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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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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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

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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

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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.

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

B ACK 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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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 sand-blasting 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.

<div align="center">ENDNOTES</div>

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 Program Working 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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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 repro-
duction; 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 fam-
ily planning; reductions in infant and child health;
reductions in maternal mortality (deaths related to
childbearing); increases in life expectancy; and univer-
sal access to education (ibid.).

In addressing population, development and
environmental links explicitly, the program of action
calls upon governments to integrate demographic vari-
ables into sustainable development policies, plans and
programs, environment impact assessments and sus-
tainable resource management efforts. It calls for
changes in unsustainable consumption and produc-
tion patterns through legislative, economic and ad-
ministrative 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 pro-
gram of action; a little more than a year after the
conference, this is proving to be a formidable chal-
lenge. 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. En-
vironmental issues face similar challenges. Both are
hard to appreciate unless individuals and communi-
ties 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 par-
ticipated, 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 defini-
tion of "reproductive health"
services: prenatal and postnatal care, medical atten-
tion 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 plan-
ning." However, many who oppose abortion were not
in agreement with this language (the Vatican and some
countries expressed formal reservations over this lan-
guage while agreeing to the overall program of action).
Antiabortion groups in the United States have been
active politically since the Conference to restrict alloca-
tion of U.S. funds for international population pro-
grams that they charge will support abortion interna-
tionally.

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 com-
mitments by governments and the international donor
community. In addition, the range of actions to ad-
dress 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 ac-
tion are expected to come from developing countries.
The remainder is to be provided by donor countries
and international donor organizations. Neither devel-
oping countries nor donors will easily find the re-
sources to meet the resource needs.

In the United States, the international popula-
tion 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 pro-
grams 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 popula-
tion 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

I N 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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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),

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.

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-

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

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 basis 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.

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

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

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.

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

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.

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

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13. *Secrecy and Government Bulletin* 53 (October 1995).
14. *Secrecy and Government Bulletin* 39 (August-September 1994).
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Saving the Environment (and Political Stability too): Institutional Responses for Developing Nations

by Jack A. Goldstone

F OREIGN 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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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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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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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

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 environmen-

tal 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 super-power 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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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 Degradation, 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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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."

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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.

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.

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."

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

M ARC 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.

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[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 toto*, 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

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

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.

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.

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POPULATION, ENVIRONMENT, AND POLITICAL CONFLICT—ADVANCING THE ARGUMENT

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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): 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, "World Population 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. 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 conserva-tion 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. ❑

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

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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 environ-

mental 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. ❑