exports. Economic growth abroad can alleviate pressure on the global environment, reduce the attraction of illegal narcotics trade and improve the health and economic productivity of global populations.

The environmental consequences of ill-designed economic growth are clear. Environmental damage will ultimately block economic growth. Rapid urbanization is outstripping the ability of nations to provide jobs, education and other services to new citizens. The continuing poverty of a quarter of the world's people leads to hunger, malnutrition, economic migration and political unrest. Widespread illiteracy and lack of technical skills hinder employment opportunities and drive entire populations to support themselves on increasingly fragile and damaged resource bases. **New diseases, such as AIDS, and other epidemics which can be spread through environmental degradation, threaten to overwhelm the health facilities of developing countries, disrupt societies and stop economic growth. Developing countries must address these realities with national sustainable development policies that offer viable alternatives. U.S. leadership is of the essence to facilitate that process. If such alternatives are not developed, the consequences for the planet's future will be grave indeed.**

Domestically, the United States is working hard to halt local and cross-border environmental degradation. In addition, the United States is fostering environmental technology that targets pollution prevention, control and cleanup. Companies that invest in energy efficiency, clean manufacturing and environmental services today will create the high-quality, high-wage jobs of tomorrow. By providing access to these types of technologies, our exports can also provide the means for other nations to achieve environmentally sustainable economic growth. **At the same time, we are taking ambitious steps at home to better manage our natural resources and reduce energy and other consumption, decrease waste generation and increase our recycling efforts.**

Internationally, the Administration's foreign assistance program focuses on four key elements of sustainable development: broad-based economic growth; the environment; population and health; and democracy. We will continue to advocate environmentally sound private investment and responsible approaches by international lenders. **As mentioned above, the Multilateral Development Banks (MDB s) are now placing increased emphasis upon sustainable development in their funding decisions, to include a commitment to perform environmental assessments on projects for both internal and public scrutiny. In particular, the Global Environmental Facility (GEF) established in 1994 provides a source of financial assistance to the developing world for climate change, biodiversity and oceans initiatives that will benefit all the world's citizens, including Americans.**

The United States is taking specific steps in all of these areas:

* In June 1993, the United States signed the Convention on Biological Diversity, which aims to protect and utilize the world's genetic inheritance. **The Interior Department created a National Biological Service to help protect species and to help the agricultural and biotechnical industries identify new sources of food, fiber and medications.**

* New policies are being implemented to ensure the sustainable management of U.S. forests by the year 2000, as pledged internationally. In addition, U.S. bilateral forest assistance programs are being expanded, and the United States is promoting sustainable management of tropical forests.

* **In the wake of the 1992 United Nations Conference on Environment and Development, the United States has undertaken initiatives to reduce land-based sources of marine pollution, maintain populations of marine species at healthy and productive levels and protect endangered marine mammals and coral reefs.**

* **The United States has focused technical assistance and encouraged nongovernmental environmental groups to provide expertise to the new independent states of the former Soviet Union and Central and Eastern European nations that have suffered the most acute environmental crises.** The Agency for International Development, the Environmental

Protection Agency and other U.S. agencies are engaged in technical cooperation with many countries around the world to advance these goals. **The United States has also been working bilaterally with a number of developing countries to promote their sustainable development and to work jointly on global environmental issues**.

* The Administration is leading a renewed global effort to address population problems and promote international consensus for stabilizing world population growth. Our comprehensive approach stresses family planning and reproductive health care, maternal and child health, education and improving the status of women. The 1994 International Conference on Population and Development held in Cairo, endorsed these approaches as important strategies in achieving our global population goals. **At the 1995 UN Conference on Women in Beijing, the United States promoted women's—and children's—international rights.**

* **With regard to the United Nations, the G-7 leaders at the Halifax Summit in 1995 endorsed an ambitious effort to modernize the organization's economic and social functions through better coordination, consolidation of related agencies, rethinking agency mandates and creating an effective management culture in a smaller and more focused Secretariat. Following President Clinton's call for a UN reform commission, the UN General Assembly established the High Level Working Group on Strengthening the UN System in September 1995.**

* **In April 1993, President Clinton pledged that the United States would reduce our greenhouse gas emissions to 1990 levels by the year 2000, in accordance with the Framework Convention on Climate Change. In March 1995, we and other parties to the Convention agreed to negotiate steps to be taken beyond the year 2000. We are resolved to deal forcefully with this threat to our planet while preserving U.S. economic competitiveness.**

* **The United States and other countries have agreed to protect the ozone layer by phasing out use of the major ozone-depleting substances. In 1995, we also agreed with other nations to decrease use of additional ozone-depleting chemicals**. (p.30-32)

Integrated Regional Approaches
(The Middle East, Southwest and South Asia)

In both the Middle East and South Asia, the pressure of expanding populations on natural resources is enormous. Growing desertification in the Middle East has strained relations over arable land. Pollution of the coastal areas in the Eastern Mediterranean, the Red Sea and the Gulf of Aqaba has degraded fish catches and hindered development. Water shortages stemming from overuse, contaminated water aquifers and riparian disputes threaten regional relations. In South Asia, high population densities and rampant pollution have exacted a tremendous toll on forests, biodiversity and the local environment. (p.43)

(Africa)

...In particular, we will seek to identify and address the root causes of conflicts and disasters before they erupt. (p.43)

Our humanitarian interventions, along with the international community, will address the grave circumstances in several nations on the continent. **USAID's new "Greater Horn of Africa" Initiative is building a foundation for food security and crisis prevention in the Greater Horn of Africa**. This initiative has now moved beyond relief to support reconstruction and sustainable development. In Somalia, our forces broke through the chaos that prevented the introduction of relief supplies. U.S. forces prevented the death of hundreds of thousands of Somalis and then turned over the mission to UN peacekeepers from over a score of nations. In Rwanda, Sudan, Angola, Sierra Leone and Liberia, we have taken an active role in providing humanitarian relief to those displaced by violence. (p.44)

We are also working with international financial institutions, regional organizations, private volunteer and nongovernmental organizations and governments throughout Africa to address the urgent issues of population growth, spreading disease (including AIDS), environmental decline, enhancing the role of women in development, eliminating support for terrorism, demobilization of bloated militaries, relieving burdensome debt and expanding trade and investment ties to the countries of Africa. The United States is working closely with other donors to implement wide ranging management and policy reforms at the African Development Bank (AfDB). The AfDB plays a key role in promoting sustainable development and poverty alleviation. (p.44)

(U.S. - Japan Framework Agreement)

The Administration is working with Japan to address common challenges to sustainable economic development through the Framework's Common Agenda for Cooperation in Global Perspective. Part-

nerships have been strengthened in the environment, human health and advanced technology development, and new initiatives were launched this year that address education, food security, counter-terrorism, natural disaster mitigation, combating emerging infectious diseases and nationbuilding. (p.29) ❑

1996 National Security Science and Technology Strategy

1996 National Security Science and Technology Strategy
The White House Office of Science & Technology Policy
Excerpts from: "Meeting The Challenge of Global Threats"

The President's 1995 *National Security Strategy of Engagement and Enlargement* recognizes that a broad class of global threats evident in the post-Cold War world affect our nation's security. The United States is not isolated from the effects of disease, disasters, or misery elsewhere in the world. In the modern world, diseases readily cross borders, and environmental degradation can have global consequences that threaten the populations of all nations. Great human suffering due to natural disasters or to other environmental, economic, or social and political factors may lead not only to large numbers of refugees crossing international borders but also to instability that increases the likelihood of ethnic and regional civil conflict. Understood in these terms, the security of the United States therefore requires engagement with the developing world and with countries in transition to democracy, to take steps to prevent deadly conflict, to encourage economic development that can be sustained for growing populations, and to respond to threats to the environment and human health.

Outbreaks of new or reemerging infectious diseases may endanger the health of U.S. citizens even if the root causes of the problem lie in distant parts of the world.... The rapidly growing human population, widespread pollution, and the deterioration of other environmental factors that contribute to the maintenance of good health, as well as the lack of dependable supplies of clean drinking water for fully a fifth of the world's people, contribute to the acceleration and spread of such diseases.

Natural disasters, the burden of which falls disproportionately on the poor, pose an especially dramatic threat to sustainable development. The costs of natural disasters are high and have been escalating. For example, domestic natural disasters...now cost the United States more than $1 billion each week. Internationally, the impacts can be greater still...[The resulting losses] represent enormous setbacks to a nation's or region's economic and human development.

Whereas natural disasters threaten human life and sustainable development in a catastrophic manner, global threats such as climate change, ozone depletion, and ocean pollution may take years or even decades to become apparent and build toward crisis. Yet each of these poses challenges to the health and long-term well-being of both U.S. citizens and people throughout the world.

The loss of biodiversity is an especially urgent threat, the consequences of which are irreversible. The permanent loss of species means we will no longer have these organisms as sources of medicines, oils, fibers, food, chemicals, and other commodities of importance to both industrial and developing societies.

The explosive growth of the world's population is of primary importance and exacerbates many of the dilemmas already discussed. In some developing countries, even the most impressive gains in total economic output can be offset by rapid population growth. Population pressures already contribute to violent disorder and mass dislocations in poor societies. Internally displaced persons—who might become refugees pose a long-term threat to the integrity of their own and other nations as well as to global stability.

As the world's population grows to exceed 8 billion people by 2025, most of this increase will occur in the cities of developing countries. Worldwide, urban population is expected to increase from 1 billion people in 1985 to 4 billion in 2025. Increases in income, greater urbanization (which leads to a shift in diet from roots, tubers, and lower quality grains to higher quality cereals, livestock, and vegetables), and overall population growth could mean that the demand for food in 2025 will be more than double that of current levels of production.

Individually or collectively, threats such as these can increase the likelihood of destabilization of countries in the developing world. Regional or civil conflicts, hastened or exacerbated by environmental stress, could involve the United States in costly and hazardous military interventions, peacekeeping, or humanitarian operations. As is the case in Haiti, severe environmental degradation and resource depletion may make economic recovery much more difficult, thereby prolonging dependence on aid and impeding

a nation's recovery from social or political chaos and progress toward democracy and prosperity.

The Challenge to Science and Technology

Research in the natural and social sciences helps us to understand the origins, characteristics, and consequences of global problems. Finding solutions to these problems, and elucidating the complex chains of cause and effect through which they may be linked, requires a coordinated effort by natural and social scientists, engineers, and policymakers. U.S. leadership in science and technology is therefore an important element of our national security.

In some cases, research and monitoring programs offer the only substantial warning to government officials and to the public of an emerging problem. For example, through remote sensing, we can have warning of famine and continue to accumulate a record of the state and evolution of the basic components of our biosphere. Such observations and measurements, coupled with the development of predictive models, are necessary tools for policymaking in the post-Cold War security environment.

Transforming scientific breakthroughs into new technologies can have a profound impact on development... One challenge is to use technology [to advance] productivity without compromising long-term natural resource viability. For example, technology helped bring about the Green Revolution, which resulted in increased agricultural productivity worldwide. But at the same time, poorly designed irrigation systems led to soil degradation in some areas. In the decades ahead, technology will be required to feed and provide energy for a growing world population while minimizing impact on the integrity of soil, water, air, forests, and other natural resources. In addition, insights from the social sciences can provide the basis for redesigning research and resource management institutions to achieve the efficient use of resources with minimal disruption to the environment. A major parallel challenge to science and technology will be to make contraception more affordable and effective.

Policy Response

The Administration's strategy for meeting the challenges described above rests on three pillars: preventive diplomacy, promoting sustainable development, and responding to global threats. Preventive diplomacy endeavors to resolve problems, reduce tensions, and defuse conflicts before they become crises. The promotion of sustainable development seeks to ensure that development occurs in a manner that can be maintained for the long term, thereby avoiding environmental, resource, or other degradation that fosters poverty and instability. Finally, there is a class of global threats that may take years or decades to become apparent or to build toward crisis but which may directly threaten the well-being of U.S. citizens as well as people around the globe. Responding to these threats will require decisive domestic action as well as international cooperation....

For a complete version of the 1996 National Security Science and Technology document, contact: The White House Office of Science and Technology Policy, Old Executive Office Building, Washington, DC 20500; Or visit the Internet Home Page: http://www.whitehouse.gov/white_house/eop/ostp/html/ostp_home.html. ❑

Statements by Warren Christopher
Secretary of State

Secretary Christopher's Remarks at Harvard University
Excerpts from: "Leadership for the Next American Century"

Our second major area of focus this year is to continue to take on new challenges to global security. As the President emphasized in a landmark UN speech last October, transnational threats like proliferation, terrorism, international crime, drugs, and environmental damage threaten all of us in our interdependent world....

...Protecting our fragile environment also has profound long-range importance for our country, and in 1996 we will strive to fully integrate our environmental goals into our diplomacy—something that has never been done before. We will seek further reductions in greenhouse gases and press for Senate approval of conventions on biodiversity and the Law of the Sea. Working closely with the Vice President, I have also focused on how we can make greater use of environmental initiatives to promote larger strategic and economic goals. That means, for example, encouraging joint water projects in the Middle East, increasing environmental cooperation with our global partners, and helping our environmental industries capture a larger share of a $400 billion global market....❑

Secretary Christopher's Memorandum to All Under and Assistant Secretaries on Complete Text: "Integrating Environment Issues into the Department's Core Foreign Policy Goals"
February 14, 1996 (Publicly Released)

Under the leadership of President Clinton and Vice President Gore, our administration has identified international environmental and resource issues as an important component of our long-term economic and political interests. In our global and regional diplomacy, we have encouraged environmental protection and effective resource management, promoted the export of American-made environmental technologies, and sought to build strategic partnerships around common environmental initiatives.

Still, we can do more to focus our environmental diplomacy and more effectively integrate it into our foreign policy through better bureau and mission planning, public diplomacy, and resource allocation. Environmental initiatives can be important, low-cost, high-impact tools in promoting our national security interests. This memorandum outlines my preliminary thoughts on this important issue, as well as steps that the Department will begin to take in the coming months.

Environmental Policy and the National Interest

America's national interests are inextricably linked with the quality of the earth's environment. Catastrophes such as Chernobyl focus public attention, but we face equally serious threats from less dramatic damage to complex and fragile environmental systems. Those threats affect broad national economic and security interests, as well as the health and well-being of individual citizens.

Worldwide environmental decay threatens U.S. national prosperity. Severe pollution directly affects cropland, livestock, fisheries, and other biological resources essential to global prosperity. Pollution's impact on a nation's health takes an enormous toll on its manufacturing, service, and agricultural productivity. When this occurs in developing countries, it makes for weaker trading partners and for greater reliance on foreign assistance.

In an integrated world economy, environmental degradation in one part of the globe can affect economies everywhere. Global climate changes caused by the build-up of greenhouse gases threaten to alter precipitation and agriculture patterns, raise sea levels, and intensify storm activity. These changes have a direct impact on farming and coastal communities already vulnerable to tropical storms and seasonal flooding. Continued ozone layer depletion will expose the entire planet to increased ultraviolet radiation, and will likely lead to an increased incidence of skin cancer, as well as to diminished crop yields. Disappearing cropland worldwide, coupled with a projected doubling in world population, may lead to dramatic rises in world food prices. All of this not only imposes enormous economic costs, but threatens to create shortages of essential goods and services. Changes in major ecological systems have real consequences for our nation. Changing weather patterns could lead to the re-emergence and migration of dangerous diseases, potentially affecting all Americans. Over-fished international waters hurt the U.S. fishing industry. The loss of biological diversity severely limits the potential for, among other things, developing new cancer-fighting drugs and other biotechnology innovations—high-tech industries in which American businesses are highly competitive.

Environmental and resource issues can also have an important effect on political stability in regions key to U.S. interests. Disputes over scarce water resources can exacerbate existing political conflict. For example, managing these resources has become essential to lasting peace in the Middle East, particularly in the face of rising populations and growing economic needs. Rapid population growth in various regions —from the Mahgreb, to Sub-Saharan Africa, to South Asia, to Central America—can combine with stagnant economies or diminished natural resources, and contribute to domestic political disorder, or to migration and international conflict.

Efforts to establish political stability in such countries as Haiti will require confronting environmental decline. The gradual loss of 98% of Haiti's forests and erosion of 50% of its topsoil has eliminated the arable land needed to support economic growth and political stability. While environmental decline was not the most immediate cause of the crisis that led thousands of Haitians to seek refuge on our shores—and ultimately led to U.S. intervention—environmental issues must be addressed if the island is to become economically and politically stable.

Addressing environmental problems is not only a challenge to our interests but also an opportunity to promote U.S. objectives. Any successful approach requires us to work closely with others. These threats transcend boundaries, and will either be dealt with through joint action or not at all. By helping foster cooperative water management in the Middle East, family planning and women's education in the rapidly industrializing countries of Asia and Latin America, and energy conservation in Central and Eastern Europe, we can help to bolster economic growth and political stability. By supporting sustainable development in destitute parts of Africa and elsewhere, we can help prevent the humanitarian catastrophes that would eventually demand the commitment of American assistance. Environmental diplomacy can bear significant rewards by building

goodwill and trust on mutually beneficial projects. In addition, common agendas, built around environmental themes, can be important diplomatic opportunities both for strengthening political ties and for promoting our national interests in vital regions. Our recent efforts with Japan and with the EU are two successful examples. As with most transnational issues, however, cooperation will not happen without U.S. leadership.

U.S. leadership also can be crucial in helping make "green" technologies and concepts central to the work of the world's industries and governments. And given our early investment in these sectors, the United States is superbly positioned to benefit from a $400 billion industry that is growing rapidly.

What We Have Done

Department efforts on the environment over the past three years have already made a significant contribution to U.S. security and economic interests.

Regional and bilateral initiatives—such as the environmental components in the Middle East Peace Process, and our common agenda initiative with the European Union, Japan, Brazil, and India—are helping to protect the environment, enhance economic and political stability, strengthen important relationships, and expand market opportunities for U.S. firms. Our work in support of Vice President Gore's Globe program has helped expand worldwide environmental education.

Our engagement on global climate change, biodiversity and ozone depletion negotiations has helped protect the quality of life in America and create U.S. jobs in high-tech pollution control sectors. We were leaders at the International Conference on Population and Development in Cairo. And our efforts to protect the world's fisheries have helped reduce a source of international friction while supporting a vital American industry.

Next Steps

We will enhance our efforts in three broad areas:

Bureau and Mission Planning. First, we must make a concerted effort to integrate more fully environment and resource objectives into the planning and daily activities of bureaus and overseas mission. Currently, bureaus vary widely in the priority the place on environmental issues. Some successfully tie carefully designed environmental components to their overall economic and security strategies. Others tend to see such concerns as primarily the responsibility of OES (Bureau of Assistant Secretary for Oceans and International Environmental and Scientific Affairs). All bureaus should take steps to integrate environmental issues into their regular planning and conduct of policy. Most prominently, I expect regional bureaus to identify how environment, population and resource issues affect key U.S. interests, and develop appropriate policies to protect scarce resources, promote investment in new technologies, or develop new political partnerships. Other bureaus also should better integrate environmental concerns into their planning, particularly in developing consistent U.S. Government positions on multi-dimensional issues such as sustainable development, and in helping identify upcoming threats to American prosperity and security.

I look to each bureau to develop specific actions to implement this objective. The range of activities will include incorporating appropriate environmental and population goals into Bureau and Mission Program Plans; incorporating environmental issues into trip preparations; including these initiatives in talking points for bilateral meetings involving the President or other senior officials; designating a Deputy Assistant Secretary as responsible for global affairs issues, including regular attendance at G (Office of the Under Secretary for Global Affairs) meetings; and including representatives from OES or G in bureau planning meetings prior to important negotiations, conferences, or meetings. FSI (Foreign Service Institute) will incorporate environmental issues more fully into generalist training. I expect each bureau to work with G, OES, PRM (Bureau of Population, Refugees and Migration), M (Bureau of Under Secretary for Management) and S/P (Secretary's Office of Policy Planning) to develop and send to me by March 15 a plan for addressing these concerns, with clear descriptions of how their initiatives will promote American interests and milestones for implementation. I will look for an assessment of progress in six months.

Global Affairs, working with OES and PRM, will also intensify its efforts to cooperate with the bureaus. That is, it will more consistently involve the bureaus in ongoing environmental negotiations and initiatives, and support bureaus' efforts to develop low-cost, high-impact initiatives that serve broad foreign policy goals. Toward this end, G will regularly meet with the regional and functional Assistant Secretaries, with their senior staff, and with P (Bureau of Under Secretary for Political Affairs), E (Bureau of the Under Secretary for Economic Affairs), T (Bureau of Under Secretary for Arms Control and International Security Affairs), and M staff, to coordinate regional and functional environmental activities.

Finally, it is essential that we build environmental work into embassy activities. Bureaus should ensure that the Mission Program Plans you are now reviewing give appropriate priority to environmental reporting and initiatives. Each embassy should designate a senior officer responsible for leading that mission's environmental team. The Bureau of Administration should develop an environmental technologies program to take advantage of federal and private-sector demonstrations and resource-saving innovations. Programs such as energy-saving performance contracts, the EPA's "Green" programs and DOE's energy efficiency initiatives can be operated at little or no cost to the Department.

Public Diplomacy. Second, we must more clearly articulate our environmental accomplishments and priorities, and make clear how these efforts relate to overall national interests in our public statements.

I highlighted environmental goals in my address last month at Harvard, and I plan to deliver a major address discussing how the environment and resource issues relate to our broad foreign policy objectives. I look to you, too, to focus public attention on the ways environmental issues contribute to the pursuit of our policy priorities in your respective fields. This will require the Department leadership to become more familiar with our central environmental goals, and to include these topics as recurrent themes in public statements. I expect Seventh Floor Principals, and all regional and appropriate functional Assistant Secretaries to devote speaking opportunities to environmental issues in the next six months.

Resources. Third, we must ensure that we have the resources necessary to follow through on our objectives. Proposed Congressional budget cuts threaten our ability to implement two of our most important international negotiations—the Framework Convention on Climate Change and the Montreal Protocol on Ozone Depletion. Limited resources also hinder our ability to follow through on recently announced bilateral and multilateral initiatives which are crucial to solidifying important relationships.

I am committed as part of the overall budget process to seek adequate funds for this effort. Within the budgetary stringencies we expect for the foreseeable future, S/RPP [Secretary's Office of Resources, Plans and Policy], M and H [Bureau of Human Rights, Democracy and Labor] should work together with G, OES, and the regional bureaus to try to assure that we are allocating resources adequate to conducting well-integrated environmental diplomacy in priority areas. The regional bureaus, in particular, should keep in mind that resources spent on environmental initiatives can pay high dividends in terms of promoting both American diplomatic and business interests. To implement this, I am requesting that OES and S/RPP work with M to develop an environmental diplomacy resource plan that identifies our diplomatic personnel and financial needs, with a report and implementation plan by May 15, 1996. ❑

Excerpts from Secretary Christopher's Remarks at the Amazon Research Institute Manaus, Brazil March 3, 1996

...I am here today because the United States recognizes that protecting the environment is essential to the health, security and prosperity, not only of the American people, but peoples all around the world. Nowhere is the importance of the environment more apparent than here in the Amazon. Its rainforests are absolutely unique and an irreplaceable resource. They are a sharp reminder of the responsibility that all of our nations share to promote economic development in a way that also safeguards our environmental resources.

At the very important Rio Summit five years ago, we forged a global commitment to pursue sustainable development, to cooperate on climate change and biodiversity and to take responsibility for the sound management of our forests.

That commitment on sustainable development is an essential component of the Declaration of Principles that our 34 democracies adopted at the Miami Summit in late 1994. Our nation will advance this Miami consensus through the commitment that we make on the sustainable development summit which will take place in Bolivia later this year.

Here in Brazil, President Cardoso has launched an admirable and ambitious national effort to clean Brazil's skies and to preserve its forests. President Cardoso has used Brazil's great influence to spur environmental cooperation between developed and developing countries around the world.

People of this city know better than anyone else that the resources of the rainforest, your resources, hold untold promise, from rubber trees and rosewood, to exotic fruits and flavors and fragrances. The rainforest yields products of great value. Modern science is discovering new uses for the ancient riches of the rainforest. Curare—a poison used by tribes in the Amazon—is the source of the primary anesthetic used in abdominal surgery in hospitals from Brasilia to Boston.

The Amazon is estimated to house more than 25% of all biological diversity. When we preserve plant and animal species, we save resources and potentially valuable scientific information, including genetic material that can unlock the cure for deadly diseases. On the other hand, when we lose species, we lose them for all time. The choices that we're making every day reverberate for generations to come.

Five days ago in San Salvador, I met with business people and researchers who are working with the United States to reduce greenhouse gas emissions. If tropical forests are carelessly burned or destroyed, it can accelerate the build-up of these dangerous heat-trapping gases, which can affect climate and rainfall around the world, causing billions of dollars of crop losses and damage to property.

From the very beginning of the Clinton Administration, we recognized the impact that damage to the environment can have on our strategic interests. On the other hand, when we work to solve environmental problems we also advance our broader strategic goals. Working closely with Vice President Gore, I instructed the State Department last month to fully integrate environmental issues into U.S. foreign policy and to improve the way we use our diplomacy to advance sustainable development and other environmental objectives. I am determined to put environmental goals exactly where they belong—in the mainstream of American foreign policy.

Here in Brazil, our two nations are deepening our cooperation on the environment by launching an ambitious Common Agenda which will be carried forward by Under Secretary Wirth's visit next month.

We are transforming sustainable development from an abstract challenge to a concrete agenda. For example, the space cooperation agreement that Foreign Minister Lampreia and I signed two days age will enable us to use our technology to spur sustainable development in the Amazon. To take another example of cooperation between Brazilian and American researchers, places like this Institute are allowing us to combine our efforts in new and more effective ways.

Like the two great rivers that meet at this remarkable location to form the mighty Amazon River, our two countries are joining forces to form a strong, new partnership on behalf of the environment. And just as the Amazon has given life to a region of great wealth and diversity, this new partnership will confer great benefits on the people of both Brazil and the United States.❑

Secretary Christopher's Address
at Stanford University
Complete Text: "American Diplomacy and the Global Environmental Challenges of the 21st Century"
April 9, 1996

From the founding of the Sierra Club in 1892 to the first Earth Day in 1970, Stanford faculty and alumni have led efforts to preserve our country's natural resources for future generations. Your centers for Conservation Biology and Global Ecosystem Function have done pioneering work. Let me also say that I am personally grateful for the continuing work of Coach Montgomery and Coach Willingham to keep the California Bear population under control.

With strong leadership from President Clinton and Vice President Gore, our Administration has recognized from the beginning that our ability to advance our global interests is inextricably linked to how we manage the Earth's natural resources. That is why we are determined to put environmental issues where they belong: in the mainstream of American foreign policy. I appreciate and value this opportunity to outline our far-reaching agenda to integrate fully environmental objectives into our diplomacy, and to set forth our priorities for the future.

The environment has a profound impact on our national interests in two ways: First, environmental forces transcend borders and oceans to threaten directly the health, prosperity and jobs of American citizens. Second, addressing natural resource issues is frequently critical to achieving political and economic stability, and to pursuing our strategic goals around the world.

The United States is providing the leadership to promote global peace and prosperity. We must also lead in safeguarding the global environment on which that prosperity and peace ultimately depend.

In 1946, when I came to Stanford as a law student, the connection between the environment and foreign policy was not so readily apparent. At home, Americans were entering a period of unprecedented prosperity fueled by seemingly infinite resources. Abroad, we were beginning to focus on the struggle between the United States and the Soviet Union. And I was trying to master the intricacies of contracts, torts, and something called remedies, taught by Stanford's version of John Houseman. I was also trying to measure up to the high standards set by a new young Dean,

Carl Spaeth, who had just come to Stanford from a very promising career at the State Department, and who first stimulated my interest in the work in which I am now engaged full time.

But since 1946, population growth, economic progress and technological breakthroughs have combined to fundamentally reshape our world. It took more than 10,000 generations to reach a world population of just over two billion. In just my lifetime—a period that may seem like an eternity to many of the students in the audience—the world's population has nearly tripled to more than five-and-a-half billion.

These changes are putting staggering pressures on global resources. From 1960 to 1990, the world's forests shrank by an amount equivalent to one-half the land area of the United States. Countless species of animals and plants are being wiped out, including many with potential value for agriculture and medicine. Pollution of our air and water endangers our health and our future.

In carrying out America's foreign policy, we will of course use our diplomacy backed by strong military forces to meet traditional and continuing threats to our security, as well as to meet new threats such as terrorism, weapons proliferation, drug trafficking and international crime. But we must also contend with the vast new danger posed to our national interests by damage to the environment and resulting global and regional instability.

As the flagship institution of American foreign policy, the State Department must spearhead a government-wide effort to meet these environmental challenges. Together with other government agencies, we are pursuing our environmental priorities—globally, regionally, bilaterally, and in partnership with business and nongovernmental organizations. Each of these four dimensions is essential to the success of our overall strategy.

First, our approach to these problems must be global because pollution respects no boundaries, and the growing demand for finite resources in any part of the world inevitably puts pressure on the resources in all others.

Across the United States, Americans suffer the consequences of damage to the environment far beyond our borders. Greenhouse gases released around the globe by power plants, automobiles and burning forests affect our health and our climate, potentially causing many billions of dollars in damage from rising sea levels and changing storm patterns. Dangerous chemicals such as PCBs and DDT that are banned here but still used elsewhere travel long distances through the air and water. Overfishing of the world's oceans has put thousands of Americans out of work. A foreign policy that failed to address such problems would be ignoring the needs of the American people.

Each nation must take steps on its own to combat these environmental threats, but we will not succeed until we can effectively fight them together. That realization inspired the pathbreaking efforts of the United Nations at the Stockholm Conference on the Human Environment 25 years ago, and at the historic Rio Summit on Environment and Development four years ago. There, the international community forged a new global commitment to "preserve, protect and restore...the Earth's ecosystem" and to promote economic development in ways that also preserve our natural resources.

Since Rio, the United States has intensified our global efforts. We led the way to an agreement to phase out the remaining substances that damage the ozone layer, to ban the ocean dumping of low-level radioactive waste, and to achieve a new consensus in Cairo on stabilizing global population growth.

We are working to reform and strengthen the UN's key environmental and sustainable development programs. We have joined forces with the World Bank to incorporate sound environmental policies in lending programs, and to fund projects through the Global Environment Facility that directly benefit our health and prosperity. And we are striving through the new World Trade Organization to reconcile the complex tensions between promoting trade and protecting the environment—and to ensure that neither comes at the expense of the other.

This year, we will begin negotiating agreements with the potential to make 1997 the most important year for the global environment since the Rio Summit. We will seek agreement on further cuts in greenhouse gases to minimize the effects of climate change. We will help lead an international process to address the problems caused by toxic chemicals that can seep into our land and water, poisoning them for generations. We will develop a strategy for the sustainable management of the world's forests—a resource that every great civilization has discovered is "indispensable for carrying-on life," as the Roman historian Pliny once wrote. We will work with Congress to ratify the Biodiversity Convention, which holds benefits for American agriculture and business. We will also seek ratification of the Law of the Sea Treaty which safeguards our access to ocean resources. We will provide the leadership needed to ensure that this June's UN Summit in Istanbul effectively confronts the pressing problems associated with the explosive growth of cities in the

developing world.

Finally, by the end of 1997, the State Department will host a conference on strategies to improve our compliance with international environmental agreements—to ensure that those agreements yield lasting results, not just promises.

This is a daunting global agenda. Achieving these goals will take time and perseverance. But I often remember Don Kennedy's advice to graduates to set a "standard higher than you can comfortably reach."

The second element of our strategy—the regional element—is to confront pollution and the scarcity of resources in key areas where they dramatically increase tensions within and among nations. Nowhere is this more evident than in the parched valleys of the Middle East, where the struggle for water has a direct impact on security and stability. In my many trips to the region, I have seen how rapid population growth and pollution can raise the stakes in water disputes as ancient as the Old Testament. As Shimon Peres once remarked to me, "The Jordan River has more history in it than water." We are helping the parties in the Middle East peace process to manage the region's water resources—to turn a source of conflict into a force for peace.

There can be no doubt that building stable market democracies in the former Soviet Union and Central Europe will reinforce our own security. However, for these new nations to succeed, we must help them overcome the poisonous factories, soot-filled skies and ruined rivers that are one of the bitter legacies of communism. The experience of this region demonstrates that governments that abuse their citizens too often have a similar contempt for the environment.

Three weeks ago in Kiev, I walked through the wards of a children's hospital that treats the victims of Chernobyl. I saw first-hand the terrible damage that this 10-year-old catastrophe still inflicts on the region's people. We are helping Ukraine to ensure that there will be no more Chernobyls. In Central Asia, we are helping nations recover from Soviet irrigation practices that turned much of the Aral Sea into an ocean of sand. Our Regional Environment Center in Budapest supports the civic groups in Central Europe that are essential to a healthy democracy and to a healthy environment.

The United States also has an enormous stake in consolidating democratic institutions and open markets in our own hemisphere. To deepen the remarkable transformation that is taking place across Latin America and the Caribbean, we are advancing the agenda for sustainable development that our 34 democracies adopted at the Miami Summit of the Americas. To help democracy succeed, for example, we must ease the pressures of deforestation and rapid population growth that I have seen at work in the bare hills and crowded city streets of Haiti. To sustain our prosperity, we must work to preserve the rich diversity of life that I saw in the Amazon rainforest. To help heal the wounds of old conflicts, we must reverse the environmental damage that has narrowed economic opportunities and fueled illegal immigration from El Salvador. And to help combat drug trafficking and crime, we are encouraging sustainable agriculture as an alternative to the slash-and-burn cultivation of opium poppies and coca from Guatemala to Colombia. These goals will be high on our agenda at the Sustainable Development Summit this December in Bolivia.

In Africa, we are pursuing environmental efforts designed to save tens of thousands of lives, prevent armed conflict, and avert the need for costly international intervention. Our Greater Horn of Africa initiative, for example, addresses the root causes of environmental problems that can turn droughts into famines, and famines into civil wars. We must not forget the hard lessons of Rwanda, where depleted resources and swollen populations exacerbated the political and economic pressures that exploded into one of this decade's greatest tragedies. We also have a national interest in helping the nations of the region address the AIDS crisis, which is decimating a whole generation of young Africans and wasting the economic resources that African nations so desperately need to build stable governments and a brighter economic future.

To intensify our regional environmental efforts, we will establish Environmental Hubs in our embassies in key countries. These will address pressing regional natural resource issues, advance sustainable development goals and help U.S. businesses to sell their leading-edge environmental technology.

The third element of our strategy is to work bilaterally with key partners around the world—beginning, of course, with our next-door neighbors. Whether it is fishing on the Georges Bank or in the Gulf of Mexico, or clean drinking water from the Great Lakes or the Rio Grande, we cannot separate our environmental interests from those of Canada or Mexico.

We are extending our century-old cooperation with Canada on behalf of clean water and flood control in the Great Lakes region. We are improving conservation in our adjoining national park lands. Through the U.S.-Canada Joint Commission, we are protecting

human health and natural habitats. And with all our Arctic neighbors, we are establishing a partnership to protect that fragile region.

Our joint efforts with Mexico have grown in importance since NAFTA took effect just over two years ago. Under the NAFTA side agreements on the environment, we have set up new institutions to help communities on both sides of the border safeguard the natural resources they share. Later this spring, we will launch an innovative program that will enable business and government leaders from Texas, New Mexico, and Ciudad Juarez to reduce some of the region's worst air pollution. When our two nations' cabinets meet in Mexico City next month, I will emphasize the importance of Mexico continuing to strengthen its environmental standards.

Through our Common Agenda with Japan, the world's two largest economies are pooling their resources and expertise to stabilize population growth, to eradicate polio, to fight AIDS and to develop new "green" technology.

Our New Transatlantic Agenda with the European Union will spur global efforts on such issues as climate change and toxic chemicals. Together, we are already advancing our environmental goals in Central Europe and the New Independent States.

Russia and China are both confronting major environmental problems that will have a profound effect on their future—and on ours.

In Russia, the fate of democracy may depend on its ability to offer the Russian people better living standards and to reverse a shocking decline in life expectancy. From Murmansk to Vladivostok, poorly stored nuclear waste poses a threat to human life for centuries to come. Economic reforms will not meet their potential if one-sixth of the Russian land mass remains so polluted that it is unfit even for industrial use, and if Russian children are handicapped by the poisons they breathe and drink.

We are cooperating with Russia to meet these challenges. Ten days from now, President Clinton will join President Yeltsin and other leaders at a Nuclear Safety Summit in Moscow which will promote the safe operation of nuclear reactors and the appropriate storage of nuclear materials. Vice President Gore and Prime Minister Chernomyrdin are spearheading joint initiatives to preserve the Arctic environment, reduce greenhouse gases and promote the management of key natural resources. We are even taking the satellite imagery once used to spot missiles and tanks and using it to help clean up military bases and track ocean pollution.

As we discussed this morning at your Institute for International Studies, the environmental challenges that China faces are truly sobering. With 22 percent of the world's population, China has only seven percent of its fresh water and cropland, three percent of its forests and two percent of its oil. The combination of China's rapid economic growth and surging population is compounding the enormous environmental pressures it already faces. That is one of the many reasons why our policy of engagement with China encompasses the environment. Later this month, Vice President Gore will launch an initiative that will expand U.S.-China cooperation on sustainable development, including elements such as energy policy and agriculture.

In our other bilateral relationships, we have created partnerships that strengthen our ties while moving beyond the outdated thinking that once predicted an inevitable struggle between North and South. Under the Common Agenda for the Environment we signed last year with India, for example, we are cooperating on a broad range of shared interests from investing in environmental technologies to controlling pesticides and toxic chemicals. During my trip to Brazil last month, we strengthened a similar Common Agenda with agreements on cooperation in space that will widen our knowledge about climate change and improve management of forest resources.

The fourth and final element of our strategy reinforces these diplomatic approaches by building partnerships with private businesses and nongovernmental organizations.

American businesses know that a healthy global environment is essential to our prosperity. Increasingly, they recognize that pitting economic growth against environmental protection is what President Clinton has called "a false choice." Both are necessary, and both are closely linked.

Protecting the environment also opens new business opportunities. We are committed to helping U.S. companies expand their already commanding share of a $400 billion market for environmental technologies. This effort was one of many championed by my late colleague and friend, Commerce Secretary Ron Brown. His last mission to Africa helped an American firm win a contract that will protect fisheries and fresh water supplies for 30 million people in Uganda, Tanzania and Kenya. On my recent visit to El Salvador, I met with U.S. firms, nongovernmental organizations and their Central American partners who are

pioneering the use of solar and wind power stations.

Non-governmental organizations working with USAID have played a crucial role in advancing our environmental objectives overseas. For many years, for example, the Sierra Club has been deeply engaged in international population efforts and it made an important contribution to the Cairo Conference. As part of these joint efforts, the World Wildlife Fund is helping to conserve biodiversity in more than 40 countries, the World Resources Institute is confronting deforestation in Africa, and the Nature Conservancy is protecting wildlife preserves across Latin America. Through the State Department's new "Partnership for Environment and Foreign Policy," we will bring together environmental organizations, business leaders and foreign policy specialists to enhance our cooperation in meeting environmental challenges.

It is the responsibility of the State Department to lead in ensuring the success of each one of the four elements of the strategy that I have discussed today—global, regional, bilateral and partnerships with business and NGOs. Working closely with the President and the Vice President, I have instructed our bureaus and our embassies to improve the way we use our diplomacy to advance our environmental objectives.

We will raise these issues on every occasion where our influence may be useful. We will bolster our ability to blend diplomacy and science, and to negotiate global agreements that protect our health and well-being. We will reinforce the role of the Under Secretary for Global Affairs which was created at the beginning of our Administration to address transnational issues. We will strengthen our efforts with USAID to promote sustainable development through effective environment and family planning assistance. And we will reinforce the environmental partnerships that we have formed with the EPA, and the departments of Defense, Energy, Commerce, Interior and Agriculture.

In addition, I am announcing today that starting on Earth Day 1997, the Department will issue an annual report on Global Environmental Challenges. This report will be an essential tool of our environmental diplomacy, bringing together an assessment of global environmental trends, international policy developments and U.S. priorities for the coming year.

I will continue to work with the Congress to ensure the success of our environmental efforts. The current Congress has slashed critical funding for needed environmental programs at home and abroad. We will press Congress to provide the necessary resources to get the job done.

Our strength as a nation has always been to harness our democracy to meet new threats to our security and prosperity. Our creed as a people has always been to make tomorrow better for ourselves and for our children. Drawing on the same ideals and interests that have led Americans from Teddy Roosevelt to Ed Muskie to put a priority on preserving our land, our skies and our waters at home, we must meet the challenge of making global environmental issues a vital part of our foreign policy. For the sake of future generations, we must succeed. ❑

Statements by J. Brian Atwood
Administrator, U.S. Agency for International Development

Administrator Atwood's Remarks to the "Conference on New Directions in U.S. Foreign Policy" at the University of Maryland, College Park
Excerpts from "Towards A New Definition of National Security"
November 2, 1995

...I did not come here today to tout the Administration's achievements. Rather, I came here to acknowledge that the frustration level remains high over our nation's foreign policy. I came to suggest some possible causes for that frustration—causes that relate more to the state of our political debate and the state of the intellectual discussion held within this community, a community of academics and professionals of which I have been proud to be a part.

We have traditionally looked to the community represented in this room to shape the new paradigms, to provide the conceptual framework. But we are not getting what we should expect. Perhaps in the foreign policy community we reflect the confusion of the American community at large, perhaps a desire to hold on to old structures and methods, or perhaps an inclination to seek the center between increasingly extreme poles. Whatever the cause, I believe we have become less imaginative and excessively reactive as a community.

...We remain reluctant in this community to accept a broader definition of national security, even when the facts cry out for such a definition. I am generalizing of course, but foreign policy and military professionals remain wedded to the notion that the word "strategic," for example, has a particular meaning. Does a country, or a government, constitute a potential military threat to the United States? Does instability in a particular region—Europe or the Persian Gulf—risk disrupting key markets or energy supplies?

Objective analysis should suggest that each of these threats would rise to the level of "strategic" even given what has happened to the Soviet Union. We do

not need to exclude these very real considerations in our national security calculus. But global stability is threatened by other factors as well, factors that in some cases might already constitute strategic threats, but will certainly grow into that definition in the near-term future.

One growing threat comes from the failure of nations. This threat emerges from the persistence of destabilizing conditions and weak governance. Consider for a moment: When the United States fought communism in Korea and Vietnam, when we created NATO as a bulwark in Europe and checked Soviet adventurism in Africa and Asia, what precisely, did we fear? The answer is not really simple, but it was and is persuasive. We feared the loss of our freedom. We feared the loss of our markets and the loss of influence. We feared the possibility that even if unconquered, America might be surrounded by hostile forces. And we feared a moral defeat, the defeat of the human spirit, the defeat of our special value system.

So now, with communism dead, and Gorbachev giving lectures, let's ask a few questions: If nations fall to homegrown warlords, is that any less a setback for international stability? If our markets vanish from civil war instead of collectivization, does that limit our economic potential any more? If ethnic cleansing takes the place of the Gulag, are the standards of international politics any less violated? If tribal machetes take a million lives in Rwanda, is that less a defeat for the human spirit than the million deaths from artillery and starvation on the front lines of the Cold War in Afghanistan?

Communists were unaccountable; that was why Chernobyl happened. But is the pollution from one exploding reactor any more dangerous than the accumulated effluents from burning rain forests and teaming urban centers in the developing world? Communist hordes—what about hordes of refugees or Communist subversion? What about the subversion caused by drug cartels and international mafia that push aside weak and failing governments?

The foreign policy community recognizes that our national security can be threatened, even in the absence of missiles and bombers. But we hesitate in redefining national security out of fear that we will be seen as fuzzy-headed and weak. Objective analysis—hard-headed thinking—should lead us to conclude that national security today entails more than a defense against missile attack. It involves more than ideological competition. National security policy today must begin with a simple truth; if people elsewhere are destabilizing their regions, flowing across borders as refugees, creating human and environmental catastrophes, then American interests are at risk or will soon be at risk.

To paraphrase the old philosophical question: if a tree falls in a rain forest far away, yes, today we do indeed hear it. We pay the price in global warming, lost species and miracle drugs that are never found. If people in Africa are forced from their homes by conflict, Americans become less secure. We have to feed them—or turn our backs. We have to try to restore order—or stand aside while chaos spreads. If millions live in poverty, we who live in this global economy are the poorer for their suffering. If rural migrants overwhelm the cities by the tens of millions, we must breathe the air they pollute and drink the water they foul. Their diseases will find us. Their misery will envelop us.

Lest I begin to sound like Robert Kaplan, let me say that the situation we face today is not yet out of control. In some regions, particularly in Africa, it is. But it is growing worse and only pre-emptive investments will enable us to stay ahead of the curve. Listen to some disturbing facts. Today the international community is spending over $4 billion a year on 42 million refugees and displaced persons, double the number from 1980. We spent $5.4 million in 1993 on peacekeeping, more than the 45 previous years combined. We have lost forests equal to three times the size of France in the past decade and we are losing 42 million acres of forests every year. And the world's population grows by 90 million people a year. Twenty years from now we will be attempting to manage a world with 2-2.5 billion more people.

Twenty years from now no one will debate the application of the word "strategic." And if we do not invest today, if we do not lead today, the national security of our children will be severely compromised. To look at the FY 96 foreign affairs budget, one would have to conclude that many in the Congress believe that new challenges can still be addressed by old methods, or failing that, safely ignored. Yet, the Defense and Intelligence communities have already taken up the challenges to foreign policy posed by recent events. We would do well to consider their response.

The CIA's *Task Force on Failed States* recently studied the threat posed by failed and failing states. It identified specific weaknesses that cause nations to collapse: inadequate human capacity, including lack of education, poor health standards, inadequate housing and social services; the fragility of democracy, especially weak or absent institutions to channel public opinion and defuse social tensions; economic weakness, especially the absence of trade and the openness to innovation that comes with it; and the lack of

policies and institutions that enable a middle class, which is the rudder of any modern state, to emerge and expand.

The CIA focused on development issues because their status illuminates the likelihood of whether a nation will become a Korea or a Somalia. Development is a cross-cutting indicator: the level of infant mortality, for instance, reflects a nation's health standards, its economic progress, its agricultural productivity, its standards of nutrition—especially among the poor—the status of women, even democracy. Infant mortality says much about national spirit—that intangible attitude toward the future: people in developing lands are no different from parents anywhere. In a land where people expect to bury children, pessimism and despair sap daily life like a parasite.

The Defense Intelligence Agency recently identified the ecological deterioration of Lake Victoria as a cause of potential instability in East Africa. Thirty million people, they reported, were at risk of having their livelihoods and their well-being compromised by the threat of this huge lake. Why is that of concern to the Defense Intelligence Agency in 1995? Because if the root causes of the problem go unaddressed, our military forces may be called upon to deal with the consequences a few years hence.

They have talked about the necessity of American leadership but undercut that leadership in international development, discouraging other nations from greater involvement. Think about the challenges of managing two billion more people. Somehow, economies that are hamstrung and unproductive today will have to generate hundreds of millions of new jobs. Our natural environment will have to deal with cities—not countries. Mind you, cities hold tens of millions of people.

Must we respond? Well, that is my choice. But we can't hesitate. We can rationalize away the consequences of avoiding investments. We can call ourselves optimists and assume that human ingenuity will compensate for the lack of resources. Some, like Patrick Buchanan would argue that the United States has done enough for fifty years, and that in Robert Frost's words, good fences make good neighbors. I do not believe that the American people share his isolationism, but I do believe that they are tired. They certainly are frustrated with the absence of a peace dividend. They are disheartened that the end of communism unleashed a wave of new conflicts.

How has the Congress responded? They have not counseled separation from the world, but they have indulged in a sort of backing and filling that is troubling. They have been outspoken against the unilateral deployment of American forces, yet have failed to adequately fund the United Nations, the best mechanism for multilateral action. They have talked about emerging markets yet sanctioned precipitous cuts in development assistance, the very thing that helps those markets emerge. They have acknowledged the dependence of the poorest nations upon the assistance rendered by the World Bank's International Development Association (IDA), yet cut funding and thus diminished the funds that IDA can leverage from $8-9 billion to $2-3 billion. They have talked about the necessity of American leadership but undercut that leadership in international development—discouraging other nations from greater involvement.

For some years, we have warned that the U.S. would reach a turning point, when its ability and commitment to international engagement would come into question. We now have reached the crossroads. So now we face a fundamental question of policy—will we continue to react to the demands of a changed and changing world, or will we construct and implement a proactive, preventive diplomacy?

And this is my third and final admonition. Many in the foreign policy community have embraced the goal of preventive diplomacy but not the methods, particularly those that cost money. It is time now to deal with the contradictions. We have had the budget debate. That debate has distracted us in its focus on phony savings plans—plans to merge agencies and cut administrative costs while fully funding important missions. That's just not real. And the talk is about further cutting a foreign affairs account that is vastly underfunded. It is now time to have the policy debate.

Any debate about foreign policy must reflect an objective analysis of the problems we face and the world faces. Only then can we identify the tools and methods that will protect our interests and constructively address the root causes of those problems. I believe that a debate over how to exercise American leadership to move the international community toward preventative diplomacy will inevitably lead our nation to a renewed awareness of all the tools needed to counter the new strategic threats.

If we are concerned about festering conflicts, then we must invest in programs that help nations build inclusive and representative institutions. If we want to help nations stave off collapse, then we need to pursue early interventions that prevent problems from becoming crises, and arrest the step-by-step implosion of the political order and the traditional economy. If we want to help nations resist the lures of autocracy,

then we have to fund programs that enable people to empower themselves economically and politically and create a political order that demands accountability.

We also need to concern ourselves operationally, just as we did during the Cold War. We must seek out allies—not only other donor governments, but the panoply of non-governmental organizations that are playing an ever-more-important role in international affairs. We must put our assets to better use, especially utilizing the influence of the American model and our democratic values. Just as during the Cold War, our ideals remain a central part of our arsenal. We must seek out economies of scale, sharing technical resources, pooling information and methods, allocating responsibilities and using regional approaches—everything from early warning systems to election observers—to bolster countries in crisis. Even where traditional security issues make the primary demand on our time, as in Bosnia or the West Bank and Gaza, a response that combines development assistance with military and political elements will better ensure the success of the peace process.

And, we must fully fund international institutions that implement our concerns, like the UN and the World Bank, just as we funded NATO. Whatever its imperfections, the United Nations system remains the best way to bring diverse nations together, to exchange ideas and to pursue collective action that by its very nature civilizes and stabilizes the international environment. The UN embodies our belief that the global community exists, that our world is more than a collection of warring states. It gives substance to the idea that international law is not just words on paper. It is a teaching device and a moral platform. It is indispensable. And, we cannot continue to overtax its resources and underfund its accounts. Reform, yes, but I hope Congress will soon help us abandon our posture of representation without taxation.

You are the creative minds of our foreign policy community. We need your objective analysis, your best thinking. Together, we need to find the courage to redefine national security and the political will to redirect resources to fund that redefinition. We need to break out of the constraints imposed by a debate over the balanced budget and realize that even that goal cannot be reached if we fail to invest in the stability and growth of the global economy. And, we need to make preventive diplomacy more than just a comforting theory.

The wise men of the post-World War II period eagerly embraced the challenge. They reshaped foreign policy and created a new international community. The men and women of our era—the post-Cold War era—owe just as much to our own grandchildren. ❑

New Publications and Reviews

FULL HOUSE: Reassessing the Earth's Population Carrying Capacity
by Lester Brown and Hal Kane
W.W. Norton, 1994. 261 pp.

Reviewed by Richard P. Cincotta

The Reverend Thomas Robert Malthus was an economist. Perhaps not surprisingly, in reading through an expanded version of his original essay on population and food supply[1], I could find not a single allusion to human-induced environmental degradation, neither as cause nor effect of inadequacies in agriculture. Not until after the Dust Bowl droughts of the early 1930s, and works by Paul Sears[2] (*Deserts on the March*, 1935) and Jacks and Whyte[3] (*The Rape of the Earth, 1939*), were environmental stress and degradation fully embraced as serious impacts on food production. By the late 1960s the two disciplinary lines of analysis, classical economics and resource ecology, were brought together in what is now recognized as the neo-Malthusian synthesis, to which Brown and Kane's *Full House* belongs, as do numerous books authored by Paul and Ann Ehrlich, Donella Meadows, Garrett Hardin, and colleagues.

For those already familiar with the first author and the Worldwatch Institute that he heads, one should be able to foretell the basic conclusion of this volume. Without parting pages, Lester Brown's critics have written him off as a "doomed planet" ideologue-and, indeed, this book's projections for food security in the 21st century do not defeat those expectations: according to Brown and Kane's analysis, by 2030 the world will likely be facing "[grain] import needs that exceed export supplies by 526 million tons—an amount approaching the current grain consumption of the United States and China combined." While most agricultural economists disagree with several of the authors' assumptions and their quantitative conclusions paradoxically, none bring more historical insight and data to this debate than Brown and Kane. By the end of the first section of *Full House*, the authors will have convinced readers with any previous doubts that the risk of global food shortfalls by the mid-21st century is substantial and must be addressed.

But what certainty is associated with this risk? How adaptive is the world agricultural economy? And what are the environmental and political consequences of either shortfall or adaptation? Answers in the literature are numerous and varied. This book provides just one perspective.

Those who are quick to dismiss Brown as the ultimate pessimist might be surprised to learn that the authors do not support the "lifeboat ethics" solutions (when you're on the lifeboat and it's full, charity is futile, if not dangerous) generally attributed to the neo-Malthusians. Brown and Kane stand firmly behind the "Programme of Action" agreed upon by over 180 nations in Cairo in September, 1994, during the International Conference on Population and Development (ICPD). They agree that population policies must be broad-not only providing quality voluntary family planning, but also building programs to improve the status and literacy of women. In fact, looking back at Lester Brown's career provides additional surprises.

During the 1960s and early '70s, Brown was an influential proponent of the Third World's Green Revolution, encouraging the transfer and mobilization of modern agricultural technologies in developing countries. Susan George, in her often cited critique of international food aid, *How the Other Half Dies: the Real Reasons for World Hunger*[4], found Mr. Brown a culpable figure in establishing a beachhead for multinational agribusiness profiteering and technological dependency in the Third World. George warned of the negative impacts of Green Revolution technologies on small farmers, on local economies and on environmental quality. Then why the sudden shift from promoting technological solutions and industrial agribusiness practice to underscoring and forecasting its failures?

Two opinions can be gleaned from sampling lunchtime conversations around the subsidized salad-bar at the World Bank and the dusty classrooms of U.S. land-grant universities. Among the "food first" and "no-tillage agriculture" crowds, word has it that Brown did the quick switch; shifting sympathies to tap a new wave of environmentally-friendly foundation grants. The second possibility is one that Brown and Kane themselves call to the attention of the reader—and it is the theme of this book: global conditions under which food is grown, harvested, and consumed have changed radically over the previous 15 years. The modern transformation of food production is nearly complete. Virtually within our lifetimes, the world has transited between two distinct eras of modern agriculture.

The first era spanned the initial three-quarters of the 20th century, and was characterized by vast cropland expansion coupled with the creation, dissemination, and application of agricultural technologies. Gains in food production exceeded population growth. In the 30 years following World War II, per capita production climbed

rapidly as modern agricultural methods were adopted in the newly independent countries of the post-colonial world. We now find ourselves in a second era that began in the 1980s, where small gains in agriculture output are achieved at substantial costs to environmental quality and public health, and population growth outpaces growth in food production. Today, growth in per capita yields of rice, wheat and corn has dropped off dramatically. While the world grain yield per hectare increased by 2.3% annually during the period 1954-84, in the following decade growth slowed to only 1% per annum.

Full House is organized around the premise that there are three major pillars of world food production—two of these global systems have been severely undermined, leaving the third overburdened with the responsibility of feeding a planetary population expanding by 90 million humans each year (95% of whom are in the developing world). The former two systems, ocean fisheries and rangeland livestock, are extensive natural systems that appeared, at least as humans spread across the globe, to represent an almost boundless supply of animal protein. As environmental scientists have shown, these natural sources of human nutrition are presently in an unprecedented spiral of decline. The third pillar is an anthropogenic set of systems known collectively as agricultural production. Complex tradeoffs are occurring. Demand for protein is being generated by an expanding global middle-class who can afford meat. Output lost through rangeland degradation has been substituted with growth in farm-fed livestock production, and some depleted natural fisheries are being replaced by agriculture. Unfortunately, both of these intensive replacement technologies are nutrient intensive and tend to generate copious wastes that create their own pollution problems. Few frontiers remain for agricultural land expansion, and future increases in food energy and protein must rely almost totally upon advances in agricultural technology. While the most optimistic economists rest their hopes on human ingenuity, Brown and Kane punch large holes of doubt in this optimism.

The authors show that the flow of new agricultural technology has actually slowed since the late 1970s and early 1980s. While sophisticated biotechnologies have caught the attention of the press, most of the recent advances do not boost potential yields; they cut the costs of farming by reducing the need for pesticides. In fact, the most substantial gains in productivity, in the developed and developing world, resulted from introducing improved irrigation and fertilizer management, improved plant varieties, and mechanization—much of which was developed, or at least envisioned, prior to 1900. Today, most of these technologies are well established throughout the world. For example, China now uses 29 million tons of chemical fertilizer compared to 18 million tons by the U.S., while India is closing the gap with 12 million tons. Brown and Kane are not alone in their lack of confidence in technology's abilities to keep pace with the nutritional needs of the Earth's growing billions. In the two years leading up to the Cairo Conference, officers of the U.S. National Academy of Sciences and Royal Society of London, the Union of Concerned Scientists, and a conference of 58 national scientific academies from around the globe each issued statements[5] characterizing technology as an unlikely prophylaxis for the environmental destruction and human misery being generated along our present path of economic development.

If things look so gloomy, why aren't international agencies more anxious about this issue? The authors dedicate a chapter to demonstrating how the World Bank and the Food and Agricultural Organization (FAO) have succeeded in painting an overly rosy picture of our global future. It seems that grain projections used by these agencies are mere extrapolations of the good times–the upslope in early post-war agricultural performance. According to Brown and Kane, the World Bank's approach "misses the dramatic slowdown in the rise in yields that has occurred in the late eighties and early nineties and fails to take into account the tendency for all biological growth processes in a finite environment to eventually follow an 'S-shaped curve'"—in other words, to flatten out at an upper limit.

The authors promote investment in a few of the "wildcards" still available for improving food output. These include post-harvest waste reduction, improved water and soil fertility management, better food distribution, and some new technologies, the impact of which could be made more effective by bolstering agricultural research and extension. Brown and Kane argue that, unfortunately, there is precious little time to make the gains needed: the population clock is ticking away—2.5 billion in 1945; over 5.7 billion today; 8.5 billion (the UN medium projection) by 2025 and likely more if international family planning programs suffer cuts. The authors predict an unavoidable rise in future staple prices that will adversely affect the growing number of the world's urban poor who now spend nearly 70% of their meager income on food. Such problems seem distant to the American public and to freshmen congressmen—but the security lessons of the 1990s teach us that widespread economic frustration, poverty and hunger in the Third World spawn regional and political instabilities for which developed countries eventually pay the bills.

Full House forays into the sensitive arena of population policy by first endorsing the UN Programme of Action on population and development, and then adding an appeal to population policy-makers that is interesting—and debatable. The authors recommend that governments mount stan-

dardized efforts to estimate national human carrying capacity based on present food productivity and water resources, untapped potential, and trends in fisheries, rangelands and agriculture. With these estimates on top of national population projections, policy makers may more closely consider policies influencing the level and type of food shortfalls, projected food imports, and levels of foreign exchange support needed for imports. Brown and Kane are surely right; such information is generally absent from population policies, and its presence would likely move Third World leaders to greater action. But to what action?

Many feminists oppose any enumeration of national carrying capacities. They suspect that this exercise will provoke, in the minds of an already worried Third World elite, fears of impending mass starvation and political chaos. Such fears have supplied at least part of the rationale for running voluntary sterilization programs on a massive scale under poor clinical conditions, as the Indian government has done over the past two decades; for coercing women into contraceptive use, as in China; or for administering methods without patient consent—for example, the allegations of post-partum IUD insertions in Mexico. Nonetheless, few policy analysts are convinced that coercion necessarily follows from merely setting demographic goals, for that has not been the case in the vast majority of countries. In fact, while the ICPD Programme of Action decries coercion in any form, the document contains moderate language on national goal-setting, accepting that demographic goals are "legitimately the subject of government development strategies," but stating explicitly that these goals "should not be imposed on family planning providers in the form of targets or quotas for the recruitment of clients." Quite separately, "family planning [goals] should be defined in terms of unmet needs for information and services" [Ch 7.12].

Full House addresses international food security issues in five sections, among which there are 16 chapters. The sections are: (1) "Reading the Trends," which defines food insecurity, reviews trends in world population growth, and evaluates the increase in consumption worldwide; (2) "The Three Food Systems," which provides an overview of ocean fisheries, rangelands and agriculture; (3)"Losing Momentum," which covers water scarcity, fertilizer efficiency, biological yield limits and environmental costs; (4) "Looking Ahead," which analyzes carrying capacity estimates for the U.S., China, the former Soviet Union states, and India, and evaluates prospects for the next nine most populous countries, and disputes World Bank and FAO agricultural projections; and (5) "Taking Charge," in which Brown and Kane post their recommendations for workable population and agricultural policies.

To put things in perspective, this book's conclusions are not popular among the world's agricultural technologists and development economists. Vaclav Smil's analysis[6] is more indicative of how this community characterizes the food future: as extremely difficult and fraught with regional uncertainties, but a problem that is surmountable—at least for another 40 years. He states that "it would seem realistic to conclude that the Earth can support a population of 10-11 billion people during the next century" [p. 280] by responding to increased demand through improved technologies and greater efficiencies. Smil predicts substantial gains in efficiency, especially in the harvest, processing and storage of agricultural produce, which at present are enormously wasteful (reducing post-harvest losses by 20% is equal to about 6% of current food energy consumption [p.271]).

Brown and Kane are not optimistic about the ability of Third World nations to markedly resolve their inefficiencies, especially in time to prevent huge supply shortfalls and rapid price increases. Neither do they believe that the bread-basket countries of the North can double grain output without exhausting huge volumes of soil and fresh water—nor that most Third World nations can export enough consumer goods to pay grain import prices. This is slippery ground. Like the Ehrlichs before them, Brown and Kane could very well be underestimating the capacity of the global economy to adapt under pressure, or even more likely, underestimating its ability to externalize food production costs as further environmental and human health burdens.

As one might have already perceived, food security is the "greased pig" among population and global change issues. One thing is certain, however, no respectable analysis suggests that the next half-century of population growth will witness an easy and painless transition in food production. If, as the authors contend, food insecurity becomes the most salient product of global change in the 21st century, the related political instabilities will likely tear at the fabric of both regional and U.S. national security. *Full House* finishes with a plea for the U.S., and for all developed countries, to invest in the future: to become more engaged in international population assistance, in agricultural research, and environmental conservation. Meanwhile, the 104th U.S. Congress has maneuvered to eliminate the one-half of 1% of the budget spent on foreign economic assistance, which includes these programs. *Full House* may be remembered as timely awareness-raising—or, perhaps, just food for thought.

Richard P. Cincotta is presently a fellow at the Western Consortium for Public Health. Under this fellowship he serves as a policy analyst for the U.S. Agency for International Development.

ENDNOTES

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5. see, *World Scientists' Warning to Humanity*. Statement signed by 1,600 scientists. (Cambridge, MA: Union of Concerned Scientists, April 1993); *Population Growth, Resource Consumption and a Sustainable World*. A joint statement by the officers of the Royal Society of London & U.S. National Academy of Sciences (1992); *Population Summit of the World's Scientific Academies*. A joint statement of 58 of the world's scientific academies (New Delhi, 1993).
6. Vaclav Smil, "How Many People Can the Earth Feed?" *Population and Development Review* 20:2 (1994): 255-292. ❑

ENVIRONMENTAL AND HEALTH ATLAS OF RUSSIA

Edited by Murray Feshbach et al.
PAIMS Publishing House, 1995, not paginated

Reviewed by Richard A. Matthew

An environmentally secure world would meet at least three conditions: (1) environmental goods—such as water, air and energy—would be used at a sustainable rate; (2) all people would enjoy fair and reasonable access to environmental goods; and (3) institutions would exist to manage disasters, crises and conflicts resulting from scarcities and environmental change, and to promote (1) and (2). Today, however, various forms of environmental insecurity are evident throughout the world. The *Environmental and Health Atlas of Russia*, compiled under the direction of Murray Feshbach, provides a detailed and graphic account of the high human costs associated with the unsustainable practices, command-controlled access, and environmentally unfriendly institutions of the former Soviet Union.

The *Atlas* incorporates data collected by a team of Russian and American scholars drawing upon extensive resources in both countries. Much of the material was unavailable to researchers during the Cold War. Sifting through seventy years of often incomplete records and organizing the raw data into a useful and accurate volume was clearly an important pioneering effort for all of the individuals involved.

The result, albeit imperfect in certain regards, constitutes a major contribution to our understanding of the environmental and health crisis currently being experienced in Russia and neighboring countries. The importance of the volume extends well beyond this, however—it serves as a prototype for the systematic integration of demographic, ecological, economic and health data. Those interested in studying the complex relationships between these variables in other regions of the world would be well-served by carefully examining this *Atlas*.

The *Atlas* is comprised of 89 pages of analytical text and over 300 maps, both organized into four complementary sections. (1) "The Population of Russia" provides basic demographic information. (2) "Ecological and Other Factors Affecting the Health of the Population" begins with basic ecological data and concludes with detailed information about industrial and agricultural practices and social behavior. (3) "Health of the Population" covers in disturbing detail reproduction patterns, child health issues, disease and other illnesses, life expectancy and death rates. Finally, (4) "Means and Long-term Factors Forming the Health of the Population," presents the current state of health care in Russia.

The richness of the *Atlas* is not easy to convey in a short review. It is only by leafing through its pages, and studying the maps, that one begins to appreciate the wealth of information it contains. To facilitate exploring relationships between variables, the authors have used the same map throughout the volume—one that divides Russia into its administrative territories and includes an inset of the densely populated Urals, central and southern European region. Thus, for example, one can quickly compare child mortality rates with radioactive pollution sites or the location of ferrous metallurgical enterprises.

Overall, the *Atlas* provides compelling evidence of the close relationships between economic activities, environmental change and serious health problems. It also underscores the severe limitations of existing health services to deal with the situation, further substantiating arguments made by Feshbach in his books *Ecocide in the USSR* (1992) and *Ecological Disaster* (1995). The *Atlas*, however, is not without weaknesses, although, given the originality and magnitude of the project, most of these are easily understood.

The short essays, many of which were written by Russian scholars, tend to be dense and difficult to follow. A second edition would benefit from aggressive editing. The data presented on each map is based on the most recent figures available, generally between 1988 and 1993. This makes certain comparisons difficult, which is especially significant because there appears to have been a very rapid decline in health in the 1990s. In some instances, one can only compare variables using data from different years. And, of course, some data that one might like are not included.

It would be churlish to make too much of these shortcomings. Feshbach's *Atlas* is an extremely valuable tool. It provides a wealth of information about Russia and offers a model for data collection and integration that future researchers will have the welcome opportunity to perfect.

Richard A. Matthew is Assistant Professor of International Relations and Director of the Peter F. Krogh Scholars Program, School of Foreign Service, Georgetown University. ❑

ATOMS, WHALES AND RIVERS:
Global Environmental Security and International Organization
by Peter J. Stoett
Nova Science, 1995. 230 pp.

Reviewed by Richard P. Cincotta

This book's seemingly eco-centric first title hopefully will not deter people from reading it—for Peter Stoett's work is a serious contribution to the political science of international institutions, and a candidate for a practical college text on the subject. The book can be divided into three parts: (1) reviews of the relevant political theory, including a brief overview of salient international relations theories; a careful discussion of state security, placing the rise of environmental security concerns within its context; and a run-through of global environmental security issues and the international institutions responsive to them; (2) three distinct case studies (and hence the book's title) examining (a) atomic trade and attempts to subdue weapons proliferation, (b) international whaling conventions, and (c) international agreements regulating development along the Mekong River; and (3) conclusions that revisit theories of international relations and institutions in light of these case studies, and rethink issues of global environmental security. By focusing on concrete case studies, the author succeeds in dealing with the most practical aspects of international environmental institutions: their foundations, their intent, their motivations, their accomplishments and short comings. Stoett observes that these institutions are capable of mobilizing impressive levels of technical prowess to address environmental problems, and are thus generally successful at defining the issues and conceptualizing the problems, but concludes (uncomfortably) that international institutions seem incapable of transcending many of the parochially political processes from which they were born.

Richard P. Cincotta is presently a fellow at the Western Consortium for Public Health. Under this fellowship he serves as a policy analyst for the U.S. Agency for International Development. ❑

THE OCEANS AND ENVIRONMENTAL SECURITY: Shared U.S. and Russian Perspectives

James M. Broadus and Raphael V. Vartanov, eds.
Island Press. 1994. 328 pp.

Reviewed by Stacy D. VanDeveer

Despite the limitless appearance of the earth's oceans, it is clear that their resources and capacity to absorb and disperse the by-products of human activity are not infinite. Numerous recent assessments of the ecological health of our world's oceans support this claim.[1] Even the review of marine ecological quality and resource levels in the environmentally skeptical *The True State of the Planet*, which bills itself as "a major challenge to the environmental movement," states that "pollution, habitat destruction or modification, and over fishing" are serious problems, "particularly severe in estuarine and coastal areas."[2]

Oceans and Environmental Security goes beyond diagnosing and describing oceanic environmental problems. James Broadus and Raphael Vartanov organized a multidisciplinary group of Russian and American scholars to examine the implications of "environmental security" as it applies to the world's oceans. The book serves as a primer on most of the major issues surrounding oceanic governance and the difficulties of incorporating environmental security in policy. The individual chapters do not have specific attributions because all are products of subsets of the large group of scholars, with significant input from the volume editors.

Broadus and Vartanov base their notion of "environmental security" on the existence of shared interests—in this case mutual Russian-United States interests—in avoiding common aversions. The working definition of "environmental security" for their research project is as follows:

> *Environmental security* is the reasonable assurance of protection against threats to national well being of the common interests of the international community associated with environmental damage.
>
> *Critical problems of international environmental security* are those that are likely to destabilize normal relations between nations and to promote international countermeasures (p. 6).

Students of environmental security may find

this definition a bit vague and somewhat problematic. The definition does attempt to incorporate both national and international interests. For Broadus and Vartanov, the "world ocean, as a single, uninterrupted medium, exemplifies the continuity and interconnectedness of environmental process (p. 9)." This view illustrates the necessity of somehow harmonizing both national and international interests and, by extension, national and transnational notions of environmental security in order to avoid the common aversions of oceanic ecological decline and ecosystem collapse. I fear, however, that the authors have glossed over the extreme difficulty of this task.

Broadus and Vartanov seem unconcerned that "national well being" and "the common interests of the international community" can, at times, be at odds. Certainly this is true in the case of Russian-United States relations. The national interests of two, or *the two*, of the world's great powers may not always correspond so nicely with the interests of most other nations or the world as a whole. (By way of example, one may recall the two Cold War superpowers' division of Europe into spheres of influence, their willingness to draw borders and their fighting of proxy wars around the globe.) This issue of the compatibility between national and international interests has vexed scholars and theorists of international relations for generations and it raises some doubt about the ease with which Broadus and Vartanov outline their concept of environmental security.

One more point must be made regarding the definition. For Broadus and Vartanov, normal relations among nations can be disrupted by international environmental security problems. While I agree, I believe one also must note that many aspects of these "normal relations" cause the very environmental problems which challenge stability and security. Critical problems of environmental security are endogenous, not exogenous, to the system, processes and institutions of "normal" international relations.

Using the working definition and the voluminous knowledge of the editors and the assembled group of scholars, the research team identifies seven post-Cold War problems of mutual interest to the United States and Russia. The volume's chapters, several of which contain case studies, are organized around these seven topics. The topics are as follows: (1) land based marine pollution (Black Sea and Gulf of Mexico case studies); (2) living resources (North Pacific case study); (3) hazardous material transport; (4) radioactivity in the oceans; (5) environmental protection for the Arctic; (6) the southern ocean (surrounding Antarctica); and (7) the Law of the Sea. Noticeably absent are examinations of the relationship between global trade and the environment and a systematic treatment of the negative environmental effects of military activities (in peace and war) and production.

In general, the individual chapters are clear, comprehensive and well documented. Only the Law of the Sea chapter stands out as somewhat weak and dated, probably as a result of the timing of the book's creation and publication. All others inform both newcomers and experts regarding major contemporary issues in international environmental governance. In the end, one is left with a clear sense that, from an environmentally informed perspective, the United States and Russia have many shared interests in protecting oceanic environmental quality—and many of these interests are shared by the international community as a whole. Unfortunately, the United States and Russia remain largely unpersuaded about the existence or the importance of these interests.

The authors conclude their tour-de-force treatment of oceans and environmental security by identifying nine cross-cutting themes within the book: issues of responsibility, liability and compensation; the common global perspective; implications of population growth; criteria and standards; monitoring, data and information; international cooperation and coordination; the role of international organizations; application of technology and technology transfer; and problems and opportunities arising with military conversion. I would add two more. The first is an acceptance of the reality and utility of combining regional, global and issue-specific approaches to ocean governance. Second, the book illustrates the profoundly important role of scientists and other "experts" in framing, organizing and administering international arrangements for ocean governance. Finally, *Oceans and Environmental Security* serves as an important memorial to the late James Broadus and as an illustration of his important intellectual legacy.

Stacy D. VanDeveer is a Ph.D. candidate in Government and Politics at the University of Maryland at College Park and co-editor (with L. Anathea Brooks) of the forthcoming volume, Saving the Seas: Values, Scientists and International Governance.

ENDNOTES

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ington, D.C., 1993.
2. Kent Jeffreys, "Rescuing the Oceans," in *The True State of the Planet*, ed. Ronald Bailey (New York: Free Press, 1995): 295-338, quotes p. 300. ❑

ENVIRONMENT, POVERTY, CONFLICT:
International Peace Research Institute Report 2/94
Nina Graeger and Dan Smith, eds.
Oslo, 1994

THE CONCEPT OF ENVIRONMENTAL SECURITY–POLITICAL SLOGAN OR ANALYTICAL TOOL?
International Peace Research Institute Report 2/95
by Karin Dokken and Nina Graeger
Oslo, 1995

Reviewed by Peter J. Stoett

These two very short reports, published by the widely respected International Peace Research Institute in Oslo, Norway, add conceptual depth to the advancing, and divided, field of environmental security studies. The first report emerged from a workshop which explored the peace and conflict implications of environmental sustainability. It surveys extant literature on the relations between the environment and conflict, addresses related implications for policy, and looks at methodological questions as well. It is the lengthier and more descriptive of the two reports, though one might well opt to read the other first since it deals more specifically with the conceptual groundwork needed.

In their introductory chapter, Graeger and Smith define peace as a "social and political situation in which human freedoms and rights are respected without recourse to life-threatening conflict" (p.9). It is thus clear from the outset that the authors are going beyond a conventional understanding of state-centered security, more attuned to a "realist" perspective in the study of world politics, toward a human-centered conception that includes questions of quality of life and social justice. Robert Goodland, a senior consultant at the World Bank, supplies a key chapter explicating the many links between poverty and environmental degradation, emphasizing the need for Northern economies to slow down alongside population stabilization in the south. Dan Smith discusses the "Dynamics of Contemporary Conflict", and the difficulty of causal analysis in this field; he also supplies several useful tables which depict current wars and systemic sub-war violence. We are constantly reminded of the inter-connections involved—between debt and violence, between ethnic conflict and resource disputes, and between mass migration of environmental mismanagement. These are, however, inter-connections only; they do not lend themselves neatly to the determination of single causes, nor can they, regardless of our theoretical approach.

This point is made most clear in what might be the most interesting chapter in the 1994 report. David Dessler offers one of the most concise epistemological discussions related to environmental causes of conflict ever published. Most research in the area, he points out, will follow one of two central routes: it will focus rather exclusively on single case studies, offering what he terms genetic explanations of conflicts over resources, such as the Senegal River in 1989; or it will offer instead "inductively-generated typologies of causes, effects, and causal patterns which seek to link different case studies." (The work by Thomas Homer-Dixon and his colleagues in the *Environmental Change and Acute Conflict* project attempts this). Dessler goes on to argue that the only widely accepted basic model remains rational choice theory, or what he terms the "intentional-actor model"; and he distinguishes further between various roles played by causes of events, such as triggers, targets, channels, and catalysts. Dessler contributes an engrossing essay for those with a primary interest in methodology, though he might have explored other approaches, such as structuralist designs and even postmodernist perspectives on causation. Ultimately, however, we search in vain for single causal factors in a field as complex as environmental security studies. What we continue to need are approaches which embrace rather than seek to eliminate multiple causality.

The concept of environmental security itself, as Dokken and Graeger make clear in the subsequent 1995 report, may do just this. It is impossible to think of environmental security as something that can exist on one level only, since the local, regional, and even global arenas are so closely linked by ecology. Therefore we must accept a rather broad definition, which leads to frustration for those who seek linear relationships in the social/natural interface. Others reject this broad conception because it either takes emphasis away from the nation-state, redirects environmentalism toward the nation-state, or focuses our attention away from local problems to a sort of common denominator "one-boat" approach which is susceptible to manipulation by global elites. One might argue that this debate has largely taken place in other journals, and that much of the discussion here is either outdated or superfluous. Nonetheless it makes an excellent—although hardly impartial—introduction to one of the main questions facing the fields of peace and conflict studies and environmental politics as well.

The Dokken/Graeger work reads more like a long essay than a report, and some sections may have been eliminated since they borrow heavily from other published works (Thomas Homer-Dixon appears rather frequently). Other sections, however, need

more treatment. For example, the concept of subsidiarity, as (supposedly) practiced by the European union, is offered as a potential political avenue away from the stubborn levels-of-analysis (or levels of security policy) problem. This begs a much more detailed analysis, including a tougher assessment of whether such a western European-based model is exportable elsewhere (particularly at the global level!), but the authors decided not to spend appropriate time on the issue.

The authors in both reports do not provide us with a conceptual discussion of how various perspectives on human-nature philosophy factor into the work surveyed and the research agenda put forth. One suspects this omission is intentional, since it would further muddy the conceptual waters; yet it is an important and divisive aspect in need of explication.

Overall, however, the authors' conclusions appear most sound. The concept of environmental security has not lead directly to the solutions some hoped it would, but what social science concept has? And, as they write on page 26 of the 1995 report, there have emerged two central currents in the applied field: one that "deals with questions about comprehensive human security and normative claims about security as a human right, etc.; and one more empirically oriented current that seeks to reach more concrete conclusions about the relationship between the environment and security." This division mirrors that found in other areas of social science, which implies above all perhaps that the field of environmental security, while still far from reaching prominence, has achieved a certain maturity.

Peter J. Stoett is a Professor in the Department of Political Science, University of Guelph, Ontario, Canada. ❑

ENVIRONMENTAL ACTIVISM AND WORLD POLITICS

by Paul Wapner

State University of New York Press, 1996. 238 pp.

Reviewed by Richard A. Matthew

Much of the recent literature on environmental issues has conveyed a message of frustration and pessimism. This is particularly true in the area of environmental security, where analyses and recommendations are often presented in a dark, menacing style illustrated with bleak scenarios of present and future scarcity and conflict. We live in a world destined to deteriorate because of the tragedy of the commons, a world in which the population bomb has been detonated, nature has ended and violent anarchy is on the horizon. The cautious optimism of Paul Wapner's carefully researched study is a welcome change.

Part of the problem, according to Wapner, who teaches in the School of International Service at the American University, is that many encouraging trends are not picked up by the analytical tools students of international affairs tend to use in their investigations. To correct this deficiency, he adopts an unconventional but highly illuminating perspective, informed by recent studies of interdependence, transnationalism and the behavior of non-state actors.

Wapner identifies three mainstream approaches to environmentalism. The first contends that many environmental problems are transnational or global in magnitude, and concludes that they can only be addressed effectively by a powerful and authoritative international entity—something like a world state. In contrast, the second approach emphasizes the extent to which the effects of environmental change are experienced locally. States are too large and remote to address local issues; hence, their power and authority needs to be decentralized. The final approach argues that, whatever the virtues of suprastatism and substatism may be in theory, they are quite impractical in practice. Only through greening the state can we hope to solve environmental problems.

These mainstream approaches begin with the state and use it as their point of reference. But, Wapner argues, what makes efforts political "is not that they are ultimately codified into law or governmental decree but that they represent the use of power to influence and guide widespread behavior." (p. 43) His idea of "world civic politics" represents "an understanding that states do not hold a monopoly over the instruments that govern human affairs but rather that nonstate forms of governance exist and can be used to effect widespread change." (p. 7) Modifying the state or reproducing the state at a different level of social interaction do not exhaust the possibilities of world politics.

Environmental activists do not deny the importance of the state or of formal political institutions at any level and they devote a significant amount of time to trying to influence both. But they also seek to change the behavior of individuals, communities, businesses and other associations directly.

Wapner explores this nonstate realm through case studies of Greenpeace, World Wildlife Fund (WWF) and Friends of the Earth (FOE). The case studies have been selected to illustrate neglected forms of politics that operate at the world, state and local levels. For example, among its various activities, Greenpeace seeks to promote a global ecological sensibility—to make this part of the way in which people understand and function in the world. WWF tackles tensions between economic and ecological needs at the local level, encouraging local groups to design and implement sustainable economic practices. And FOE seeks to shape what states can do by influencing the

external environment—the realm of economic and ecological interdependencies—in which they operate.

This study succeeds on several fronts. It adds to our understanding of the nonstate realm of politics. It identifies the ways in which state and nonstate politics are linked directly or through feedback mechanisms and the ways in which they are independent. It provides useful information about the activities of three prominent environmental NGOs. It suggests that we should not sink into despair because states and interstate organizations such as the UN have failed to respond aggressively to environmental concerns. That they are not providing leadership in this area does not mean there is no leadership. Although still in its formative period, a highly innovative and pervasive global polity is emerging that is concerned with the environment, and individuals and groups are acting on this concern to change the world in which they live and states operate.

Critics of such a perspective are likely to focus on the question, How much impact does the nonstate realm really have on behavior? Wapner acknowledges that this is extremely difficult to measure. His objective is to develop a persuasive theoretical argument, illustrated with diverse examples, showing that NGOs are significant in world politics, but his study is very cautious and does not obviously exaggerate their impact.

Policymakers and others concerned with environmental security would benefit from reading this book. Many sympathetic officials are confused when environmentalists do not fully embrace their efforts. It would be wrong to conclude that environmentalists tend to be uncritically opposed to government initiatives or believe that these are incidental to environmental restoration. Their reluctance is related to the fact that they devote so much time to working outside the formal realm of politics—to greening the gray area above and below and between states. Understanding this is likely to facilitate dialogue and promote cooperation by enabling actors with very different tools and constraints to identify the common ground in their endeavors while appreciating their particular strengths and weaknesses, as well as their different constituencies and institutional limitations.

Richard A. Matthew is Assistant Professor of International Relations and Director of the Peter F. Krogh Scholars Program, School of Foreign Service, Georgetown University. ❑

Intelligence Support to Humanitarian-Disaster Relief Operations

In December 1995, G. Ted Constantine (a senior intelligence analyst with the Defense Intelligence Agency's Office of Transnational Issues, Low-Intensity Conflict Cell) published a monograph entitle*d Intelligence Support to Humanitarian-Disaster Relief Operatio*ns. The study—resulting from Constantine's research while serving in the Director of Central Intelligence Exceptional Intelligence Analyst Program at the Center for the Study of Intelligence from May 1994 to May 1995—explores the role of the US Intelligence Community in support of humanitarian-disaster relief operations conducted abroad by US military forces.

The author conducted extensive interviews with intelligence and military personnel, and took surveys of both government and nongovernmental consumers of intelligence. Interviewees were asked to discuss their roles, responsibilities, intelligence requirements, and issues of concern regarding disaster relief operations. Some were invited to evaluate the usefulness to their missions of various intelligence products, specifically the Defense Intelligence Agency's (DIA), *Contingency Support Study (CSS), Environmental Defense Intelligence for Natural Disaster Relief Operations, Bangladesh,* published in April 1993.

The report highlights the Essential Elements of Information that should be considered when producing environmental intelligence. Constantine defines environmental intelligence as including traditional military geography for the target area (terrain, vegetation, meteorology). It also embraces estimates of potential future disasters, the possible extent of disaster-induced damage, the impact on cross-country movement, and environmental constraints on operating forces. Much of this information is typically in short supply for many of the low-priority, disaster-prone countries. The study recommends the creation of a Humanitarian Emergencies Intelligence Unit within the DIA. The unit would be comprised of all-source intelligence analysts that would focus on the production of unclassified analysis. The goal would be to facilitate the widest consumption of the product.

Meetings–Discussion Group

In November 1994, the Wilson Center inaugurated a series of monthly luncheon meetings of the "Environment and Security Discussion Group," consisting of experts from academia, Congress, various government institutions, the military, non-governmental organizations, and other communities. Below are detailed summaries from four of the sessions, including presentations and selected comments.

18 May 1995

Military Capabilities and Possible Missions Related to Environmental Security

SHERRI W. GOODMAN
Deputy Under Secretary of Defense (Environmental Security)

ADMIRAL WILLIAM CENTER
Deputy Director for International Negotiations, Joint Staff

Opening Remarks by Sherri W. Goodman: Good afternoon. It is my honor and pleasure to be here with Admiral Center of the Joint Staff, and to have the opportunity to address this group on a subject of personal and professional interest to me. I want to thank P.J. Simmons and the other members of the Smithsonian's Wilson Center staff for continuing to sponsor this dialogue on Environmental Security. As a frequent attendee of these luncheons, I am continuously impressed with the professionalism, level of interest and knowledge that I encounter each month. I hope that my remarks today will answer some of your questions about the Environmental Security program at the Department of Defense. I know from experience that your questions will spur a healthy discussion. Today, my remarks will focus on the mission, concepts and policies of Environmental Security. Admiral Center will address certain environmental activities, and the Department's prospects for the future from the Joint Staff perspective.

During his remarks celebrating the 25th Anniversary of Earth Day, President Clinton had this to say about international environment affairs: "We must be more concerned with these issues, not less concerned. We cannot disarm our ability to deal with them. Our natural security must be seen as a part of our national security." We, corporately, in the Department of Defense, take this charge very seriously. We recognize environmental security as a component of national security. In fact, in April 1993, when my office was created, one of our first tasks was to incorporate environmental awareness into every aspect of the Defense mission. This is not a simple task.

Let me tell you about the environmental capabilities the Department of Defense has to offer. We created a program model that mirrored the Armed Forces structure. I call it P2C3 plus T. This stands for Pollution Prevention, Cleanup, Compliance and Conservation plus Technology. Pollution prevention is preventive medicine for the environment. It represents the future in environmental management and environmental investment. Pollution prevention means changing the way weapons systems are developed, buildings are constructed, and refining the acquisition process itself. It is central to everything that occurs within the Department of Defense. Cleanup is what we do on active bases and closing bases to address contaminated sites. Compliance includes activities the Department undertakes to comply with current laws and regulations to prevent pollution. The Conservation program is designed to protect the natural and cultural resources of the Department, while supporting the military mission. We use Technology to support and enhance each of these programs.

After creating the structure, we determined our top priorities, or missions, in the program. Four are critical to enhancing international environmental security. They are: protecting the Department's assets; helping neutralize environmental conditions which could lead to instability; incorporating environment into national security policy; and determining how the Department of Defense can contribute to the national environmental policy. The first mission is to "protect the Department's assets: people, equipment, weapons systems and

facilities. This incorporates protection from accidental losses and threats such as chemical, biological and explosive." Thus, we have a responsibility to maintain the environmental security of our own personnel in their daily activities. It also means we have a responsibility to respect the environment in foreign countries. These are not idle responsibilities. If we don't adequately protect our personnel, we run the risk of losing them. If we don't care for the air, land and water we need for the Defense mission, we may lose access to them. When access is lost, we are unable to perform the Defense mission. Let me give you a case in point. We deployed approximately 18,000 military personnel to Somalia during Operation Restore Hope. They were exposed to a wide variety of vector borne diseases. In order to assure the maximum protection we equipped them with permethrin, a pesticide that is applied to clothing and repels a wide variety of disease carrying insects. The Armed Forces Pest Management Board estimates that we saved thousands from disease or what the military calls "non-battle casualties."

Our second mission is to help neutralize or mitigate environmental, safety or health conditions which could lead to instabilities among peoples or countries. We want to contribute to the understanding of how environmental factors can be a source of conflict. The Department of Defense's role is to use our capabilities to detect, forecast and take actions to prevent, when possible, conflicts arising from environmental factors. These factors may range from deforestation or desertification, which could lead to agricultural migration, to the environmental aftermath of the Cold War—particularly the presence of hundreds of former Soviet bases on non-Soviet territory—which poses health threats and barriers to the economic growth necessary to the stability of these countries.

We are currently engaged with Estonia to address contanimation from former Soviet bases. The initiative started when President Clinton visited Estonia and pledged $2 million in assistance for the radioactive contamination on the Paldiski Peninsula. This program is being managed by the Department of Energy. Subsequently, at the request of the Estonian government and the Department of State, the Department of Defense sent a team led by my deputy, Gary Vest, to assess the situation on the former Soviet military sites and develop a proposal for consideration by both governments. This activity received additional attention during Vice President Gore's visit to Estonia in March. We are now working in consultation with the Estonian government—particularly the military—to address environmental management across a broad spectrum of activities. The developing democracies of Central and Eastern Europe need infrastructure: trained professionals, environmental offices within key agencies, including their ministry of defense, and procedures for intra-agency consultation. They must gain the capacity to apply prioritization and investment strategies, to foster economic development without sacrificing environmental protection.

We are also engaged with Russia and Norway in a process we call Arctic Military Environmental Cooperation. This trilateral military consultation is focused on the potential threat posed by radioactive waste in the Barents, Kara and Arctic Seas. This dialogue represents an important first step in what we hope will develop into international cooperation to protect the Arctic environment from radioactive pollution. The Department of Defense can play an important role in these and similar fora. If you aggregate all the militaries in the world, you have identified one of the primary forces in the world—positive or negative—on the environment. If we can change the culture in the militaries, we can make a substantial contribution to global environmental sustainability. We are already working with most NATO and Central and Eastern European countries, the Baltics, Korea, Australia, and Russia.

The third mission is to bring appropriate environmental, safety and health considerations to bear in the development of national security policy. One important means for doing this is through Military-to-Military cooperation, which Admiral Center will describe in detail. The primary message here is that the environment is a national security consideration. Our Administration is certainly treating it as such—we have, for the first time, global environmental policy being coordinated out of the National Security Council.

The final mission is to determine how and in what circumstances the Department of Defense can be used as an instrument of National Environmental Policy. This represents perhaps the greatest departure from past practices. Never before has the Department made a policy decision to use its considerable resources for the advancement of the United States' global environmental interests. But consider the opportunity costs involved. We have environmental professionals deployed all over the world. In an era of shrinking budgets and multi-faceted foreign policy objectives, we would be irresponsible not to take advantage of all resources.

One example is the military's leadership in advancing the goals of the Montreal Protocol on Substances that Deplete the Ozone Layer. The original version of the protocol simply froze halon production to 1986 levels by the year 2000. Enter the U.S. military. We used ODCs in literally every single weapon system and support system in the Department of Defense inventory as either a working fluid, a maintenance tool, or as a fire suppressant. We were a major stakeholder, and we needed to act. One of our first projects was to demonstrate the feasibility of halon recycling technology—enabling a real phaseout to occur. We

also founded the Halon Alternative Research Corporation, which coordinated halon research worldwide and makes recycled halon for the few critical uses it's been approved for, across industries and around the world.

Working with industry—in particular, the International Cooperative for Ozone Layer Protection—we developed several non-ozone depleting substances for use in military equipment and aircraft. Partnership with industry was also critical to organizing two NATO conferences on the "Role of the Military in Protecting the Ozone Layer." These conferences culminated in a NATO communiqué to the Executive Director of the United Nations Environment Program, stating that NATO militaries could achieve manage accelerated phaseouts of both CFCs and halons.

Another example I would like to share with you is a new trilateral collaboration we have established with Canada and Australia. Under this trilateral, we are actively pursuing military cooperation in 15 distinct environmental areas. Subjects range from management of training areas to how to interact with government regulators and the public on base closure to other sensitive environmental issues. Our goal is twofold. First, sharing with these two developed nations creates a more efficient program and mutually benefits our relationship. Second, it develops a sound basis for environmental outreach to the lesser-developed nations of the Pacific Rim. Thus environmental security cooperation yields the benefits of traditional security cooperation: insight into, and influence upon, another nation's military structure.

In fact, this theme is very real to me. On Monday, I addressed a conference sponsored by the intelligence community on how the United States does, and Russia might, use data gathered by intelligence sources for environmental purposes. I will be returning to participate in related meetings with Russian government officials this afternoon. In addition, my office is sponsoring a conference in June entitled, "Environmental Security / National Security." The conference will explore how the intelligence community, national security community and civilian environmental community within the United States government can work together to further United States environmental goals. Several agencies are lending high-level support, and I anticipate that it will be an important catalyst in the government's environmental security deliberations.

These concepts of policy and mission underscore the message that the Department of Defense is engaged in environmental security. We are dedicated to making it a focus of our national security apparatus. Our challenge is to appropriately apply the capabilities we have developed to the security threats of environmental degradation. Thank you and I look forward to our discussion after the Admiral's remarks.

Remarks by William Center: Thank you very much for the kind words of introduction. Thanks also to Sherri Goodman for offering to share this time. I very much appreciate this opportunity to review our views on "Environmental Security" even though environment is a very small nugget of our overall business which is the formulation of national security policy. Even though it's a very small piece of my portfolio, in my travels around the world one thing is very clear to me...we have a great deal to be thankful for, in this country, in terms of the quality of our environment, and how environment is going to directly affect the development of many emerging democracies in the former Soviet Union and elsewhere. In devising solutions to those environmental issues, I do not feel that DOD should be the lead agency. However, we should not be kept out of the fight because we have unique military capabilities—and perhaps the only capability in the world—to respond to certain types of environmental calamities like the recent situations in Rwanda and Somalia.

Before beginning, I'd like to make a plug for the conference Sherri's office and the Intel Community Management Staff are sponsoring in mid-June. It will explore a broad range of environmental and national security issues with particular emphasis on the role of intelligence in predicting future situations like we saw in Haiti or Rwanda. It should be a very worthwhile interchange.

On a personal note, I regret that when I transfer to San Francisco later this summer I won't be able to attend any more of these sessions. Sherri has informed me that part of my new duties will be as DOD environmental coordinator for region nine, so I'll still be in the business. Reflecting on sources of conflict and instability which may require military action in the future, I am more convinced than ever of the need for military leaders to stay engaged in this debate. We must build on earlier lessons to stay engaged in this debate, and to—ideally—devise and implement programs which reduce the risk of conflict. The work of the Wilson Center to focus attention on the important questions of environmental security is necessary and important to that effort.

I'm going to review briefly four points: (1) the changing nature of challenges to U.S. national security since the end of the Cold War; (2) how those changes are reflected in current policy; (3) some things we're doing; (4) and I'm going to take out my murky crystal ball and try to predict the types of things which DOD is likely to become engaged in in the years to come.

Changing Security Environment

Few vestiges of the Cold War remain. Those

ideological battles have largely been displaced by religious, ethnic, environmental and other related factors as a cause for future conflict. Population growth increases the number of states "at-risk."

I recently reviewed James Winnefeld's excellent RAND report on the "Changing Nature of Conflict and the Environmental Connection." He looked at 30 current or potential conflicts, and showed that environmental or resource issues are important causative factors in as many as one-third of the cases. Sudan, India-Pakistan, Philippines, Peru, Somalia, and China exemplify states in which environment or resource issues may contribute to future instability.

We need a good model for examining the failure of nation states and determining the role environment or resource depredation will play in future conflicts. Ultimately, I'd like to see the sort of energy expended on preventing environmental-based conflicts we now expend battling proliferation of weapons of mass destruction.

Current Policies and Outlook

Military leaders have now been exposed to 25 "Earth Days." Most agree that environmental factors can sow the seeds of conflict. Further, because foreign access is so important to us, there is also an institutional understanding that the environment must be considered and safeguarded in all military operations. We want to protect the areas in which we are operating and we want to preserve our access.

Along with this increased sensitivity, comes a genuine concern that too much activism risks transforming our fighting forces into "Eco-Cops." Our military forces have many tremendous capabilities which are unique in the world and which can—and properly should—be employed as instruments of national policy. DOD should not normally be the lead agency here, but we have a role to play. I expect over the next decade our interest will continue to grow in both predicting and working to prevent regional environmental calamities which could lead to conflict or other "lower intensity" situations (like mass migration) where the military would be directed to play a role. As has been discussed in the forum before, I don't expect, even if we develop good predictive tools, that it will be easy to move our government or the international community to take needed action. It's not clear to me the extent to which DOD will be able to be proactive and actually contribute to ameliorating any specific environmental challenge before the risk scenario plays out. So I'm not suggesting our institution is any more forward looking or responsive on that score than anyone else.

What are We Doing?

Our military-to-military exchange programs are adding an environmental component. For example, European Command runs an annual environmental conference with Eastern European nations (we fund their participation) in which we distribute information on civil engineering techniques and management of various types of waste streams. A few weeks ago at the Marshall Center in Germany, combat engineers and defense environmental officials from the former Warsaw Pact were exposed to some of the newest environmental technologies and techniques such as recently developed plasma torch technology which has the potential to revolutionize solid waste disposal. While we don't expect immediate application of all the high-tech solutions, we're planting seeds. We've also provided information on designing and operating low cost waste water treatment plants and upgrading operating practices to minimize the environmental consequences of military operations. And, because these military professionals often hold important government positions, the lessons they learn at these information exchanges have a good chance of being adopted and incorporated when they return home. The Southern Command, in Panama, and the Pacific Command, in Hawaii, have similar programs. The military departments and combat commanders also have a long history of nation building activities in less developed countries, and providing disaster assistance in critical cases.

We have also launched a number of initiatives to share data with the scientific community to aid in the solution of global environmental problems, particularly in oceanography and meteorology. For example, the Naval Oceanographic Data Distribution System (NODDS) is a computer data base maintained by the Oceanographer of the Navy to support a variety of military missions. That data was recently made fully accessible to the scientific community to study global warming and other ocean ecology issues. Another remnant of the Cold War—the formerly secret SOSUS undersea surveillance network—is now being made available to civilian scientists to monitor fish stocks and movements of marine mammals. Unfortunately, I'm not sure how long we'll be able to maintain this cooperative use of SOSUS since the costs of operating the system are so high and the Russian submarine threat has greatly diminished.

One of the most revolutionary areas of DOD involvement has been the promulgation of a formal program of support for monitoring and detection of illegal driftnet fishing on the world's oceans. As many of you know, there is a worldwide moratorium on large scale driftnets. A few months ago we established procedures for using U.S. monitoring assets—including ships, aircraft, and satellites—to detect and report on illegal fishing. While we're not involved in direct law enforcement, this is one of the first times our capabilities have been used to address a specific world-

wide resource challenge. Our actions are not driven by altruism alone—it is simply no good when our NATO allies have their warships "nose to nose" to protect their fishing vessels. We're participating in formulating tough conservation-minded enforcement regimes to assure long term survival of fish stocks and minimize potential for violent conflict.

Where Should We Go?

I've mentioned a few things we're doing. The question is where do we go from here? Should we only attempt to fix small/regional problems (like helping an underdeveloped nation build a waste water treatment plant in a particular locale) or should we tackle the really big problems like radiological contamination in the FSU? Speaking for myself—not for the Chairman or the Chiefs—there is a growing sense of connection between national security and environmental issues. Though some disagree, I believe the U.S. military has a role to play.

If we accept that there are environmental factors which can lead—if not to war, at least to instability of the sort which can only be addressed by military operations such as Somalia and Haiti—then should we not be able to recognize the warning signs—deforestation, desertification, massive cross border pollution, drought? Of course we can. But can we then chart a policy course to minimize the chance we'll have to use a military option at some point? Can we energize, enable and empower government resources, agencies and NGOs to effective action in advance of mass migration, starvation, and political upheaval? Not easily or often, but we're learning what we need to do. Anyone who has ever tried to energize the interagency to action in advance of a crisis knows how tough that is; we have our hands full just trying to cope with the crises which are already in full flower. It is hard to get people excited about the need for a tree planting program in Africa or an environmental clean-up program in the former Soviet Union.

When we look at situations from an environmental security perspective, the Joint Staff clearly has an interest and equity in raising such concerns. I don't want to overstate or oversell this, but as our awareness of the security consequences of environmental degredation grows, I can forsee a time when we voice as much concern regarding those factors as we now do over, for example, nuclear proliferation.

Comments During Discussion

Comment: When the military goes into battle, damage to the environment is a cost of that operation. Should the United States make assessments that try to anticipate military damage to the environment when deciding whether to use force or not?

Goodman: The U.S. military does do assessments for all military operations short of war.

Center: The U.S. military observes the international convention that identifies tactics such as dumping oil as a war crime. The military is examining ways to make military actions less damaging. These efforts are driven by a larger environmental consciousness. The military does have a limited ability to move money among accounts so it is difficult to give heightened attention to the prevention of environmental causes of conflict.

Comment: On the subject of conflict prevention, does the military have adequate models?

Center: Many good models do exist, but the challenge is determining what needs to be done, who should do it, and who pays for it. Hence there are big political questions. Proposals for a crisis center have been put forward. The CIA provides good information on migrations and early warning. But again, the political problems make implementation difficult. While Congress exhibits a high degree of interest, misgivings about preemptive actions come from all sides.

Goodman: DOD is changing the process of evaluating environmental contingencies, but it remains unclear what the contingencies are. The environmental budget within DOD may be viewed as a source of funding for these contingencies. If fences come down between budgets within the Defense Department, money may be drawn off the environmental cleanup focus for intervening in environmental contingencies.

Comment: Can you provide some specifics on the prevention element? In particular, I would make the case that social and economic factors must be given considerable attention in addition to the instrumentalities of preventing environmental conflict. What are the national priorities for helping countries? Is addressing social inequity the priority and way to help these countries or does it focus more on the military budgets in developing countries? In total, I am not sure DOD is the institution to address the broader concerns of social inequity.

Center: DOD will play a larger role if the military is expected to react to and address instability or conflict resulting from environmental factors. The military will also be expected to clean up the environment after the operation. For this reason, DOD also has a big stake in trying to avoid the problems to begin with. ❑

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The Intelligence Community and the Environment: Capabilities and Future Missions

Richard Smith
Deputy National Intelligence Officer for Global and Multilateral Affairs

Opening Remarks by Richard Smith: Henry Kissinger recently wrote that "security can no longer be the principal unifying bond of the Atlantic nations because there no longer exists a unifying threat. Common purposes, not common fears, must provide the cohesion in the new era in which economic and social issues are becoming dominant." With the end of the Cold War, we are in the process of redefining "national security" to meet the "new threats." The need for a broadened concept of national security lies at the heart of today's debate about foreign intelligence and the environment.

The Clinton Administration believes, as enunciated recently by National Security Advisor Anthony Lake, that environmental degradation can lead to both political and societal stress, and even major instability. Therefore, it is the Intelligence Community's [IC's] responsibility to provide the supporting analysis on those foreign environmental activities, developments and trends that either affect, or have the potential to affect, U.S. foreign policy and national security interests.

There can be no doubt—however one defines "environmental security"—that foreign environmental developments, activities and trends either impact or have the potential to impact directly and seriously the well-being of the United States. These impacts have become more pressing since the landmark 1987 report of The World Commission on Environment and Development—the "Brundtland Report"—clearly noted this link between security and environment. Over the last decade there has been a burst of interest in and serious attention paid to these issues in the academic, media, and NGO communities, as well as in government.

Categorizing Environmental Threats

Environmental threats to national and international well-being are of several types:

(1) Global environmental issues:

These issues pose overall threats to the world's security through negative political, economic or health effects. For example: failure to arrest and reverse the deterioration of the stratospheric ozone layer would harm U.S. citizens' health substantially through increased skin cancers and a degradation of immune systems; unchecked global warming might lead to climatic changes that affect U.S. agricultural productivity—and the associated sea-level rise would cause vast damage in low-lying coastal regions; increased frequency of catastrophic weather events will impose substantial additional costs in life and resource; loss of biodiversity will reduce crop yields, fish-takes, and health benefits derived from new pharmaceuticals.

(2) Regional and transboundary environmental issues:

These issues will increasingly affect U.S. foreign policy interests. Pollution problems along the U.S./Mexican border involve important U.S. interests, and had to be addressed with new international institutions and the commitment of substantial resources before we could implement NAFTA—a key U.S. policy objective. In another example, the 1977 conflict between Somalia and Ethiopia resulted in part from environmental degradation connected with deforestation and loss of arable farm land. It generated large refugee flows, a struggle for diminished resources, and ever increasing societal stresses and conflicts in which U.S. resources and military forces ultimately became involved.

(3) Environmental degradation within countries:

Decades of environmental neglect in communist countries, for example, have left a residue of serious health and ecological problems in Central and Eastern Europe and the former Soviet Union. They demand

priority attention if they are not to become destabilizing factors in this strategically important region. In Haiti—where deforestation is almost complete—high population growth rates and a devastated environment are central factors in Haiti's continuing struggle with political instability. In Haiti, we need to take a longer-range view—over the next two decades—and consider development and population issues carefully.

In El Salvador—which has six times the population density of neighboring Honduras—environmental impoverishment and overpopulation have contributed to a 15-year cycle of political upheaval and violence involving high costs to El Salvador, the United States and the world community. Environmental degradation and severe population pressures were also elements in the instability and societal stresses plaguing Rwanda.

(4) Sudden, specific environmental threats:

Environmental destruction can be used as a tool of war—as Iraq did against Kuwait in the Gulf War by dumping and burning great quantities of oil. The ignition of fires (destroying 732 Kuwaiti oil wells) and the dumping of millions of barrels of Kuwaiti crude into the Persian Gulf presented new strategic challenges to the U.S. military. Coalition lives were likely saved when environmental intelligence analyses revealed that the impending destruction by Iraqis of high pressure oil wells in southern Kuwait would release lethal hydrogen sulfide; as a result, U.S. troops were moved away.

(5) Environmental-health links:

There is a rising level of concern over the implication of emerging infectious diseases, which tend to arise in areas affected by environmental problems.

All of these aforementioned stresses on the environment are aggravated by growing population pressures. Despite a decades-long decline in fertility rates, demographic momentum assures continuing substantial annual increases to world population well into the next century, reaching 90 million a year in the period 2016-2020. By 2005, the world's population will have grown by 860 million people to reach 6.6 billion—over 90 percent of that growth will occur in developing countries, many of them already environmentally fragile.

The Role of the National Intelligence Council

The National Intelligence Officer (NIO) for Global and Multilateral issues was established in late 1993 to work on these environmental issues and other global concerns. We work closely with the NIO for Science and Technology, Larry Gershwin, whose responsibility for environmental science and technology issues is also new. These two NIOs have joint responsibility for identifying and assessing national intelligence needs in the environmental field. Over the past year, a number of National Intelligence Estimates (NIEs) that touch on aspects of global environmental and related issues have been completed. They have dealt, for example, with the implication of global population trends over the next 10 years; the impact of the HIV/AIDS pandemic on military forces around the world; and the global outlook for humanitarian emergencies.

International Environmental Negotiations

As environmental concerns have grown sharply in recent years, the U.S. has actively participated in the negotiation of numerous multilateral environmental agreements—all of which enhance collective environmental interests—including the Montreal Protocol on Substances that deplete the Stratospheric Ozone Layer; the Climate Change Treaty; the Basel Convention on the Export of Hazardous Wastes; the Biodiversity Convention; the Convention on Desertification.

There will be more such environmental agreements and new institutional arrangements as we address additional global environmental problems, including the worldwide loss of coral reefs and the increasing problem presented by persistent organic pollutants (POPS). Moreover, most existing agreements will continue to evolve and raise further negotiating and implementation issues which require careful analysis. The Climate Change Agreement, for example, only sets out a framework to which specific commitments to reduce greenhouse gases remain to be added. The parties to that agreement are also working on innovative approaches such as "joint implementation" through which a developed and a developing country can work together to achieve a given amount of emissions reduction more efficiently.

The concept of "sustainable development," which incorporates a consensus in favor of a new sensitivity to environmental concerns in the development process, has emerged as a central theme in U.S. and multilateral development programs. This set of concerns has become a dominant element in the North/South dialogue in the post-Cold War era. Developing countries have, in fact, set a price for their cooperation under various environmental agreements; they insist upon the availability of effective, targeted financial aid and technology transfer to assist them in meeting the agreements' obligations. Similarly, environmental degradation is also a serious threat in transitional democracies, and cannot be successfully redressed without substantial financial assistance and investment. Environmental aid, however, is leveling off as many governments fall short of expectations created for such aid. For example, the major donors earmarked the same amount in 1994 as in 1993, about $4

billion, for bilateral environmental assistance to developing countries. That was after doubling such commitments between 1991 and 1993.

Given the growing importance of these problems, the complexity of the multilateral arrangements which address them and the shortage of resources, it is critical that environmental issues be subjected to clear, objective targeted analysis to assure global environmental issues are dealt with as cost-effectively as possible.

Environmental Intelligence Needs

To deal effectively with this set of issues, policy officials need intelligence both on environmental matters, per se, and on the intentions of other governments in addressing them. Let me mention five types of needs for environmental intelligence:

(1) Ongoing Analysis:

Reporting and analysis of ongoing environmental, demographic and health developments and trends finds a receptive audience in the policy community. Policy needs include: information and analysis about impending breakthroughs in environmental technologies; early warning of environmental disasters; indications on the course of global epidemics; population trends and their environmental implications; country-specific studies of environmental conditions; population pressures, land tenancy and the differential access of various communal groups to resources.

(2) Negotiations Support:

Environmental negotiators need support from the IC both with regard to issues under negotiation, and the positions, strategies and tactics likely to be pursued by other countries.

(3) Treaty Monitoring and Compliance:

It is often crucial for policy officials to know whether other countries are meeting the commitments they have made under international environmental agreements—and this has been an area in which the IC has been helpful. In the case of the Montreal Protocol, for example, information about prohibited shipments of CFCs led the parties to the agreements to take further steps to deal with the problem.

(4) Support for Military Operations:

Analysts throughout the community, but particularly in defense intelligence, follow environmental and health developments which can impact on military operations. For example, we attempt to assess the environmental dimensions of humanitarian emergencies in which U.S. military and civilian resources and capabilities are likely to be engaged.

(5) Support for the Scientific Enterprise:

Satellite imagery gathered and analyzed by the IC over three decades has been recognized by senior policy officials—led by Vice President Gore since he was in the Senate—as a basic resource in addressing environmental issues:

(a) An "Environmental Task Force" initiative has led to a highly productive working relationship between CIA and the environmental science community to make effective use of this imagery capability. As part of this effort, the so-called MEDEA group—involving more than 50 eminent environmentalists—was formed and given a high-level clearance. They have become a remarkable asset for the IC. The goal of the ETF was to perform a technical review of our government's classified assets to determine their utility in providing information important to national and global environmental issues. The ETF found that current classified systems and classified data archives provide unique data that are of unparalleled significance to environmental issues and that is not attainable from, but is complementary to, current civilian sources.

(b) In May 1995, the IC sponsored a joint U.S.-Russia meeting with senior Russian intelligence, military and environmental officials to explore ways we could cooperate to make more effective use of our imagery capabilities for environmental purposes. Vice President Gore suggested that the United States and Russia have a mutual interest in sharing photo imagery, since the United States has more pictures of Russia than does Russia itself—and vice versa.

Conclusion

Environmental issues have moved to the top of the in-boxes in the offices of the IC's policy customers—and there they will remain. Policymakers will therefore be looking to the IC for continuing support, and we must respond—even in an era of declining resources. The IC is already making a significant contribution on these issues, but demands will grow and we cannot afford to rest on our laurels. Our job in a time of declining resources is to provide the kind of clear, well-focused and hard-headed analysis that helps policy makers understand the issues better and assists them in dealing with the tough policy challenges that they face. We must draw upon all sources of information both within and outside the government, utilizing effectively the vast information and insights from open sources and adding what secrets there may be to mix.

The environment has been identified by the IC as one of the 22 "enduring challenges" which it will face over the next three to seven years and beyond. After Saddam has come and gone and Fidel Castro is only a dim memory, these issues will be very much with us.

Comments During Discussion

Comment: Could you comment on how the work of the National Intelligence Council's agencies is changing? So much work is classified, but it seems as if some intelligence estimates and assessments on issues like the environment could be shared with at least friendly nations?

Smith: There is a very active, ongoing debate precisely on the balance between open and covert sources, and the question of the value added by the IC. I would disagree with those who argue that the IC should only focus on areas in which open sources are unavailable. While environmental and other global issues can largely be analyzed using open sources, I would argue that even if you have an analytical project of which 90-95% is open sources and 5% is intelligence, it's worth doing because that 5% can make a significant difference. Also, policy specialists cannot always devote adequate time to these issues and the IC can sometimes fill this gap.

Comment: It seems that except for environmental and health dimensions of military conflict, all the other services need not be done by an intelligence agency—one which is constrained by internal operational rules and has little external accountability and contact with NGOs and other non-government bodies. What is the rationale for keeping these functions within the IC?

Smith: There is an effort to make available the analysis and the accessibility of valuable inventory to agencies outside intelligence circles. Environmental analyses certainly could be done by other agencies or groups, provided you could establish an independent research group, could recruit enough analysts, and develop a sufficient budget. They would lack some intelligence pieces, however. In addition, if you reduce the IC's capability to do this work, it would disappear; at the moment, this resource doesn't exist anywhere else, and I don't think that new resources will be created. We should not remove the valuable analytical capabilities that exist in the IC until we are confident that they will reemerge somewhere else. I think the best solution, already underway, is to open up further the IC. The NIC plays an important role in this development, as a bridge between the IC and the policy community. For example, while working on a recent NIE, we held a meeting so academics could look at the information we were developing on Eastern Europe and the environment and provide advice. These kinds of meetings are becoming more routine.

Comment: To underline your point, we've evolved into a situation where the only analytical resources—real staff, databases, data processing people—that exist in the federal government, are basically in two places: the IC (principally CIA) and in Congressional support agencies. Many agencies are dismantling these capabilities right now, because of years of budgetary pressures. This capability now only exists in the intelligence world, and in an eroding capability on Capitol Hill. Agencies must therefore leverage and exploit the resources they have, knowing that if they lose them the resources will not be replaced.

Comment: What efforts are being made to ensure that information goes to groups who will be able to use it, and how is this determined?

Smith: We are trying to make sure the information is distributed usefully. For example, we produced an unclassified version of an NIE that tries to predict where environmental and humanitarian emergencies will occur, and what resources will be needed to address them. We briefed UN Ambassadors and NGOs. We should certainly do more briefings and publish more material for wider distribution—notwithstanding a long tradition of reluctance to do so that exists within the IC.

Comment: Another critical area of Agency work involves assessments of political prospects and stability in other countries. For example, what are the prospects for democracy in Russia, and how is this related to the catastrophic environmental situation? In principle, there is strong rationale for continued Agency responsibility in this area of political analysis; yet in practice, it is unclear the Agency can perform these assessments well, give its poor track record.

Smith: We do look at those issues and questions of how environmental change plays politically. I agree that we could do better.

Comment: Government has to confront the distrust that has grown over the last few decades. Some of the greatest suspicions are in those areas where there's a good deal of classified material. How is it possible to reestablish trust, and work cooperatively in a lot of those areas?

Smith: We must continue going to more meetings outside of Langley, and hosting conferences which bring in people so that we can use open sources in a creative and productive way. I would say that this is

getting much better in the IC. On the question of classification, you're absolutely right; intelligence is not very useful to the environmental community unless we can derive some value out of it that is not classified. In this area, we are improving: for example, we produced an unclassified version of the NIE on population trends for State—and it was used broadly. This practice is becoming routinized, and the general trend is to build links with NGOs, academics, and outside sources while distributing more unclassified material.

Comment: How deeply is it accepted within the IC that the environment is important? Can you give us a rough idea of where the environment would rank among other issues such as drugs and terrorism?

Smith: There are obviously differences of opinion, so it is difficult to give exact rankings. Some people are strongly in favor of the non-traditional types of work, including the environment. Others are more traditionalist and want to emphasize areas where we depend more on special sources of information. The Director of Central Intelligence himself has been very engaged in these issues; he is sympathetic to this non-traditional approach, and is bringing in a lot of people who share that point of view. My experience is that most senior officials recognize the great interest of the President, Vice President, and Undersecretary of State for Global Affairs in the environment. Working-level analysts also recognize the importance of environmental issues. There is, however, a group of people in the middle who are still very traditionalist. I would note again that the environment has been recognized as one of the 22 enduring challenges for the IC, and does rank up there with some of the more traditional issues.

Comment: I would like to offer a conflicting perspective from someone in the middle. There is no question that the Vice President is a senior consumer, and we do respond to the consumers, and there's no question that there are issues—support for negotiations, treaty monitoring, etc.—that are priorities that should be on that list of 22. But there's a tension between the resources that are available and how broadly we define the role of intelligence with regard to the environment. The reality is that the Agency has taken some major hits in resources, and we're not through yet. Looking at the list, the question is, where do you put the environment when there are other issues that have much more of an immediate impact? In Rwanda, for example, environmental degradation is a result of other things that we've always followed, are still going wrong, and must be grasped first. Only when it reaches a certain critical threshold, does the environment become an appropriate concern for intelligence. We are very interested in those critical thresholds, where the environment becomes the trigger for instability or conflict. This is a serious debate within the Agency. When it comes to defending budgets, it gets a lot tougher when you enter the unclassified field. Are we a Congressional Research Service, or are we something else?

Smith: It is very much an issue, and it is being addressed. The ultimate solution is to reach a point where environmental issues become considered across the board. Any analyst who's looking at developments in a particular country—and their importance for U.S. interests—should be looking at environmental issues. That's the ultimate goal; but we're not there yet. In the meantime, we do have to force the issue.

Comment: One problem is that the IC traditionally deals only with proximate threats. That reflects a defect in the political system—and in the orders given to the community.

Smith: The pressure will always be to deal with immediate issues. But the IC has the responsibility also to evaluate areas which might be of future concern to the United States.

Comment: Someone in the environmental community commented that the IC's satellite imagery missions relating to the environment are simply a means of justifying very expensive satellite apparati. Can we expect useful data from these very expensive imaging technologies?

Smith: With regard to satellite imagery, I don't think the IC will produce a custom-made operation. The Vice President's idea was that the money has been spent, satellites have been put up, and decades of pictures have been taken. They weren't taken for the purpose of looking at deforestation, but they're the only decades-long time series we have to look at some of these problems. Data exist. They're cheap, and they're valuable. I'm not going to argue that if you were going to start to create a system of satellites for environmental purposes you would want to place it in the IC.

Comment: We're experiencing the elimination of a lot of the satellite capabilities that exist in NOAA, NASA and much of the academic community. Why are we intent on eliminating this capability?

Smith: That's the problem, and the point I was making in another context. If you take away the capabilities of the IC and they don't appear somewhere else, there will be a net loss which could be very serious.

Comment: Are there any plans to rationalize different National Intelligence Agencies and missions?

Smith: There is much talk about rationalizing going on, and there is a new DCI who has very strong ideas on this subject. We've already begun to consolidate imagery operations. There will be one national office that deals with imagery rather than the several that there are now. Certainly, the bureaucracy could use some consolidation; yet some overlapping is desirable, since it is often helpful to have more than one group looking at the same questions. Many organizational decisions have yet to be made.

Comment: To what degree can intelligence analyses be more effectively integrated into the policy process? When we were in Somalia, I found it extraordinary that we were worrying about fighting in Mogadishu, yet ignoring other important information: population growth was up to 3% in 1993; the carrying capacity of the country had been well exceeded; natural resources had been almost completely depleted.

Smith: The distinction between intelligence and policy must be respected. We can show our evidence, suggest where it leads, and provide analysis, but cannot tell policymakers what they should or should not do. The problem, though, is that we are not getting the information and the evidence to the policymakers as effectively as we should. In addition to memos and briefings, we're starting to make some videos of this material. These have been an effective means of disseminating information. We must use the technologies that are available and develop a more effective method of distributing our message.

Comment: A related question concerns the traditional way in which the NIC communicates with the policy community. It produces consensus documents that don't reveal different points of view. Environmental issues, however, are controversial. The scientific evidence isn't always clear. The political implications are not always clear.

Smith: If there's a dispute between intelligence agencies over the implications of a set of facts, then it's very important to show those differences. Years ago we may have tried to achieve total consensus on an estimate, but this is no longer the case. Now you see dissenting opinions in the final product.

Comment: It is important that the IC is responding to changing requirements of new administrations and priorities. The IC should simply provide intelligence analyses to the Administration, and not argue with the President about whether certain missions, like environmental ones, are appropriate. Congress and the public can do that.

Smith: I would qualify that: with an issue like the environment, there are varying levels of interest within any Administration and from one Administration to another. In some cases, the IC has a responsibility to tell policymakers certain things—even if they do not ask or are not particularly interested.

Comment: Can you comment on the results of the military-intelligence conference on "environmental security" held in Washington last week, as well as on the recent joint U.S.-Russia conference on similar issues?

Smith: The conference held was co-sponsored by the Department of Defense and the Community Management Staff. One of the things that struck me was that the military leadership and the DOD civilian leadership are ahead of many other wings of government in their recognition of the sensitivity and importance of environmental issues. There was good discussion between these groups which don't often meet together. The keynote speaker was Eileen Claussen from the NSC. There was also a panel of military intelligence and civilian speakers who spoke on their perspectives on "Environmental Security in the Context of National Security." The other meeting you mentioned, the Joint U.S.-Russia Ecological / Environmental Seminar of U.S. and Russian intelligence and military representatives, dealt with how the U.S. and Russia could exchange imagery data—something which will be on the agenda of the next Gore-Chernomyrdin meeting. I think there will be some real progress in using satellite imagery for environmental purposes.

Comment: You'll notice that the signatories of the U.S.-Russian seminar are the ministers of environment for Russia and NOAA. The impetus there from the Russian environmental community—both government and NGO representatives—is less to get access to U.S. material than to access their own government's material. This was designed to bring these people together to give Russian environmental advocates some background on our Environmental Task Force in the United States and to encourage them to launch a similar initiative in Russia. It was recommended that a working group be established to work specifically on the exchange of environmental information from national security forces. There will probably be all sorts of sub-groups formed specifically to talk about imagery and the type of Soviet information being exchanged.❑

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The United Nations Community and Environment & Security Issues: Capabilities and Future Missions

Hilary French
Senior Researcher, Worldwatch Institute

John McGuinness
Deputy Director, Office of Economic and Social Affairs,
Bureau of International Organization Affairs, State Department

Opening Remarks by Hilary French: Environmental issues have become prominent on the international security agenda, as represented by the 1994-95 U.S. National Security Strategy documents. Today's atmosphere is quite different from the one in 1945 when the United Nations (UN) was created. Then, the memory of World War II, and hence, military security, was very much in the minds of the framers of the UN Charter, unlike the new environment and security threats confronting us today.

The prominence of environmental issues is obvious considering increased storm damage related to global warming, or the fact that shots were fired off the coast of Newfoundland as a result of the overfishing crisis. Such problems were not salient enough to weigh heavily in the design of a system of international security for the post-WWII era. Fifty years later we are trying to design a UN that will be able to provide environmental security in this very new era. Now is the opportune time to do so, as environment and security problems are certain to become increasingly intense and demanding of action in the coming decades.

In the context of the debate over the 50th anniversary of the UN, environmental issues have received relatively little attention. Thoughts about membership on the security council and discussion about creating an economic security council seem to be among the most pressing issues, somewhat ironically, perhaps, since one of the greatest changes in the world since the UN was created is the emergence of environmental issues of significant gravity in that they are central to global security itself. Yet discussion of modernizing the UN to meet such challenges somehow lags behind. The paper that I wrote, "Partnership with a Planet," has two essential messages (some critics would say it has a single mixed message).

The Good News: The Emergence of Environmental Issues at the UN

The first part is what I call the good news: the environment has, almost by accident, become a very major focus of UN activities. Notwithstanding that environmental issues are not in the UN Charter, the system has responded fairly flexibly to growing demands placed upon it, evidenced by a wide range of UN environmental activities already underway. Three particularly significant categories of UN environmental activity indicate how the UN has become involved in the environment. The first category is in the area of global treaties. There are now over 170 international environmental treaties, two-thirds of which have been agreed to since 1972. Not every one of these treaties is a product of the UN, but the vast majority are reposited with the UN. The UN often isn't given credit for the fact that there is a UN Convention on Climate Change, or a UN Convention on Biological Diversity. The Ozone Treaty is often widely cited as a real success story where global CFC emissions have declined by about 66% since their peak in 1987. Clearly, environment and security is an area where the UN is making a major contribution already.

The second major area of UN environmental activity is in the realm of international conferences, which have received a lot of attention in most recent years. A new model of brokering environment and security issues globally and of administering such agreements at the national and local levels was forged in these conferences, offering the potential for creating some serious results. Very local issues—land degradation, unequal access to land, water scarcity and so forth—need to be addressed at the local level if they are to be resolved.

Countries have taken it upon themselves to develop national level Agenda 21's, and even urban Agenda 21's, in an attempt to translate the broad goals laid out in that document into national and local action. Over 130

countries now have national level efforts underway to come up with Agenda 21-like documents—the U.S. has the President's Council on Sustainable Development; China is similarly developing its own Agenda 21. Such accomplishments have the RIO Conference as an antecedent.

Finally, beyond treaties and conferences, various UN bodies and institutions concern themselves with the environment. The UN Environment Program (UNEP) is the one organ in the UN system that is explicitly charged with environmental action. It was created in 1972 as a result of the first UN conference on the environment that was held in Stockholm, but there are many, many other institutions that are also important players—the Commission on Sustainable Development, for instance, that was created as an outgrowth of the Rio Conference to oversee follow-up on the Rio Accords; the Global Environment Facility, a joint initiative with the World Bank; the United Nations Development Programme (UNDP), which has a very sizable environmental program called SEE-Division, the sustainable energy and environment division; and the World Bank which spent over $2 billion in 1994 on programs explicitly for environmental protection.

The Bad News: The Limitations and Inefficiencies of the UN

This brings me to the second part of my somewhat ambivalent message. In some ways the good news has become bad news, in that there is duplication, diffusion and the lack of a well-organized UN system to confront environmental challenges, particularly those concerning environment and security. Look at worsening trends such as population growth, soil erosion, water scarcity, and greenhouse gas emissions. The system is clearly not working well enough to respond to environment and security threats, because rather than witnessing a reduction of such threats, we are witnessing their proliferation.

What can be done about this? It is a very complicated question because the UN is a very complicated bureaucracy. No bureacracy ever wants to die, making talk about consolidation difficult. On Capitol Hill there is a lot of focus on making the system work more efficiently, a discussion in which the environment and security communities need to make proposals. An obvious question concerns the United Nations Environment Program. Despite sounding like the obvious locus of UN environmental activities, it suffers from problems. A key problem is its location in Nairobi. It is the only UN agency located in a developing country. UNEP was never intended to be an operational agency that undertakes projects and programs of its own, but rather was structured to oversee the other agencies. It is difficult for a coordinating and catalizing agency to fulfill such a function when it is located far away from all the institutions and organizations and programs it is supposed to be coordinating.

Secondly, UNEP's budget—about $100 million annually—needs to be reconsidered. Compare that with UNICEF, at $1.8 billion, or the World Health Organization at $1.3 billion. Given the prominence of environmental challenges at this point in time, such a budget is inadequate. Governments responded to this problem at the Rio Earth Summit in 1992, and created the Commission on Sustainable Development at the UN in New York.

Environment and Sustainable Development

The distinction or dissimilarity between environmental missions and sustainable development missions needs to be clarified. A common argument is that sustainable development integrates the environment into economic activity such as agricultural and energy policy.

In some ways the environment is the essence of sustainable development. Sustainable development became a favorable buzzword at the Rio Conference with everybody in its favor and relatively fewer participants preserving the original environmental context of the term. One of the original definitions of sustainable development was a form of development that does not deplete the natural reource base upon which future generations depend.

Thus there is the Commission on Sustainable Development with an unclear environmental mission. The question is, did this replace UNEP, or does this complement UNEP, or how do these two organizations fit together? It is important to realize that the Commission on Sustainable Development is a political organization. It's a commission of governments which meets once a year, but has no operational mandate. Their roles are somewhat distinct although confusion remains over organizational responsibilities. Additionally, it is fair to say that the Commission on Sustainable Development was created as a partial response to the perceived inadequacies of UNEP, giving weight to claims that they are in competition.

The Locus of Environment in the UN

There is fairly widespread agreement that the environment does not have the prominence within the UN system that it merits. There have been proposals for instance, to create an environmental security council. Such a high-profile political forum would pay a lot of attention to emerging environmental security threats and could marshall the international response needed for timely action, according to proponents. Nobody, however, is talking about developing an agency that can actually conduct programs, which is central to tackling problems of ineffectiveness. The real missing

link in the UN environment system is an operational agency that actually has field offices around the world and people on the ground who work with developing countries, as well as with other countries, to design effective environmental programs. The question remains whether environmental issues should be pursued by the United Nations Development Program(UNDP) in their own right or integrated into larger conerns.

UNDP is a major contender for becoming the central agency within the UN system having responsibility for environmental programs. UNDP has a big, new environmental program under way, under the leadership of Gus Spath, the former head of the World Resources Institute. Serious proposals have been put forth to fold UNEP and UNDP into one organization. Unfortunately, such proposals typically advocate the creation of a massive UN technical assistance organization. Although some consolidation of UN development activities would be favorable, it would be important to maintain an independent voice for the environment in this system.

This view is largely based on the domestic experience of the U.S. and other countries. The notion that environment needs to be integrated into broader development policies still holds true; at the national level it is very important for the U.S. Department of Agriculture, the U.S. Department of Energy, and other agencies, to provide sustainable development policies. Most people would not argue that the EPA is redundant, yet such an argument is being made at the global level.

I think that we do need a recognized international environmental agency at the global level, with more significant force than presently. It needs to be located in Geneva or New York, which are the global headquarters of the UN system, and needs a budget and a mandate to actually take on programs, rather than acting in its present so-called catalytic, coordinating role. What really is needed is money. Within the UN system there is quite a bit of that funding cooperation. UNEP, if it had the resources, could cooperate with the Food and Agricultural Organization (FAO) on a sustainable agriculture project, currently impossible with a paltry budget.

Thus, do we need to create a new organization, or upgrade the United Nations Environment Program into something more workable? I believe we really need a UN environment agency that's very different in its look, in its effectiveness, in its reach, than the UN Environment Program.

It is very important for any UN environment agency and existing UN environmental efforts to work more effectively with NGOs around the world than they have to date. In fact, that is one thing that the Commission on Sustainable Development will say for itself—it was deliberately created to be a forum where NGOs around the world could organize and bring their prospectus. It is interesting to note that the polling data suggests that there is actually widespread support around the world both for protecting the environment in general, and for a stronger UN role in environmental activities. Gallup did a survey in 1993 that found a remarkably high level of concern all over the world. In the Philippines, 94% of those polled said that they had a great deal or a fair amount of concern about the environment. In Nigeria, the figure was 87%, and 66% in the U.S. So it's somewhat contrary to what you might expect. Majorities in both the industrialized and the developing world explicitly favored creating a stronger and more effective international environmental organization, a UN environmental organization.

Conclusion

This brings us full circle to the political situation we now face. Clearly, I am talking about a grandiose, new, upgraded UN Environmental Program. This may seem ironic when existing UN environmental initiatives are currently on the chopping block. All of these organizations are likely to take a very strong hit in the current political climate.

This leads us back to the question of redefining security. If we really do believe that some of the greatest threats to U.S. citizens over the coming years are going to emerge from problems such as climate change, from conflict in developing countries as a result of resource degradation and scarcity, and so forth, then we need a commitment to fund the programs that will prevent this from happening. It has become a truism, almost, to emphasize that prevention is cheaper than cure. Interventions in places like Somalia, Rwanda, and Haiti, cost a lot of money whereas we are desperately under-funding some of the initiatives that would preclude such problems. We need to really figure out how we are going to realign our spending priorities, and I think that a strong U.S. role is essential. If we believe that environmental degradation should be viewed as a threat to our security, then isn't this the time to create a structure of institutions at the international level that will prevent these conflicts from developing, and respond to those that we already have? Unfortunately the U.S. is retrenching in a drastic way, not only from the institutions, but from the treaties, particularly the Biological Diversity Treaty which the U.S. still has not ratified. Commitment to giving environment and security issues the place they merit in international institutions is clearly not guaranteed.

Remarks by John McGuinness: Clearly there's an identified set of needs here that must be met and Hilary certainly has addressed those. In terms of

functions, it's clear that a number of things need to be done, especially by bilateral international organizations. The main requirement is to pull it all together, whether in the form of a new operational agency on the environment, or in the form of a better coordinating, processing mechanism, with the existing structures, organizations and institutions. As far as the U.S. government is concerned, the preference is always to go with what you've got, and not to create anything new. In this case, it probably makes sense, given the range of activities that are already underway. Thus, the aim is to strengthen bodies or organizations or programs, like UNEP, and redefine or reestablish or set them up for the first time.

The division of labor of the various elements is already at work. The principal elements quite obviously are the Commission on Sustainable Development (CSD) follow-up to the Earth Summit, and the UNEP. The UNEP governing council last May concluded that it would delegate to the CSD a higher level of policy issues relating to sustainable development, leaving the more technical environmental issues to UNEP. It is a perfectly reasonable division of labor and one which I think everybody would agree ought to be pursued. In fact, given the relative weakness of UNEP and the comparative strength of the CSD, many seek to implement exclusively environmental initiatives to the CSD. Many believe that the CSD has a better chance of actually getting things done. The lead-free gasoline initiative is a perfect case in point. You couldn't select a subject that UNEP would be better placed to pursue, at least in principle, since it has the environmental mandate, since it's done a lot of work on toxics, and since it has promoted the guidelines for the required form of consent for the international trade of toxic chemicals. It is now supposed to be working on the run-up to a possible convention on this higher form setting guidelines. Nevertheless, the conclusion of those who had initiated this lead-free gasoline initiative, and these were by and large American NGOs, was that if you want to get things done, you just can't give them to UNEP, because you can't count on UNEP. That, in a nutshell, illustrates the difficulty.

Therefore, how do you strengthen UNEP? The first goal is to get it out of Nairobi. Because a move like that would probably be a political impossibility, we've been encouraging UNEP to build its regional offices, especially those in Geneva and New York, and to conduct more activities from those places, rather than try to run everything from Nairobi. We hope that trend continues.

In terms of getting everything organized in a more suitable fashion, we would look to the 1997 special session, which is going to review the follow-up to UNCED. That sounds fine in principle, except if you ask the U.S. Government, who's done any work on this? The answer is nobody...yet. But, this would be an appropriate forum to try and make sense of the division of labor on the environment in the UN system.

The Commission on Sustainable Development will run out of things to do and its multi-year work program will be finished in 1997. No one expects that it's going to go out of business. Obviously it needs a new mandate for work and a course will elaborate then. Presumably, with UNEP having finished its program redesign, and its national reorganization, both of which are underway simultaneously, the special session would be well-placed to define some of these divisions of labor.

We have consistently advocated colocating and consolidating the implementation of environmental agreements. Colocation because the exchange of views and information and communication in general would benefit them all. Certainly it would benefit those that relate to biodiversity. In a sense, we already have a nascent center for biodiversity agreements—Geneva. We therefore hope that the biodiversity Convention Secretariat will be located in Geneva, since they're already there for UNEP. On the advice of the Ministry of Support, UNEP has a regional office in Geneva, which is something of a branch headquarters, although it's not described that way. Because of its location, however, it functions, to a certain extent, in that mode. So UNEP's support, based in Geneva for the Biodiversity Convention, would make perfect sense.

This grand scheme is being undercut by some of the countries one would expect to support it. For example the Spaniards, the Kenyans, and the Canadians, have all offered to house the Biodiversity Convention Secretariat. Perhaps the most significant undercutting in this colocating, consolidating process was the decision to put the Climate Convention Secretariat in Bonn. This is unfortunate because Geneva had been the center for a lot of work on atmospheric issues. Located there are the World Meteorological Organization and the Panel on Climate Change.

In sum, the approach would be to make better use of what we've got, relying on the special session of 1997 to sort out some of the programs, and to make subsequent adjustments based on the decisions of that session. An approach like that is probably the most practical expectation we have at this juncture. As to the climate, the situation is going to go from bad to desperate. And maybe, in a number of years, from desperate to catastrophic. So we're not only going to have to use what we've got, but we're going to have to use less of it, to do more. That's an unfortunate prospect.

Comments During Discussion

Comment: Although it's unsatisfying in a certain way, I think you've got to be reluctant to push for another big operational entity. It just won't work—donors will not contribute. So the CSD is still a favorable option to

get issues addressed which will also have the attention of the country. Clearly we're in what I hope is just a lull at this point. The leadership of the U.S. shows that they want their own protocol for lots of reasons; it's not being assertive in the same way that it was. The Europeans are backing off, they're having a lot of structural economic problems of their own. I think that there are basic trends that are going to be favorable in the long run, but we're in a tough bind now.

Comment: Hilary, I was most struck by the very scant comments made on the role of the non-government sector. I'm sure in your book you have written on it, because I know your commitment to that sector. But still, let's not get mislead about the role of CSD. CSD was never a member, or done anything in the NGO Community. It's a public sector organization. People attending CSD meetings are ministers, and that's a requirement. The role ascribed NGOs in those meetings is marginal. Do you wish to comment on that?

French: I think that's a very important point. There is a section in the paper all about democratizing and I do think that it's critical to this whole endeavor. If these institutions are going to have any credibility, they have to be taken seriously by people, including NGOs around the world and the governments. Neither governments nor NGOs have the faith in the UN system to put a lot of resources into it.

If you think about NGO roles and how they relate to the UN system, there are two fields of activity. One is in the political arena and the other is in the field where NGOs intersect with the UN system. The political arena would be the CSD. NGOs do have the right to attend the sessions, and so forth. For instance in the Climate Treaty you'll see NGOs playing an absolutely critical role in terms of attending the meetings, and holding governments to account for what's happening, or what's not happening.

In terms of on the ground, field interactions, I'm thinking of the instance when UNDP undertakes a development project, and works carefully with the local people that are benefitting from that project. The World Bank has been engaged in a big effort to come up with a Participation Action Plan that will make this, in theory, the order of business for the World Bank. When they come up with projects, they'll actually go to local communities and say, what do you need and we'll work with you on it. I think that's a very promising initiative. There's a lot of work to be done to see that it's actually implemented. It's a step that this actual plan's been developed, and I think that UNDP has been engaged in some similar types of initiatives.

Regarding the existence of a macro-NGO international institution that can better harness the energy and inititative that's coming from the NGO community. The Earth Council, I don't really feel is fulfilling that function. It's good that it exists, but I'm not sure it really is representative of the broad range of people around the world who are really concerned by these issues and directly affected by them. The question is, does NGO activity and initiative, which is clearly so important, need to be organized in some fashion, in a kind of umbrella group; or, is it better to let NGOs be NGOs, and organize around particular issues as they have, like the Climate Action Network and the Biodiversity Network; or do we need something like an Amnesty for the Earth, modelled on Amnesty International to hold governments accountable? I think there could be room for that.

Comment: I wonder if John could comment on how the revitalized, reorganized UN function on the environment might respond to some very current environmental security initiatives. The planet is still controlled by 180 or so sovereign states and we should really try to figure out a way to deal with problems in country. We talk about problems being global and most of them truly depend upon national action. The real problem is that we have too many treaties, too many conferences, and too many institutions, and not enough folks who focus on really seeing that into action.

McGuinness: I have often debated the locus of activities being at the national level, versus international institutions. If international institutions are to be relevant, their whole goal is to spur action at the national and local levels. I think that this has happened, although not as efficiently and effectively as we might wish it had, and is evidenced by the existence of all the national level Agenda 21 and Urban Agenda 21 initiatives under way, that wouldn't have happened probably if there hadn't been a Rio Earth Summit. These are things happening on the ground in countries as a result of international efforts and initiatives. For example, the GEF is funding programs that are trying to prevent urban emissions in developing countries and to address biodiversity laws. However, what do we do about real crisis situations that need a response now? Do we need something like an Environmental Security Council, or should the Security Council itself take on these threats? If these can be defined as truly threats to national security, then do we need a quick-response mechanism, and if so, what, because at the moment, there's nothing in the institutional realm that can do that. The head of a UN Environment Agency should be in some position to generate some international pressure to bring to bear on situations like this. I think that that's where you get back to this question of how do we assure there's enough stature in this organization, so that the person who's at the head of this is really seen as a figure and a force to listen to and to respond to.

There's also the question of an ombudsman position. Should there be a place where NGOs, and others can make complaints, or petition for issues to be paid attention to? Within the World Bank, there is a panel that has been set up to be a place where people can bring complaints about abridges in World Bank procedures. I think that raises broader questions about the UN's ability to forsee international conflicts and prevent them. There's a question as to whether we should think about environmental security as that challenge that should be dealt with by UN security folks or is it more an environmental challenge that should be dealt with by the environmental development part of the UN, or both?

Comment: You don't expect the UN institutionally to have a leader who plays a role. The previous director, Javier Perez de Cuellar, was very strong in flagging the ozone problem. It's a question of getting the right individual in the place for that particular function.

Comment: The basic difficulty is the fact that you're dealing with an international structure that's predicated by national sovereignty, having many deficiencies. The ability to override the directives of national governments is the central issue that determines things like the UN's or international organizations' multilateral affairs. There are only three instances where national sovereignty is infringed upon. One is when the security council determines that something is a threat to international peace and security efforts and authorizes action, as in the Korean War or the Gulf Operation. The second would be the instance where the International Atomic Energy Agency is authorized to apply safeguards and undertake supplementary investigations and surveys to determine if governments are complying with their commitments to the nonproliferation treaty. The third instance is in the case, for example, in Northern Iraq where the rights of the Kurds were being violated so severely that the UN saw fit to authorize a humanitarian intervention. None of these cases gets close to anything like the kinds of issues we're concerned about with the environment, and frankly the concern about the environment has not yet reached a sufficient level of intensity where anybody could reasonably expect interventions to override sovereign national security. The only instance where anything touching the environmental agenda itself is likely to give rise to operations or measures that in effect override national sovereignty would be in the case of nuclear accidents in the former Soviet Union. There would be such pressure on the Ukraine to allow interventions to prevent it, that in effect you would have what would almost amount to an overriding of national sovereignty.

Comment: The public image of the UN system itself has been eroded. To some degree I must say it's the UN system of management that is at fault as well as U.S. policymakers—for example, the authorization of interventions in Somalia and Haiti under Chapter 7, as threats to the peace in the region. We all know that neither Haiti nor Somalia posed a threat to peace in the region. We've misused UN authority in that way, and I think that's a serious aspect of this whole debate.

French: I agree that the whole public support question is obviously key here, especially if you look at Capitol Hill where clearly those in control believe that they're doing what people are asking them to do. A number of polls have shown surprising levels of public support, so it's not completely clear to me that the people are as distrustful of the UN as has been suggested.

It seems that we need to make the case of what this whole redefining security debate is about. I don't think most American people understand that things as basic as the protection of their homes and skin are really directly related to whether we have an international mechanism that is able to design an international regime to head off that problem. There's an educational challenge to make the electorate understand that a) these problems are real, and significant threats to their security; and b) to respond to them adequately, we simply need to support the institutions that are able to marshall the response.

Comment: You seem to be emphasizing international organizations, but could you discuss regimes, a less formal type of international agreement. Do you think that international regimes could be fostered and yet have a time to grow so that at some time in the future they might yield a better environment to create international organizations?

French: I think that it works both ways. I think that institutions help to foster regimes. Mustafa Tolba, the head of UNEP, played a very important role in generating political support to create an international regime treaty. Each major treaty creates its own mini institutions that foster the regime. I think that is the direction we're going in—the decentralized regimes around different issues. People can't forget that those regimes wouldn't happen if there weren't these institutions that helped create them. It is the UN Convention on Climate Change, and the UN Convention on Biological Diversity that have fostered regimes, and the UN's ability to be active depends on a world meteorological organization to draw upon expertise, scientific panels and so forth.

Comment: NGOs provide intelligence, but it's not sufficient. My suggestion therefore is that the larger, industrial state intelligence apparatus might be used

to support international agreements.

French: Intelligence is an important piece of this equation. Some of the military traditions which aren't oriented towards transparency but more towards the secrecy direction are relevant in considering how intelligence might be of use. That's not to say that a lot of the skills and the knowledge that exist in the military aren't applicable, but in the case of developing countries, there is often no capacity to comply with obligations. Pointing that out through intelligence isn't necessarily able to remedy the problem.

Comment: At the Department of the Interior we've had a lot of discussions with other government agencies, including the CIA, about relations with the U.S. Geological Survey, and what we could use for our resource management work, particularly with Mexico. We find that intelligence communities are starting to wonder what environmental enforcement requires. As a gut reaction, intelligence is not the first, primary solution to the environmental problem.

Regarding the UN and institutional reform, a questionable UN-type activity is the on-the-ground projects. The narrow technical functions of the organizations and initiatives are really something separate from the gravity of the UN's more important international bodies such as the General Assembly and the Security Council, and have little to do with the grand scheme of international politics. Thus, can we focus the UN to do what the UN does best?

French: There is skepticism that the UN per se is capable of delivering such results. There's so much focus on the policymaking with little real action. Actually getting some programs underway in countries around the world will be what produces results.

I think it's quite impressive, the way the environment has figured into national security strategies. For the U.S. government, it is relatively new. There is a lot of work still to be done, and I think the UN draw-up clause has an important role to play in this. On this 50th Anniversary of the UN, I hope people realize that the environment is one of the most important reasons that we need the UN in the years ahead. ❑

21 November 1995

A Potential Role for the Environmental Protection Agency and Other Agencies

William Nitze
Assistant Administrator for International Activities, EPA

Opening Remarks by William Nitze: I will begin with remarks under the following four headings: (1) the concept of "Environmental Security" or Environment and Security; (2) organizational linkages within the U.S. government and abroad; (3) examples of activities in which the U.S. government is engaged under an environmental security heading; and (4) the politics of environmental security.

The Environmental Security Concept

The linkage between environment and security—if security means a material and psychological quality of life for those people being secured—is one that came to the fore under the rubric of sustainable development first with the Brundtland Commission Report [Editor's Note: *Our Common Future*, 1987] and later with the UN Conference on Environment and Development (and its documents, the Rio Declaration and Agenda 21). As with the term sustainable development, there is considerable intellectual difficulty with the term environmental security. The difficulty with environmental security rests in the following questions: to what extent is human behavior affected by environmental conditions; if it is affected, how do those conditions change behavior in ways that affect security? Frankly, I am not at all clear about those connections. There are hundreds of millions of people in this world who live rather peaceably under atrocious environmental conditions; yet they do not complain, riot or rebel—they just get sick and die. And yet there are others who live under good environmental conditions who complain loudly and riot on precisely this issue.

To clarify the concept, I will identify some negative and positive linkages between environment and security. As for negative linkages, we can say some things with confidence. First, environmental conditions affect quality of life. There is a huge political debate in this country over levels of environmental protection. Partly because of leadership by the Clinton Administration and because of efforts of the environmental community and other key constituencies, the U.S. public has made it clear to elected officials that Americans care about environmental protection, and that backsliding on health and safety will not be tolerated. This is the case in other countries where public consciousness on the environment is high.

When environmental conditions are poor, there is a negative synergy between environmental degradation and quality of life for the poorest people in the world. If you have dirty drinking water, no wood for cooking, no decent soil to raise crops, and if you are subject to environmental hazards which affect your health, your quality of life has been significantly degraded. This description is unfortunately true for a majority of the world's population.

Moreover, particular circumstances have led to further environmental degradation and have worsened problems for select populations. The Cold War environmental legacy in the former Soviet Union presents a clear case. Examples include injecting radionuclides into underground deposits which may affect drinking water, using one-way cooling systems with plutonium reactors, conducting nuclear tests over people who have absolutely no protective gear, and placing close to 1,000 radioactive waste disposal sites within the Moscow municipal area.

It is pretty clear that environmental degradation in places like Northern Iraq, Somalia, Rwanda, Burundi, and Haiti, has made social conditions more difficult. It has exacerbated problems caused by overpopulation, social disparities, breakdowns in governmental institutions, and ethnic rivalries. It is clear that some of the social justice problems that exist even in advanced industrial countries are exacerbated by problems of environmental justice. The United States has a place called Cancer Alley near Baton Rouge, Louisiana, in part because the chemical industry there can get away with more than in other parts of the country. The higher-income residents

of Los Angeles and San Francisco, for example, would not tolerate such conditions.

There are also positive linkages. For example, there are ways to take a systematic approach to producing better goods and services more efficiently while also protecting the environment. That is the new wave of advanced industry around the world. It is the new wave of community management around the world, and an important goal of American domestic and foreign policy. It clearly has benefits in terms of protecting the environment, improving social conditions, making people richer, and (and this is where we need to do some serious work) improving international stability and reducing risk. If people get richer, if they can improve their quality of life more efficiently, with less damage to the environment, they will probably be more peaceable.

Organizational Implications

Since the end of the Cold War, the basic national security debate around the world has changed. There is a genuine shift in focus that has begun to express itself in the United States. The national security establishment (the Department of Defense, the Intelligence Community, and other agencies involved in traditional national defense concerns) are now working with the EPA, National Oceanic and Atmospheric Administration, the Department of State and other agencies in a different way. This cooperation includes information gathering and analysis as well as thinking about their programs.

One important aspect can be called the "greening of the military." The Navy has become a leader in programs designed to remove CFCs, recycle plastics, address water pollution, and generally improve the eco-efficiency of Navy operations. It is also in the process of commercializing some of the technologies it has developed. Such actions are happening throughout the Department of Defense. It has been a quiet revolution. When the NATO Committee on Challenges to Modern Society (CCMS) met in the United States in November, NATO officials were surprised at how much progress the U.S. military had made. Hopefully there will be greater cooperation within NATO, with NATO partners, and beyond NATO, in terms of the "greening of the military services."

There is also growing awareness that it is much more difficult to conduct military operations in truly environmentally degraded places. When environmental hazards such as collapsing earthworks, undrinkable water, or flood prone areas persist, it is much harder to conduct any sort of operation.

Finally, people are gradually becoming aware that when the U.S. military goes into a place like Haiti to effectuate a political transition, we might want to do more than just keep the peace, disarm a few people and make sure that President Aristide can sleep at night. We might want to do something about the water system in Port au Prince or rebuild a few bridges or do some other things that the Corps of Engineers is quite good at doing. But we do not have the statutory authorization to spend money that way yet.

Within the intelligence community, there is a shifting of assets toward looking at environmental trends more broadly, not just in a military context. This context includes, for example, what should Vice President Gore's priorities be in the Gore-Chernomyrdin Commission process? I think that the U.S. government will focus increasingly on the human health dimension, one aspect of which is environmental. In this regard, one thing we certainly want is for the Russians to comply with international agreements they have signed, such as the Montreal Protocol. They are currently not complying with the Montreal Protocol. It is very important to get information about the nature of their non-compliance, and here the intelligence community has been very helpful. Intelligence community involvement allows fruitful and specific dialogue with people in Russia who do not always have the relevant information themselves. The more you know, the more you can help the Russians design counter-measures.

Let me turn to another very promising example in Russia. We are trying to enable the Russian Navy and the Murmansk Shipping Company to handle its radioactive waste. They have a reprocessing facility in Murmansk. Its capacity is much too small and cannot handle high saline waste. We are in the process of getting the green light for a feasibility study to expand it. The cost will be about $3 million, and we are asking Murmansk to share that cost. It has been a presidential initiative, and that has allowed us to overcome a number of bureaucratic obstacles both here and, more importantly, there. This initiative will hopefully be the core of a broader program in Northwest Russia where we can work with the Russians on avoiding very unfortunate consequences of nuclear waste mismanagement.

What are some of the possible consequences of nuclear waste mismanagement? First, there are about 80 nuclear submarines in Russia waiting to be decommissioned. In the absence of a satisfactory nuclear waste disposal program, the decommissioning process could grind to a halt. Second, water systems could be further contaminated. A third consequence would be that some of this material may get into the wrong hands. Overall, we are working with the Russians to contain what is a big national security problem. There is not enough money in the world to undo all the damage that the Russians have already done. But we can work with them to alleviate the problem.

On the U.S. side, this involves at least four core agencies: the Department of Defense, Department of

Energy, Department of State, and the Environmental Protection Agency, with the support of the intelligence community and others. It could well expand. We are currently operating under the broad rubric of an Arctic national security directive, which was formulated at the beginning of the Clinton Administration. But we will probably need some additional architecture which will be worked on. That cooperation will hopefully expand into something broader over time so that we can begin to take a more systematic look at nuclear waste management problems.

The Politics of Environmental Security

I will finish with a few words on politics. The conservative Republican majority in Congress has not been very friendly to some of our domestic environmental initiatives. Small business seems to be upset about the cost of compliance with our environmental regulatory system. There is some hostility at work at the EPA. Politically we are pushing back quite effectively. However, it is not the most friendly climate in the United States for environmental initiatives.

Environmental security faces a very different and potentially more positive political climate. There is a lot of interest on both sides of the aisle in Congress on whether there is a linkage between changes in environmental conditions and national security. If so, what can we do to focus our efforts environmentally in ways that enhance our national security? Collaboration, particularly with the DOD, is something that the Republican side of the aisle would find attractive and might actually be willing to commit more resources to. Gary Vest in the DOD Environmental Security Office has a budget almost as big as the EPA's—about $5 billion. EPA will be lucky if it receives $5.7 billion total. The DOD is the second largest environmental agency in the U.S. and may be well on its way to becoming the first, which indicates the level of Congressional support for this activity in the DOD budget. I think that is suggestive of what we might accomplish if we can promote some more effective partnerships.

Comments During Discussion

Comment: What is the perception of environmental security in other countries and what are the prospects and challenges for greater cooperation?

Nitze: I do not know country by country, but let me make a few comments based on what I have heard. First, within the NATO context, the Jessica Mathews view of the security agenda of the future has a strong constituency in Northern Europe. This includes Scandinavia, Germany, the Netherlands, and other traditionally activist countries and even in the military context. The United Kingdom, France, and some of the southern European countries are probably less inclined but they are open to the ideas. The Turks, for example, are very open. The Eastern European countries are also interested. What they want is financial help, especially for cleaning up the legacy of the Cold War, and not just advice and technical assistance. In this regard, DOD—cooperating with EPA and other agencies—is trying to design some programs focused on former Soviet military installations in Eastern Europe.

Comment: What about APEC countries, the United States and Japan?

Nitze: The Japanese are receptive to some programs in the Philippines and elsewhere as part of our Common Agenda with Japan. The Japanese had been putting money into protecting some of the ecosystems around our former bases in the Philippines. In this region, there is always the question, "What is the U.S. really trying to do here?" But I suspect even China, Malaysia, and others would be receptive if the issue was presented well and they were made full partners in the dialogue. The Chinese, despite the difficulties on other issues with the United States, are extremely interested in working with the United States on environmental issues. They want technologies, they want assistance, they want factories. The military sector, based on a very limited experience, is a little less open.

Comment: The United States has serious dialogue on an enormous range of issues with the Russians. When preparing for high level meetings, how do we really incorporate environmental concerns into this dialogue. Perhaps for the purposes of prioritizing, we could factor out two obvious issues—nuclear proliferation and nuclear plant safety—because everyone would acknowledge that these two are only part of a longer list of things to stress. We ought to try to make a categorical listing of the other items on your agenda: concern with public health; concern with broader planetary environmental conditions; and concern with pollution levels, and so forth. How would you go about integrating these kinds of concerns with a very large, very critical bilateral agenda?

Nitze: We have a strategy and its first element is to create a legal system that is friendly to business enterprise and foreign investment. The second element is creating an atmosphere where you can get two-way technology transfers with easy-to-do technologies. The third element is to work with the World Bank and other institutions in providing needed infrastructure, like roads and electricity. Fourthly, we are trying to help convert defense related enterprises to profitable civilian businesses. There is a strategy to try and convert this command and control Cold War economy

into a more free-enterprise economy. Progress is slow but it is a strategy, and it is probably the right strategy.

Comment: I was surprised at your optimistic prognosis regarding the Republican Congress and the environmental security agenda. It seems to me that it is almost the opposite. The prospect for moving forward on issues relating to environmental security is even worse than on domestic environmental issues, since international issues do not have the same immediacy in the public consciousness. The Republicans seem to be doing more damage on a number of fronts relating to foreign assistance. And in the DOD budget, the money invested in environmental clean-up has really suffered compared with the rest of the defense budget.

Nitze: If international environmental protection efforts do not impose obvious costs on American lifestyles, people become more open-minded. In the environmental security area, there may be ways of advancing agendas that do not negatively impact American lifestyles. American industry, when it really comes to its senses, will become a force in favor of an enlightened environmental security agenda.

Comment: Do you think that the Congressional backsliding on environmental laws might be the sort of push the American public needs to intuitively grasp this concept of environmental security? You are talking about the health and safety of kids and the individual family. Do you think we could push forward on that kind of front?

Nitze: Unfortunately the bulk of the American middle class does not perceive itself as having yet benefited from the globalization of the American economy. Millions of families across this country see stagnation in real wages, rising costs, and a disruption in their general cultural environment. They associate in part these negatives with America becoming more integrated with the rest of the world. These thoughts account, to some extent, for their skepticism about foreign aid, and U.S. assistance to foreign countries in general. If things continue to improve economically and we get over some of these structural problems in America, the public mood will improve and people will be in a more generous frame of mind.

Comment: Could you discuss EPA's international interaction with other agencies, particularly in Russia and Eastern Europe. What role does EPA play and what are your priorities among overall priorities?

Nitze: EPA has a lot of collective knowledge and experience which the rest of the world would like to access. Thus, our main function is to make the knowledge and expertise of the EPA available to not only national governments but to governments and private sectors around the world. We are doing specific work on building the regulatory capacity of other countries including training programs, work with environmental ministries and pilot projects. Increasingly, environmental issues are becoming a part of the U.S. foreign policy agenda. The State Department and other parts of the government have formal leadership in terms of multilateral negotiations. But in order to really know what they are talking about, State needs some input from EPA, NOAA, Interior, and other agencies that have scientifically technical expertise. We try to organize this input and play a role in policy-making. This is a time of change in terms of how we approach national security. The environment is a component of the new vision, but it needs an institutional spokesperson, and EPA is a logical choice.

Comment: In the case of a U.S. assistance program for Eastern Europe, at least one dozen other agencies have been involved in environmental assistance. In the example of the Czech Republic in 1992, the number of environmental consulting firms boomed because of Western governmental and private assistance. Assistance came first in writing laws and regulations; second, in providing technical assistance so that those laws and regulations could be enforced; and third, in promoting NGOs with reliable data to monitor environmental laws. As a result, plant managers felt the need to find some environmental experts to help them meet standards that were now being enforced. That was the beginning of systemic reform that helped the Czech Republic begin to remediate 45 years of devastation left by the Communists.

Nitze: The U.S. Agency for International Development has taken the lead in this particular kind of institutional capacity and democracy building. Technical assistance to Mexico, for example, is an example of how AID and EPA technical assistance helps to build democracies. Power traditionally has been concentrated in Mexico City and local state or municipal autonomy is a new idea in Mexico. We are promoting decision-making autonomy through NAFTA institutions such as the Border Environment Cooperation Commission, the Pan American Development Bank, and the North American Commission on Environmental Cooperation. The environment partnership is one aspect of an underlying change going on in Mexican civic culture. The U.S. government, in its various NAFTA related activities including AID programs, is a force for real democratization and disbursal of political power. It requires a fairly intense level of engagement. Fortunately there is a strong Congressional constituency from the border states for spending some real money on improving environmental conditions. The Congress earmarked $100 million, as they did last

year, for water infrastructure projects along the border.

Comment: In Russia, health and environmental issues are so severe that people's security concerns are connected to fears about survival. Concerning radioactivity and health impacts in Russia: we lack data on many things, including the four secret cities near Murmansk. There are reports that plutonium is found in the placentas of pregnant women, and only 5% of newborn children are healthy with increasing birth defects—probably tied in part to radioactivity. The difference between official figures and alleged correct figures by Americans, in terms of radioactive waste pollution in the Arctic Ocean, is enormous. If U.S. figures are correct, their are great dangers to our country, to Alaska, and to other countries. Pollution is a huge problem: in Moscow (where pollution is considered bad) there are 0.6 tons of pollutants per year per capita; in Norilsk, it is 86 tons. Male life expectancy is probably going to go down, in a good scenario, to around 55 in 2005 and in a bad scenario to about 52.

Comment: Is there a working paper in EPA that assesses the needs of the various nations seeking our help? How receptive are the political leaders and other power structures within those nations to these initiatives? Finally, are there some means to establish measures of effectiveness for these programs?

Nitze: An ongoing challenge for both AID and EPA has been measuring effectiveness. Our technical assistance tends to oscillate between an emphasis on short-term results that can be shown to senior officials in Congress and what we know is probably the better long-term strategy. A longer term strategy rests on building local capacity so individuals can take control of their own destinies and build their own responses. Poland, for example, has had a 50 percent improvement in air quality since 1987. Part of this improvement is due to the closing of a number of air polluting plants; and part of it is due to better management of pollution sources. This better management is a result of a tremendous improvement in their monitoring capability that the EPA, working with AID and others, put into place with the Poles. The Visegrad countries have made significant progress and will continue to do so.

It is harder in the former Soviet Union. In many cities—including Moscow and St. Petersburg—where we have had a number of activities, things would probably have been considerably worse today without programs we supported. The Russians have taken the lead out of gas in those two major cities. Our Moscow drinking water project has probably helped avoid a deterioration in the drinking water system in the city. The public infrastructure in Russia, particularly the health system, has fallen on hard times. Some of our projects have prevented that deterioration from being worse. The Chernobyl type reactors and the old VVRs are safer to operate because of fire control and other systems which the Nuclear Regulatory Commission has helped to install. The Russians have cut their production and consumption of CFCs by about 40 percent. The worst problem regarding CFCs stems from their selling them illegally in the Western world and in the European markets. Overall in a place like Russia, the general situation is so bad that the magnitude of the past overwhelms any limited current accomplishments. ❑

Non-Governmental Activities

Foundations

The John D. and Catherine T. MacArthur Foundation, Program on Peace and International Cooperation
The Program seeks to enhance prospects for peace and international security through grants for public outreach, policy studies and academic research and training. Within these grantmaking categories it fosters the global exchange of ideas by bringing together people with differing national, institutional, professional and cultural perspectives across a broad array of security issues. For information, contact: The John D. and Catherine T. MacArthur Foundation Program on Peace and International Cooperation, 140 South Dearborn Street, Chicago, IL 60603. Tel: 312-726-8000; Fax: 312-917-0334; E-mail: 4answers@macfdn.org.

The Pew Charitable Trusts' Global Stewardship Initiative
The Global Stewardship Initiative is an interdisciplinary grant-making program founded in 1992 by the Pew Charitable Trusts in association with the Aspen Institute. It supports efforts to "restore the United States to a position of international leadership in solving the interrelated problems associated with rapid population growth and the unsustainable consumption of resources." Through its own activities (such as convening round-tables, seminars and developing media-based public education strategies) and through grants to other organizations, the Initiative aims to: build a stronger conceptual base for global stewardship; forge consensus among diverse constituencies working on population and consumption issues; encourage new constituencies to share and enlarge this common ground; foster interdisciplinary approaches to population and consumption challenges; inform and improve relevant U.S. and multilateral policies and programs; and increase public understanding of these challenges. For information, contact: Susan Sechler, Director, The Pew Global Stewardship Initiative, 1333 New Hampshire Avenue, NW, Suite 1070, Washington, DC 20036. Tel: 202-736-5815; Fax: 202-775-2622.

The Rockefeller Brothers Fund, Programs on "One World: Sustainable Resource Use" and "One World: World Security"
The goal of the Fund's sustainable resource use program is to "foster environmental stewardship which is ecologically based, economically sound, culturally appropriate, and sensitive to questions of intergenerational equity." The Fund's grantmaking in the area of world security, which was defined to recognize that world peace is threatened not only by armed conflict but "also by frustration and aggression arising from inequities in the sharing of the food, energy, goods, and services the world economy produces," is currently under review (see the Fund's Project on World Security below). Until new guidelines are adopted, probably in 1998, no new grants are being made in the international relations field. The Fund's three geographic areas of grant activity are the United States, East Central Europe and East Asia. For information, contact: Rockefeller Brothers Fund, Inc., 1290 Avenue of the Americas, New York, NY 10104-0233. Tel: 212-373-4200; Fax: 212-315-0996; E-mail: rbf@mcimail.com.

The Rockefeller Brothers Fund, Project on World Security
The Fund's Project on World Security, located in Washington, DC, was undertaken in March 1996 with the goal of reviewing the threats to and requirements of security in the post-Cold War world. The project is designed to help develop and build consensus on a common view of security that can provide the basis for policymaking and scholarly research. It also hopes to encourage a larger public debate on the nature of security, ways to assure it, and humanity's responsibility for doing so. The project will issue a publication or series of publications describing its findings. At the end of this two-year project, the Fund expects to launch a new grantmaking program in the field of world security; no new grants will be made in this area for the duration of the project. For information, contact: Jane Wales, Project Director; or Ann Florini, Research Director, Rockefeller Brothers Fund, Project on World Security, 11 Dupont Circle, Suite 610, Washington, DC 20036. Tel: 202-232-0864; Fax: 202-232-0810; E-mail: aflorini@rbf.org.

W. Alton Jones Foundation, Sustainable World & Secure World Programs
The W. Alton Jones Foundation seeks to build a sustainable world by developing new ways for humanity to interact responsibly with the planet's ecological systems, and to build a secure world by eliminating the possibility of nuclear war and by providing alternative methods of resolving conflicts and promoting security.

The Sustainable World Program supports efforts that will ensure that human activities do not undermine the quality of life of future generations and do not erode the Earth's capacity to support living organisms. The Foundation addresses this challenge with a tight focus on issues whose resolution will determine how habitable the planet remains over the next century and beyond: maintaining biological diversity; ensuring that human economic activity is based on sound ecological principles; solving humanity's energy needs in environmentally sustainable ways; and avoiding patterns of contamination that erode the planet's capacity to support life. The Secure World Program seeks to build a secure world, free from the nuclear threat. The Foundation addresses this challenge by: promoting Common Security and strategies related to how nations can structure their relationships without resorting to nuclear weapons; devising and promoting policy options to control and eventually eliminate existing nuclear arsenals and fissile materials; stemming proliferation of nuclear weapons and related materials; addressing threats to global sustainability by preventing the massive release of radioactive material; and assessing and publicizing the full costs of being a nuclear-weapon state. For information, contact: W. Alton Jones Foundation, 232 East High Street, Charlottesville, VA 22902-5178. Tel: 804-295-2134; Fax: 804-295-1648; E-mail: earth@wajones.org; Internet Site: http://www.wajones.org/wajones.

Non-Governmental Organizations

American Meteorological Society (AMS)
The American Meteorological Society is a professional organization serving the atmospheric and related oceanic and hydrologic sciences. It sponsors over a dozen major scientific conferences each year and publishes seven technical journals. In addition, the AMS publishes the *Bulletin of the American Meteorological Society*, which occasionally includes statements and reports on policy issues such as the free and open exchange of global weather data. The AMS recently published a policy brief on "Weather and Climate and the Nation's Well Being." For information, contact: AMS, 45 Beacon Street, Boston, MA 02108-3693. Tel: 617-227-2425; Fax: 617-742-8718.

CAREER/PRO
CAREER/PRO, a project of San Francisco State University's San Francisco Urban Institute, helps communities that host or have hosted U.S. military installations address the legacy of military environmental degradation. CAREER/PRO operates a widely used Internet newsgroup, holds training workshops for members of Restoration Advisory Boards and consults with citizens and community groups both within the U.S. and abroad. Project staff participate in numerous advisory committees dealing with military base clean-up. CAREER/PRO publishes the newsletter, *Citizens' Report on the Military and the Environme*nt, which is available from CAREER/PRO free of charge—and in September 1995 it published the *Military Contamination and Cleanup Atlas for the United States-1995*, mapping and listing military contamination in all U.S. states and territories. For information, contact: SFSU CAREER/PRO, 425 Market Street, Suite 705, San Francisco, CA 94015. Tel: 415-904-7750; Fax: 415-904-7765; E-mail: aimeeh@igc.apc.org.

The Center for Defense Information (CDI)
The Center for Defense Information is a nonprofit, non-government organization which believes that strong social, economic, political, and military components and a healthy environment contribute equally to the nation's security. CDI opposes excessive expenditures for weapons and policies that increase the danger of war. CDI also has a weekly television show, "America's Defense Monitor," on Channel 32 (WHMM-Washington, DC) at 12:30 p.m. on Sundays. For other local showing times, as well as access to extensive resources about military and security issues, contact CDI's Internet Site: www.cdi.org. For information, contact: Center for Defense Information, 1500 Massachusetts Avenue, NW, Washington, DC 20005. Tel: 202-862-0700; Fax: 202-862-0708; E-Mail: info@cdi.org.

The Center for Economic Conversion (CEC)
Founded in 1975, CEC is a nonprofit organization dedicated to positive alternatives to excessive dependence upon military spending. Starting in 1996, CEC is inaugurating a program in "green conversion," the transfer of military assets (money, talent, technology, facilities and equipment) to activities that enhance the natural environment and foster sustainable economic development. This work will include: studies of green conversion efforts already underway in the U.S. and abroad, a pilot project in green military base conversion, the promotion of public policies that foster green conversion and various educational activities to inform the public and build support for green conversion. For information, contact: Michael Closson, Center for Economic Conversion, 222

View Street, Mountain View, CA 94041. Tel: 415-968-8798; Fax: 415-968-1126; E-mail: cec@igc.apc.org; Internet Site: http: //www. conversion. org.

The Cambridge Global Security Programme, Cambridge University

The Global Security Programme attempts to build understanding across the areas of international relations, development studies and environmental studies. The programme pursues this interdisciplinary approach through teaching, research and policy development. An independent project entitled "The Global Security Communications" initiative also operates under the auspices of the GSP. For information, contact: Gwyn Prins, Director: Global Security Programme, Botolph House, 17 Botolph Lane, Cambridge, United Kingdom CB2 3RE. Tel: 1223. 33. 45. 09; Fax: 1223. 33. 50. 65; Email: gsp-admin@lists.cam.ac.uk.

The Center for Security Policy

The Center for Security Policy exists as a non-profit, non-partisan organization to stimulate and inform the national and international debates about all aspects of security policy—including their strategic and environmental implications—particularly as they relate to the all-encompassing question of energy. The Center is committed to preserving the credibility of U.S. antiproliferation efforts, and the message to allies and potential adversaries that the U.S. is serious about ensuring the safe and benign global development of nuclear energy. The Center has extensively studied the Cienfuegos nuclear power project in Cuba, and expressed concern over the Department of Energy's Environmental Management (EM) program for cleaning up the nuclear legacy of the Cold War. In addition, the Center calls for increased attention to the strategic importance of the vast oil reserves of the Caspian Basin, and to the deterioration of the sensitive ecosystems and waterways of the region (for example Turkey's imperilled Bosphorus Straits). The Center for Security Policy makes a unique contribution to the debate about these and other aspects of security and environmental policies through its rapid preparation and real-time dissemination of analyses and policy recommendations via computerized fax, published articles and electronic media. For information, contact: The Center for Security Policy, 1250 24th Street, NW, Suite 350, Washington, DC 20037. Tel: 202-466-0515; Fax 202-466-0518.

The Center for Strategic and International Studies (CSIS)

CSIS is examining the links between population, foreign policy and security through its project (funded by the Pew Global Stewardship Initiative) on "Population and U.S. National Interests." One of the project's case studies, led by Ambassador Ernest H. Preeg, explored connections between population, environmental degradation, economic development and political stability in Haiti. In April 1996, the

Consortium for International Earth Science Information Network (CIESIN)

The Consortium for International Earth Science Information Network (CIESIN), is a private, nonprofit consortium of leading universities and non-government research organizations dedicated to advancing understanding of the human dimensions of global environmental change, sustainable development and natural disaster research and reduction. It is agency-neutral, specializing in the access and integration of physical, natural and socioeconomic information across agency missions and scientific disciplines. CIESIN's efforts are directed toward making the data collected by U.S. government agencies, the scientific community, NGOs and international governmental organizations available for widespread use in scientific research, public policy making and education. Its Information Cooperative provides a mechanism for obtaining data from about 50 major archives and resource centers worldwide. CIESIN has been involved with a number of projects relating to environment and security issues—including work with Vice President Gore's Task Force on State Failure. It also implemented a project in the Strategic Environmental Research and Development Program (SERDP) designed to disseminate recently declassified and civilian data involved in global environmental and population research. CIESIN has expanded the scope of its work to encompass a broad range of activities, including (1) building global and regional networks and information systems that are at the center of the emerging global information infrastructure; (2) developing new approaches to science data management that make data from disparate and distributed sources instantly accessible, and allow at-your-desktop integration and visualization to aid research and decisionmaking; (3) creating decision support systems and tools that help decisionmakers visualize the effects of their choices and understand the forces that influence those choices; and (4) providing training, education and consultation to develop the skills needed to access and share information effectively. CIESIN and the Human Dimensions of Global Environmental Change Programme (HDP) have created a mailing list that provides a forum for discussions of human dimensions of global environmental change. It is unmoderated and open to the public. You can subscribe by e-mailing majordomo@ ciesin.org with the message—"subscribe hdgec." For information, contact: Robert C. Worrest, CIESIN, 1747 Pennsylvania Avenue, NW, Suite 200, Washington, DC 20006. Tel: 202-775-6614; Fax: 202-775-6622; E-mail: robert. worrest@ ciesin.org; Internet Site: http: //www.ciesin.org.

Project's results were published by the CSIS Steering Committee on Population and U.S. National Interests (co-chaired by Alan K. Simpson and Anthony C. Beilenson) in a report entitled, "Population and U.S. National Interests: A Framework for Thinking About the Connections." For copies of that report and information, contact: David Wendt, Director of International Economic and Social Development, CSIS, 1800 K Street, NW, Suite 400, Washington, DC 20006. Tel: 202-887-0200; Fax: 202-775-3199.

The Climate Institute
The Climate Institute has an ongoing "Environmental Refugees Program" that seeks to assess and respond to likely changes across the globe concerning people displaced from their homes due to land degradation, drought, desertification, deforestation and other environmental problems. The Program, whose Principal Investigator is Norman Myers, has already produced a report entitled, "Environmental Exodus: An Emergent Crisis in the Global Arena." According to that report, there are at least 25 million "environmental refugees" today—a figure that may double by the year 2010. The Program's next phase will include work with national and international government bodies to generate a consensus on response strategies to these critical issues. For information, contact: Christopher Dabi, The Climate Institute, 324 4th Street, NE, Washington, DC 20002-5821. Tel: 202-547-0104; Fax: 202-547-0111.

Cornell Program on Environmental Conflict Management (CPECM)
CPECM strives on both domestic and international levels to provide a forum for resolution of environmental conflicts. The Program builds partnerships among private and public institutions through conferences and workshops. For information, contact: Kasia Grzelkowski, Cornell Program on Environmental Conflict Management, 200 Rice Hall, Center for the Environment, Ithaca, NY 14853. Tel: 607-255-7879; Email: kg17@cornell.edu.

Earth Science Research and the Challenges of Environmental Security, Space Policy Institute, The George Washington University
This project will examine NASA's science data and research tools that could help national security planners and international development agencies better predict emerging environmental scarcities throughout the world—particularly in areas where scarcities might contribute to conflicts. The Space Policy Institute will hold several workshops, bringing together Earth scientists, industry representatives, experts from the international development and national security communities and NASA planners. The workshops, and additional research by the staff of the Space Policy Institute, will result in a report recommending how NASA can focus some of its Earth observation science research in areas of importance to international development and to national security analysts and planners. The project will address issues such as: What Earth science information is most critical in identifying and monitoring potential scarcities of renewable resources? How can the results of NASA's scientific research add to the understanding of environmental changes that might engender violent conflict? What new analytic directions should NASA consider in order to make some of its current research of greater direct benefit to the national security community? What utility would data from the projected new commercial satellite systems, used in combination with NASA's data and analytic tools, have in addressing these problems? For information, contact: Dr. Ray Williamson, Space Policy Institute, George Washington University, Gelman Library, Suite 714, Washington, DC 20050. Tel: 202-994-6451.

Environment and Conflicts Project (ENCOP), Swiss Peace Foundation (Berne)/Zurich Center for Security Studies at The Swiss Federal Institute of Technology
This international project, in its final year, has investigated the relationship between environmental problems and actual or possible violent conflicts, as well as means to peaceful conflict resolution. ENCOP has published several working papers in English and German. The Project has partner institutions in Germany, England, Nigeria and Bangladesh. For information, contact: Kurt R. Spillman, Center for Security Studies and Conflict Research, Swiss Federal Institute of Technology, ETH Zentrum, 8092 Zurich, Switzerland. Tel: 41.1.632.40.25; Fax: 41.1.363.91.96. Or contact: Gunther Bachler, Swiss Peace Foundation, Wasserwerkgasse 7, P.O. Box 43,3000 Bern 13, Switzerland. Tel: 41.31.311.55.82; Fax: 41.31.311.55.83.

Environmental and Energy Studies Institute (EESI)
In 1992, EESI organized a series of round table discussions between members of Congress and experts in various fields interested in environment and security. The program, entitled "Environment, Economy, and Security in the Post Cold War World," produced nine commissioned papers. EESI's current efforts in this area focus on how development assistance might be retooled to address environment and security problems and prevent state failure. The May 1995 issue of *Current History*, which focuses on global security, features an article entitled

"Environmental Security as a National Security Issue" by Gareth Porter of EESI. For information, contact: Gareth Porter, EESI, 122 C Street, NW, Suite 700, Washington, DC 20001-2109. Tel: 202-628-1400; Fax: 202-628-1825.

The Fridtjof Nansen Institute
Established in 1958, this independent foundation is named after Norway's famous Arctic explorer. The Institute conducts applied social science research on international issues of energy, resource management and the environment. Placing a particular emphasis on an interdisciplinary approach, FNI strives to meet academic quality standards while producing user-relevant and topical results. Projects of particular relevance for environmental change and security include the International Northern Sea Route Programme and the *Green Globe Yearbook.* For information, contact: Willy Østreng, Director, The Fridtjof Nansen Institute, Fridtjof Nansens vei 17, Postboks 324, Lysaker, Norway N-1324. Tel: 47. 67. 53. 89. 12; Fax: 47. 67. 12. 50. 47; E-mail: iliseter@ulrik.uio.no.

Global Green USA Legacy Program/Green Cross International
The Legacy Project aims to "accelerate the clean-up of the environmental legacy of the Cold War" by facilitating cooperation and dialogue between the military, environment, business, scientific and government communities. Current efforts include: a Washington, DC office focused on public education and policy advocacy to strengthen military-related pollution cleanup; CHEMTRUST, a three-year project to build public participation in Russian and American decisionmaking for chemical weapons demilitarization; and the development of educational products in partnership with the Center for Urban Policy and the Environment at Indiana University's School for Public and Environmental Affairs. For information, contact: GG USA Legacy Program, 1025 Vermont Avenue, NW, Suite 300, Washington, DC 20005-6303. Tel: 202-879-3181; Fax: 202-879-3182; E-mail: ggusa@globalgreen.org or pparks@igc.apc.org.

Global Security Network/Russian Marine Mammal Council
The Global Security Network (GSN) and its research division, the Investigative Network (IN), is a non-profit environment and human rights organization. IN identifies and highlights threats to global security in the post-Cold War era, and GSN assists in the development and implementation of remedial programs. IN conducts investigations into problems such as the cross-border trade in endangered species and weapons of mass destruction, and the effects on marine mammal life from industrial development. GSN then establishes relationships with host of local organizations, such as the Russian Marine Mammal Council (RMMC). RMMC is a Moscow-based registered Russian public organization focused on oceans research in the former USSR, conservation of marine mammals and marine clean-up and enforcement strategies to address the growing problems of pollution and poaching in Russian/NIS waters. The RMMC is comprised of dozens of marine scientists, including President Yeltsin's Ecological Security Advisor, Alexei Yablokov. GSN is also helping to fund the Russian Ministry of Environment's "Operation Amba," which oversees forestry patrols in the Russian Far East working to protect the Siberian Tiger and other endangered species. For information, contact: Global Security Network/Investigative Network, 1348 T Street, NW, Suite 200, Washington, DC 20009. Tel: 202-387-0028; Fax: 202-387-2590; E-mail:ingsn@igc.apc.org.

Harvard Center for Population and Development Studies
The Common Security Forum is an independent international grouping of public leaders and scholars who seek to promote reflection and communication about the nature of security and to advance practical policies to ensure peace and development. The Human Security Program of the Common Security Forum, based at the Harvard Center for Population and Development Studies, was established to explore the human dimensions of security. The program is pursuing several complementary research initiatives in the following areas: ethics and international policy, human survival crises during complex humanitarian emergencies and population and security. For information, contact: Harvard Center for Population and Development Studies, 9 Bow Street, Cambridge, MA 02138. Tel: 617-495-0417; Fax: 617-495-5418.

International Clearinghouse on the Military and the Environment (ICME)
The ICME collects and disseminates a wide variety of data on the relationship between the military and the environment and the effects of war (and preparations for war) on the environment. For information, contact: John M. Miller, Coordinator, ICME/ARC, P.O. Box 150753, Brooklyn, NY 11215. Tel: 718-788-6071; E-mail: fbp@igc.org.

International Consortium for the Study of Environmental Security (ICSE)
The ICSE was created in response to a need for theoretical analysis and empirical research about the notion of environmental security. Its primary function is thus to collate data and apply it to different methodologies. Its

approach leads it to analyze policies, their objectives and constraints, and thus to evaluate them in light of criteria drawn from both the natural and social sciences. ICSE produces newsletters and sponsors conferences with strong international participation; it recently began publishing a new journal entitled *Environment & Security.* For information, contact: Université Laval, Groupe d'Etudes et de Recherches sur les Politiques Environmentales (GERPE), Jean-Durand Building, Université Laval, Québec, Canada G1K7P4. Tel: 418-656-2316; Fax: 418-656-7908.

International Human Dimensions of Global Change Programme (IHDP)

The IHDP recently initiated a research program entitled "Global Environmental Change and Human Security." The program, directed by Stephen Lonergan and the Canadian Human Dimensions of Global Change Programme will "promote international cooperation in research on environmental security" by facilitating interdisciplinary and North-South linkages among researchers, policymakers and stakeholders. An ongoing working group will explore key environment and security research areas, including:

- Expanding the theoretical and conceptual discussion on the relationships among environmental change / resource use, population displacement, and human security;

- Categorizing catastrophic and cumulative environmental changes and assessing implications for population movements;

- Applying diverse methodological frameworks to analyze the relationships among environmental degradation, population displacement and security;

- Conducting empirical studies that complement theoretical, methodological and policy analyses;

- Collecting information and disseminating research findings in ways that reflect the global nature of the problems and the human resource and infrastructure constraints in developing countries.

The IHDP Working Group will prepare a detailed research program, convene international conferences, produce an edited volume, publish a newsletter and establish a World Wide Web site. For information, contact Stephen Lonergan, Director: Centre for Sustainable Regional Development, University of Victoria, PO Box 1700, Victoria, BC Canada V8W 2Y2. Tel: 604-721-8782; Fax: 604-595-0403; Email: Lonergan@uvic.ca.

The Institute for Foreign Policy Analysis, Inc. (IFPA)

The Institute for Foreign Policy Analysis is a nonprofit policy research organization affiliated with the Fletcher School of Law and Diplomacy, Tufts University. Founded in 1976, the Institute has performed a wide range of privately supported and contracted studies of a variety of foreign policy and security affairs issues, as well as the sources, scope and impact of ethnic conflict in the post-Soviet security environment. The Institute also has a long-standing interest in issues of resource scarcity; the security implications of energy extraction, transit and processing; and the linkages between economic development, environmental degradation and political stability. IFPA is well-known internationally for its ability to organize a wide range of fora that bring together key decisionmakers and experts from throughout the international community. These meetings have included senior-level, formal gatherings involving the participation of heads of state and government, leaders of key multinational organizations and senior parliamentarians; expert-level workshops and round tables; and seminar series on Capitol Hill and elsewhere. With offices in Washington, DC and Cambridge, Massachusetts, IFPA has extensive resources upon which to draw in both the worlds of policy and academe. For information, contact: Institute for Foreign Policy Analysis, Inc., 1725 DeSales Street, NW, Suite 402, Washington, DC 20036. Tel: 202-463-7942; Fax: 202-785-2785.

International Institute for Sustainable Development (IISD)

This Canadian institute seeks to integrate sustainable development into Canadian and international policy decision-making. The institute targets research and activities to public, business, academic and policy audiences. For information, contact: International Institute for Sustainable Development, 161 Portage Avenue East, 6th Floor, Winnipeg, Manitoba, Canada R3B 0Y4. Tel: 204-958-7700; Fax: 204-958-7710; Email: reception@iisdpost.iisd.ca.

International Peace Research Institute, Oslo (PRIO)

The International Peace Research Institute, in Oslo, Norway (PRIO), was founded in 1959 as one of the first institutions of its kind in the world. PRIO is financed by Norwegian ministries, research councils, the UN system and various international institutions. Researchers at PRIO have published significant theoretical contributions on the concept of security while also investigating the specific linkages between environment, poverty and conflict. Future projects center on connections between the natural environment and conflict and migration.

PRIO also makes ongoing contributions as the editorial home to both *The Journal of Peace Research* and *Security Dialogue.* For information, contact: Dan Smith, Director, International Peace Research Institute, (PRIO), Fuglehauggata 11, 0260 Oslo, Norway. Tel: 472-557150; Fax: 472-558422.

INSTITUTE FOR RESEARCH AND INFORMATION ON PEACE AND SECURITY (GRIP) [INSTITUT DE RECHERCHE ET D'INFORMATION SUR LA PAIX ET LA SECURITE]

This Belgian Institute has researched the relationship between environmental change and conflict and the effects of the military on the environment. It produced a 1992 report (in French) entitled, "Green Conflicts: the Deterioration of the Environment, a Source of Serious Tensions," and issued a wall-chart, "The Green Conflicts that will Threaten us in the Year 2000." For information, contact: GRIP, 33 Rue Van Hoorde, B-1030 Brussels, Belgium. Tel: 32.2.241.8420; Fax: 32.2.245.1933.

IUCN: THE WORLD CONSERVATION UNION

IUCN is a unique international conservation organization composed of a diverse range of over 800 governments, government agencies and non-government organizations across some 140 countries. The mission of IUCN is 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. IUCN has made significant contributions to international conservation objectives at the global, regional and national levels, drawing on its members and scientific and technical networks. It has been an important actor in promoting effective global governance and in conflict avoidance. The triennial meeting of IUCN's members will be held in Montreal, Canada, October 13-23, 1996 at the first IUCN World Conservation Congress. *Caring for the Earth* will be the theme of the Congress and it is expected that it will address fundamental challenges facing sustainable development and protection of the planet into the 21st century. Environmental security and other global issues will be the subject of specific workshops and recommendations from the Congress. For information, contact: Scott A. Hajost, Executive Director, IUCN-US, 1400 16th Street, NW, Washington, DC 20036. Tel: 202-797-6594; Fax: 202-797-5461; E-mail: shajost@iucnus.org.

MILITARY TOXICS PROJECT (MTP)

The Project unites activists, organizations and communities in the struggle to clean up military pollution, safe-guard the transportation of hazardous materials and to advance the development and implementation of preventative solutions to the toxic and radioactive pollution caused by military activities. It provides information and resources to the public and publishes the newsletter, "Touching Bases." In January 1996, MTP published *Radioactive Battlefields of the 1990's: The United States Army's Use of Depleted Uranium and its Consequences for Human Health and the Environment*. For information, contact: Military Toxics Project, PO Box 246, Norway, ME 04268. Tel: 207-743-2541; Fax: 207-743-2648; E-mail: mtp@igc.apc.org.

THE NAUTILUS INSTITUTE FOR SECURITY AND SUSTAINABLE DEVELOPMENT

The Nautilus Institute is conducting projects on environmental conflict and cooperation in Northeast Asia and in the Asia-Pacific region. The Institute has completed a number of UN policy-oriented studies on this topic, the reports of which are available on an FTP site accessible through their World Wide Web home page. Current projects include a U.S.-Japan policy study group to run over three years, with a first-year focus on transboundary acid rain issues in Northeast Asia; a project to examine the nexus between environmental, economic and security outcomes associated with energy development scenarios for Northeast Asia; North-South Korean dialogues on environmental security issues in the Korean Peninsula and the region; and a policy study group on trade-environment issues in the APEC region. Nautilus researchers have produced many reports on environmental regimes and issues in Asia-Pacific region. Nautilus also provides free e-mail information services on regional environmental issues (APRENet or Asia Pacific Regional Environment Network) and security issues (NAPSNet or Northeast Asia Peace and Security Network). For information, contact: Peter Hayes or Lyuba Zarsky, Nautilus Institute, 1831 Second Street, Berkeley, CA 94710. Tel: 510-204-9296; Fax: 510-204-9298; E-mail: NPR@IGC.APC.ORG; Internet Site: http//www.nautilus.org/nautilus.

NATURAL RESOURCES DEFENSE COUNCIL (NRDC)

NRDC is a non-profit environmental protection organization which has long had an active program related to environment and security. It has undertaken research, analysis and advocacy on the environmental impacts of nuclear weapons production in the United States and the former Soviet Union. NRDC has encouraged the U.S. government to address global common problems and environmental challenges in developing countries, which may adversely affect our own nation's security. Since the 1992 Earth Summit, NRDC has worked to establish

mechanisms to hold governments accountable for the commitments they have made to move toward "sustainable development." The Council's current priorities include climate change, fisheries and forests. For information, contact: S. Jacob Scherr, Senior Attorney, NRDC, 1350 New York Avenue, NW, Washington, DC 20005. Tel: 202-783-7800; Fax: 202-783-5917.

National Wildlife Federation (NWF)
To ensure that environment and security issues are given appropriate attention in the long term, the NWF International Office lobbies members of Congress to reform foreign aid and security budgets, advocating increased allocations for international environment, sustainable development and population stabilization programs. NWF advocates reforms in the World Trade Organization and inclusion of environmental issues within new, post-Cold War security policy. For information, contact: Barbara Bramble, Director International Office, National Wildlife Federation, 1400 16th Street, NW, Washington, DC 20036. Tel: 202-797-6600; Fax: 202-797-5486.

Project on Environmental Scarcities, State Capacity, and Civil Violence
Sponsored by the American Academy of Arts and Sciences and the Peace and Conflict Studies Program at the University of Toronto, the State Capacity Project has investigated the impacts of water, forests and cropland resource scarcities on governmental capabilities in the developing country cases of China, India and Indonesia. If capacity declines, is there an increased capacity of widespread civil violence such as riots, ethnic clashes, insurgency and revolution? The two-year project has targeted its findings for the public and policy-makers in Canada, the United States, China, India and Indonesia. Funding for the State Capacity Project has been provided by The Rockefeller Foundation and The Pew Charitable Trusts. For information, contact: Thomas Homer-Dixon, Principal Investigator: Peace and Conflict Studies Program, University College, 15 King's College Circle, University of Toronto, Toronto, Canada M5S 1A1. Tel: 416-978-8148; Fax: 416-978-8416.

Pacific Institute for Studies in Development, Environment, and Security
The Pacific Institute, directed by Dr. Peter H. Gleick, is an independent, nonprofit center created in 1987 to do research and policy analysis in the areas of environment degradation, sustainable development and international security. The Institute has three broad goals: (1) to conduct policy-relevant research on the connections between international security, global environmental change and economic development; (2) to facilitate communication between individuals and institutions working on problems in these three areas; and (3) to educate policymakers and the public on the nature of these problems and the need for long-term strategies to deal with them. The Institute has been a leader in research on how resource issues may fuel instability and conflict, particularly focusing on freshwater resources, forestry and resource management. Current projects include work on water related conflicts in the Middle East, U.S.-Mexican border water issues and sustainable water planning and use. For information, contact: The Pacific Institute for Studies in Development, Environment, and Security, 1204 Preservation Park Way, Oakland, CA 94612. Tel: 510-251-1600; Fax: 510-251-2203; E-mail: pistaff@pacinst.org; Internet Site: http://www.pacinst.org/pacinst.

Population Action International (PAI)
Population Action International promotes the early stabilization of world population through policies that enable all women and couples to decide for themselves, safely and in good health, whether and when to have children. PAI's Population and Environment Program supports this work through research on the relationship of population dynamics to the sustainability of natural resources critical to human well-being. The program most recently published a wall chart titled *Catching the Limit: Population and the Decline of Fisheries*, projecting global demand for fish through 2050, addressing the capacity of aquaculture to help satisfy that demand, and considering prospects for the resolution of international and national conflict over fish. Other publications have dealt with population and such natural resources as renewable fresh water, arable land and the atmosphere's regulation of global climate. For information, contact: Robert Engelman, Director, Population and Environment Program, Population Action International, 1120 19th Street, NW, Suite 550, Washington, DC 20036. Tel: 202-659-1833; Fax: 202-293-1795; E-mail: re@popact.org.

Population Reference Bureau (PRB)
The Population Reference Bureau provides information to policymakers, educators, the media, opinion leaders and the public around the world about U.S. and international population trends. PRB examines the links between population and a range of issues, including links between population, environment and security. PRB has recently initiated a cross-national project on population, environment and consumption in collaboration with

research institutes in Mali, Mexico and Thailand. For information, contact: Alene Gelbard, Director, International Programs, PRB, 1875 Connecticut Avenue, NW, Suite 520, Washington, DC 20009-5728. Tel: 202-483-1100; Fax: 202-328-3937; E-mail: popref@igc.apc.org.

THE PROJECT ON ENVIRONMENT, POPULATION, AND SECURITY UNIVERSITY OF TORONTO, PEACE AND CONFLICT STUDIES

This Project, under the direction of Thomas Homer-Dixon, was completed in May 1996. Its goal was to gather, evaluate and assess information on the relationship between the scarcity of renewable resources and the outbreak of violent conflict. The Project produced a methodology paper guiding social analysts in their investigation of causal links between environmental stress and violence, a thematic report examining the relationship between urbanization and social instability, as well as a case study on links between environmental scarcity and violence in Rwanda (see pp. 45-48 for information on Homer-Dixon's related, ongoing Project on Environmental Scarcities, State Capacity and Civil Violence).

The second set of papers from this project, three regional examinations of the relationship between environmental scarcity and social instability, are now available. Philip Howard investigated the contribution of environmental factors to the Zapatista rebellion in Chiapas, Mexico. This case study discovered that land scarcity—due to inequitable distribution of cropland, population growth and land degradation—caused severe impoverishment. As it became clear to Chiapan peasants that the state was not prepared to fulfill its land reform promises, the peasants turned to the Zapatista movement to fight for improved living conditions. The Gaza case study, written by Kimberley Kelly, examined the relationship between water scarcity and civil unrest within the Gaza Strip. Water scarcity, caused by inequitable distribution of water resources, high population densities within the Gaza region and the salinization and pollution of the aquifer, detrimentally affected public health and contributed to deteriorating socio-economic conditions. These factors have increased the level of dissatisfaction within the Palestinian community, which threatens to strain the transition to Palestinian rule. The South Africa case, researched by Valerie Percival, analyzes how environmental scarcity helped foster South Africa's civil unrest in the early 1990s. The scarcity of resources such as land, water and fuelwood contributed to reduced agricultural productivity in the homelands, migrations to and within urban areas and the deterioration of the local urban environment. The level of grievances within society rose, and the transition from minority rule provided an opportunity for the violent expression of these grievances.

The final set of papers from the Project was published in May. This set includes a paper on Social Adaptation, a case study of the relationship between environmental factors and urban violence within Pakistan, and a Briefing Book for policymakers summarizing the Project's case studies and outlining the key findings of its research (see page XX of this *Report* for a detailed summary of findings).

The Peace and Conflict Studies Department at the University of Toronto has just launched a series of Internet Sites for its various research projects: General information on the Peace and Conflict Studies Program can be found at http://utl1.library.utoronto.ca/www/pcs/pcs.htm; The Project on Environment, Population and Security is at http://utl1.library.utoronto.ca/www/pcs/eps.htm; and The Project on Environmental Scarcities, State Capacity, and Civil Violence is at http://utl1.library.utoronto. ca/www/pcs/state.htm. For information, contact: Thomas Homer-Dixon, Peace and Conflict Studies, University of Toronto, 15 King's College Circle, Toronto, Ontario, Canada M5S 2H7. Tel: 416-978-8148; Fax: 416-978-8416.

STOCKHOLM INTERNATIONAL PEACE RESEARCH INSTITUTE (SIPRI)

Financed by the Swedish Parliament, this independent institute was established in 1966. SIPRI's international staff pursues research on a variety of defense and disarmament issues, including the links between environment and security. SIPRI publishes the *SIPRI Yearbook*, an annual collection of articles on world armaments and international security. For information, contact: Stockholm International Peace Research Institute, Frosunda, S-171 53 Solna, Sweden. Tel: 46. 8. 655. 97. 00; Fax: 46. 8. 655. 97. 33; E-mail: sipri@sipri.se.

TAMPERE PEACE RESEARCH INSTITUTE (TAPRI)

Researchers at TAPRI have convened conferences and published research on the environment and security nexus in the context of a larger peace research agenda. TAPRI's contributions include theoretical as well as case studies as found in Director Jyrki Käkönen's edited volumes, *Green Security or Militarized Environment* (1994) and

Perspectives on Environmental Conflict and International Politics (1992). Researchers commonly focus on Arctic and Baltic issues in addition to European security and conflict and development in the developing world. For information, contact: Jyrki Käkönen, Director: Tampere Peace Research Institute, Aakerlundinkatu 3, 4th Floor, PO Box 607, FIN-33101 Tampere, Finland. Tel: 358. 31. 215. 61. 11; Fax: 358. 31. 223. 66. 20.

Worldwatch Institute

Worldwatch has a long-standing interest in how environmental issues relate to security; Worldwatch president Lester Brown wrote some of the earliest articles on environment and security issues. The Institute recently published *Full House: Reassessing the Earth's Population Carrying Capacit*y (written by Lester Brown and Hal Kane), which addresses the effects of food scarcity on global and regional political stability. Worldwatch researcher Michael Renner is in the process of writing a book on international security and environment/sustainable development, due out in late 1996 from W.W. Norton & Company. Various Worldwatch papers have dealt with international security issues, especially those by Mr. Renner—most recently Paper 122, "Budgeting for Disarmament: The Costs of War and Peace," and Paper 114, "Critical Juncture: The Future of Peacekeeping." Worldwatch Paper 125, "The Hour of Departure: Forces that Create Refugees and Migrants," by Hal Kane, also deals with security issues and the environment. Many other Worldwatch publications discuss redefining security in the context of global environmental and social issues, and Worldwatch will continue these analyses. For information, contact: Worldwatch Institute, 1776 Massachusetts Avenue, NW, Washington, DC 20036. Tel: 202-452-1999; Fax: 202-296-7365.

Governmental Activities

The Centers for Disease Control and Prevention

The CDC is addressing the public health aspects of environment and security links by developing a strategy to confront the spread of infectious diseases. The CDC outlines this strategy in "Addressing Emerging Infectious Disease Threats: A Prevention Strategy for the United States," published in April 1994. The plan contains four goals.

Surveillance: The CDC will expand and coordinate surveillance systems for the early detection, tracking and evaluation of emerging infections in the United States; develop more effective international surveillance networks for the anticipation, recognition, control and prevention of emerging infectious diseases; improve surveillance and rapid laboratory identification to ensure early detection of antimicrobial resistance; strengthen and integrate programs to monitor and prevent emerging infections associated with food/water, new technology and environmental sources; strengthen and integrate programs to monitor, control and prevent emerging vectorborne and zoonotic diseases.

Applied Research: The CDC will expand epidemiologic and prevention effectiveness research; improve laboratory and epidemiologic techniques for the rapid identification of new pathogens and syndromes; ensure timely development, appropriate use and availability of diagnostic tests and reagents; augment rapid response capabilities for vaccine production and delivery; and expand evaluation of vaccine efficacy and the cost effectiveness of vaccination programs.

Prevention and Control: The CDC will use diverse communication methods for wider and more effective delivery of critical public health messages; establish the mechanisms and partnerships needed to ensure the rapid and effective development and implementation of prevention measures.

Public Health Infrastructure: The CDC will ensure the ready availability of the professional expertise and support personnel needed to better understand, monitor and control emerging infections; make available state-of-the-art physical resources (laboratory space, training facilities, and equipment) needed to safely and effectively support the preceding goals and objectives.

For information, contact: Centers for Disease Control and Prevention, 1600 Clifton Road, Mailstop D-25, Atlanta, GA 30333. Tel: 404-639-3286; Fax: 404-639-1623.

Department of Commerce/National Oceanic and Atmospheric Administration (NOAA)

Office of Global Programs

NOAA's Office of Global Programs coordinates and funds the NOAA Climate and Global Change Program, which contributes to the U.S. Global Change Research Program (USGCRP). To enhance the security and physical well-being of citizens of the United States and other nations affected by climate variability, NOAA hopes to set up an International Research Institute for the Seasonal to Interannual Climate Prediction Program (IRI/SCPP). The SCPP is intended to assemble participants from around the world to achieve a task no single country could accomplish on its own: to forecast the behavior of the El Niño-Southern Oscillation (ENSO) cycle—known to be central to short-term variability in the earth's climate system—a year in advance, and then distribute the relevant information internationally. After publishing a call to universities for proposals to set up the IRI, NOAA expects to set up four pilot application centers in El Niño-affected countries by 1998.

In November 1995, NOAA collaborated with NSF, NASA and DOE to organize the "International Forum on Forecasting El Nino: Launching an International Research Institute." Chaired by NOAA Administrator Dr. James Baker, and hosted by the President's Science Advisor, Dr. John Gibbons, the Forum launched a multinational effort to support scientific research and climate forecasting activities of direct relevance to societies around the world sensitive to climate variability. The Forum was attended by 40 countries and more than 20 international and regional organizations, as well as members of the international physical and social science communities. The Forum provided a broad consensus for creation of an International Research Institute (IRI) and network for climate prediction that would embody an "end to end" capability for producing experimental climate forecasts based on predicting the ENSO phenomenon, and generating information that could be incorporated by

decisionmakers worldwide to mitigate climate related impacts in sectors such as agriculture, water management, disaster relief, human health and energy. For information, contact: Jim Buizer, Director, Forum Executive Secretariat (FES), c/o Josh Foster, NOAA/OGP, 1100 Wayne Avenue, Silver Spring, MD 20910. Tel: 301-427-2089 (ext. 67); Fax: 301-427-2082.

Department of Defense/Environmental Security/International Activities

The U.S. Department of Defense has a vibrant and growing role in enhancing international environmental security. DOD considers environmental protection as integral to national security. The U.S. military's role in environmental protection is manifold; it demonstrates leadership in the U.S. and abroad, helps guarantee access to the air, land and water needed to train U.S. forces and helps promote environmentally sustainable behavior on the part of other militaries around the world. If environmental degradation can incite tension, instability and conflict over scarce resources, environmental protection can advance democratic processes and environmentally benign economic development around the world.

Environmental Security/National Security Conference

June 1995

Summary of Activities

The Environmental Security/National Security Conference was convened to explore the relationships between the civil, defense and intelligence communities within the federal government. This conference, co-sponsored by the Director of Central Intelligence (DCI)/Community Management Staff and the Office of the Deputy Under Secretary of Defense (Environmental Security), was designed to promote dialogue among the communities about the evolving subject of environmental security. Objectives included: identifying appropriate roles for government agencies across the dimensions of environmental security; enhancing communication among the civil, defense intelligence and civil environmental communities about environmental threats and information or action needed to mitigate such threats; ensuring that policymakers and DOD operators have access to the best information on environmental security factors that contribute to economic, political and social instability; and providing the Intelligence Community with a clearer set of requirements and priorities pertaining to environmental security.

The conference was convened to highlight the importance of incorporating environmental security factors into national security policy deliberations and operational planning. It sought to provide a forum for federal agencies—including the civil, defense and intelligence communities—to explore their contributions to national environmental security goals.

The meeting included presentations by: Eileen Claussen, then the National Security Council's Senior Director for Global Environment, and presently the Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs; Leon Fuerth, National Security Advisor to the Vice President; Sherri Goodman, Deputy Under Secretary of Defense for Environmental Security; William Nitze, EPA Assistant Administrator for International Activities; Enid Schoettle, National Intelligence Officer for Global and Multilateral Issues; Timothy Wirth, Under Secretary of State for Global Issues; and General Anthony Zinni, Commanding General of the First Marine Expeditionary Force.

Findings, Conclusion and Recommendations

In closing the conference, Gary Vest, Principal Assistant Deputy Under Secretary of Defense for Environmental Security, compiled a list of findings, conclusions and preliminary recommendations.

Findings

- Environmental conditions around the world should be assessed along with political, economic and military factors in terms of potential threats to U.S. national security interests.
- Environmental security is multilateral, multidimensional and multidisciplinary. No single agency in the United States can protect U.S. public interests. No single country can protect the world environment; however, U.S. leadership is essential on an international scale.
- There is important, relevant environmental security work underway throughout the Intelligence Community in response to existing national security requirements.
- The defense community has the capability and organizational capacity to respond to and to mitigate the worst consequences of environmental catastrophes or environmentally caused threats to national security. To some extent, it lacks the authority, training and resources to do so.

DOD's view of "environmental security" is comprised of the following: (1) ensuring environmentally responsible action by military units wherever they may be; (2) ensuring adequate access to land, air and water to conduct a defense mission; (3) protecting DOD's war-fighting assets (people, equipment and facilities); (4) understanding where environmental conditions contribute to instability and where the environment fits into the war and peace equation; (5) bringing defense-related environmental concerns to the development of national security; (6) studying how defense components can be used as instruments of U.S. global environmental policy.

Globally, the military figures prominently in environmental issues, both because of its past and potential effects on the environment and its ability to protect the environment. DOD has been a leader in such environmental efforts as: (1) implementing the Montreal Protocol and bringing defense environmental leadership to NATO's Committee for Challenges to a Modern Society (CCMS); (2) sending teams to the former USSR and Warsaw Pact countries to help those nations address environmental problems through the U.S. European Command's "Military-to-Military" program; (3) helping to link environmental policy to the democratization of Eastern

- The Intelligence Community has (1) the information-gathering infrastructure, (2) the ability to perform integrated analyses on relationships between the environment, political stability and economic conditions and (3) the means to communicate with policymakers in a timely manner. To some extent, it lacks the directive to do so systematically or with defined priorities.

- The U.S. Government—in partnership with counterparts in other countries and the private sector—has the ability to apply environmental scientific and technological practices and procedures to address environmental trends and to change both practices and paradigms abroad and within the United States.

- A consensus is developing among participants in the national security process that the environment should be considered a key element in the national security arena.

Conclusion

A national strategy, involving appropriate U.S. government agencies, is needed to prioritize international environmental security issues in order to enhance U.S. national security.

Recommendations

Address the following issues in complete, justifiable and understandable terms:

- Why is protecting the environment important to national security? Specific themes would include protecting U.S. health and safety, limiting pressure on military resources and enhancing economic security.

- Identify, characterize, assess and understand threats and associated risks. Specific themes would include global, regional, and national environmental issues, environmental phenomena, and acute or chronic health effects.

- Identify, understand and communicate relationships between environmental security and military missions, environmental security and roles and missions of all agencies, environmental security and international institutions, environmental security and civil society, environmental security and foreign policy.

- Facilitate cost-effective measures at early stages to avoid extensive international assistance or military intervention.

Adopt and implement a clear, concise U.S. environmental security policy that:

- Answers questions of why environmental security is important to national security.

- Identifies and focuses agencies' capabilities into a coherent, integrated approach.

- Creates a framework for a U.S. government policy-making process to identify threats, assess risks, and prioritize resources.

- Persuades, through diplomatic and other means, other countries and international organizations to pursue environmental security goals consistent with our own.

- Reaches all interested constituencies to engage them in a dialogue on environmental security issues.

Europe in developing an environmental security curriculum for the Marshall School; (4) co-sponsoring the June 1995 conference with the intelligence community on the relationship between environmental security, national security and intelligence; (5) holding conferences in the Nordic/Baltic countries, the Pacific and Germany to discuss environmental links to defense; (6) launching a trilateral defense environmental initiative with Canada and Australia; (7) conducting war-gaming exercises on questions such as, "To what extent should the U.S. pay for Cold War environmental clean-up in Russia?"

The Environmental Security/ International Activities program has two major thrusts. One focuses on building institutional relationships within the U.S. and the other reaches out to other nations, through military institutions. Within the U.S. policy community, DOD has shown leadership in exploring the roles of the national security community, the intelligence community and the civilian environmental agencies in advancing environmental security.

A U.S. Government conference on "Environmental Security & National Security" in June 1995 detailed the contributions each of these communities can make in detecting, characterizing and mitigating or preventing environmental degradation around the world which could induce instability or conflict. The same conference called for a U.S. Government policy on environmental security, which is now being circulated among all participating agencies. In addition, DOD is formalizing its relationships with the Department of State, EPA, Department of Energy and others to fully coordinate environmental activities outside the U.S. and to align with top foreign, environmental and defense policy goals.

In the international community, DOD has been recognized as a premier exemple of how to institutionalize environmental protection within a military organization. Among the many bilateral, trilateral and multilateral initiatives DOD has undertaken are:

- Bilateral Memoranda of Agreement on Environmental Protection within the military with Norway, Sweden, Poland and Russia;
- A NATO Pilot Study on Environmental Aspects of Re-using Former Military Lands;
- A NATO Pilot Study on Environmental Management Systems;
- A NATO Pilot Study on Environmental Security in an international context, on broad environment and national security issues;
- An Arctic Military Environmental Cooperation program with Norway and Russia focusing on militaryenvironmental management in the Arctic;
- A Baltic Sea Initiative;
- A Military Environmental Handbook, documenting how to build an environmental program with a military;
- A Trilateral Agreement with Canada and Australia on Environmental Security issues;
- Asia-Pacific Defense Environmental Security Initiative to open a military environmental venue for cooperation with Pacific Rim countries.

Among the goals for 1996 are to integrate DOD efforts more closely with other federal government agencies and U.S. businesses.

Department of Energy/Energy Programs

DOE engages in a variety of activities that could be considered as "environmental security" activities. For example, over one-third of the DOE budget is spent on addressing the legacy of environmental mistakes in the manufacture of nuclear weapons. In addition, DOE engages in activities to help reduce U.S. dependence on imports of oil. But DOE's technology development and other programs devoted to sustainable use of resources and implications for national and global quality of life are perhaps of most interest to readers, since sustainability

of the resource base and the global ecosystem are at the heart of most "environmental security" issues.

DOE promotes sustainable use of resources and the global ecosystem through many other activities, and engages in technology development. DOE performs 70% of all federal pollution prevention R&D. Some major activities in the environment and security area include:

1. Climate Change Action Plan: This technology development and employment effort will help cost-effectively minimize the production of carbon dioxide and other greenhouse gases. It focuses on deploying energy- efficient building and industrial technologies and on promoting changes on the supply-side by promoting renewable energy sources.

2. Clean Car Initiative: This joint public-private R&D venture will design automobiles that produce fewer emissions and have three times the fuel efficiency of today's automobiles. This will help reduce the oil-intensity of the economy and will benefit the global environment by reducing emissions.

3. Industries of the Future: DOE is working with the most polluting and resource intensive industries (including the pulp and paper industry, petroleum refining, steel & aluminum, chemicals, glass and foundries). It seeks to develop a vision of an extremely efficient, very low-emitting and productive industry.

4. Trade missions to other countries: DOE seeks to reduce current and future carbon dioxide emissions by promoting cleaner or renewable energy use in the rapidly expanding economies of China, India and Pakistan. In Ukraine, DOE is helping to replace the more dangerous nuclear plants with other energy sources to enhance European security against another Chernobyl event.

Department of State/Bureau of Intelligence & Research

The Bureau of Intelligence and Research (INR) at the State Department has a small division working on environment and sustainable development issues. INR believes that resource scarcity is much more of an immediate security threat than climate change. Resource degradation tends to be local and will increase ethnic tensions (mostly at a sub-national level) between people competing for jobs and land. This view explains INR's focus on sustainability issues and the need for reliable sustainable development indicators.

INR's Office of the Geographer and Global Issues (GGI) deals with the following: (1) UN and humanitarian concerns; (2) territorial conflicts and cartography; and (3) environmental and sustainable development. It publishes a classified bi-weekly newsletter, "Environment and Sustainable Development Update." INR believes most international environmental issues can be best analyzed from open sources and should not be absorbed casually as another new intelligence problem.

Two INR/GGI initiatives might be of interest because they link preventive measures to information sharing on environment and security issues: (1) Relief Web, which began as a joint effort with the Bureau of International Organizations to set up an Internet-based information network for humanitarian crises, is now managed by the UN Department for Humanitarian Affairs in Geneva; (2) EarthMap, which seeks to enhance the international use of geospatial data and tools to help improve sustainable development decisionmaking (see page XX for additional information on State Department environmental activities).

Environmental Protection Agency/Office of International Activities

EPA's definition of "environmental security" includes resource scarcity / conflict issues, transfrontier movement of hazardous waste, pesticides and pollution. In 1995, ongoing EPA projects relating to environment and security were:

1. activities with the Economic Commission of Europe (ECE) to address long-range transboundary air pollution (LRTAP) in Europe, since if a country lacks clean air it can easily affect economic and possibly political stability;

2. a joint project with AID to create a regional information and training centers in Asia and the Mid-Pacific which will focus on environmental health problems, safe drinking water and other problems associated with rapid urbanization in the region;

3. the "Russian Far East Project," which seeks to minimize instability and migration in the region by addressing the damage from changes to watersheds, forests and fish stocks;

United States Bilateral Partnerships
Department of State

The United States-India Common Agenda for the Environment (CAE)

The United States-India Common Agenda was launched in April 1994 by Under Secretary of State for Global Affairs Timothy Wirth and then-Indian Minister of State for the Environment and Forests Kamal Nath. The CAE is intended to outline key areas of common concern and to promote cooperation on global and domestic environmental challenges. Specific objectives are: (1) to share perspectives and positions on key global environmental issues such as global warming, ozone depletion, desertification, biodiversity, conservation and hazardous waste; (2) to facilitate scientific and technological research and exchanges and other joint efforts to address environmental problems of mutual concern; (3) to exchange information and facilitate trade in environmentally sound technologies, including sustainable energy generation and use, pollution abatement and prevention, waste management and water treatment; (4) to seek increased efficiency in the use of available funds and to mobilize additional funds from existing and new sources, including the public and private sectors to meet environmental challenges; (5) to support implementation of India's Environmental Action Program.

The Common Agenda is already producing positive results and enhancing bilateral relations. Last year, various working groups (on Environment Trade and Investment, Global Environmental Affairs, and Science and Technology) outlined specific areas of future collaboration. These include opportunities to promote U.S. environmental technology exports to India, expand dialogue on multilateral environmental issues and continue cooperation on scientific and environmental projects.

The United States-Japan Common Agenda for Cooperation in Global Perspective

The United States-Japan Common Agenda for Cooperation in Global Perspective addresses common challenges to sustainable economic development. The Common Agenda has strengthened partnerships between the United States and Japan on issues such as the environment, human health and advanced technology development. New initiatives were launched in 1996 that address education, food security, counter-terrorism, natural disaster mitigation, combating emerging infectious diseases and nation-building.

The environmental partnership has led to projects such as the establishment of a marine research center for the Pacific region; joint conservation efforts in Indonesia and the Philippines; funding projects that will protect nature reserves in five Central American and Caribbean countries; and the establishment of the Environmental Policy Dialogue through which the U.S. and Japan formulate common approaches on international environmental issues—such as global climate change, biodiversity, hazardous waste and ozone layer depletion.

On the scientific front, the U.S. and Japan are strengthening their exchange of information and data through the Global Observation Information Network—an effort to establish a global system for sharing information about the earth. The Common Agenda has allowed the two countries to exchange information on carbon-dioxide sequestration and encourage the development of substitute technologies for ozone-depleting chlorofluorocabons.

4. projects on the U.S.-Mexico border area, where sewage and other pollution problems can create politically volatile situations within Mexico and between the U.S. and Mexico;

5. a range of highly successful activities in the Middle East peace process to address water scarcity with the various actors involved;

6. pollution prevention centers in the Czech Republic, Ukraine, Poland, Russia and China to address pollution prevention and other issues;

7. the NATO Committee for Challenges to a Modern Society (CCMS) Program which is training a new class of

environmental professionals in the region and sponsoring many meetings and case studies.

In 1996, the EPA has several exciting developments in the area of environmental security. The EPA, in cooperation with several other federal agencies, has drafted an environmental security policy for the U.S. Government. This document outlines the need for environmental security—the how, and why—and formally submits a U.S. policy. As President Clinton acknowledged in his introduction to the February 1995 *National Security Strategy of Engagement and Enlargement*, "Large scale environmental degradation, exacerbated by rapid population growth, threatens to undermine political stability in many countries and regions." The need to contend with this threat gave birth to the field of environmental security.

The EPA, recognizing the linkage of environmental and national security issues, is in the process of finalizing a memorandum of understanding, policy documents and cooperative efforts under a joint environmental security mission with the Department of Defense. Components of the Department of State, and the Departments of Energy and Commerce may also become partners in this effort.

As part of the aforementioned interagency partnership, a concept (TEAM USA) is under development to allow the agencies to share mission responsibilities, legal authorities and resources under an environmental security agenda. Initially this team will focus on environmental, economic and national security concerns in the Arctic—specifically concerns the U.S. shares with other Arctic nations involving major radioactive waste and non-radioactive contamination problems by the former Soviet Union in Northwest Russia. The team then intends to expand its efforts to other parts of the world, as well as to other activities that are not defense-related. EPA believes that the establishment of an interagency (TEAM USA) framework will link respective mission responsibilities and authorities to achieve U.S. environmental and foreign policy objectives.

The INFOTERRA Network/USA National Focal Point/Environmental Protection Agency

INFOTERRA is the international environmental research and referral network of the United Nations Environment Programme (UNEP). It is composed of 170 National Focal Points in as many member countries. This system was established in accordance with the decisions of the 1972 United Nations Conference on the Human Environment in Stockholm, Sweden. Its goal is to serve as a link between those who are seeking environmental information, and those who have the knowledge and expertise.

The National Focal Points represent their countries in the INFOTERRA system and carry out work at the national level. The U.S. National Focal Point for INFOTERRA responds to 400-500 requests per month from governments, NGOs, universities, schools, industries and concerned citizens inside and outside the United States. It conducts research on international environmental topics, identifies and locates international and U.S. Government documents, compiles customized bibliographies, provides requesters with copies of EPA documents in hardcopy or microfiche, refers patrons to experts around the world, briefs international visitors and conducts database searches on over 400 databases. For information, contact: INFOTERRA / USA, U.S. EPA (3404), 401 M Street, SW, Washington, DC 20460. Tel: 202-260-5927; Fax: 202-260-3923; E-mail: infoterra@epamail.epa.gov.

NASA Mission to Planet Earth

NASA's Mission to Planet Earth seeks to improve our understanding of the Earth's system, and the natural and human-induced changes in that environment. NASA launched its first weather satellite in 1960, and has since provided valuable observations and analyses on ozone depletion, global sea levels, the El Niño phenomena and the rate of deforestation in the Amazon.

The Mission to Planet Earth is observing and analyzing the Earth's system and the consequences of potential global climate changes. It is divided into two stages: Phase I, now underway, is measuring specific aspects of the Earth, including ozone layer, radiation levels, effects of the sun, oceans and surface vegetation and Phase II, the Earth Observing System (EOS), beginning in 1998. EOS satellites will make more than two dozen different measurements over at least 15 years to provide the first long-term, integrated observations of the global environment. These observations will enable scientists to understand how the Earth's land, air, water and life interact and eventually to predict how the Earth's climate will change.

Some of Phase I's primary missions through 1998 include: (1984) Earth Radiation Budget Satellite—radiation budget, aerosols, ozone; (1991) Upper atmospheric chemistry —with Russia & Japan; (1996)Total Ozone Mapping Spectrometer—ozone measurements with Russia & Japan; and the (1998) Landsat-7—Land surface features &

changes (high resolution). Examples of future Phase II projects include: the (1998) Earth Observing System-AM Series—Atmospheric/surface/solar processes controlling fresh water resources and ecological processes affecting global climate with Japan and Canada; the (2000) EOS-PM Series : Causes of climate variations and basis for improvements in long term weather/climate prediction with Europe; (2002) EOS-Chemistry Series and (1998-2001) SAGE—Behavior of ozone, other greenhouse gases, and aerosols, and their impact on global climate; also regional and global studies of pollution with Japan, UK and Russia. For information, contact: Dr. Nancy Maynard, Deputy Director, Office of Mission to Planet Earth, NASA HQ, Code YS, 300 E Street, SW, Washington, DC 20546. Tel: 202-358-2559; Fax: 202-358-2770; E-mail: nmaynard@mtpe.hq.nasa.gov.

SPY SATELLITES COLLECT ENVIRONMENTAL DATA

In November 1995, the *New York Times* reported that at the urging of Vice President Gore, with the support of Congress, a new program began in late 1995 to direct spy satellites to study about two dozen ecologically sensitive sites around the world. Ultimately, it is to monitor about 500 sites. Scientists are programming the satellites to study diverse habitats vulnerable to environmental shifts and damage, including some that are unusually remote and forbidding. The data will be archived for future generations of scientists and will remain secret for now to conceal the abilities of the nation's reconnaissance systems (see *New York Times*, November 27, 1995, p.B5, col. 1).

Among the 500 sites to be targeted are: Clouds off the California coast between Los Angeles and San Diego; the Mojave Desert in California; the Liquillo experimental forest in Puerto Rico; a mixed coniferous-deciduous in Pleshcheyevo, Russia; the Konza prairie in Kansas; a lowland tropical rain forest at Le Selva, Costa Rica; the forested slopes of the Sumava Mountains, Czechoslovakia; the coastal zone around the Galapagos Islands off Ecuador; permafrost in Fish Creek, Alaska; glaciers in Griegsletchner, Switzerland; and, the high slopes of Mount Kilimanjaro.

OFFICE OF SCIENCE & TECHNOLOGY POLICY(OSTP)/NATIONAL SECURITY & INTERNATIONAL AFFAIRS

The mission of OSTP is articulated in its 1995 publication, *The National Security Science and Technology Strategy*. The strategy emphasizes the importance of U.S. science and technology investments for military readiness, curbing the proliferation of weapons of mass destruction, preserving U.S. economic competitiveness and protecting global stability. To achieve global stability, OSTP seeks to apply the tools of science and technology to the prevention of stresses that lead to conflict, such as unchecked population growth, food scarcity, environmental degradation, natural disasters and infectious diseases. One method by which OSTP pursues these objectives is through international cooperation in science and technology. OSTP has developed a series of "country strategies" for certain priority countries that are key to the stability of their region, have the scientific and technology base to attract long-term investments and trade, and offer emerging markets for U.S. goods and services. These strategies call for cooperation in priority areas of science and technology that will lead to positive political and economic reform, regional stability, sustainable development and economic growth. For example, an important component of the U.S. bilateral science and technology relationship with Russia is the retraining of former weapons scientists and cooperation in non-military research. In the U.S. relationship with China, many cooperative programs are aimed at promoting sustainable development.

CLINTON'S NATIONAL ENVIRONMENTAL TECHNOLOGY STRATEGY

The Bridge to a Sustainable Future

The National Science and Technology Council (NSTC)—formed to drive interagency consensus on science and technology policy—has developed a new resource in its efforts to promote the growth of the environmental technology industry. The *Bridge to a Sustainable Future* CD-ROM is a first-of-its-kind collection of U.S. federal environmental technology information and resources. The disc is an outgrowth of the Clinton Administration's Technology for a Sustainable Future (TSF) Initiative launched in July of 1994 by Vice President Al Gore. The CD-ROM is also a companion piece to the two previously released NSTC reports *Technology for a Sustainable Future* (July 1994) and *Bridge to a Sustainable Future, The National Environmental Technology Strategy* (April 1995). The CD showcases the federal programs, strategies and technologies directed to capturing this growing domestic and international market.

The *Bridge to a Sustainable Future* CD-ROM is comprised of more than 150 text documents—including: the Defense Department's Strategic Environmental Research & Development Projects; the Energy Department's Environmental Program Profile; NASA's Environmental Program; the Global Climate Change Program; and the President's Council on Sustainable Development. The disc contains thirty video excerpts, including an overview of the U.S. Agency for International Development's global environmental accomplishments and Vice President Gore's December 1994 speech at the White House Conference on Environmental Technologies. All of the material on the disc is fully searchable by key words.

The CD-ROMs will be available at no cost to private industry, non-governmental organizations, state and local governments, U.S. embassies, trade missions, institutions of higher learning and interested citizens. The CD-ROM can be ordered by mailing a request to USEPA/NCEPI, P.O. Box 42419, Cincinnati, Ohio 45242-2419 or by fax to (513) 489-8695.

DEPARTMENT OF STATE
Environmental Initiative for the Twenty-First Century

In February 1996, Secretary of State Warren Christopher issued an unclassified memorandum to all Under Secretaries and Assistant Secretaries of State on "Integrating Environment Issues into the Department's Core Foreign Policy Goals." In April 1996, Christopher delivered a major address at Stanford University, outlining a broad-ranging agenda for further integrating environmental issues into U.S. diplomacy. (See Official Statements section on pp. 77-85 for complete transcripts of the memo and the Stanford speech.) Several bureaus and departments at State are working together to implement the strategy, including: all regional bureaus; Office of the Under Secretary for Global Affairs; Bureau of Assistant Secretary for Oceans and International Environmental and Scientific Affairs; Secretary's Office of Policy Planning; Secretary's Office of Resources, Plans and Policy; Bureau of Population, Refugees and Migration; Bureau of Under Secretary for Political Affairs; Bureau of the Under Secretary for Economic Affairs; Bureau of Under Secretary for Arms Control and International Security Affairs; Bureau of Under Secretary for Management.

According to Christopher, the Department will take additional steps to systematically protect the world's resources, to use environmental issues to promote core U.S. interests, and to ensure needed expertise and financial support for environmental goals. The Department described its environmental activities and accomplishments to date—and its priorities and new initiatives—as follows:

Accomplishments

(1) Protecting the Earth's Atmosphere:

- **Ozone Depletion**: Damage to the ozone layer leads to increased rates of skin cancer and to cataracts. In 1995, the Department led an effort to complete the phase out of the last remaining major chemical that depletes the earth's ozone layer.
- **Climate Change**: Changing weather patterns caused by increased emissions of greenhouse gases threaten agricultural production, endanger coastal communities, promote the spread of infectious disease, and are an emerging concern for financial institutions and insurance companies. The U.S. implemented a Climate Action Plan to control greenhouse gas emissions before the year 2000, and worked with others helped to establish a process to limit these emissions after the year 2000. Through the U.S. Initiative for Joint Implementation, the U.S. has encouraged private sector involvement in international efforts to reduce climate change.

(2) Protecting Oceans:

- **Marine Pollution**: The U.S. hosted a major United Nations conference on marine pollution in 1995, with an agreement on an action plan to protect oceans. This action advanced efforts to deal with the use of dangerous toxic chemicals like DDT and PCBs. These chemicals persist for long periods and, transported by the atmosphere and oceans, poison vast regions of the planet.
- **Fisheries**: The U.S. has successfully concluded major agreements to deal with the world's crisis of over fishing, a major concern to the US. fishing industry.

(3) Protecting Species and their Habitats:

- **Biodiversity**: President Clinton signed the Biodiversity Convention Treaty soon after entering the White House. If ratified by the Senate, the United States' participation as a full party to the Treaty would help to promote fair trade in biotechnology products, to encourage the sustainable use and conservation of the world's natural resources, and to have continued access to rare genetic material.
- **Wildlife Protection**: The U.S. has worked to conserve endangered species and to promote "ecotourism" as a sustainable industry for developing countries. In particular, the United States initiated an effort to improve the worldwide management of coral reefs, and has taken a strong stand against illegal trade in rhino and tiger products, including the use of trade sanctions against violating nations. The United States recently amended the U.S.-Canada Migratory Bird Treaty to help manage wisely North America's waterfowl resources into the twenty-first century.

(4) Advancing U.S. Interests in Key Regions and Countries:

- **Bringing Peace to Troubled Regions**: Working with the parties to the Middle East Peace Process on water resources, and with newly independent states in the Caucasus on energy resources, the United States has attempted to turn obstacles to peace into opportunities for cooperation.
- **Close to Home**: the Department has worked to improve environmental cooperation with Canada and Mexico, implementing important environmental side agreements to the NAFTA accord. The U.S. has worked directly with Canada to clean up the Great Lakes, and with Mexico to clean up the Rio Grande and San Diego River valleys.
- **Pivotal Alliances**: Important partnerships worldwide include: U.S.-*Japan* Common Agenda (1993); New Transatlantic Agenda with *EU* (1995); Gore-Chernomyrdin with *Russia* (1993); Sustainable Development Forum with *China* (1996); *Americas*: Summit of the Americas(1994); CONCAUSA (1994); U.S.-*Brazil* Common Agenda (1995); U.S.-*India* Common Agenda(1995); Gore-Mbeki Commission with *South Africa* (1994); Gore-Mubarak Commission with *Egypt* (1994).

(5) Resources:

- **Protecting the Global Environment**: Nearly $400 million has been provided over the past three years for bilateral and multilateral programs that protect the global environment and address population concerns. This included allocations for restructuring and supporting the Global Environment Facility which addresses climate change and biodiversity issues; contributions to the Montreal Protocol Fund to protect the ozone layer; and support for the UN Population Fund and the UN International Conference on Population and Development in Cairo, Egypt, in September, 1994.
- **Providing Critical Bilateral Assistance**: The U.S. has contributed nearly $2 billion from FY'94-'96 for bilateral assistance projects through USAID, designed to deal with population growth and environmental protection that directly serves American interests. U.S. assistance has helped address communism's legacy of pollution in Russia and other newly independent states, assist Haiti in restoring the natural resource base critical for its political stability, preserve forests from Congo to Mexico vital to the earth's atmosphere, and combat the spread of HIV / AIDS and other infectious diseases worldwide.

Priorities and New Initiatives
Efforts to Protect the Global Environment

Global environmental problems transcend borders to threaten the jobs and health of Americans.

- **Priorities**: In 1996, the U.S. will begin negotiations on several international agreements, whose culmination in 1997 will make it the most important year for international environment issues since the Rio Earth Summit. In the next year the U.S. will seek: agreements on post-2000 emissions cuts to mitigate climate change; a process for managing and eliminating the most dangerous chemicals; and consensus strategies for managing the world's forests.

- **New Initiatives**: *Annual Report on Global Environmental Challenges*: Starting on Earth Day in 1997, the Department will issue an annual assessment of global environmental trends, policy developments, and U.S. priorities for the coming year. *International Conference on Treaty Compliance and Enforcement.* Since 1993, the U.S. has built on an impressive set of international environmental agreements, from banning ozone-depleting chemicals to protecting endangered wildlife. We must ensure that these treaties work now and into the next century. Accordingly, the U.S. will host an international conference within two years on treaty compliance and enforcement.

Advancing U.S. Interests in Key Regions and Countries

Natural resource issues are critical to maintaining stability and advancing core U.S. interests worldwide.

- **Priorities**: **Europe** - Advancing worldwide population and environmental cooperation through the New Transatlantic Agenda with the European Union; **Latin America** - Ensuring a successful Hemispheric Sustainable Development Summit in Bolivia; **Middle East** - Advancing water resources discussions in the Middle East Peace Process; **Asia** - Launching the Sustainable Development Forum with China; **Africa** - Promoting growth and preventing conflict by preserving soil, forest, and agricultural resources.

- **New Initiative**: *Environmental Opportunity Hubs*. To intensify regional environmental efforts, the Secretary will instruct our embassies in key countries to work with NGOs and businesses to address pressing region-wide natural resource issues, especially those which might lead to conflict; advance sustainable development goals, and help U.S. businesses to sell their leading-edge environmental technology.

Resources

We will pursue aggressively the support necessary for critical activities that protect natural resources.

- **Priorities**: *Multilateral*. The Administration has requested $180 million for multilateral assistance for population and the environment, including funding for the International Organizations and Programs account and the Global Environment Facility, while more forcefully coordinating donor activities. *Bilateral partnerships*. The Administration has requested $56.25 million for the North American Development Bank, most of which is dedicated to environmental projects which will directly benefit U.S. border communities, and $725 million for USAID environment and population programs in selected countries.

- **New Initiative**: *Partnership for Environment and Foreign Policy.* In a time of diminishing financial resources for diplomacy, it is critical to help forge a new coalition between "traditional" foreign policy specialists, environmental experts, and business leaders. The Department will sponsor a series of meetings with these groups to identify specific suggestions for better integrating environmental issues into our conduct of foreign policy. The Department also will expand environmental training for our diplomatic corps.

Academic and Professional Meetings

23-24 May 1995: The George Washington University Space Policy Institute of the Elliot School of International Affairs and the Central Intelligence Agency Center for the Study of Intelligence

"Piercing the Curtain: CORONA and the Revolution in Intelligence"

This conference presented the first public opportunity for policymakers, media, scientists, historians and private sector representatives to discuss the CORONA project. The conference was prompted by the recent declassification of America's earliest satellite reconnaissance system images that will be transferred to the National Archives and made available to the public. For information, contact: John M. Logsdon, Space Policy Institute, The George Washington University, Washington, DC 20052. Tel: 202-994-7292; Fax: 202-994-1639.

6 June 1995: Women in International Security and Institute for Policy Studies

"Environment and Security: A Military Mission?"

This seminar featured a presentation by Rachel Fleishman, Special Assistant for International Activities to the Deputy Undersecretary of Defense for Environmental Security. She discussed the concept of environmental security from the perspectives of threats, capabilities and political will in local, regional and global terms. For information, contact: Carola Weil, WIIS, 4113F Van Munching Hall, University of Maryland, College Park, MD 20742. Tel: 301-405-7612.

14-18 June 1995: National University of Singapore Center for Advanced Studies and Department of Geography, and University of Durham (UK) International Boundaries Research Unit

"International Boundaries and Environmental Security: Frameworks for Regional Cooperation"

This international conference sought to raise awareness of critical transborder environmental issues in the Asia-Pacific region and to bring together representatives from NGOs, the private sector and the public sector to discuss environmental security and transboundary environmental cooperation. For information, contact: Center for Advanced Studies, Faculty of Arts and Social Studies, National University of Singapore, 10 Kent Ridge Crescent, Singapore 0511. Tel: 65-772-6284; Fax: 65-779-1428; E-mail: cassec@nus.sg.

19 June and 22 June 1995: EcoPeace and Friends of the Earth

"Working Together for Peace and the Environment in the Middle East"

"Environmental Challenges of Middle East Peace"

These sessions featured panels of senior Jordanian, Israeli, Egyptian and Palestinian diplomats to discuss issues and efforts for achieving ecologically sustainable peace. EcoPeace is a consortium of Egyptian, Israeli, Jordanian and Palestinian environmental NGOs working toward sustainable development and peace in their region.

29 June-2 July 1995: International Peace Research Institute (Oslo) and Estonian Institute of International and Social Studies

"Peace and Security in the Nordic-Baltic Region"

This Thirteenth Nordic (and First Baltic) Peace Research Conference included a panel of papers on environmental security from various Nordic perspectives, an Estonian perspective, an American perspective and an Ukranian perspective. For information, contact Dr. Dan Smith: International Peace Research Institute, Oslo (PRIO), Fuglehauggata 11, N-0260 Oslo, Norway. Tel: 47-22-55-71-50; Fax: 47-22-55-84-22; E-mail: info@prio.no.

19 September 1995: The White House

"National Security Science and Technology Strategy"

This panel discussion featuring senior administration officials accompanied the publication of National Security Science and Technology Strategy as developed by the National Science and Technology Council's Committee on National Security. The project began at the 29-30 March 1995 White House Forum on the Role of Science and Technology In Promoting National Security and Global Stability conference. The resulting document is billed as the country's first systematic strategy for harnessing science and technology to national security goals. For information, contact: The White House, Tel: 202-456-2894.

2-3 November 1995: University of Pittsburgh Center for West European Studies

"Global Security Beyond 2000: Global Population Growth, Environmental Degradation, Migration, and Transitional Organized Crime"

This conference brought academics and policymakers from the United States and Western Europe together to

present papers and discuss the policy implications of newly recognized threats to security. For information, contact: Dr. Alberta Sbragia, Center for West European Studies, University of Pittsburgh, 4E23 Forbes Quadrangle Bldg., Pittsburgh, PA 15260. Tel: 412-648-7405; Fax: 412-648-2199.

2-4 November 1995: University of Maryland Harrison Program on the Future Global Agenda and International Studies Association Foreign Policy Studies Section

"Engagement and Disengagement: New Directions in U.S. Foreign Policy"

This conference brought together academics and policymakers to discuss a broad agenda of new U.S. foreign policy challenges. In particular, Brian Atwood, the Administrator of the U.S. Agency for International Development, challenged academics in his keynote address to develop tools for policymakers to address the multiple and understudied threats to national security (See pp. 85-88). A volume of papers will be published. For information, contact: Dr. Dennis Pirages, Department of Government and Politics, Tydings Hall, University of Maryland, College Park, MD 20742. Tel: 301-405-7490; Fax: 301-314-7619.

18-19 November 1995: North/South Coalition and International Peace Research Institute, Oslo

"Causes of Conflict in the Third World"

This conference featured paper presentations and policy design workshops for the government, NGO, press and research representatives in attendance. The Oslo conference included a session entitled "The Environment and Conflict in the Third World: Examining Linkage, Context and Policy." An edited volume of papers and workshop summaries will be published. For information, contact: Ketil Volden, North/South Coalition, Fuglehauggata 11, N-0260 Oslo, Norway. Tel: 47-22-55-71-50; Fax: 47-22-55-84-22; E-mail: Ketil@prio.no.

1 February 1996: Global Green USA and International City/County Management Association

"Roundtable on the FY96 Defense Environmental Cleanup Budget"

This meeting brought together representatives of federal, state and local government, the military, congressional staff and citizen groups to focus on the Defense Environmental Restoration Account (DERA), the Base Re-Alignment and Closure Account (BRAC), the Defense-State Memorandum of Agreement (DSMOA), Technical Review Committees (TRC) and Restoration Advisory Boards (RAB). For information, contact: Polly Parks, Global Green USA, 1025 Vermont Avenue, NW, Suite 300, Washington, DC 20005. Tel: 202-879-3181; Fax: 202-879-3182.

8-13 February 1996: American Association for the Advancement of Science "Where Science Comes to Life"

"Environmental Stress and Violence in the Developing World"

"Environmental Refugees: Anticipation, Intervention, Restoration."

Held in Baltimore during their annual conference. For audio cassettes of the sessions, call 1-800-810-8273. For information, contact: Brian Smith, AAAS 1333 H Street, NW, Washington, DC 20005. Tel: 202-326-6652; Fax: 202-371-0970; E-mail: psis@aaas.org; Web site: http://www.aaas.org.

7-10 March 1996: Indiana Center on Global Change and World Peace

"Water: A Trigger for Conflict/A Reason for Peace"

This conference on the campus of the University of Indiana, Bloomington, featured panels on a wide-range of water topics. For information, contact: Dr. Jack W. Hopkins, Indiana Center on Global Change and World Peace, Indiana University, 1217 Atwater Street, Bloomington, IN 47405. Tel: 812-855-8862; Fax: 812-855-3209; E-mail: ICGCWP@Indiana.edu.

16-20 April 1996: International Studies Association

"Where to Next in International Relations"

Held in San Diego, CA, this annual conference featured panels entitled, "Environment and Security: Theory, Metaphor, and Policy" and "Environment and Conflict: Competing Perspectives." For information, contact: International Studies Association, 324 Social Sciences, University of Arizona, Tucson, AZ 85721. Tel: 520-621-7715; Fax: 520-621-5780; E-mail: isa@arizona.edu.

17 April 1996: MacArthur Foundation Program on International Peace and Security

"Resources, Environment, and Conflict in Africa"

Held in San Diego, CA, this workshop included panels on "Oil, Environmental Conflict, and National Security in Nigeria: Ramifications of the Ecology—Security Nexus for Sub-regional Peace" and "The Shrinking Vegetation: Potentials and Consequences—a Case of Nigeria's Smoldering Animal Pastures." For information, contact: Social Science Research Council, 810 Seventh Avenue, New York, NY 10019. Tel: 212-377-2700; Fax: 212-377-2727;

E-mail: lastname@ssrc.org; www:http://www.ssrc.org.

20-22 April 1996: The Heinrich Boell Foundation

"Lessons of Chernobyl Conference"

The purpose of this conference was to draw on lessons learned from the tragedy which started on April 26, 1986. Over 200 international activists and analysts presented the true extent and consequences of the accident, attempted to clarify the problematic role of nuclear power in energy policy and showed the options for a nuclear-free future. The conference was held in Kiev, Ukraine.

20 May 1996: University of Toronto Project on Environment, Population and Security; the American Association for the Advancement of Science; Woodrow Wilson International Center for Scholars Environmental Change and Security Project

"Environmental Scarcity and Violent Conflict"

This briefing featured the findings of a multi-year study led by Professor Thomas Homer-Dixon of the University of Toronto. The Project on Environment, Population and Security produced multiple publications including numerous case studies and a policy briefing book (See pages xx for complete citations). For information, contact: Brian Smith, American Association for the Advancement of Science, 1333 H Street, NW, Washington, DC 20005. Tel: 202-326-6652; Fax: 202-371-0970; E-mail: psis@aaas.org.

23 May 1996: The Pew Global Stewardship Initiative

"Environment, Population and Security: The State of the Art"

This meeting featured a broad review of the concepts and U.S. policies associated with the term environmental security. Participants heard reports from significant research projects in the field while debating directions for future academic and policy research efforts. For information, contact: Susan Sechler, Director, Pew Global Stewardship Initiative, 1333 New Hampshire Avenue, NW, Suite 1070, Washington, DC 20036. Tel: 202-736-5850; Fax: 202-775-2622.

12-16 June 1996: International Peace Research Institute (Oslo) and Russian Academy of Sciences Institute for Systems Studies

"Conflict and the Environment-An International Conference"

To be held in Zapolyarni, Russia, this invitation-only conference will feature paper presentations investigating links between the environment and conflict from a leading group of international researchers. For information, contact: Nils Petter Gleditsch, PRIO, Fuglehauggata 11, N-0260 Oslo, Norway. Tel: 47-22-55-71-50; Fax: 47-22-55-84-22; E-mail: npg@prio.no.

13-14 July 1996: University of British Columbia Institute of International Relations

"The Politics of Planetary Surveillance"

This workshop will focus on the implications for world politics and international relations of the development and spread of space-based surveillance technologies. The workshop will take a broad historical perspective, examining how these technologies may be contributing to a transformation in world political order, how they are helping to produce a shift in the relationship between human societies and the planet, how they challenge traditional theoretical assumptions about the nature or character of world politics and how they are generating novel political problems in various issue-areas. For information, contact: Dr. Ronald J. Deibert, Institute of International Relations, C456-1866 Main Mall, University of British Columbia, Vancouver, BC, Canada, V6T-1Z1. Tel: 604-822-3844; Fax: 604-822-5540; Email: deibert@unixg.ubc.ca.

8-12 July 1996: International Peace Research Association

"Meetings of the Commission on Ecological Security"

Planned for Brisbane, Australia, as part of the IPRA general meeting, the Commission on Ecological Security is sponsoring a number of panels on a broad cross section of environment and security topics. For information, contact: Katrina Rogers, Thunderbird Europe, International Business Park, 74166 Archamps, France. Tel: 33-50-31-56-50; Fax: 33-50-31-56-58; Email: Rogers@cur-archamps.fr.

10-12 October 1996: International Studies Association West Region and Environmental Studies Section

"Global Ecology, Global Economy, and Global Security: Making Linkages"

Set for Eugene Oregon at the University of Oregon, this annual conference will feature multiple paper presentations directly relevant to environmental change and security. For information, contact: Dr. Ronald Mitchell, ISA/

West Program Chair, Department of Political Science, 1284 University of Oregon, Eugene, OR 97403-1284. Tel: 541-346-4860; Email: rmitchel@oregon.uoregon.edu; Web site: http://darkwing.uoregon.edu/~rmitchel/isawest.html.

11-13 December 1996: U.S. Army War College Strategic Outreach Program and the Cantigny Center

"Global Implications of Microbial Threats"

This conference will be held in Chicago, IL. For information, contact: COL. John O'Shea, Tel: 717-245-4075; DSN 242-4075.

1995-1996: The Woodrow Wilson International Center for Scholars' Environmental Change and Security Project

"Discussion Group Meetings and Public Seminars"

In November 1994, The Wilson Center inaugurated a series of meetings of an "Environment and Security Discussion Group," consisting of experts from academia, Congress, various government institutions, the military and intelligence communities, the private sector and non-governmental organizations. Below is a list of the topics discussed and names of presenters and commentators at the meetings. (See the *Report*, Issue 1: Spring 1995, and pp. 98-120 in this issue for summaries of some of these meetings.)

6 October 1994: "Environment and Security: The Challenge of Integration," Eileen Claussen, Special Assistant to the President and NSC Senior Director for Global Environmental Affairs.

3 November 1994: "Critical Review of Various Conceptions of Environment and Security," Ken Conca, Department of Government and Politics, University of Maryland, College Park; Alton Frye, Senior Vice President, National Director and Senior Fellow, Council on Foreign Relations, Washington, DC.

29 November 1994: "Assessment of Research to Date on Links between Environmental Change and Conflict," Thomas Homer-Dixon, Department of Peace and Conflict Studies, University of Toronto; Richard Matthew, School of Foreign Service, Georgetown University.

17 January 1995: "Environment and Security from Various Agencies' Perspectives: An Information Exchange about Current and Planned Initiatives," Theodore Constantine, Defense Intelligence Agency; Wendy Grieder, Environmental Protection Agency; Joseph Romm, Department of Energy; Kenneth Thomas, Department of State; Gary Vest, Department of Defense; William Wood, Department of State.

15 February 1995: "Environment and Security: To What End?" Kenneth Thomas, Office of the Under Secretary for Global Affairs, Department of State.

21 March 1995: "Environment and Security: By What Means?" Larry K. Smith, Counselor to the Secretary of Defense and Wilson Center Fellow.

27 April 1995: "Microsecurity: Disease Organisms and Human Well-Being," Dennis Pirages, Professor of Government and Politics, University of Maryland, College Park.

18 May 1995: "Military Capabilities and Possible Future Missions Related to Environment and Security," Sherri Goodman, Deputy Under Secretary of Defense for Environmental Security; Admiral William Center, Deputy Director for International Negotiations, Joint Staff.

22 June 1995: "The Intelligence Community and the Environment: Capabilities and Possible Future Missions," Richard Smith, Deputy National Intelligence Officer for Global & Multilateral Issues, National Intelligence Council.

12 October 1995: "The United Nations and Environment/Security Issues: Capabilities and Possible Future Missions," Hilary French, Senior Researcher, Worldwatch Institute; John McGuinness, Deputy Director, Office of Economic and Social Affairs, Bureau of International Organization Affairs, Department of State.

21 November 1995: "Observations on Environment & Security and What EPA and Other Government

Agencies Can Do," William Nitze, Assistant Administrator for International Activities, Environmental Protection Agency.

28 March 1996: "Environment, Population and Migration," Norman Myers, Harvard University and Green College, Oxford University; Robert Bach, Director, Project on Migration, Environment and Security at SUNY Binghamton's Institute for Research on Multiculturalism and Labor, and Executive Associate Commissioner for Policy & Planning, Immigration & Naturalization Service.

10 April 1996: "Mock NSC Session: Newly Independent States and Central and Eastern Europe," Zbigniew Brzezinski, Counselor, Center for Strategic and International Studies; Stephen Flanagan, National Intelligence Officer for Europe, National Intelligence Council; Robert Hutchings, Director of International Studies, Environmental Protection Agency; David Sandalow, NSC Director for Global Environmental Affairs.

7 May 1996: "Environmental Warfare: Manipulating the Environment for Hostile Purposes," Arthur Westing, Consultant, Westing Associates in Environment, Security & Education.

21 May 1996: "Environmental and Demographic Factors in State Capacity and Violence: Lessons for Future Research," Daniel Esty, School of Forestry and Environmental Studies, Yale University; Jack Goldstone, Department of Sociology, University of California at Davis; Ted Robert Gurr, Department of Government and Politics, University of Maryland.

7 June 1996: "Mock NSC Briefing on Environmental-Population Issues and U.S. Security Interests in China," Ronald Montaperto, Senior Fellow, Institute of National Strategic Studies, National Defense University; Stanley Roth, Director of Research and Studies, U.S. Institute of Peace; Jack Goldstone, Department of Sociology, University of California at Davis.

For information, contact: P.J. Simmons, Environmental Change and Security Project, Woodrow Wilson International Center for Scholars, 1000 Jefferson Drive, SW, Washington, DC 20560; Tel: 202-357-2063; Fax: 202-357-4439; E-mail: csheehan@sivm.si.edu.

Official Meetings

15-19 May 1995	U.S.-Russian Ecological/Environmental Seminar (Washington, DC)
11-15 September 1995	International Maritime Organization (IMO): Marine Environmental Protection Committee (London)
11-16 September 1995	U.S. Climate Change Country Studies Program (CSP): Transition Country Vulnerability and Adaption Workshop (Prauge, Czech Republic)
12-13 September 1995	WTO Committee on Trade and Environment (Geneva)
13 September 1995	Policy Symposium on "An Economic Perspective on Climate Change Policies" (Washington, DC)
18-19 September 1995	Intergovernmental Panel on Climate Change (IPCC) Bureau: Ninth Meeting (Geneva, Switzerland)
18-22 September 1995	Basel Conference (Madrid)
20-22 September 1995	Naval War College Symposium on War and the Environment (Newport, RI)
30 October-3 Nov 1995	Framework Convention on Climate Change/Conference of the 1995 Parties: Second Meeting of the Ad Hoc Negotiating Body for the Next Steps (Geneva, Switzerland)
17-20 October 1995	Conference on Climate Dynamics and the Global Change Perspective (Cracow, Poland)
23-24 October 1995	U.S. - Russia Working Group on General Problems of Cooperation (Moscow)
24-26 October 1995	Global Environment Facility (GEF) Council: Sixth Meeting (Washington, DC)
26-27 October 1995	WTO Committee on Trade and Environment (Geneva)
31 October-3 Nov 1995	UNEP Intergovernmental Meeting on Protection of the Marine 1995 Environ ment from Land-Based Activities: High Level Segment (Washington, DC)
3 October-3 Nov 1995	Framework Convention on Climate Change: Meeting of the Berlin Mandate Working Group (Geneva)
6-17 November 1995	Second Conference of Parties for the Convention on Biological Diversity (Jakarta, Indonesia)
9 November 1995	U.S. - Russia Gore - Chernomyrdin S&T Committee (Washington, DC)
23-24 November 1995	Montreal Protocol Multilateral Fund: Eighteenth Meeting of the Executive Committee (Vienna, Austria)
4 December 1995	Montreal Protocol: Second Meeting of the Bureau; Vienna Convention: First Meeting of the Bureau and Celebration of the Tenth Anniversary (Vienna, Austria)
4-8 December 1995	Eighteenth Consultative Meeting of Contracting Parties to the London Convention 1972 (London)

26 Feb-1 March 1996	UN Commission on Sustainable Development: Sectoral Issues 1996 Intersessional Meeting (New York)
26 Feb-1 March 1996	Law of the Sea Meeting (New York)1996
18-21 March 1996	Meeting of the Signatories to the Convention on the Environmental Impact Assessment in Trans boundary Context: Fifth Meeting (Geneva)
27 March 1996	APEC Environment Senior Officials Meeting (VanCouver, Canada)
28-29 March 1996	Intergovernmental Panel on Climate Change: Tenth Meeting of the Bureau (Geneva)
28-29 March 1996	Water Beyond 2000, International Conference on the Future of Industrial Water (Amsterdam)
30-31 March 1996	NATO Science Committee (Turkey)
11-12 April 1996	Commission for Environ mental Cooperation (CEC): Meeting on Transboundary Environ mental Impact Assessment (Montreal)
16-17 April 1996	Experts on Hazardous Wastes (UNEP/MAP) (Izmir, Turkey)
18 April-3 May 1996	Fourth Session of the UN Commission on Sustain able Development (New York)
23-25 April 1996	Commission on Environ mental Cooperation Ministerial (Hamilton, Ontario)
6-7 May 1996	Binational Commission (Mexico City)
7-9 May 1996	OECD Ninth Environment Policy Committee Meeting (Paris)
8-10 May 1996	Global Environment Facility: Council Meeting (Washington, DC)
18 May-4 June 1996	Commission on Sustain able Development (New York)
28 May-2 June 1996	APEC Fisheries Working Group Meeting (Santiago, Chile)
30-31 May 1996	NATO Science Committee (Brussels)
3-14 June 1996	UN Committee on Outer Space (Vienna)
3-7 June 1996	UN "Habitat II" City Summit (Istanbul)
11-21 June 1996	World Meteorological Organization (WMO): Forty-eighth Session of the Executive Council (Geneva)
18-19 June 1996	IEA Committee on Energy Research and Technology (Paris)
25-26 June 1996	Council of Environment Ministers (EC) (Brussels)
26-29 June 1996	Hazardous Waste Congress (New Orleans)
July 1996 (TBD)	Seventh Meeting of the Gore- Chernomyrdin Commission (Moscow)
1-4 July 1996	APEC SOM & Ministerial Meeting on Sustainable Development (Manila, Philippines)
8-12 July 1996	Framework Convention on Climate Change/Confer ence of the Parties: Third Session of the Subsidiary Bodies (Geneva)
11-17 November 1996	World Food Summit: including Senior Officials Meeting, Ministerial Session and Heads of State and Government Segment (Rome, Italy)
20-22 November 1996	Global Environment Facility: Council Meeting (Washington, DC)

Internet Sites and Resources

The following is a list of Internet sites and forums to facilitate research and policy efforts. This list of sites is not comprehensive and reflects different categories of environment and security issues. The Wilson Center encourages readers to inform the Report of other relevant sites for inclusion in the next issue. E-mail us at csheehan@sivm.si.edu.

Government Institutions

United States Agency for International Development
Population and Environment E-mail Forum
POPENV-L@info.usaid.gov
The forum's primary objective is to facilitate the distribution of publications, reviews, conference announcements, and calls-for-papers that are germane to this field.

United States Bureau of the Census
http://www.census.gov/ftp/pub/ipc/www/idbacc.html
The U.S. Census Bureau (BuCen) has an International Programs Center and has done much work in the area of Population & Security, which can be accessed through its International Database (IDB).

United States Department of Defense
http://www.acq.osd.mil/ens/
The Office of the Deputy Under Secretary of Defense for Environmental Security page includes a mission statement and links to government officials, projects, and divisions within DoD (ES).

United States Department of Defense
http://www.dtic.dla.mil/defenselink/
DefenseLINK, an information service for DOD, provides links to all branches of the armed forces.

United States Department of Defense
http://www.dtic.dla.mil/envirodod/
The DOD Environmental Restoration Electronic Bulletin Board provides information for small and minority businesses interested in the DOD's environmental cleanup mission.

United States Department of Defense
http://denix.cecer.army.mil./denix/env-sec.html
The Defense Environmental Network & Information exchange provides DOD personnel and contractors working on environmental security issues with legislative updates, departmental bulletins and links to other environmental security resources. DENIX is a project of the DOD's Defense Environmental Security Corporate Information Management Program Office (DESCIM).

United States Department of Defense
http://enviro.navy.mil
This page for the Department of the Navy Environmental Program includes a search capability, specific program reviews and links to related sites.

United States Central Intelligence Agency (CIA)
http://www.odci.gov/cia
The CIA home page provides links to Agency publications, press releases, official statements, and other intelligence community Web sites.

North Atlantic Treaty Organization
http://www.nato.int/science/latframe.htm
The page for NATO's Scientific and Environmental Affairs features newsletters, press releases, meetings and calendars. In particular, this page highlights the work of the NATO Science Committee and the NATO Committee

on the Challenges of Modern Society.

United States Department of Energy
http://apollo.osti.gov/html/
This DOE page contains links to departmental programs, personnel and informational services.

California Environmental Protection Agency
http://www.calepa.cahwnet.gov/
This California EPA home page provides numerous listings of its policies, program and initiative. In particular, the page features information on decommissioning and cleaning up military bases.

United States Government Printing Office
http://www.access.gpo.gov/su_docs/
The U.S. Government Printing Office's page provides access to the *Federal Register*, the *Congressional Record* and additional government documents.

United States Information Agency
http://www.usia.gov/topics/environ/
This page includes over 30 documents about environmental issues.

White House Office of Science and Technology Policy
http://www.whitehouse.gov/White_House/EOP/OSTP/html/OSTP.html
To achieve global stability, OSTP seeks to apply the tools of science and technology to the prevention of stresses that lead to conflict, such as unchecked population growth, food scarcity, environmental degradation, natural disasters, and infectious diseases.

Institutes and Non-Governmental Organizations

Demographic, Environmental, and Security Issues Project
http://www.igc.apc.org/desip
Ron Bleier maintains a database of on-going conflicts, with special attention to environmental and population aspects of those conflicts.

Pacific Institute for Studies in Development, Environment, and Security
http://www.pacinst.org/pacinst
The Pacific Institute provides research and policy analysis in the areas of environment, sustainable development, and international security.

Sierra Club
http://www.sierraclub.org/policy/521.html
This Sierra Club page highlights its adopted policy position on Environmental Security. The policy statement begins, "Investments in environmental security should begin to replace new military expenditures...."

Royal Institute of Technology—Stockholm, Sweden
http://www.lib.kth.se/~lg/envsite.htm
This home page, Environmental Sites on the Internet, provides a large environmental subject index with links to other home pages and gopher menus.

Stockholm International Peace Research Institute
http://www.sipri.se/
SIPRI's page provides listings of staff, projects, conferences, and publications. The Institute's research commonly considers environmental factors in discussions of security and disarmament.

Center for Security Studies and Conflict Research of the Swiss Federal Institute of Technology and Swiss Peace Foundation
http://www.fsk.ethz.ch/fsk/encop/encop.html
This home page provides an overview of the Environment and Conflicts Project (ENCOP) and includes a

complete listing of the Project's papers and links to other sources on the Internet.

Center for Security Studies and Conflict Research of the Swiss Federal Institute of Technology and Swiss Peace Foundation
http://www.fsk.ethz.ch/fsk/defs_hom.html
The International Security Network page, maintained by ENCOP (see entry above),
links to numerous security related Web pages, including major institutional sources of information on environmental security and environmentally caused conflicts. It also provides keyword searches and resources organized by subject, region, institution and event.

International Institute for Sustainable Development (IISD)
http://iisd1.iisd.ca/
This Canadian institute seeks to integrate sustainable development into Canadian and international policy decision-making. Its page provides links to the Institute's many projects including the *Earth Negotiations Bulletin.* It also links to a list of selected book and article resources for environment and security at the extension **http://iisd1.iisd.ca/ic/info/ss9502.htm**.

International Security Network (ISN)
http://www.fsk.ethz.ch/isn/subjects/s_enviro.htm
The ISN maintains a page listing links to sites on the Web dealing with environmental conflicts and environmental security.

Institute for Global Communications (IGC)
http://www.econet.apc.org/econet/en.orgs.html
EcoNet, one of a number of IGC networks, serves individuals and organizations working toward peace and environmental protection. This EcoNet organizations page provides an extensive list of environmental organizations conducting work relevant to environmental change and security issues.

Asia-Pacific Regional Environmental Network (APRENET)
APRENet is an international, electronic network of people interested in Asia-Pacific environmental issues. Network participants include analysts and activists from research institutions, environment and development citizen groups, government and business. The Network links sources and users of information on environment-related issues in the Asia-Pacific region to encourage dialogue and promote regional environmental advocacy. In 1995, APRENet's efforts were directed toward stimulating debate about institutional evolution and policy alternatives on trade, environment and development issues at APEC.

APRENet distributes commissioned papers and informational documents to subscribers. The first documents available on the Network focus on: Trade and Environment; Transboundary Resources; and Regional Environmental Cooperation. Papers currently available include commissioned papers on trade and environment issues in Asia-Pacific. Other papers examine environmental cooperation in NE Asia, energy efficiency in North Korea and climate change in Asia. The Network will soon develop a weekly Regional Environmental News Report and a bibliography of Asia-Pacific environmental data resources.

Documents produced by the Network are distributed free on electronic networks. Network reports are posted on our public FTP site and access instructions will be made available on registration. A majority of these reports will also be available on IGC networks.

For information, contact: Dana Fisher, Program Coordinator, Nautilus Institute, 1831 Second Street, Berkeley CA 94710. Tel: 510-204-9296; Fax: 510-204-9298; E-mail: npr@igc.apc.org; Internet Site: http://www.nautilus.org/nautilus.

W. Alton Jones Foundation
http://www.wajones.org/wajones
This private foundation funds projects related to environment and security questions including its Sustainable World Program and Secure World Program. This page provides information on the foundation's goals, grants, and staff.

The Center for Economic Conversion (CEC)
http://www.conversion.org
The CEC page details this non-profit corporation's attempts to build a sustainable peace-oriented economy. The page includes descriptions of local, state, and national efforts.

Consortium for International Earth Science Information Network (CIESIN)
http://www.ciesin.org
CIESIN has recently announced the beta test of www.mail@ciesin.org, a service that provides an e-mail-only gateway to environmental treaty information on the World Wide Web. The service uses the Agora software developed by Arthur Secret of CERN and the W3 Consortium.

Academic Programs

University of Toronto
http://www./library.utoronto.ca/www/pcs/pcs.htm
This home page for the University of Toronto's Peace and Conflict Studies Program contains links to its Project on Environment, Population and Security; Project on Environmental Scarcities, State Capacity and Civil Violence; and Environmental Security Library & Database.

University of Toronto/American Association for the Advancement of Science
http://www.fsk.ethz.ch/isn/subjects/aaas.htm
This home page highlights the Project on Environment, Population and Security, headed by Professor Thomas Homer-Dixon. It provides instructions for joining the Project's Document Distribution System and Discussion Forum. The multi-year project seeks to provide analysts, scholars, and policymakers with policy-relevant scholarly analyses of linkages among renewable resource scarcity, population growth, migration and violent conflict.

The Project on Environment, Population, and Security/Peace and Conflict Studies/University of Toronto
General information on the Peace and Conflict Studies Program can be found at **http://utl1.library.utoronto.ca/www/pcs/pcs.htm**. The Project on Environment, Population and Security is at **http://utl1.library.utoronto.ca/www/pcs/eps.htm**. The Project on Environmental Scarcities, State Capacity, and Civil Violence is at **http://utl1.library.utoronto.ca/www/pcs/state.htm**.

University of California Institute of Global Conflict and Cooperation (IGCC)
http://www-igcc.ucsd.edu/IGCC/igccmenu.html
The IGCC page includes information on the institute, IGCC fellowships, grants and ongoing research and campus programs. The page also provides the full text of all IGCC publications.

University of Pittsburgh and the International Affairs Network
http://www.pitt.edu/~ian/resource/conflict.html
The International Affairs Network page provides annotated links to international affairs resources on the Internet as part of the WWW Virtual Library.

Cambridge University
http://www.gsp.cam.ac.uk/
The Global Security Programme page provides information on publications, staff, and activities of this academic institute. Programme research attempts to bring together traditional environment, development and international relations studies to better understand the post-Cold War period.

Cornell Program on Environmental Management
http://www.cfe.cornell.edu/CPECM/cpecmhome.html
This Cornell University page provides an overview of its program designed to foster cooperation among private and public institutions as a means to resolve environmental conflicts. The page includes announcements of future conferences.

Laval University/Internet Forum on Food Security
http://fao50.fsaa.ulaval.ca/
This Forum has been set up to discuss poverty, demography, health and nutrition, food availability, food habits, education, international trade and geopolitics, macroeconomic policies, the management of natural resources and the environment, and the management of markets. The site is available in English, French, and Spanish.

Search Engines
The following are "search engines" that will facilitate finding additional information and sites by providing a number of directories and keyword search options: **Lycos** at **http://www.lycos.com/**; **Alta Vista** at **http://www.altavista.digital.com**; **Excist NetSearch** at **http://www.excite.com/**; **Open Text** at **Index http://www.opentext.com:8080/.**

Bibliographic Guide to the Literature

The Environmental Change and Security Project compiled the following list, updating the bibliographic entries from Issue I, Spring 1995. It includes a wide range of publications, organized by theme, which relate to the various known conceptions about environment and security. The Project will continue to publish additions to this bibliography; we welcome suggestions regarding the organization and content of the bibliography. Entries are formatted according to Kate L. Turabian's Manual for Writers of Term Papers, Theses and Dissertations.

A. Environment and Security: General Debate and Definitions

af Ornäs, A., and C. Krokfors. *Environment and International Security*. Nytt fran nordiska afrikainstitutet, 28 (1991).

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Buzan, Barry. "Environment As a Security Issue," In *Geopolitical Perspectives on Environmental Security*, ed. Paul Painchaud. Québec, Université Laval: Cahier du GERPE, No. 92-05, 1992.
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Christensen, Svend Aage. "Security Issues and Social Development," In *Welfare, Development and Security: Three Danish Essays*, 59-83. Copenhagen: Danish Ministry of Foreign Affairs, 1995.

Conca, Ken, Michael Alberty, and Geoffrey D. Dabelko. "From Ecological Conflict to Environmental Security?" In *Green Planet Blues: Environmental Politics from Stockholm to Rio*, eds. Conca, Alberty and Dabelko, 239-244. Boulder, CO: Westview Press, 1995.

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