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FEATURES

Human Population and Environmental Stresses in the Twenty-first Century

by Richard E. Benedick

Abstract: Human populations have put pressure on their natural surroundings throughout history. Yet the world is now facing truly global environmental challenges and rapid population growth in the final half of the twentieth century is a critical component to understanding these phenomena. In his article, Ambassador Richard Benedick examines a host of population dynamics and their complex interlinkages with three representative environmental issue areas: forests, freshwater resources, and climate change. These connections raise the importance of meeting the commitments made at the 1994 Cairo International Conference on Population and Development. Benedick maintains that investments in measures to slow the rate of population growth-and thereby to reach a stable population earlier, and at lower levels, than under current trends-would significantly reinforce efforts to address the environmental challenges of the century ahead, and considerably lower the cost of such efforts.

Introduction: People and Their Environment

When historians in the far distant future look back upon the tumultuous twentieth century, they will likely judge the most outstanding feature to be the extraordinary increase in human numbers that has occurred during this relatively short time period. It took the entire history of humanity—tens of thousands of years—for the world's population to reach one billion, which is now estimated to have occurred around 1804. It was more than a century later that the second billion was reached. But, it took only twelve years—from 1987 to 1999—for the most recent billion, the sixth, to be added. The world has never seen anything like the steep population growth of the twentieth century, with most of it concentrated during the last fifty years.

That human populations can exert strains upon their natural surrounding is nothing new. However, from the dawn of history until about thirty years ago, the impacts of human activities were primarily localized. Early regional civilizations—Mesopotamia in the Near East, Mohenjo Daro in Southwest Asia, the Mayans of Central America, and possibly the Anasazi in the southwest of what is now the United States—collapsed due to a likely combination

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Ambassador Benedick, formerly Deputy Assistant Secretary of State, was responsible for population and environmental policies. He was chief U.S. negotiator for the historic 1987 Montreal Protocol on Substances That Deplete the Ozone Layer, and author of Ozone Diplomacy: New Directions in Safeguarding the Planet *(Harvard University Press, revised edition 1998). Currently, he is Deputy Director at Battelle Washington Operations, Visiting Fellow at Wissenschaftszentrum Berlin, and President of the National Council for Science and the Environment.* *This article reprinted with permission from Rolf Kreibich and Udo E. Simonis, eds.* Globaler Wandel-Global Change: Ursachenkomplexe und Lösungsansätze. *[Global Transformation-Global Change: Causal Structures, Indicative Solutions] Berlin: Verlag, 2000.*

of overpopulation and scarcity or depletion of arable land and water supply. In some places, archaeologists have found evidence of adverse environmental effects caused by deforestation and by gradual salinization of irrigated land. The final blow may have been a regional climate change: a succession of unusual dry years, probably ascribed by local spiritual leaders to angry or capricious gods. Many centuries before the Aswan High Dam, Herodotus wrote of salinization in the Nile Delta. Much later, rapid industrialization in Europe and North America was accompanied by severe local pollution of air and water.

Environmental stress has thus been a continuing factor throughout human history. It is fair to say, however, that at the close of the twentieth century, the six billion inhabitants of planet Earth find themselves threatened by environmental dangers that would have been unimaginable to our 1.65 billion forefathers at the beginning of the century. The industrial, agricultural, and energy policies that produced enormous improvements in standards of living during the last half-century are now beginning to have profound environmental impacts that can adversely affect the interactive natural planetary cycles upon which all life depends. For the first time, we confront a new generation of environmental problems that are global in nature such as:

- *Changing climate* that could bring both drought and flooding, altered rainfall patterns and loss of agricultural land, sea-level rise, severe storms, and the spread of disease;
- *Depletion of the stratospheric ozone layer* that protects humans, plants, and animals from potentially fatal ultraviolet radiation;
- *Loss of biological diversity* due to mass extinctions of animal and plant species that represent an irreplaceable genetic library;
- *Spread of arid lands, desertification, and soil erosion* on a global scale, affecting the livelihood of hundreds of millions of already poor people;
- *Pollution of marine and freshwaters* that combine with overfishing to imperil a vital food source;
- *Destruction of forests* at a rate never experienced in the history of the planet; and,
- *Worldwide diffusion of hazardous substances*, including the persistent organic pollutants that may, even in minute quantities and over long time periods, adversely affect the metabolism of humans and animals.

These new environmental issues are not the premonitions of modern Cassandras. They are to a significant extent already upon us, measured and tracked by scientists. And, these environmental issues come in an era when human numbers are moving rapidly upward into uncharted territory.

All of these global environmental trends are, in some ways, touched by demographic dynamics: population size, population growth rates, population densities, and migration of peoples. Some environmental problems are influenced more directly by population, some less—even acknowledging that there are such mediating factors as income levels, consumption patterns, technological structure, and economic and political institutions. Because of these intervening parameters, it is often difficult to establish with scientific precision clear correlations between population pressures and environmental degradation. Nevertheless, it is hard to disagree with the conclusion of a recent study that "the *least* likely theory is that there are no relationships at all."[1]

Many scientists are beginning to express concern about the extent of the planet's capacity, as reflected in the functioning of its natural cycles and ecosystems, to support the unprecedented numbers of people and their growing demands.[2] Can enough food and energy be provided—not to mention jobs, education, health care, and waste disposal—to accommodate these billions without causing some irreversible ecological collapse that could imperil the whole human experiment?

As one example, the fragile layer of ozone molecules scattered throughout the stratosphere is vital to the survival of life on Earth. The example of Antarctica offers us a sobering lesson: the sudden and totally unexpected depletion of the stratospheric ozone layer over the southern continent (the so-called "ozone hole") demonstrates that when the atmosphere is perturbed, nature may not provide convenient early warning signals to moderate our activities in time. About twenty-five years ago, the cumulating effects of man-made chlorofluorocarbons (CFCs)—an "ideal" chemical whose usefulness in thousands of products and processes made it almost synonymous with modern standards of living—began slowly to lift the quantity of chlorine in the atmosphere from its natural level of 0.6 parts per billion (ppb). Concentrations increased gradually, to 0.9, 1.4, then 1.9 ppb—yet the ozone layer remained unaffected. Only when chlorine concentrations passed the minute but unforeseen threshold of two parts per billion did the ozone layer over Antarctica suddenly collapse, to the surprise and alarm of the scientific community. Notwithstanding the successful global controls imposed by the 1987 Montreal Protocol and its subsequent revisions, the long atmospheric lifetime of CFCs means that it will take about seventy years for the ozone layer world-

wide to recover to natural levels.[3]

By their very nature, the risks of other environmental thresholds are not quantifiable. But they are not zero.

In this article, I would like to explore population-environment interlinkages in three representative areas: forests, freshwater, and climate change. Following this, I will examine the most recent comprehensive effort by the international community to address population issues, as manifested in the twenty-year Cairo Programme of Action negotiated at the 1994 International Conference on Population and Development (ICPD). But before this, I will look more closely in the following section at some dimensions of the population nexus.

> "In 1950, there were fewer than half as many Africans as Europeans; now, despite the AIDS epidemic, there are nearly three times as many.

The Population Century

Some time during October 1999, the world's population passed six billion souls. Since the middle of the century, when there had been 2.5 billion people, the number of human beings on planet Earth had grown by an additional 3.5 billion. Within the previous two decades alone, the increase was equivalent to the entire population of the world at the beginning of the twentieth century. Never in human history have populations grown so rapidly and in such dimensions.[4] To be sure, the annual growth rate peaked at two percent in 1965-70, and the annual increments reached a height of nearly ninety million in 1985-90. Global population growth is currently estimated at 1.3 percent, representing an annual addition of just under eighty million.

Using sophisticated demographic tools and assumptions about the continuing rate of fertility decline, the United Nations currently estimates that in fifty more years, by 2050, the world's population will probably lie within a range of 7.3 billion (low variant) to 10.7 billion (high variant), with the 8.9 billion medium variant considered as "most likely." The difference between the low and high variants depends largely on the degree to which families in developing countries freely decide to reduce their number of pregnancies.

Looking only thirty years into the future, the ranges are closer, and the estimates more accurate, because tomorrow's parents have already been born. The low variant is 7.4 billion, the high variant 8.8 billion. (Note that under the low variant assumptions, population is peaking and will begin a slow decline to eventual stabilization around seven billion.) The most likely global population in 2030 is 8.1 billion—over two billion more people than at present.

There are three aspects of these demographic developments that I would like to highlight because of their relevance to the environment. First, population growth has been, and will continue to be, strongly skewed. Over ninety percent of the population increase during the last half-century occurred in the poorer regions of the world. The pace accelerated to ninety-seven percent in the 1990s, and for the coming fifty years, it will be virtually 100 percent. Just the *additions* to India's population in the last five years—eighty million people—was equivalent to the total population of Germany.

This phenomenon has brought about a significant redistribution of the Earth's population. Between 1950 and 2000, the populations in developing regions grew by well over three billion (which was equivalent to *total* world population in 1960). Whereas in 1950, the industrialized countries accounted for about one-third of the total, their proportion dropped below twenty percent by century's end. According to the most likely U.N. estimate, by 2050 the developing nations will comprise eighty percent of the global population. Most of these countries already face problems of health and deteriorating environments, with large numbers living in ecologically fragile areas (e.g., drylands, hillsides, savannas, low-lying deltas), and now confronting combined environmental impacts brought about by both poverty and by the early stages of industrialization.

Within the developing world itself there are also significant differences in growth patterns. While Asia's growth rates are slowing, it was and will remain the largest region in total numbers, with about sixty percent of the global population. The fastest growing—and poorest—region is Africa, with its proportion projected to grow from less than nine percent in 1950 to nearly 20 percent of the much larger world total in 2050. In 1950, there were fewer than half as many Africans as Europeans; now, despite the AIDS epidemic, there are nearly three times as many. Most industrialized countries currently have stable, or even declining populations, the main exceptions being the United States and Canada

due to immigration and higher growth rates.

A surprising note on aging: while there has been much written about the increase in numbers of older people in the industrialized world, looking ahead, the prospect is quite different. Currently, the over-sixty population in the South amounts to about 170 million, or only forty-three percent of this age category worldwide. However, during the next fifty years, the number is projected to surge more than nine-fold, to 1.6 billion, which will then comprise eighty percent of the world's total elderly population. For industrialized countries, the expected growth is from 226 million in 2000 to 376 million in 2050.

A second outstanding demographic development of our era is the accelerated concentration of populations in urban areas. In 1950, just over one third of the world's population were city dwellers, a total of 860 million. By the close of the century, this number had grown to just under three billion, forty-eight percent of total population. But in just the coming *fifteen* years, it is expected that four billion people will live in cities, or fifty-five percent of the global population.

Again, most of this growth in urbanization will occur in the South, with masses fleeing rural poverty brought about by scarcity of arable land and water, growing land degradation, and aridity. By 2015, nearly three billion city dwellers in the poorer countries will constitute three-fourths of the world's urban population. Perhaps the most striking aspect of the urbanization trend is the rise of "megacities," agglomerations of over ten million people—a phenomenon new to the planet. In 1950, there was only one megacity, New York City. By 2015, it is anticipated that there will be twenty-six, of which twenty-two will be in the South. It is difficult to conceive of Lagos holding nearly twenty-five million inhabitants, or Dhaka with over nineteen million.

Such urban concentrations have significant environmental implications. In many cases, cities will encroach on farmland or ecologically sensitive wetlands or watersheds. Increased overcrowding will bring greater health problems and higher vulnerability to epidemics and natural disasters such as earthquakes, volcanic eruptions, storms, and flooding. Issues of waste disposal—air and water pollution and solid wastes—will assume gigantic proportions. It is also worth mentioning that city dwellers consume more energy and natural resources per capita than their country cousins.

The third and final dimension of the population picture is the phenomenon of *demographic momentum*. In developing nations, an unusually large proportion of the population is under fifteen years of age—in dozens of countries they exceed forty percent of the total. This means that even if future families have fewer children, there is a continuing growth factor because the number of people that are entering into their reproductive years (new parents) is greater than the number that are leaving those years. Thus, populations continue to grow significantly for many decades even after fertility rates begin to decline. Hence, there is a built-in growth momentum.

> "The industrial, agricultural, and energy policies that produced enormous improvements in standards of living during the last half-century are now beginning to have profound environmental impacts that can adversely affect the interactive natural planetary cycles upon which all life depends."

The current total fertility rate (TFR, or average number of children per female) in most of Africa and the Middle East is well over five, which, combined with high proportions of young people, explains the continuing rapid population growth projected for these areas. In contrast, some developing countries with slow growth now have reached TFRs of under three (e.g., Mexico, Brazil, and Indonesia), or even less than two (e.g., China, Thailand). However, as long as TFR exceeds 2.1 (representing one female child per woman, with allowance for some deaths before the female children themselves, reach reproductive age), a nation's population will continue to grow.[5]

Because of the factor of demographic momentum, *for most developing countries, the greatest increase in numbers actually lies ahead, not in the past.* The following figures are based on the current U.N. medium variant ("most likely") estimates published in 1999. Only if the fertility decline is steeper than is considered most prob-

able based on recent experience, or if mortality rates and/or emigration are higher than expected, will the numbers for 2050 turn out to be below the current medium variant estimate.

With the exceptions of China, India, and Indonesia (which are shown here because of their size), in all of these countries and in many more, the greatest growth in numbers will probably occur in the coming fifty years. This is so, despite the fact that they have all witnessed a doubling, tripling, or even quadrupling of their numbers within the previous fifty years. By 2050, the number of Afghans (and Sudanese, and Yemenis) will each exceed the number of Frenchmen; there will be more Tanzanians than Germans.

In other words, the largest increases are still to come. Most of these countries are already in political and/or ecologically precarious situations. Yet political leaders, North and South, do not act as if they are aware of what lies ahead demographically. Against this background, I will now examine three specific environmental issues in terms of their relationship to population dynamics.

Dwindling Forests in the Developing World

The forests of our planet have been basic to the development of human civilization. They are a resource that is unique in its combination of multifaceted utility and easy renewability, through planting. Wood products are a major element in the global economy, fundamental for human settlements in housing, furnishings, fuel, paper and packaging, and for such non-wood products as berries, nuts, and medicinal herbs. For example, nine of the ten most-prescribed pharmaceuticals in the United States derive from forest plants and animals. Although wood has been replaced for many traditional uses by coal, oil, steel, and plastics, wood and wood products still rank third in value among the world's commodities, trailing only behind oil and natural gas.[6]

Complementing their direct economic benefits are the irreplaceable ecological functions of the world's forests. Forests are essential for biological diversity. Tropical forests alone shelter at least half of the world's known

Chart 1. Population Growth: Past, Present, and Projected Future

(population in millions)

	1950	2000	2050 (est.)
Trouble Spots			
Afghanistan	9	23	61
Angola	4	13	37
Dem. Rep. Congo	12	52	160
Iraq	5	20	55
Water scarce			
Ethiopia	18	63	169
Saudi Arabia	3	22	54
Sudan	9	29	59
Yemen	4	18	59
Tropical			
Colombia	13	42	72
Guatemala	3	11	27
Philippines	21	76	131
Tanzania	8	34	81
Giants			
China	555	1278	1478
India	368	1014	1529
Indonesia	80	212	312
Nigeria	31	112	244
Pakistan	40	156	345

Source: U.N. Population Division, 1999.

species.[7] Through the evapotranspiration cycle between soil, trees, and atmosphere, forests are a major determinant of local climate and their diminution could bring on drought. An estimated seventy-five to ninety-five percent of rainfall in the Congo River basin is recycled through forests.[8] Forests protect and enrich soils and watersheds, providing erosion control against landslides and flooding, enhancing water quality, and regulating the quantity of water. As a major sink for carbon dioxide, the world's forests help to offset anthropogenic emissions from burning fossil fuel, and thereby mitigate potential climate change. Not to be ignored are the recreational, esthetic, and spiritual aspects of forests.

More forests have been cleared since 1850 than in all of previous history, and the rates of destruction have been highest in recent decades. Although forest cover in the industrialized world is now expanding, this has been more than offset by destruction of forests in the developing nations. Asia and Africa, regions with the greatest population growth, have lost an estimated sixty-five to seventy percent of their original forest cover.[9]

Global wood consumption has tripled during the twentieth century—roughly paralleling growth in human numbers. But interestingly, forest loss is not a problem caused by profligate consumers in the North. Industrialized countries, largely with managed forests and reforestation programs, produce seventy-five percent of the total industrial hardwood, while tropical forests account for only fifteen percent. Thus, the North produces eighty percent of the world's wood used for paper and pulp. In contrast, developing countries produce ninety percent of wood used for household consumption as fuel and charcoal. In the ten developing nations that lost the most forest in the period 1990-1995, all but two consumed over ninety percent of their output domestically, including Brazil, Congo, Indonesia, Mexico, Sudan, and Thailand. Rising demand for wood, especially for fuel, in Bangladesh, China, India, Nepal, Pakistan, Sri Lanka, Thailand, and Vietnam, poses increasing dangers to the viability of their forests.[10]

Because of the complexities involved in human use of forests, it has been difficult to provide definitive proof of the link between population growth and forest destruction. Nevertheless, a recent study of 111 countries by an international research consortium concluded that approximately half of the deforestation over the course of human history could be explained by changes in population. The World Bank has noted that Central Africa, during the 1980s, experienced the world's second highest rate of deforestation while having the lowest per capita income and the highest population growth rate. Haiti, the most severely deforested nation in Central America, is also the poorest and most densely populated. In South Asia, the U.N. Food and Agriculture Organization warned that conservation efforts "will be nullified and in places reversed, unless...accompanied by a reduction in the rate of growth of population."[11]

Many analysts are convinced that the greatest future threat to forests stems from the imperative to provide food for the immense numbers of people on the horizon. Judging from the recent half-century, there will be pressures to clear more forests to provide land for crops and/or livestock. When dams are constructed to furnish needed water for irrigation, forests are often flooded and farmers are displaced to highlands, where the destruction cycle continues in order to make room for agricultural land. Forests have also fallen victim to government resettlement programs in response to local population pressures (e.g., in Indonesia, Brazil, and the Philippines). Poverty and inequitable land tenure force landless workers to seek a livelihood by clearing forest lands.

It has been estimated that by 1995, 1.7 billion people in forty countries already were, because of inadequate forest cover, vulnerable to shortages of fuel wood and to growing impacts of flooding and erosion. In just thirty years, by 2025, this number is projected to rise to 4.6 billion people in fifty-three countries. In many areas, including Egypt, Kenya, and Pakistan, it is anticipated that severe forest loss will combine with increased water scarcity over this period to compound the threats to the well-being of hundreds of millions of people.[12]

Growing Water Scarcity

Water gives an illusion of abundance since it covers about two thirds of our planet's surface. The reality, however, is that only 2.5 percent consists of the freshwater needed by human beings. Of this fraction, sixty-nine percent is locked into permanent snow cover or glaciers. A further thirty percent consists of fresh groundwater, much of which is inaccessible, unusable, or only obtained at great expense of energy. Only three-tenths of one percent of total freshwater can truly be considered as renewable: the water from rainfall, seeping into the soils to nourish plant and tree growth and replenish underground aquifers, collecting in rivers and lakes, flowing into the oceans, and evaporating into the atmosphere in a natural hydrological cycle that will produce more rain.[13]

Humanity uses freshwater for drinking and hygiene, for carrying away wastes (e.g., from urban areas), for industrial purposes, but most of all—more than two-

thirds—for irrigating land to satisfy the world's growing demand for food. In the past half-century, there has been a virtual explosion of large-scale irrigation projects, mostly concentrated in the developing world. The number of large dams (defined as over fifteen meters in height) grew from 5,000 in 1950 to approximately 40,000 today.[14] Most of the expansion in irrigation has been concentrated in Asia. China, India, Indonesia, and Pakistan, for example, depend on irrigated land for more than half of their domestic food harvest.[15]

Current trends in water usage are disturbing. Growth in irrigated land in recent decades has not kept pace with population growth. The watersheds of some of the largest Asian rivers—the Indus, Ganges, Yangtze, and Yellow rivers—have been damaged by deforestation.[16] Many of the world's major rivers—including, in addition to the above-mentioned, the Nile, Colorado, Chao Phraya (Thailand), and Amu Darya (Central Asia), are overused to such a degree that little or none of their flow ever reaches the sea. Indeed the Yellow River has run dry in every year throughout the 1990s.[17]

Worldwide, cropland is being lost to cities, industry, erosion, flooding, and to salinization—the slowly cumulating curse that accompanies big irrigation schemes, described as "one of the gravest threats to irrigated agriculture and food security."[18] Increasing reliance on nonrenewable groundwater is resulting in falling water tables being recorded on every continent, including in the United States. It is estimated that India's water withdrawals are already twice the rate of natural groundwater recharging—and a half-billion more Indians are on the way.[19]

Poor quality drinking water affects the health of hundreds of millions of people in the developing world and is a major factor in infant and child mortality. The number of people without access to safe drinking water has risen by the end of the twentieth century to over 1.2 billion, roughly one person in four in the poorer countries.[20] The growth in the developing world of large cities with over one million inhabitants—from thirty-four in 1950 to an estimated 400 by 2015—imposes added strains on water supplies and leads to rainwater being flushed away rather than recharging underground aquifers by natural seepage through the soil.

"Poor quality drinking water affects the health of hundreds of millions of people in the developing world and is a major factor in infant and child mortality.

Beyond the strictly utilitarian demands on freshwater, scientists and environmentalists make a strong case for a holistic concept of freshwater as part of a network of interconnected ecological systems. Although economists cannot assign a market price, freshwater ecosystems perform numerous vital functions: carrying nutrients into the sea that sustain marine life; providing habitats and spawning grounds for a diversity of animal and plant species; replenishing soil fertility; and diluting wastes. And, as with forests, the waters possess aesthetic and inspirational qualities that have enriched the human experience.

A symbol of the conflict between preserving an ecosystem and conventional economic development is the Okavango Delta in Botswana, the largest in the world. The Okavango nourishes Africa's biggest oasis, a watering ground for millions of animals fleeing the Kalahari Valley during the dry season. About 100,000 local fishers and herders also derive their livelihood from the Okavango. Development planners, advising neighboring Namibia, proposed a system of dams and dredging to divert the river for multiple purposes, including irrigation, a rapidly growing metropolis, and diamond mine operations. A consortium of conservationists and local villagers was able to block the project and ecotourism has been promoted as an alternative revenue source. But the demands, here and elsewhere, will inevitably grow.[21]

Looking into the coming century, it should be possible to meet the growing water needs for personal use, for municipalities, and for industries, assuming there is more intensive conservation measures, more realistic water pricing, and some luck with technological innovation. However, there will be growing competition with the needs of agriculture, which could lead to loss of food production.

The population-food-land equation is compounded by humans seeking ever greater supplies of water—under the U.N.'s most likely variant, two billion additional people in the next thirty years. Because of the sheer volume of water required for irrigation, population growth is the critical factor, translated into demand for food, which in turn implies more irrigated land. It is clear that the risks are growing that more people will face the prospect of water scarcity and, therefore, food scarcity. As a leading water resource scholar recently observed:

"Water scarcity is now the single biggest threat to food production."[22]

The poor are particularly vulnerable. Researchers have noted that approximately 470 million people in the developing world were affected by water stress or scarcity in 1995. They estimate that this number could rise more than six-fold in only thirty years, to over three billion by 2025—nearly forty percent of the world's population.[23] People in affected countries would be subject to chronic shortages as not enough water would be available to satisfy all the needs of cities, industries, and irrigated agriculture.

With water scarcity affecting harvests, poor countries will need to import increased quantities of grain. Egypt, for example, which used to be self-sufficient, now depends on imports for forty percent of its grain consumption. If the situation worsens, economic development will be set back and serious environmental degradation may occur. The combination of hunger, rising prices for imported grain, and large urban populations has the potential to destabilize societies in many parts of the world.

As recently as twenty to thirty years ago, shortages of water were only occasional, scattered occurrences. Now, the problem is becoming pervasive. Water scarcity on such a large scale, affecting hundreds of millions of people, is a uniquely modern phenomenon. Security concerns mount as nations compete for increasingly scarce water to meet the needs of their people. Many of the great river systems provide water to countries with rapidly rising populations, and in most cases the greatest numbers are, as we have seen above (*see Chart 1*), still to come, such as with the Tigris-Euphrates River (Turkey, Syria, and Iraq); the Ganges River (India and Bangladesh); and the Nile River (Sudan, Ethiopia, and Egypt). In 1985, Boutros Boutros-Ghali, at that time, Foreign Minister of Egypt, warned that "the next war in our region will be over the waters of the Nile, not politics."[24]

Many agricultural specialists believe that the future of the Green Revolution will depend on irrigation, since only an assured water supply will justify farmers' large investments in seeds, fertilizers, pesticides, and technologies to increase land productivity. But, how will this happen? Most potential major dam sites have already been exploited, at great social and economic cost. In any event, the long-term viability of such massive projects is questionable. Rising costs (including compensation for displaced persons), greater awareness of ecological consequences, siltation, and waterlogging and salinity are diminishing the returns from mammoth irrigation schemes.[25]

The future will need to see different and more efficient management of the planet's scarce freshwater resources, combined with greater sensitivity to the interconnected ecological systems—water, land, and forests—that provide the context for our civilization and well-being. The productivity of irrigation water could be enhanced by greater conservation and by various technical improvements. Measures could include drip irrigation and high efficiency sprinklers; rational pricing and water allocation planning; crop selectivity and better cultivation practices; more accurate weather forecasting linked to water distribution; and recycling of urban water for irrigation use. If not discouraged by political or emotional considerations, further advances in biogenetics could create food crop varieties that are resistant to drought, salts, and pests. Desalinization of seawater might provide unlimited supplies if problems of cost, energy, and transport can be solved.

If population growth could be slowed to the low variant path of the UN estimates, with only one billion additional people, the task of marshalling water resources to meet rising demands while preserving the planet's associated ecosystems would be considerably more manageable. But clouding the future of water supply is the wild card of climate change, which itself will be influenced by population. Potential climate change can greatly complicate issues of planning, timing, and location of long-term investments in water management.

Global Climate Change

Sophisticated models based on paleological evidence, and on theories of physical, chemical, and biological interactions, predict that continued unchecked emissions of greenhouse gases from anthropogenic sources (chiefly carbon dioxide from fossil fuel combustion and destruction of forests, but also methane and other gases) could precipitate a global change in the climate that has accompanied the history of human habitation. In actuality, concentrations of carbon dioxide in the atmosphere have increased by about a third since the start of the Industrial Revolution, and (like population numbers) they are moving up into uncharted territory. There is scientific consensus that this growth cannot continue indefinitely without throwing the Earth's climate out of the equilibrium that has prevailed for millennia – notably, since the dawn of agriculture.[26]

Great uncertainties, however, surround the issue of climate change. Since there is no prior experience with this phenomenon, the prospective consequences are largely conjectural. There is no indication as to what

level of concentration of greenhouse gases in the atmosphere could prove dangerous, nor how severe or differentiated the possible impacts might be in different regions of the planet. For example, intensified hurricanes and storms are expected, and rainfall and monsoon patterns would almost surely shift. In some regions there could be more rainfall, in others less. Presently unproductive areas (e.g., Siberia) might become more suitable for agriculture. Elsewhere, there could be flooding, erosion, drought, and the spread of arid lands. Rivers might change their courses. More carbon dioxide could prove conducive to higher crop yields and the expansion of agriculture. On the other hand, there might be an increase in weeds, disease, and pests. Higher sea levels and resultant salinization of coastal farmlands and ecosystems are among the most probable consequences. For all of these possible impacts, however, the extent and timing are unclear.

> "Central Africa, during the 1980s, experienced the world's second highest rate of deforestation while having the lowest per capita income and the highest population growth rate.

The continuing growth in anthropogenic greenhouse gas emissions might be mitigated to some degree, although not indefinitely, by offsetting natural forces such as greater carbon absorption in the oceans or increasing cloud cover. But because the gases have such long atmospheric lifetimes, any major change in the great planetary forces that determine long-term climate—stratospheric windstreams, ocean currents, polar ice cover, or the hydrological cycle—could have portentous and potentially irreversible results. Crossing an invisible and unpredictable threshold would be dangerous.

The links between population and climate change are subtle. Historically, most carbon dioxide emissions stem from the great economic expansion of the industrialized nations of the North, fueled largely by energy from coal and oil during the last century. These nations have relatively small populations and, at present, virtually no population growth. But, they also have very high per capita emissions. However, climate change is decidedly not—as an Indian diplomat once remarked to me in the context of the ozone negotiations— "rich man's problem: rich man's solution."

Demographic trends in the developing world can affect greenhouse gas emissions in several ways. More energy will be consumed by large and growing populations to enhance their standard of living. Even now, two billion people in the South are yet to be supplied with electricity, quite apart from the greater numbers that lie ahead. Unprecedented urbanization, combined with an aging population (more households) will further contribute to higher per capita energy consumption. Intensive industrialization in the currently less developed nations will also add to total energy demand. Carbon dioxide emissions will rise as additional land is cleared for agriculture and fuelwood, and more methane will be released from rice paddies and other forms of agricultural production, as well as from expanding livestock herds.

It is true that per capita emissions of carbon dioxide from fossil fuel combustion in the currently less developed nations average only about one-fifth that of the North. However, emissions of total greenhouse gases from the South are augmented by the massive clearing of forests and savannas to acquire ever more firewood and land for crops and settlements, a factor as yet difficult to measure but nevertheless significant. Some estimates place them at about one-fourth of all anthropogenic emissions.[27] Moreover, developing countries' understandable priority for economic growth, means that their future per capita emissions will increase *even as their population growth begins to taper off.*[28]

In fact, developing nations' emissions are already rapidly overtaking those of the North. Even considering only carbon dioxide emissions from fossil fuel combustion (and ignoring those from deforestation and biomass burning), the South's portion of the global total has jumped in only twelve years from twenty-nine percent in 1985 to forty-two percent in 1997. China's emissions are already second only to the United States, and the ground under 1.3 billion Chinese contains one third of the world's known coal reserves. India's emissions have surged nearly fifty percent since 1990 and are now higher than Germany's. South Korea has surpassed Italy, and Mexico's emissions are almost as large as those of France.[29] Propelled by rapid population growth and expanding industrialization, the South's emissions will probably exceed those of the North in two to three decades.

Unfortunately, efforts under the United Nations to curb rising worldwide emissions of greenhouse gases have met with little success to date. Beginning at Chantilly,

Virginia, in early 1991, 180 nations have been negotiating in vain to establish a realistic approach to the problem of climate change. The U.N. Framework Convention on Climate Change was signed in June 1992 at the U.N. Conference on Environment and Development in Rio de Janeiro and entered into force two-and-a-half years later. This was followed by the Kyoto Protocol, agreed upon in Japan in December 1997. The protocol, however, has thus far, only been ratified by nineteen small developing countries and none of the major emitting countries. Its prospects for entering into force are questionable given continuing deep differences among the negotiating parties on the modalities for achieving emissions reductions.[30]

During the negotiations for both of these treaties, population was an unwelcome guest. There was no overt discussion of the linkages. Because of the inability of industrialized countries to undertake effective steps to cut emissions, key developing nations have refused to even consider commitments to rein in their own rapidly rising emissions. Unfortunately, the populations of the South, most already living in ecologically fragile areas, are also the most vulnerable to possible impacts of climate change, especially altered monsoon patterns, flooding, drought, aridity, sea-level rise, and severe storms.

Climate change and population growth share the characteristic of being long-term in their effects. Halting population growth will not by itself prevent climate change. Especially in the near term, a slower rise in population will barely affect total emissions, which will be largely influenced by the nature of industrialization, energy use, and consumption patterns in the South. Still less, will it affect the level of atmospheric carbon dioxide concentrations during the coming century, as it is mainly a product of previous emissions of the long-lived gases?

However, in the longer term, the effects of slowing population growth—and of an earlier stabilization of global population—would cumulate and significantly improve the chances of mitigating climate change. The further into the future one looks, the greater the difference between smaller (low variant) and larger (high variant) population sizes could make in the ability of growing economies to achieve the substantial future cutbacks in carbon dioxide emissions that are necessary in order to avoid dangerous levels of atmospheric concentrations. Slower population growth would also relieve pressures on fragile ecosystems—freshwater, forests, highlands, watersheds, and arid regions—and thus, improve the chances for adaptation to long-term climate changes.[31]

Containing Population Growth: The Cairo Solution

H.L. Mencken, the satirical American social commentator of the 1930s, has been quoted as stating that for every difficult problem, there is a simple solution—and it is usually wrong. The phenomenon of population growth, as we have witnessed it in the twentieth century, is surely one of the most difficult and complex of problems.

Birth rates in most countries of the South have begun to decline during the past decade. But, in the face of the United Nations' medium variant projection for 2050, the "most likely" outcome, are they declining rapidly enough? Is nearly nine billion people in the next fifty years—and still rising, possibly to eleven or twelve billion desirable? Is it inevitable?

Can we lower birth rates sufficiently to achieve the 7.3 billion low variant—which, incidentally, would imply a future stabilization of global population at somewhat below this level, just a billion or so more than at present? Is "development the best contraceptive," as propagandists for the South trumpeted for many years as an argument for more, and ever more, foreign aid? Will the free market and less government interference provide the solution? Is "democratization" the key? Is it simply a matter of inundating the South with condoms and contraceptive pills? As the experience of population programs over the last thirty years has demonstrated, there are no simple answers. We will have to do many things simultaneously.

At Rio de Janeiro in 1992, the U.N. Conference on Environment and Development, the largest world summit in history, culminated over two years of negotiations on an agenda for the future. Among the many important documents, resolutions, declarations, and aspirations at this monumental conference, one historic feature stands out. The leaders of nearly all the world's nations established for the first time the political legitimacy of the concept, *sustainable development*: to conserve and manage the planet's resources in a manner that can improve the conditions of today's populations without foreclosing options for the well-being of the generations still to come.

A logical follow-up to the rather profound and many-faceted implications of the Rio conference was the convening in Cairo, two years later, of the 1994 International Conference on Population and Development (ICPD). Again, following two years of preparatory negotiations, the world's governments at Cairo affirmed that early stabilization of the Earth's human population would be crucial for attaining sustainable development.

In particular, they agreed on a "Cairo Programme of Action."[32]

This carefully negotiated document, a twenty-year program to the year 2015, was both more specific and more practical than the voluminous 800-page "Agenda 21" that was adopted at Rio to encourage long-term actions to promote sustainable development. Under the Cairo Programme, governments accepted specific quantitative and qualitative twenty-year targets which, if achieved, might enable the world to achieve population stabilization at just over seven billion, rather than facing in mid-century a still-growing population of nine billion or even eleven billion.

> "[T]he populations of the South, most already living in ecologically fragile areas, are also the most vulnerable to possible impacts of climate change, especially altered monsoon patterns, flooding, drought, aridity, sea-level rise, and severe storms.

The ICPD deliberations were influenced by three decades of international experience that clearly demonstrated that family planning programs could succeed in countries widely differing in their cultures, political and economic systems, and levels of development—from Cuba to Tunisia, from Iran to Vietnam, and from Sri Lanka to Brazil. The key to significant lowering of birth rates was the presence of certain enabling conditions: when girls and women enjoyed decent health care and access to family planning methods and advice; when most girls received at least a primary education; when women had better economic opportunities and social status; when infant mortality was low; when adolescent child-bearing declined; when marriage was delayed to a later age; and, when births were spaced more widely. Each of these factors reinforces the others, in a cumulative effect. Perhaps most important, experience worldwide showed that most women, if given the choice and the means, would have fewer children than their mothers did.

For over twenty years, since the first world conference on population in 1974 in Bucharest, governments had largely paid lip service (and then only after strenuous negotiations) to the concept that all couples and individuals have a basic right to decide freely and responsibly the number, spacing, and timing of their children—and to have the information, education, and means to do so. But, despite two decades of noble rhetoric, the realities were different as the century drew to a close. About one third of women of reproductive age in developing nations—approximately 350 million—have no access to family planning information and services. Existing health programs were strained to meet the needs of the increasing numbers of women entering their reproductive years. There are approximately one billion adolescents—more than ever before in history—who, largely because of religious and cultural mores, are hypocritically kept uneducated about these subjects, even though most are sexually active. Thus, they are particularly susceptible to sexually transmitted diseases and unwanted early pregnancies, which are inimical to the health of both the young mothers and their infants. And, finally, in most countries social equity for women remains a cruel fiction, and they are still denied equal access to education, health care, and job opportunities.

Against this background, high-level representatives of 179 governments at Cairo, under the sensitive leadership of the conference secretary general Dr. Nafis Sadik, Executive Director of the United Nations Population Fund, agreed on several quantitative targets to be achieved in the ensuing two decades.[33] These targets included:

- universal access by 2015 to the full range of "reproductive health" services, covering family planning, maternal health, and prevention and treatment of sexually transmitted diseases, including HIV/AIDS;
- universal primary education by 2015 for all girls and boys;
- specified, significant reductions by 2015 in mortality rates for infants, children, and mothers; and,
- financial targets.

In addition, the Cairo Programme of Action iterated qualitative goals, or aspirations, which were just as carefully negotiated as the quantitative targets. These included: increased access by young women to higher education (beyond primary school); greater attention to adolescents' reproductive health needs; the elimination

of violence against women; broad-based measures to ensure gender equity and equality; and the empowerment of women in the job market and in the development process.

The ICPD did not adopt or recommend demographic targets, such as specific reductions in birth rates or family size, since experience in some countries, notably India and China, had shown that such targets could lead to human rights abuses by overzealous administrators. Instead, a consistent theme throughout the Cairo Programme of Action was the emphasis on personal choice and on the quality of reproductive health and family planning services.

Underlying the ICPD approach is the assumption that creating suitable conditions will lead women—and their menfolk—to make the "right" choices in terms of birth spacing and family size. As discussed above, experience has showed that birth rates can indeed decline under certain circumstances. What remains an open question after Cairo, however, is whether they can fall fast enough and far enough to make a difference, or whether the total fertility rate might stall at three or even 2.5 children per woman. Were this to occur at anything above a TFR of 2.1 (the "replacement level of fertility"), population numbers would continue to climb to new heights, albeit more slowly.

Unfortunately, follow-up negotiations during 1999, to evaluate progress under the program, revealed backsliding by some governments and sadly familiar controversies over issues of cultural and religious sensitivity, ranging from acknowledgment of adolescent sexuality and ensuring safe abortion (where legal) to the status and rights of women in general. Five years after Cairo, the trends were not encouraging: continued discrimination and violence against girls and women; hundreds of millions of couples still lacking access to family planning services; HIV/AIDS spreading more rapidly than anticipated; tens of thousands of women still dying due to unsafe abortions; and, only limited progress in reducing infant, child, and maternal mortality.[34]

Equally discouraging was the failure of governments to come up with the financial resources that had been estimated at Cairo as essential to implement the program. The ICPD, after hard negotiation, had calculated that a total of $17.5 billion would be required by the year 2000, and $21.7 billion by 2015, to achieve the quantitative targets enumerated above. It was agreed that two-thirds of these amounts would be raised by the developing countries themselves, while the donor community would furnish the remaining one-third.

The latest available data, however, revealed that the foreign donors, in particular, were far behind the needed pace. In 1997, only $1.7 billion had been raised, making it highly unlikely that the donors would reach their $5.7 billion target for 2000.[35] With the exception of a handful of nations (Denmark, Finland, Netherlands, Norway, and Sweden), aid-malaise appears to have taken its toll on the health, education, and women's programs recommended by the ICPD. To place the sums in perspective, the $17.5 billion global target for 2000 amounts to less than one week of the world's expenditures on armaments.[36]

Conclusion: Uncertainties Ahead

It is clear that in the course of the new century, the human population will move into a zone—eight to twelve billion—which many analysts predict could exceed the Earth's supportive capacity.[37] The difference between the 7.3 billion United Nations low variant and the 10.7 billion high variant for 2050 is equivalent to the *total* population of the world as recently as 1966. That is quite a difference.

There is no question that improving standards of living for the current poor of the world, plus providing for the billions still to come, will increase global demand for food, water, energy, wood, housing, sanitation, and disposal of wastes. Even if the interrelationships between population and the ecological support systems of the planet are not yet established with statistical certainty, it behooves us to act with prudence: to err on the side of caution in both our population and our environmental policies.

Investments in measures to slow the rate of population growth—and thereby to reach a stable population earlier, and at lower levels, than under current trends—would significantly reinforce efforts to address the environmental challenges of the century ahead, and considerably lower the cost of such efforts. We need to proceed on several fronts simultaneously, including:

- achieving the health, education, and gender equity goals of the ICPD Programme of Action;
- reducing wasteful life-styles and consumption;
- investing in technology to facilitate new energy forms and less resource-intensive industrial and agricultural production; and,
- adapting our political and economic institutions to the future, making them more responsive, more humane, and more focused on the long-term perspective rather than on tomorrow's stock market results or next year's elections.

Seven years ago, the officers of fifty-eight national academies of science met at a worldwide "Science Summit" in New Delhi. They issued a warning that is relevant to our current concerns. The scientific leaders

> "... expressed a sense of urgent concern about the expansion of the world's population and concluded that if current predictions of population growth prove accurate and patterns of human activity on the planet remain unchanged, science and technology may not be able to prevent irreversible degradation of the natural environment and continued poverty for much of the world. ...
>
> The academies believe that ultimate success in dealing with global social, economic, and environmental problems cannot be achieved without a stable world population. The goal should be to reach zero population growth within the lifetime of our children."[38]

The stable population goal of the national academies is equivalent to the U.N. low variant estimate for 2050, which is also the objective of the ICPD's Cairo Programme of Action. We are, clearly, not on that path. The interactions between human activities and the Earth's natural systems in the century ahead will determine the future of our species. It is not merely a technical problem of feeding the teeming billions. We must define our vision of the future: an Earth of humans and wheat (or edible seaweed) without the wilderness, without the great animals? Decisions made now will be critical. The central issue is the quality of life: how men and women of the future will be able to live, their options and their trade-offs. Will it be a life of dignity, security, and beauty?

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NOTES

[1] O'Neill *et.al.*, 1998, emphasis added.
[2] Cohen 1995, Watson, *et.al.* 1998.
[3] Benedick 1998.
[4] Demographic data throughout this article come from: United Nations Population Division 1999 and, for urban data, *ibid.*, 1998.
[5] United Nations 1999:70-72.
[6] Gardner-Outlaw and Engelman 1999:18-19.
[7] Ibid, 22.
[8] Ibid, 19.
[9] Ibid, 25-27.
[10] Ibid, 9,34-37.
[11] Ibid, 32-33,56.
[12] Ibid, 9,49-51.
[13] Shiklomanov 1993.
[14] Postel 1999:81.
[15] Ibid, 41.
[16] Gardner-Outlaw and Engelman 1999:21.
[17] Postel 1999:65-73.
[18] Ibid, 109.
[19] Ibid,73-80; United Nations 1999:28.
[20] Watson, *et.al.* 1998.
[21] Gardner-Outlaw and Engelman 1997; Postel 1997.
[22] Postel 1999:6.
[23] Ibid,128-132; Gardner-Outlaw and Engelman 1997.
[24] Gleick 1994.
[25] Postel 1999:60-64.
[26] Benedick 1997; 2000.
[27] Gardner-Outlaw and Engelman 1999:23.
[28] Meyerson 1998.
[29] CDIAC 1999.
[30] Benedick 2000.
[31] Meyerson 1998; Bongaarts *et.al.* 1997; O'Neill *et.al.* 1998.
[32] Ashford 1995; UNFPA 1999.
[33] UNFPA 1999.
[34] Ibid.
[35] Ibid.
[36] UNFPA 1997.
[37] Cohen 1995.
[38] National Academy of Sciences 1993.

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Oiling the Friction: Environmental Conflict Management in the Niger Delta, Nigeria

by Okechukwu Ibeanu

Abstract: The Niger Delta, a sensitive ecosystem rich in biodiversity, has witnessed considerable violence as a result of the tense relationship among oil companies, the Nigerian state, and oil-bearing communities. Environmental damage from the extraction and movement of fossil fuels is a central point of dispute among the parties while the precise extent of ecological damage remains unknown. Drawing on numerous interviews while living and working in the Niger Delta, Dr. Okechukwu Ibeanu analyzes the management of conflicts surrounding petroleum production in the region, including the role of state violence and contradictory perceptions of security held by Delta communities and the oil companies and their partners in the Nigerian federal government.

Introduction

"OIL, BLOOD, AND FIRE." This was how an elderly resident of the Ogoni town of Bori described the Niger Delta to me in 1995. It was at the height of the violent conflicts between Shell (Shell Petroleum Development Company, an affiliate of the Royal Dutch/Shell Group), backed by Nigeria's military rulers at the time, and the Ogoni, an ethnic minority in the oil-rich Niger Delta. The violence culminated in the execution of nine Ogoni rights activists by the military dictatorship of General Sani Abacha after a mock trial. Paradoxically, the violent suppression of the Ogoni, which the military had hoped would cow the restive region and keep the oil wells flowing, unleashed a rash of further conflicts involving the state, oil companies, and ethnic communities across the Niger Delta. Consequently, between 1996 and 1998, when the dictator Abacha died, crude oil production, the mainstay of the Nigerian economy, was paralyzed. Angry youths seized oil wells, terminals, and flow stations belonging to companies like Shell, Chevron, and Mobil, and took numerous hostages for ransom. Assailed by their angry hosts, *petrobusiness*[1] began to withdraw from the Delta. Alarmed by the prospects of empty coffers to fund its unbridled corruption, the dictatorship responded by unleashing even more violence on the local communities. The result was LESS OIL, MORE BLOOD, AND MORE FIRE.

The violence of the last ten years in the Niger Delta has brought relations among oil companies, the Nigerian state, and oil-bearing communities full-circle. For four decades, ecological devastation on the one hand, and neglect arising from crude oil production, on the other hand, have left much of the Niger Delta desolate, uninhabitable, and poor. The shady *modus operandi* of oil companies and the incompetence and corruption of state officials, ensured that neither took responsibility for the enormous environmental and social damages caused by crude oil production. Frustrated, the people of the Niger Delta took up arms against *petrobusiness* and its political allies. The failure of a violent final solution to the community resistance, a tactic favored by successive military dictatorships, inevitably led to calls for a reassessment of the petroleum industry in Nigeria, and particularly the need for a new conflict management regime in Nigeria's oil belt. Presently, these calls are even more pronounced since the inauguration of an elected government in May 1999 appears not to have assuaged the people's needs of the Niger Delta. As late as November 1999, there were very violent clashes between youths and security forces in the communities of Choba in Rivers State and Odi in Bayelsa State. In the case of the Odi, the new civilian administration surprisingly called in the army, which sacked the entire community, killed over 100 inhabitants, and destroyed property running

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into billions of Nigerian Naira (100 Naira = US$1).

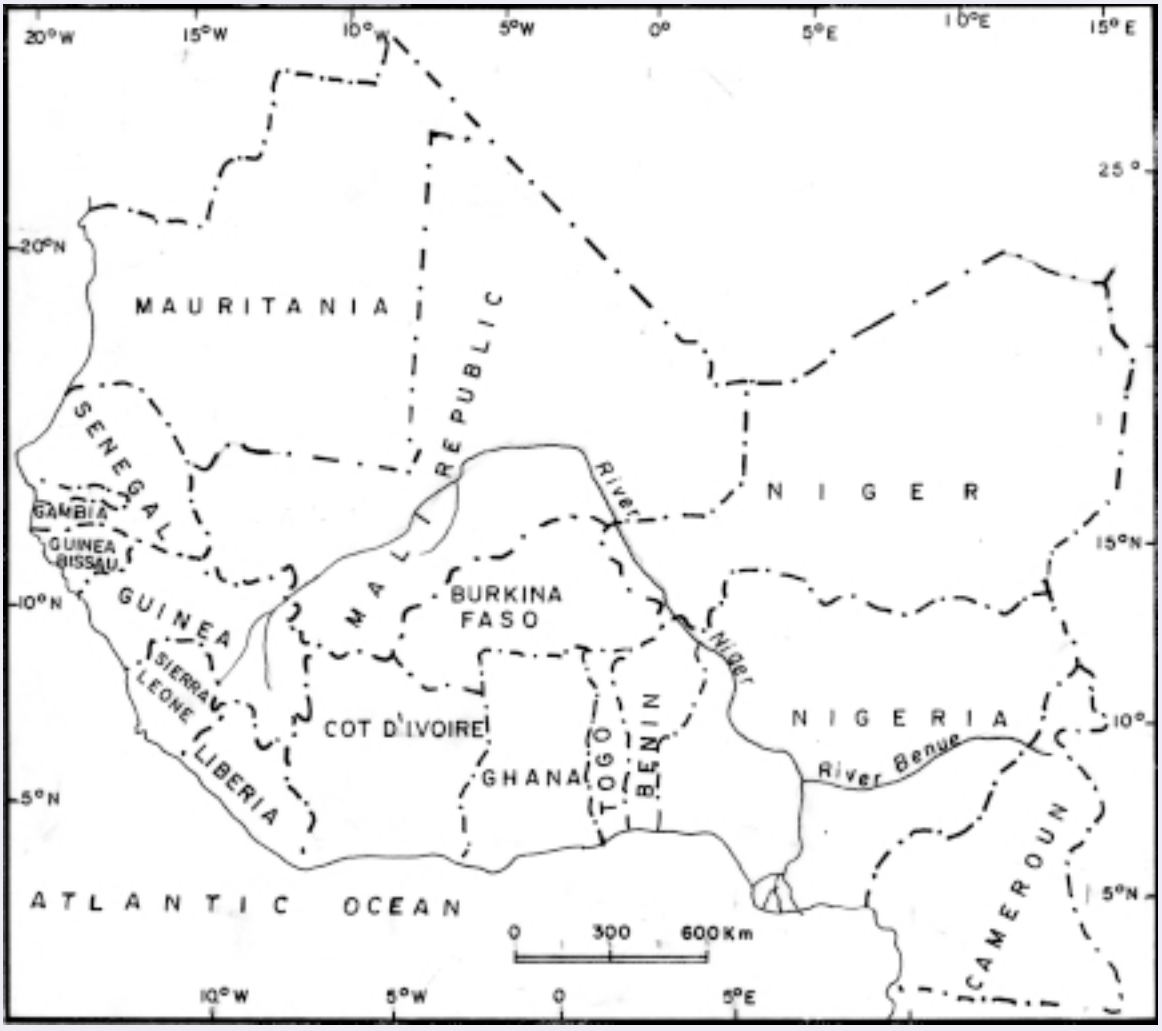
This article analyzes the management of conflicts surrounding petroleum production in the Niger Delta. It sets out the dynamic of environmental conflict in the region and explores how two different political regimes, one authoritarian and the other democratic, have approached conflict management in the area.

The Niger Delta Environment

The Niger Delta is said to be the world's largest wetland. This 36,000 square kilometers (14,000 square miles) of marshland, creeks, tributaries, and lagoons drain the Niger River into the Atlantic at the Bight of Biafra. A third of this area, about 12,000 square kilometers, is fragile mangrove forest, probably the largest mangrove forest in the world. The biodiversity of the Niger Delta is very high. The area contains diverse plant and animal species, including many exotic and unique flowers and birds. Implied in this ecology is that the Niger Delta is an easily disequilibrated environment. There is also a serious scarcity of arable land and freshwater. Additionally, transportation through this ecosystem, which is usually via rivers and creeks that snake through dense, mosquito-infested swamps, is very difficult. There is a high incidence of malaria and other water borne diseases in the area. Indeed, early European visitors to the area described it as the "white man's graveyard" because of the high mortality rate they experienced. In short, the Niger Delta is a very sensitive ecosystem.

Not anymore, however. The white man's graveyard has become the white man's gold mine with the discovery of black gold. The introduction of petroleum exploration and drilling in this very fragile environment, however, has had a devastating effect on the environ-

Figure 1. Map of West Africa

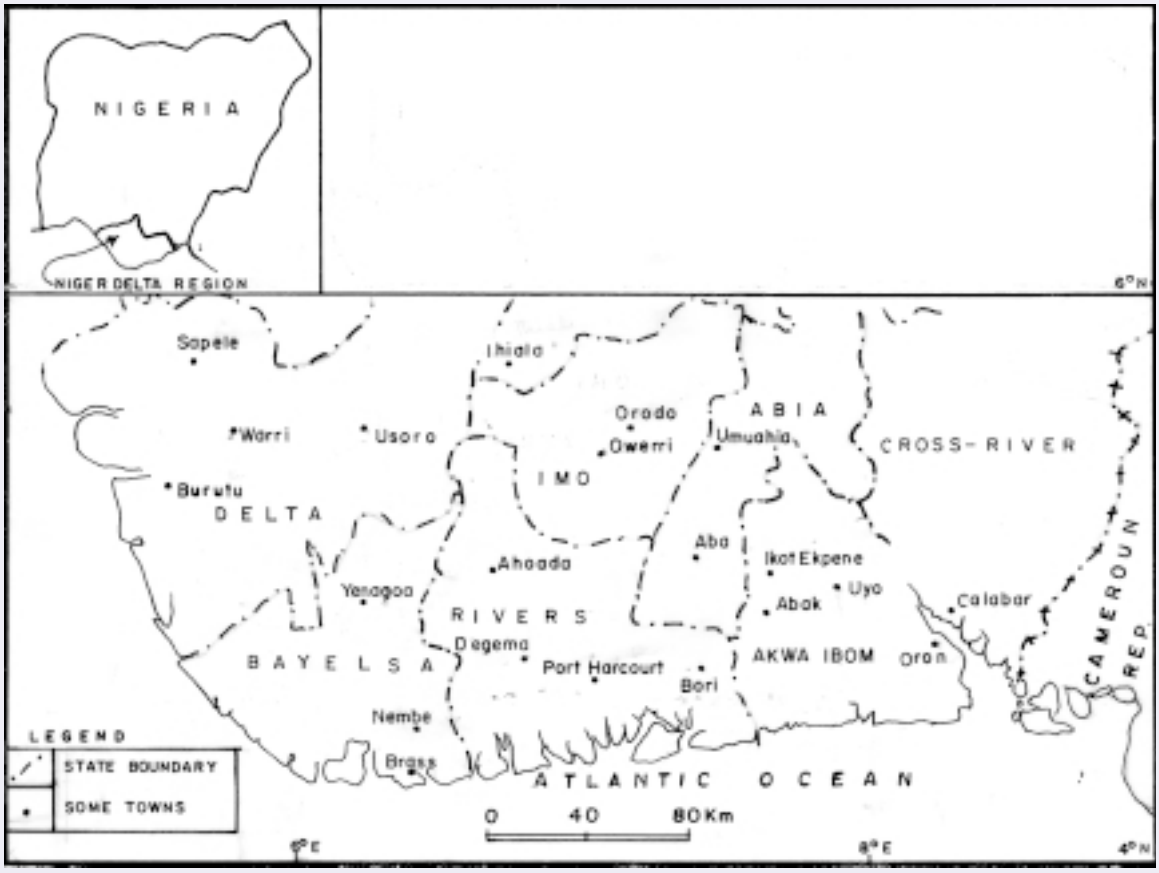


ment. In the fifty years of crude oil production, the graveyard is itself close to dying, while *petrobusiness* and corrupt state officials continue to profit enormously.

Petroleum exploration in Nigeria dates back to the first few years of this century. Organized marketing and distribution started around 1907 by a German Company, Nigerian Bitumen Corporation. In 1956, the Anglo-Dutch group Shell D'Archy discovered oil in commercial quantities at Oloibiri, a town in the Niger Delta. By February 1958, Nigeria became an oil exporter with a production level of 6,000 barrels per day. Other multinational oil companies like Mobil, Elf Aquitane, Chevron, and Agip have since joined Shell. Nigeria is the fifth largest producer of crude oil in the Organization of Petroleum Exporting Countries (OPEC). At peak production in the 1970s, Nigeria's export was two million barrels of crude oil per day. Presently, exports stand at about one million barrels daily, mostly to the United States. Nigeria's oil, the so-called *Bonny Light*, is said to be environmentally friendly because of its low sulfur content.

Today, crude oil is produced in nine states in Nigeria, namely, Rivers, Bayelsa, Delta, Edo, Imo, Abia, Akwa-Ibom, Cross-River, and Ondo. Although it contributes only thirteen percent of Nigeria's gross domestic product, petroleum provides over eighty percent of government revenues annually. This makes oil production very central to the survival of state officials as most public works contracts and the continued functioning of government agencies depend on it. By law, the Nigerian state owns all mineral deposits in Nigeria, including crude oil. The central government controls revenues from crude oil and sets up a formula for distributing them to the other tiers of government. Shell remains the largest producer in Nigeria, controlling about fifty percent of total production. In 1995, the company reported that in all, it had ninety-four oil fields scattered across an area of 31,000 square kilometers in the Niger Delta, from which nearly one million barrels of oil were produced daily.[2] Inevitably, this position has brought Shell very close to the ruling governments in Nigeria. In fact, for many communities in the Niger Delta, there is little difference between the oil companies, especially Shell, and the Nigerian state. This assumption is not entirely

Figure 2. Map of Niger Delta Region, Nigeria



without justification. For instance, on countless occasions, oil companies have called out directly the police, the army, and the navy to quell disturbances on their installations, without applying to the government for help.

Apart from crude oil production, there are many other upstream and downstream activities of the petroleum industry in Nigeria including refineries, oil services, liquefied petroleum gas, and liquefied natural gas production and marketing. Export of liquefied natural gas began in late 1999 following the completion of the multi-billion dollar liquefied natural gas project in Bonny, said to be the largest in the developing world. Nigeria is said to have natural gas reserves of 100 trillion standard cubic feet (about 2.8317 trillion standard cubic meters) in the region.

Prior to the Bonny project, the practice of oil companies was to flare the gas. Enormous amounts of natural gas were flared annually, usually in the vicinity of human dwellings. In 1982, Shell, Gulf, Mobil, Agip, Texaco, Pan Ocean, Ashland, Phillips, Tenneco, and Elf flared over thirteen billion cubic meters of gas in 145 communities in Nigeria (Table 1). Shell, the worst culprit, flared nearly seven billion cubic meters of gas in that year alone. In one case, in the town of Sapele, Shell burnt over 944 million cubic meters of gas. In 1991, Nigeria exceeded the world average for natural gas flaring by seventy-two percent. In that year, while the world average for gas flared as a percentage of total production was four percent, Nigeria flared seventy-six percent of that total production (Table 2). Apart from the huge quantities of greenhouse gases that gas-flaring pumps

Table 1. Gas flaring in Nigeria by company, 1982-83

	1982		
Company	**Gas Produced (billion m^3)**	**Gas Flared (billion m^3)**	**Percent Flared**
Shell	7,367,789,877	6,932,385,329	94.09
Gulf	2,120,140,478	2,096,585,478	98.88
Mobil	983,743,700	673,759,700	68.49
Agip	2,699,179,721	2,382,145,001	88.25
Texaco	375,931,000	368,279,000	97.96
Pan Ocean	85,815,232	79,787,789	92.98
Ashland	224,416,103	223,232,456	99.47
Phillips	28,885,150	28,434,153	98.44
Tenneco	26,263,565	26,175,613	99.66
Elf	559,405,267	550,999,332	98.50
Total	14,471,570,093	13,361,783,851	92.33
	1983		
Company	**Gas Produced (billion m^3)**	**Gas Flared (billion m^3)**	**Percent Flared**
Shell	8,148,964,094	5,413,250,218	66.43
Gulf	1,824,902,000	180,0971,000	98.69
Mobil	1,272,157,000	900,286,000	70.77
Agip	2,192,274,700	2,102,150,861	95.89
Texaco	436,157,000	430,988,000	98.81
Pan Ocean	128,410,203	122,307,350	95.25
Ashland	435,503,850	430,560,153	98.86
Phillips	26,217,125	25,779,720	98.33
Tenneco	3,1145,189	31,145,189	100.00
Elf	696,543,040	690,734,090	99.16
Total	15,192,274,201	10,618,229,855	69.89

Source: Nigerian National Petroleum Corporation, *Annual Reports*.

into the atmosphere, constant flares affect both wildlife and human beings negatively. At temperatures of up to 1,400°C, the "sauna bath" effects that gas flares produce make living in many communities nearly impossible.

The Niger Delta environment is being destroyed in many ways. High-pressure pipelines criss-cross villages carrying crude oil, premium motor spirits, diesel, and gas. Spills and leaks from these pipelines and other installations destroy wildlife, farmlands, forests, aquifers, and human lives. Within the last year, separate fires in the Jesse and Ngwa areas in the states of Delta and Abia respectively, claimed hundreds of lives. Often, oil companies and the government claim that spillage is the result of sabotage by local communities for purposes of illegally obtaining petroleum products and monetary compensation. Note that Nigerian laws forbid the payment of compensation in spills involving sabotage. However, many of the pipelines and valves in question are very old and therefore prone to failure.

Additionally, the discharge of refinery effluents into freshwater sources and farmland devastates the environment and threatens human lives. Such effluents contain excessive amounts of very toxic materials like mercury and chromium. For instance, fish store mercury in their brains for a long time, which can then easily pass into the human food chain with adverse affects on human populations. Recent studies of some communities in the Niger Delta by the environmental group Environmental Rights Action (ERA) showed that most of the underground aquifers are heavily contaminated with a cocktail of dangerous metals and chemicals.

Table 2. Natural Gas Flared as Percentage of Gross Production (1991)

Country	Percent of Gas Flared
U.S.A	0.6
Holland	0.0
Britain	4.3
Ex-USSR	1.5
Mexico	5.0
OPEC COUNTRIES	
Nigeria	76.0
Libya	21.0
Saudi Arabia	20.0
Iran	19.0
Algeria	4.0
OPEC TOTAL	**18.0**
WORLD TOTAL	**4.0**

Source: Friends of the Earth, Nigeria, 2000.

Finally, badly constructed canals and causeways built to facilitate activities of oil companies have devastated the hydrology of the region, causing flooding in some areas and water deficiency in others. Large forests have atrophied as a result. Most of these artificial canals also let saline waters of the Atlantic into freshwater sources thereby increasing the scarcity of drinking water and killing many species of plants, animals, and fish. In some cases, the entire vegetation is precipitously altered as freshwater is destroyed by oil company canals and causeways. For instance, water hyacinths[3] have become very common in many areas where they were previously unknown. Although oil companies and successive governments in Nigeria would want to paint a contrary picture, the devastation that petroleum production has inflicted on the environment is a central factor in understanding the conflict dynamic in the Niger Delta.

Understanding the Conflict Dynamic in the Niger Delta

The Niger Delta contains most of Nigeria's hydrocarbon deposits. By implication, the Delta holds the bulk of the economic resources that sustains the public treasury in Nigeria. Yet, years of neglect and ecological devastation have left much of the Niger Delta despoiled and impoverished. This contradiction of riches is a constant refrain in most conflicts in the Delta.

A myriad of specific factors is often adduced for the protracted conflict in the Niger Delta. Among them are neglect by government and oil companies, unemployment, military rule, the minority question, and a badly structured Nigerian federalism, especially as it concerns finances. While these factors singly or jointly bear on the conflict dynamic in the region, what has been lacking is their integration into an explanatory system to enable us to make sense of empirical data and support effective policy intervention. Thus, it is not often clear if all the factors are causal or only mediatory. If they are all causal factors, are they principal, secondary, or tertiary? It is also not clear if the factors are trigger, pivotal, mobilizing, or aggravating.[4]

Perhaps, the most commonly cited reason for conflict in the Niger Delta is the dissatisfaction of oil-bearing communities with monetary compensation paid by oil companies and government for exploitation rights and ecological damage. The oil-bearing communities are then portrayed as greedy and unpatriotic. This explanation is popular in government and *petrobusiness* circles.[5] Surely, this explanation is simplistic and reductionist for

it explains everything in terms of money. Without doubt, compensation is important in understanding what is happening in Nigeria's oil belt, but it conceals more than it reveals. For instance, it disguises the fact that in some cases it is the type of compensation that is contested, and in others it is the procedure for arriving at the compensation that is at issue. Still in other cases, what creates discord is the skewed distribution of compensation. Most importantly, in many cases of conflict, monetary compensation is not the issue at all. Local people are simply asking to have their farmlands back in order to repossess control of their lives and environment. Moreover, the monetary explanation is unacceptable for it simply blames the victims: it is the villagers' excessive monetary demands that generate crisis.

> "Local communal or traditional conflict management structures must be built into processes of conflict resolution."

A Contradiction of Securities

Contrary to conventional wisdom and prevalent explanations of the conflict in the Niger Delta, disagreements with state officials and *petrobusiness* over monetary compensation do not necessarily propel local communities into a conflict trajectory. Rather, conflicts arise out of a *contradiction of securities*, which the Nigerian state because of its character is unable to manage and reconcile. This contradiction of securities hinges on the opposition between perceptions and conditions of security advanced by local communities and those advanced by state officials and *petrobusiness*. Put simply, security for local communities means recognition that mindless exploitation of crude oil and the resultant ecological damage threaten resource flows and livelihoods. For state officials and *petrobusiness*, security consists of an unencumbered production of crude oil at competitive (read cheap) costs.

Conceptually, security has two related meanings.[6] First, it has a strictly political meaning that refers to the capacity of a ruling group to protect its interests/values (internally and externally located), relative to external threats to these interests/values posed by other ruling groups. It is also the capacity of a ruling group to maintain order internally with minimal use of violence, given challenges posed by other groups, the difference between weak and strong states. Externally, ruling groups of weak states show a relatively low capacity to protect their interests. And internally, force/violence characterizes the state's transactions with society. Although the use of violence and the emasculation of civil society make such states appear strong internally, it is only an illusion because they are in fact weak states.[7]

Second, security has to do with relations of the labor process. In this sense, security designates two organically connected relations. First is the relation between members of a society and the natural environment in which they live. Security here refers to the carrying capacity of the biophysical environment. In other words, security measures the capacity of the natural environment to sustain the physical needs of man. In this sense, two issues are important in measuring security. One is the extent to which members of the society understand the laws of nature (science) and use this understanding to create tools (technology), thereby enhancing their capacity to derive their physical needs from nature.[8] Second, is their capacity to *efficiently* exploit nature. Efficient exploitation in this context is what is now commonly termed sustainable development: the sustainable exploitation of nature, that is striking a balance between the exploitation of nature for man's immediate physical needs on the one hand, and its protection for his future needs on the other.

The second labor process relating to security is the relationship among members of a society. The relation between man and nature always manifests in a historically determined social form. It exists only in unity with certain relations of production expressed in social structures and institutions. Here, security means the capacity of groups (and individuals as their agents) to provide their physical and psychosocial needs and livelihoods. This means a progressive elimination of objective conditions that limit this capacity, as well as reduction of fears and anxieties about their abilities to meet these needs. In this sense, security has to do with protection from poverty, exploitation, disease, bio-chemical contamination, injustice, and the like. The issue here is the control of resource flows. In modern societies, social relations are invariably antagonistic as all groups strive to maximize security given finite resources. All groups desire security, yet problems arise when people have different perceptions and want different conditions of security.

A primary role of the state is to mediate these opposing relations and conditions of security in order to

keep them within the bounds of order. To accomplish this role requires the state to "rise above" social contradictions and opposing conditions of security and appear as an impartial arbiter, always striving for consensus. By that position, it becomes possible for the state to minimize force in its management of contradictions of security. It is this issue that has been variously posed in the literature as the *problematique* of state autonomy, Bonapartism, and the national popular state.[9]

But an examination of the Nigerian state in the recent past shows that it has been unable to become popular/national. Instead of appearing as the representation of the general interests of the people-nation, the Nigerian state has been "privatized" and "parceled-out" as "means of production" for regional, ethnic, religious, class, and other special interests. Consequently, the Nigerian state has been clearly embroiled in social struggles and has been most ineffective in mediating them.

This involvement has had profound consequences for conflict and security. First, social relations are particularly conflictive and violent, as a privatized state becomes the instrument of groups prosecuting social struggles. Second, state violence, that is the aggression of the state towards targeted groups assumed to threaten state security, becomes a principal variable in social conflicts. Thus, it would be argued by some observers that what is happening in Nigeria is not conflict but state violence through militarism, even though resistance to this state violence is always defined as relations between social groups. However, this is an illusion for it is the aggression of a privatized state that appears as group conflicts.[10] In other words, it is state aggression against a targeted group in a conflict, rather than the aggression of one group against another, strictly speaking, that we observe in inter-group conflicts. Consequently, state intervention in conflicts, which normally should be one of mediation, actually magnifies violence, while deflecting attention from state-sponsored violence and abuse of natural resources. Third, since the Nigerian state has become essentially a repertory of violence used against specific groups, instead of a repository of all the interests of the people-nation, the violence it vents in conflicts is devastating in terms of social cost. Finally, state violence makes conflict resolution very difficult.

This role of the state affects security in a number of ways. As the state is privatized and parceled out to groups and interests, the security of private individuals and groups becomes increasingly deflected as the security of the state. Internal security of the state, which consists in elimination of force and violence in the maintenance of internal order, by contrast, becomes an unending cycle of conflict and violence. State violence leads to resistance by targeted groups, which leads to more state violence and more resistance. The insecurity of the state against external aggression and insecurity among victims of state violence increase tremendously. Synergy between external threat and internal/civil strife becomes increasingly possible.[11]

> "For oil-bearing communities, security means the maintenance of the carrying capacity of the fragile Niger Delta environment. State officials and petrobusiness, on the other hand, see security in terms of uninterrupted production of petroleum irrespective of environmental and social impacts.

Security of the environment also decreases. For one, the ability of people to protect the natural environment declines as a result of growing social stress and violence by the state. In fact, there is a positive correlation between environmental stress and social stress. For instance, where entire villages are sacked by the military and people are impoverished, environmental protection will be the least of their concerns. State violence also fuels the inefficient exploitation of nature as groups that control the state use it to justify and perpetuate their unsustainable use of natural resources and degradation of the environment.

At the heart of conflicts in the Niger Delta, therefore, are different meanings of security attached to crude oil. For oil-bearing communities, security means the maintenance of the carrying capacity of the fragile Niger Delta environment. It is the realization that an unsustainable exploitation of crude oil, with its devastation of farmland and fishing waters, threatens resource flows and livelihoods for both individuals and communities as collectives. When a population feels its livelihood threatened, it feels insecure. Therefore, elimination of deprivation is a key concern of the oil-bearing commu-

nities of the Niger Delta. Since the state and its allies appropriate almost all the oil wealth from these communities, they are resentful of the state and *petrobusiness* and feel that a good part of the financial resources should be re-invested in the communities.

Finally, oil-bearing communities link group security to popular mobilization, since most of these communities are made up of minority groups. In addition, a greater part of the Niger Delta is still rural and inaccessible. Although the level of education has been rising across Nigeria's rural communities since independence, a great majority of the people still lacks basic education. Certainly, getting these people to understand their plight and to do something about it requires effective mobilization through grassroots organizations, which are customarily led by the middle class. Organizations like the Movement for the Survival of Ogoni People (MOSOP), the Movement for the Survival of Ijaw Ethnic Nationality (MOSIEN), and Ijaw Youth Council have been at the fore of popular mobilization in the Niger Delta.

To state officials and *petrobusiness*, security is defined as an uninterrupted production of crude oil at "competitive" costs. Informed by a pro-growth ideology, their concern is the production of petroleum to boost state revenues and company profits, irrespective of environmental consequences and indeed, irrespective of long-term economic irrationality. For instance, one of the paradoxes of the petroleum industry in the Niger Delta is that it destroys renewable resources like arable land and aquifers in order to extract crude oil, which is a non-renewable, finite resource.

The untenable position of state officials and *petrobusiness* has been sustained over the years by the authoritarian rule of the military in Nigeria. Having banished all forms of institutional means to express popular feelings, the military, especially under General Abacha, widely employed state violence to impose its wishes in the Niger Delta. A draconian military regime and highly mobilized communities in the Niger Delta set the stage for a decade of disaffection and spiraling violence in the region.

State Violence: The Solution that Failed

State Violence and Popular Resistance by the Ogoni and Ijaw

The story of the relationship between the Nigerian state and the Ogoni and Ijaw, two ethnic minorities in the Niger Delta, is a useful illustration of the role of state violence in understanding the politics of oil in the region. The Ogoni and Ijaw are important ethnic groups in understanding the story of the Niger Delta not only because in total they constitute about sixty percent of the population of the Delta, but also because they played a frontal role in resisting state violence against oil communities. They are also important because the similarities and contrasts in their strategies and state responses facilitate appreciation of the different ramifications of state-community relations in Niger Delta conflicts. For instance, while the Ogoni struggle was highly cerebral and led by the middle class and professionals, the Ijaw struggle has tended to be more militant and led by mainly unemployed youths.

Rise and Fall of Ogoni Resistance

From about 1993, the Ogoni began a massive campaign against environmental pollution, material deprivation and social exclusion, which they attributed to crude oil production by *petrobusiness* and discriminatory policies of the Nigerian state. In October 1990 they issued a Bill of Rights through their popular organization, the MOSOP. Among other things, the bill requested proper compensation for destruction of the Ogoni environment and a fair share of the $30 billion dollars they claimed accrued to Nigeria from crude oil extracted from Ogoniland since 1958. The drafters of the bill also lamented the pervasive poverty in Ogoni, the lack of health, educational, and other social amenities, as well as the progressive disappearance of Ogoni languages as "other Nigerian languages are being forced on us."[12] Unsatisfactory response to these demands by the military regime led to acts of "resistance" by the Ogoni.

In Ogoniland, state violence has taken three major forms. First, it has taken the form of harassment of Ogoni leaders through arrests, detention, surveillance, and related tactics. Since the Ogoni campaign began in earnest in 1991, their leaders have become regular victims of the state's security and intelligence agencies. On many occasions, the then leaders of MOSOP including G.B. Leton, Kobani, and Ken Saro-Wiwa were detained and questioned. In January 1993, they were arrested in Lagos. In April of the same year, Saro-Wiwa was arrested twice. Again, on 21 June 1993, he was re-arrested together with two other MOSOP activists, N. Dube and K. Nwile. On 13 July, criminal charges were brought against them.[13] In December 1993, Ledum Mitee, another MOSOP leader was arrested and detained without charge. Between May and June 1994, following the murders of four Ogoni leaders, several hundreds of people were arrested in Ogoniland.[14]

Second, state violence has been used against the Ogoni by encouraging violent conflicts between the

Ogoni and their neighbors, and using this violence as a pretext to repress the Ogoni. The government readily proclaims the clashes to be purely ethnic clashes. But, the frequency of such clashes among erstwhile peaceful neighbors, the extent of devastation, and the sophistication of weapons employed have convinced some independent observers that "broader forces might have been interested in perhaps putting the Ogonis under pressure, probably to derail their agenda."[15] Between July 1993 and April 1994, there were at least three conflicts between the Ogoni and their neighbors, involving the destruction of many villages, loss of life, and refugees—the Andoni in July 1993, the Okrika in December 1993, and the Ndoki in April 1994. In each case, the security forces blamed the Ogoni.

Finally, state violence has been by direct violence using the armed forces and police. Extra-judicial killings, flogging, torture, rapes, looting, and extortion by the security forces against the Ogoni have been widely reported. In fact, following the situation in Ogoniland, the Rivers State government established an Internal Security Task Force under one Major (later Lt. Col.) Okuntimo. His job has been the systematic use of violence against the Ogoni. Indeed, Okuntimo had bragged on prime time national television that the army taught him 204 ways of killing people, but he had only used three on the Ogoni. It is not surprising that since 21 May 1994 when four Ogoni leaders were killed in the town of Giokoo, the security forces have executed at least fifty Ogonis.[16] Earlier in April 1993, in what has become known as the Wilbros Affair, at least eleven Ogonis, including one woman, were shot at Biara by a detachment of the Second Amphibious Brigade based in Bori. The Ogoni were protesting the laying of a pipeline from Rumuekpe to Bori. Major U. Braimah of the Brigade claimed that his men were carrying out duties directed by the Federal Government.[17]

To give legal backing to some of these acts, the military government of Babangida made a catch-all decree against treason on 4 May 1993. The decree, among other things, stipulates the death penalty for anybody who organizes war against Nigeria, intimidates the President of Governors, utters or publishes words suggesting the break up of Nigeria, flies a flag, or suggests creation of a new state or local government for the country.

On their part, the Ogoni responded with increased mobilization and a media campaign against the state and oil companies, sometimes through violent demonstrations spearheaded by the MOSOP. The strategy of violent demonstrations was the immediate (but not remote) cause of the division within MOSOP. A weakened MOSOP, in turn, meant the intensification of state violence and sounded the death knell of the Ogoni struggle.

End of Ogoni Resistance

The implosion of MOSOP, which culminated in the killing of four Ogoni leaders by their own people on 21 May 1994, did not surprise many. Following the Wilbros Affair in April 1993, some leaders of MOSOP were accused of selling-out to government. The rancor generated by that episode had hardly died down when a controversial decision by MOSOP led to the boycott of the 12 June Presidential election that year. At the time, it was obvious that the leadership of the Movement had been split into two. Some accused Ken Saro-Wiwa of being brash, foolhardy, confrontational, and authoritarian, claiming that he created the National Youth Council of Ogoni People (NYCOP) as a private army for intimidating and eliminating his enemies. They also accused him of planning to kill thirteen Ogoni leaders, among them some of those who later died on 21 May 1994.

On 21 June 1993, the security forces arrested Ken Saro-Wiwa in relation to the boycott of the presidential election by the Ogoni. In reaction, Ogoni youths, probably members of NYCOP, went on the rampage. Their demonstration was later seized on by their neighbors, the Andoni, to attack some Ogoni villages like Kaa in August 1994. The Saro-Wiwa faction of MOSOP rejected a subsequent peace accord brokered by the Rivers State government. Exchanges of angry letters among leaders of the Movement followed until Gokana, one of the five clans making up the Ogoni ethnic group, repudiated MOSOP and Saro-Wiwa in the so-called Giokoo Accord of March 1994. At that point, the implosion of MOSOP was completed and the struggle became Ogoni against Ogoni.

The popular view in Nigeria is that the division within the Ogoni leadership was an ideological one between moderates led by Dr. Leton, president of the movement, and militants led by Saro-Wiwa. However, it is more than an ideological view. Without doubt, the mass of Ogoni people joined MOSOP to protect their livelihoods. Nevertheless, their leaders were essentially interested in personal power and money. The Nigerian petty bourgeoisie is not given to ideological fidelity. They are simply power fetishists. In any case, they lack the discipline and strength of character to pursue any ideological line consistently. Money and power always overrides. Moderates could become militants and militants moderates in a short space of time.

The tragedy of popular movements in Nigeria is the inability of the ordinary people to impose their interests on the leadership. Since popular control rarely

exists, popular movements led by the petty-bourgeoisie easily degenerate into authoritarianism. The tendency of this class is to concentrate power in themselves, first as leaders of the people and then as individuals. Collective leadership remains difficult. The signs are always clear: internal bickering and self-seeking maneuvers for power and money. Moderation and militancy are only strategies, not philosophies. In short, a successful mass movement like MOSOP was destined to implode and crumble as a result of leadership in-fighting, especially because of the money and power that it was able to garner.

> "Differences of class, gender, and generation should be addressed if productive community relations and conflict resolution systems are to be developed in the Niger Delta."

The Ijaw Egbesu Wars

The Ogoni have passed the mantle of leading the struggle of the people of the Niger Delta to the Ijaw. Since the implosion of MOSOP, Ijaw youths have increasingly taken center stage. In August 1997, over 10,000 youths from across the Delta demonstrated at Aleibiri in Ekeremor Local Area of Bayelsa State to demand an end to all Shell activities in the Niger Delta. Aleibiri was chosen as the focus of the demonstration because, according to the youths, Shell has refused to clear an oil spill that occurred there on 18 March 1997. Even at the time, evidence clearly pointed to more conflicts between the state, oil companies, and Ijaw youths, in spite of repeated claims by government that peace had returned to the area. Speaking at the Aleibiri gathering, a community leader and retired Navy Lieutenant, Chief Augustine Anthony, clearly stated that Ijaw youths would fight until there was freedom in the Niger Delta because "we have been exploited for so long."[18]

Within one year, Ijawland exploded again. Between mid-1998 and January 1999, Bayelsa State was in turmoil. The Ijaw inhabit Bayelsa, one of the main petroleum producing states in Nigeria. What became known as the first *Egbesu* war began when an Ijaw youth leader was arrested and detained by the military Governor of the State during the rule of General Abacha. He was held without trial in the Government House (the military Governor's official residence) for distributing "seditious" documents questioning the financial probity of the governor. In reaction, a group of youths said to be members of an Ijaw cult, the *Egbesu*, stormed the Government House in Yenagoa, disarmed the guards and released their leader. Many residents of Yenagoa, including policemen and soldiers, believe that members of the cult were able to break into the well-guarded Government House because they wore charms that made them impervious to bullets. The success of the first *Egbesu* war obviously enhanced the profile of the youths and the cult, and encouraged more young people, many of whom were unemployed, to join the protests. In a matter of weeks, the invincibility of the *Egbesu* had spread throughout Ijawland and beyond. The success of the *Egbesu* youth in the "first war" also fed into wider demands by the Ijaw for more petroleum revenues. Prior to the *Egbesu*, the Ijaw National Council and the Movement for the Survival of Ijaw Ethnic Nationality (MOSIEN) had made vociferous demands for more petroleum revenues to be allocated to the Ijaw. The formation of MOSIEN was largely influenced by MOSOP, the Ogoni organization.

The death of the dictator Abacha in June 1998, improvements in human rights, and an expansion of the political space made it possible for Ijaw demands to become more openly articulated and massively pursued. The first *Egbesu* war had guaranteed a central role for the youth in this new dispensation. This guarantee became clear in late 1998 following a spate of oil installation hijackings by Ijaw youths. This phase of resistance, as the youths called it, culminated in a grand Convention of Ijaw Youths in Kaiama town. The meeting issued a document addressed to the government and oil companies requesting more local control of oil revenues and better environmental practices. The *Kaiama Declaration* also gave the government until 31 December 1998 to respond positively to their demands. The government upped the ante with a spate of condemnations and threats to use force against the youths. In his new year/budget broadcast on 1 January 1999, the Head of State General Abubakar, gave indications of military action against the youths. Since early December 1998, there had been massive military build-up in Bayelsa State by the government, including the positioning of frigates in the Gulf of Guinea. Throughout December 1998 and early January 1999, Bayelsa State was virtually under siege. The second *Egbesu* war started when military men in Yenagoa, the capital of Bayelsa State, confronted

Ijaw youths participating in a cultural festival. In the ensuing violence, which lasted for over one week, many Ijaw youths lost their lives in Yenagoa and Kaiama, property worth millions of Naira was destroyed, and scores of people were displaced.

A Democratic Approach?

Following the unbending resistance of oil-bearing communities and the steady international condemnation of the policies of the military government and oil companies in the Niger Delta, *petrobusiness* began to preach a new "community-based" approach to its activities in the Niger Delta. Ostensibly, this change in attitude arose from a re-evaluation by the oil giants of their activities in the developing world. For instance, in a rare case of *mea culpa* Shell embarked on a worldwide review of its policy regarding its host communities. The commencement of this review was widely publicized even if its outcome was far less so. However, from 1997 it was clear that for oil companies to regain access into the oil-bearing communities, they had to alter their attitude toward the people. The giants like Shell had been forced to shut down operations in many parts of the Delta costing them and the military government an estimated $1 million daily. At that point, *petrobusiness* realized that the violent solution of the military government, which they had widely supported with money and munitions (the dreaded Rivers State internal security force was said to have been funded and equipped by Shell), could not secure their oil installations.

Everywhere, oil companies began to drum up support for this new approach. Its thrust, according to them, was a new partnership of all stakeholders in the petroleum industry. The stakeholders were the oil communities, *petrobusiness*, and government. Oil companies began to set up autonomous community relations units, manned by community development specialists. In addition, the new approach sought to negotiate access directly with oil communities rather than through government. Hitherto, oil companies sought to absolve themselves from the desolation of the Niger Delta by claiming to be tenants of government and not the local communities. They also claimed that they met all their contractual obligations to the Nigerian government and so could not be held responsible for the failures of government. This claim may well be correct in law because a previous military regime (ironically headed by the present civilian President) had passed an unpopular decree in 1978 declaring all land and minerals under it the property of the state. The change in attitude by the oil companies was a realization that with the situation on the ground, that law was passé.

The new emphasis was on Memoranda of Understanding (MOUs) by stakeholders. Each MOU detailed the duties, responsibilities, and benefits of the stakeholders. Essentially, the oil companies committed themselves to the development of host communities. In return, the communities pledged to protect installations and to solve problems through dialogue. For its part, the government was expected to serve as the umpire. An added element of this "new" approach was the increasing involvement of nongovernmental organizations (NGOs) and community-based organizations (CBOs) with the oil companies. This element came about partly because of the prominent role that these organizations played as advocates of the oil-bearing communities against the military dictatorship and *petrobusiness*.

Unfortunately, the MOUs remain elitist in both conception and content. To illustrate, in the Memorandum of Understanding between the Bonny Kingdom and the Joint Industry Company, the collective working on the liquefied natural gas project in the area, little or no grassroots consultations took place.[19] First, the signing of the document involved the elite of the Bonny society, most of whom live outside the Kingdom, government officials, and the oil companies. Secondly, the projects envisaged under the Memorandum included paving of roads, electricity, water treatment, and a master plan for the town. These are clearly trappings of urban elite life. Across the Niger Delta, there is a deep-seated feeling among unemployed youth and rural dwellers that such elite demands distort their struggles by fostering a pecuniary interpretation of their problems. In many cases, the urban-based elite holds positions that run counter to those of their people living at "home" in the rural areas. Many rural dwellers say that while these demands are not necessarily bad, they tend to favor only the vocal, urban-based people who understand the language of compensation and are in a position to enjoy the social amenities provided. In the process, the simple needs of the vast majority are bypassed.

The youth remain the powder keg. Unable to get proper schooling or stable employment, they constitute a "reserve army" for social discontent. Frustration associated with aspirations to elite status makes the youth of the Niger Delta very volatile. The point is that to assume, as oil companies presently do, that their host communities are internally monolithic is wrong. Differences of class, gender, and generation should be addressed if productive community relations and conflict resolution systems are to be developed in the Niger Delta. Existing MOUs do not seem to be doing that.

Finding the legitimate representatives of the communities is also a problem encumbering MOUs. During the period of military repression in the Niger Delta, the oil companies shot themselves in the foot by helping to hunt down the true representatives of the communities, who were described as trouble makers and security risks. Many of them were killed, others went into exile, and most have been cowed. Illegitimate, government-installed chiefs, extortionists, and other charlatans filled the vacuum created by their exit. Consequently, in many cases the response of the ordinary members of the communities has been cynicism towards the recent overtures of the oil companies.

The born-again community-based approach of the oil companies seems to have anticipated the end of military dictatorship and inauguration of an elected government under President Obasanjo, himself a former army general. There has been great optimism locally and internationally that the new civilian administration will resolve the festering sore of violent conflicts in the Niger Delta. In fact, many observers suggest that the litmus test for the success of the new administration will be events in the Niger Delta.

> "[S]ecurity has to do with protection from poverty, exploitation, disease, bio-chemical contamination, injustice, and the like."

Early on, the new government seemed conscious of the importance of the problem in the Niger Delta. Soon after his inauguration, President Obasanjo toured the area, preaching the need for non-violent resolution of conflicts between communities, government, and oil companies. The President immediately followed this with consultations with representatives of communities and other stakeholders in the petroleum industry. Finally, a Niger Delta Development Commission (NDDC) would take charge of development activities in the Niger Delta to supplement the direct efforts of the federal, state, and local governments.

Two approaches to conflict resolution in the Niger Delta have emerged since the new civilian government came into office. The first suggests that civil society organizations have done their work by mobilizing communities to resist the militarist state and insensitive oil companies. Now, they and the communities must allow the elected representatives of the people acting through democratic structures like local councils, state assemblies, and governors, the national assembly, and the presidency, as well as the judiciary to tackle the problems. This approach advocates patience and an understanding that the wheel of democratic government grinds slowly. The second approach insists that while occupants of structures that dictated the problems in the Delta may have changed, the structures themselves and their internal dynamics have changed very little. Therefore, communities and civil society need to practice continued vigilance to ensure fundamental transformations. An important aspect of this transformation is to renegotiate Nigeria's fiscal federalism to ensure that communities of the Delta retain the bulk of resources generated from their land. As such, they note that the constitution given by the military, which gave birth to the present government, is flawed and requires re-negotiation in a sovereign national conference.

The continued violence in the Niger Delta suggests that the two positions are still not reconciled. Violent conflicts continue to occur across the Delta, both between government and communities, and among communities themselves. Since the new government came into being, there has been trouble in Bonny, which delayed the take off of the huge liquefied gas project there, Eleme and Okrika, Oleh, Choba, and Odi, among others. The Odi case seems to confirm the fears of the human rights community in Nigeria that it will take some time before the vestiges of state violence as a solution to the Niger Delta problem are eliminated.

Odi is the second largest town in Bayelsa State, after the capital Yenagoa. In mid-November 1999, Odi youths took several policemen hostage and later tortured them to death. The team of policemen had gone to the town to investigate rumors that some Ijaw youths were mobilizing to storm Lagos in reprisal for attacks a month earlier on Ijaw by the Lagos-based Yoruba youth group the Oodua Peoples Congress (OPC). It was widely believed that the OPC attacks on Ijaw residents of the Lagos suburb of Ajegunle were a carryover from the conflicts in the State of Ondo between the Ijaw and Ilaje, a Yoruba clan. The government interpreted the killing of the policemen as a renewal of the activities of the *Egbesu*. However, it is known that one of the leaders of the youths that murdered the policemen at Odi was in fact a member of the ruling Peoples Democratic Party (PDP), the party of both President Obasanjo and Governor Diepreye Alamieyeseigha of Bayelsa State. This youth leader is known to be very influential among Ijaw youths and mobilized them to support the PDP in the guber-

natorial elections of January 1999.

In response to the death of the policemen, President Obasanjo ordered Governor Alamieyeseigha to produce the culprits. When this failed, Obasanjo ordered in the army. The consequence was chilling: over one hundred inhabitants dead, many more missing, thousands forced to flee, and virtually no house standing in Odi. As if this devastation were not enough, the President in a televised interview ordered security forces to shoot rioters at sight. These draconian measures have been widely criticized in Nigeria, but the government continues to defend its actions. In fact, the general attitude in the Niger Delta today is not whether there will be more trouble, but when and where.

Part of the problem is the lingering militarist disposition among individual members of the civilian government and the communities of the Niger Delta. President Obasanjo's support for the summary execution of riotous youths and saboteurs of oil installations in his recent "shoot-at-sight" orders to the police capture this disposition. In fact, the government is setting up a special paramilitary force to deal summarily with people who vandalize petroleum pipelines. Such militarist tendencies are still very much ingrained in government circles. On the part of the Niger Delta people, years of military repression have left them brutalized but militarized. The culture of violence is deep-seated in the region.[20]

Conclusion and Policy Implications

The root of conflict in the Niger Delta rests in the different meanings of security. On the one hand, local communities see the current pattern of petroleum exploitation, which devastates the environment, as a threat to security of livelihoods. State officials and *petrobusiness*, on the other hand, see security in terms of uninterrupted production of petroleum irrespective of environmental and social impacts. The long rule of the military failed to forge the consensus necessary for a peaceful management of this *conflict of securities*. Instead, the military sought through state violence to impose the interests of *petrobusiness*. This practice made the Niger Delta ungovernable. A spiral of violence enveloped the area in the last ten years as local populations mobilized to confront state violence. Repression failed. It failed precisely because it excluded the people. As such, oil companies have recently been claiming a new community and people orientation for their projects. This new attitude dovetails into the efforts of the new civilian government to address the Niger Delta problem. However, continued violence and disaffection suggest that fundamental problems remain.

Policymakers continue to get it wrong in the Niger Delta by believing that the problem is money. True, the elite will continue to push for more money and contracts. However, beyond the nummular interests of the elite, there are fundamental questions of participation and social rights, both for individuals and for whole communities. The solution to the Niger Delta's problem cannot be achieved only by providing amenities and paying compensation. It has to transcend these and make it possible for the people and their authentic representatives to share in real decision-making with *petrobusiness*. Such a fundamental change will not come from the isolated activities of individual oil companies or the good intentions of a benevolent government. Instead, its achievement is linked to resolving the fundamental questions of the Nigerian federation, especially fiscal control and the position of ethnic minorities. This question of federalism must be an integral part of the project to create a true democracy built on good governance and transparency in Nigeria. However, in the short term a new regime of conflict management in the Niger Delta is necessary. First, such a regime must de-emphasize monetary compensation to individuals and middlemen. Instead, investment in community development projects, arrived at in full agreement with the local residents, should be emphasized. Community development investments should aim at building the stock of local human capital instead of just putting money in the pockets of individuals. Monetary compensation has tended to spawn "compensation merchants" and "conflict entrepreneurs" in the Niger Delta. These careerists exploit the grief of local people for personal financial ends. For example, it is known that "conflict entrepreneurs" go to communities affected by oil spills buying damaged nets and poisoned seafood for purposes of claiming compensation and grants from government, oil companies, and international funding agencies.

Second, because the alliance between state bureaucracy and *petrobusiness* under the military was a central *casus belli* in the Niger Delta, a new conflict management regime in the region must be one that seeks to break and transcend this alliance. Therefore, it must marginalize state bureaucracy, particularly the coercive organs of the state. The people and their popular representatives in government and civil society must be the bedrock of conflict resolution. Local communal or traditional conflict management structures must be built into processes of conflict resolution. Often, these traditional conflict management structures emphasize consultation and consensus, rather than imposition,

which was the preferred orientation under the military.

Third, the oil companies must fundamentally alter their penchant to cast themselves as outsiders instead of responsible local corporate citizens. Oil companies tend to ally too closely with state officials, especially under the military. At best, they try to cast themselves as neutral in the conflict between government and people. This is backed up with massive public relations and image laundering by the oil companies. However, all these strategies are counterproductive. Local people continue to associate oil companies with government, including bad governments. Oil companies have evaded public scrutiny and accountability. Companies need to maintain a studied distance from government and to become more accountable to the local communities.

Finally, the government should set up a Trust Fund for the Niger Delta with an elected board of trustees. Trustees should be elected on a non-party basis from the communities in the Niger Delta. A public hearing on the nominated candidates should precede their final confirmation by the State Assembly to stand the election. The trustees should have a consolidated remuneration fixed by the National Assembly. They are not to be paid from the Niger Delta Trust Fund. The board of trustees should be the sole determinants of the use of the Trust Fund. The NDDC could then become the bureaucratic arm of the Trust Fund, manned by experts in capital investment, project development, and fundraising. ■

NOTES

[1] *Petrobusiness* refers to all aspects of the petroleum industry not just the oil companies that extract and sell crude oil (e.g., oil refineries, oil services).

[2] Shell Petroleum Development Company, *The Nigeria Brief: The Ogoni Issue*, Lagos: The Shell Petroleum Development Company of Nigeria Limited, 1995: 1.

[3] In many parts of the Niger Delta, water hyacinths are a non-native species whose growth has been propelled by the activities of the oil companies.

[4] Clingendael Institute, *Seminar on Intra-state Conflict and Options for Policy: Seminar Documentation*, The Hague: Netherlands Institute for International Relations, 1998:4.

[5] N. Onishi, "Deep in the Republic of Chevron," *The New York Times Magazine* (July 4, 1999).

[6] Okechukwu Ibeanu, 'Ogoni - oil, resource flow and conflict' in Granfelt, T. (ed*) Managing the Globalized Environment*, London: Intermediate Technology Publications, 1999.

[7] Samir Amin. "Preface: The State and the Question of Development," In *Popular Struggles for Democracy in Africa*, ed. P. Anyang' Nyong'o. London: Zed Press and United Nations University, 1987: 3-5.

[8] See Walter Rodney, *How Europe Underdeveloped Africa*, Enugu: Ikenga Publishers, 1982.

[9] Cf. Antonio Gramsci, *Selections from the Prison Notebooks*. London: Lawrence and Wishart, 1971; Hamza Alavi, "The State in Post-Colonial Societies: Pakistan and Bangladesh." *New Left Review* 74 (1972); Colin Leys, "The 'overdeveloped' post-colonial state: re-evaluation." *Review of African Political Economy.* 5 (1976); Nicos Poulantzas, *Political Power and Social Classes*. London: Verso, 1978; Claude Ake, "The Future of the State in Africa." *International Political Science Review* 6:1 (1985); Eme Ekekwe, *Class and State in Nigeria*, Lagos: Longman, 1986; and Okechukwu Ibeanu, "The State and the Market: Reflections on Ake's Analysis of the State in the Periphery." *Africa Development* 18:3 (1993).

[10] Claude Ake *et al.*, "The Causes of Conflict in Africa," Center for Advanced Social Science, Port Harcourt (mimeo), not dated: 9 (b).

[11] James Rosenau, ed. *International Aspects of Civil Strife*. Princeton: Princeton University Press, 1964.

[12] Movement for the Survival of Ogoni People (MOSOP) *Ogoni Bill of Rights*. Port Harcourt: Saros International Publishers, 1992: 10-11.

[13] See Okechukwu Ibeanu, "Ogonis: Oil and Environmental Conflict in Nigeria." *Nigeria Now* 2:11 (1993); and Human Rights Watch, "Nigeria: The Ogoni Crisis: A Case-study of Military Repression in Southeastern Nigeria." *Human Rights Watch/Africa* 7:5 (1995).

[14] Human Rights Watch, 1995.

[15] Claude Ake quoted in Human Rights Watch, 1995: 12.

[16] Ibid: 17.

[17] Ibid.

[18] *The Guardian Newspaper*, Lagos, Nigeria (28 March 1994).

[19] Okechukwu Ibeanu, "Bringing the Local People Back In: Community-Based Environmental Conflict Management in the Niger Delta, Nigeria." Paper presented at the Open Meeting of the Human Dimensions of Global Environmental Change Research Community, Shonan Village, Kanagawa, Japan, 24-26 June 1999.

[20] Goddy Nwabueze, "Contextualizing the Niger Delta Crisis." *CASS Newsletter* 6:2 (1999).

SPECIAL REPORTS

National Intelligence Estimate: The Global Infectious Disease Threat and Its Implications for the United States

National Intelligence Council, January 2000

Abstract: Infectious diseases are a leading cause of death, accounting for a quarter to a third of all deaths worldwide. The spread of infectious diseases results from both human behavior such as lifestyle choices, land-use patterns, increased trade and travel, and inappropriate use of antibiotic drugs, as well as mutations in pathogens. These excerpts from a January 2000 National Intelligence Estimate highlight the rising global health threat of new and reemerging infectious diseases. The National Intelligence Council argues that the infectious disease threat will complicate U.S. and global security over the next twenty years. These diseases will endanger U.S. citizens at home and abroad, threaten U.S. armed forces deployed overseas, and exacerbate social and political instability in key countries and regions in which the United States has significant interests, according to the report.

PREFACE

This report represents an important initiative on the part of the Intelligence Community to consider the national security dimension of a nontraditional threat. It responds to a growing concern by senior U.S. leaders about the implications—in terms of health, economics, and national security—of the growing global infectious disease threat. The dramatic increase in drug-resistant microbes, combined with the lag in development of new antibiotics, the rise of megacities with severe health care deficiencies, environmental degradation, and the growing ease and frequency of cross-border movements of people and produce have greatly facilitated the spread of infectious diseases.

In June 1996, President Clinton issued a Presidential Decision Directive calling for a more focused U.S. policy on infectious diseases. The State Department's Strategic Plan for International Affairs lists protecting human health

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This National Intelligence Estimate was produced under the auspices of David F. Gordon, National Intelligence Officer for Economics and Global Issues. The primary drafters were Lt. Col. (Dr.) Donald Noah of the Armed Forces Medical Intelligence Center and George Fidas, Deputy National Intelligence Officer for Global and Multilateral Issues, NIC. The Estimate also benefited from a conference on infectious diseases held jointly with the State Department's Bureau of Intelligence and Research and was reviewed by several prominent epidemiologists and other health experts in and outside the U.S. Government. Comments and inquiries may be directed to Dr. Gordon at (703) 482-4128 or by e-mail at davidfg@ucia.gov.. Special thanks to Dr. Gordon, George Fidas, and Gerald Fields for their assistance in reprinting the excerpts. Please see the Meeting Summaries section for coverage of an ECSP meeting highlighting the release of this National Intelligence Estimate.

and reducing the spread of infectious diseases as U.S. strategic goals, and Secretary Albright in December 1999 announced the second of two major U.S. initiatives to combat HIV/AIDS. The unprecedented UN Security Council session devoted exclusively to the threat to Africa from HIV/AIDS in January 2000 is a measure of the international community's concern about the infectious disease threat.

As part of this new U.S. Government effort, the National Intelligence Council produced this National Intelligence Estimate. It examines the most lethal diseases globally and by region; develops alternative scenarios about their future course; examines national and international capacities to deal with them; and assesses their national and global social, economic, political, and security impact. It then assesses the infectious disease threat from international sources to the United States; to U.S. military personnel overseas; and to regions in which the United States has or may develop significant equities.

Key Judgments

The Global Infectious Disease Threat and Its Implications for the United States

New and reemerging infectious diseases will pose a rising global health threat and will complicate U.S. and global security over the next twenty years. These diseases will endanger U.S. citizens at home and abroad, threaten U.S. armed forces deployed overseas, and exacerbate social and political instability in key countries and regions in which the United States has significant interests.

Infectious diseases are a leading cause of death, accounting for a quarter to a third of the estimated fifty-four million deaths worldwide in 1998. The spread of infectious diseases results as much from changes in human behavior—including lifestyles and land use patterns, increased trade and travel, and inappropriate use of antibiotic drugs—as from mutations in pathogens.

- Twenty well-known diseases—including tuberculosis (TB), malaria, and cholera—have reemerged or spread geographically since 1973, often in more virulent and drug-resistant forms.
- At least thirty previously unknown disease agents have been identified since 1973, including HIV, Ebola, hepatitis C, and Nipah virus, for which no cures are available.
- Of the seven biggest killers worldwide, TB, malaria, hepatitis, and, in particular, HIV/AIDS continue to surge, with HIV/AIDS and TB likely to account for the overwhelming majority of deaths from infectious diseases in developing countries by 2020. Acute lower respiratory infections—including pneumonia and influenza—as well as diarrheal diseases and measles, appear to have peaked at high incidence levels.

Impact Within the United States

Although the infectious disease threat in the United States remains relatively modest as compared to that of noninfectious diseases, the trend is up. Annual infectious disease-related death rates in the United States have nearly doubled to some 170,000 annually after reaching an historic low in 1980. Many infectious diseases—most recently, the West Nile virus—originate outside U.S. borders and are introduced by international travelers, immigrants, returning U.S. military personnel, or imported animals and foodstuffs. In the opinion of the U.S. Institute of Medicine, the next major infectious disease threat to the United States may be, like HIV, a previously unrecognized pathogen. Barring that, the most dangerous known infectious diseases likely to threaten the United States over the next two decades will be HIV/AIDS, hepatitis C, TB, and new, more lethal variants of influenza. Hospital-acquired infections and foodborne illnesses also will pose a threat.

- Although multidrug therapies have cut *HIV/AIDS* deaths by two-thirds to 17,000 annually since 1995, emerging microbial resistance to such drugs and continued new infections will sustain the threat.
- Some four million Americans are chronic carriers of the *hepatitis C* virus, a significant cause of liver cancer and cirrhosis. The U.S. death toll from the virus may surpass that of HIV/AIDS in the next five years.
- *TB*, exacerbated by multidrug resistant strains and HIV/AIDS co-infection, has made a comeback. Although a massive and costly control effort is achieving considerable success, the threat will be sustained by the spread of HIV and the growing

number of new, particularly illegal, immigrants infected with TB.

- *Influenza* now kills some 30,000 Americans annually, and epidemiologists generally agree that it is not a question of whether, but when, the next killer pandemic will occur.

By 2010, the region could surpass Africa in the number of HIV infections.

- The former Soviet Union (FSU) and, to a lesser extent, Eastern Europe also are likely to see a substantial increase in infectious disease incidence and deaths. In the FSU especially, the steep deterioration in health care and other services owing to economic decline has led to a sharp rise in diphtheria, dysentery, cholera, and hepatitis B and C. TB has reached epidemic proportions throughout the FSU, while the HIV-infected population in Russia alone could exceed one million by the end of 2000 and double yet again by 2002.

> "Some of the hardest hit countries in sub-Saharan Africa-and possibly later in South and Southeast Asia-will face a demographic upheaval as HIV/AIDS and associated diseases reduce human life expectancy by as much as thirty years and kill as many as a quarter of their populations over a decade or less, producing a huge orphan cohort."

- Highly virulent and increasingly *antimicrobial resistant pathogens*, such as *Staphylococcus aureus*, are major sources of hospital-acquired infections that kill some 14,000 patients annually.

- The doubling of U.S. food imports over the last five years is one of the factors contributing to tens of millions of *foodborne illnesses* and 9,000 deaths that occur annually, and the trend is up.

Regional Trends

Developing and former communist countries will continue to experience the greatest impact from infectious diseases—because of malnutrition, poor sanitation, poor water quality, and inadequate health care—but developed countries also will be affected:

- Sub-Saharan Africa—accounting for nearly half of infectious disease deaths globally—will remain the most vulnerable region. The death rates for many diseases, including HIV/AIDS and malaria, exceed those in all other regions. Sub-Saharan Africa's health care capacity—the poorest in the world—will continue to lag.

- Asia and the Pacific, where multidrug resistant TB, malaria, and cholera are rampant, is likely to witness a dramatic increase in infectious disease deaths, largely driven by the spread of HIV/AIDS in South and Southeast Asia and its likely spread to East Asia.

- Latin American countries generally are making progress in infectious disease control, including the eradication of polio, but uneven economic development has contributed to widespread resurgence of cholera, malaria, TB, and dengue. These diseases will continue to take a heavy toll in tropical and poorer countries.

- The Middle East and North Africa region has substantial TB and hepatitis B and C prevalence, but conservative social mores, climatic factors, and the high level of health spending in the oil-producing states tend to limit some globally prevalent diseases, such as HIV/ AIDS and malaria. The region has the lowest HIV infection rate among all regions, although this is probably due in part to above-average underreporting because of the stigma associated with the disease in Muslim societies.

- Western Europe faces threats from several infectious diseases, such as HIV/AIDS, TB, and hepatitis B and C, as well as from several economically costly zoonotic diseases (that is, those transmitted from animals to humans). The region's large volume of

travel, trade, and immigration increases the risks of importing diseases from other regions, but its highly developed health care system will limit their impact.

Response Capacity

Development of an effective global surveillance and response system probably is at least a decade or more away, owing to inadequate coordination and funding at the international level and lack of capacity, funds, and commitment in many developing and former communist states. Although overall global health care capacity has improved substantially in recent decades, the gap between rich and poorer countries in the availability and quality of health care, as illustrated by a typology developed by the Defense Intelligence Agency's Armed Forces Medical Intelligence Center (AFMIC), is widening.

Alternative Scenarios

We have examined three plausible scenarios for the course of the infectious disease threat over the next twenty years:

Steady Progress

The least likely scenario projects steady progress whereby the aging of global populations and declining fertility rates, socio-economic advances, and improvements in health care and medical breakthroughs hasten movement toward a "health transition" in which such noninfectious diseases as heart disease and cancer would replace infectious diseases as the overarching global health challenge. We believe this scenario is unlikely primarily because it gives inadequate emphasis to persistent demographic and socio-economic challenges in the developing countries, to increasing microbial resistance to existing antibiotics, and because related models have already underestimated the force of major killers such as HIV/AIDS, TB, and malaria.

Progress Stymied

A more pessimistic—and more plausible—scenario projects little or no progress in countering infectious diseases over the duration of this Estimate. Under this scenario, HIV/AIDS reaches catastrophic proportions as the virus spreads throughout the vast populations of India, China, the former Soviet Union, and Latin America, while multidrug treatments encounter microbial resistance and remain prohibitively expensive for developing countries. Multidrug resistant strains of TB, malaria, and other infectious diseases appear at a faster pace than new drugs and vaccines, wreaking havoc on world health. Although more likely than the "steady progress" scenario, we judge that this scenario also is unlikely to prevail because it underestimates the prospects for socio-economic development, international collaboration, and medical and health care advances to constrain the spread of at least some widespread infectious diseases.

Deterioration, Then Limited Improvement

The most likely scenario, in our view, is one in which the infectious disease threat—particularly from HIV/AIDS—worsens during the first half of our time frame, but decreases fitfully after that, owing to better prevention and control efforts, new drugs and vaccines, and socio-economic improvements. In the next decade, under this scenario, negative demographic and social conditions in developing countries, such as continued urbanization and poor health care capacity, remain conducive to the spread of infectious diseases; persistent poverty sustains the least developed countries as reservoirs of infection; and microbial resistance continues to increase faster than the pace of new drug and vaccine development. During the subsequent decade, more positive demographic changes such as reduced fertility and aging populations; gradual socio-economic improvement in most countries; medical advances against childhood and vaccine-preventable killers such as diarrheal diseases, neonatal tetanus, and measles; expanded international surveillance and response systems; and improvements in national health care capacities take hold in all but the least developed countries. Barring the appearance of a deadly and highly infectious new disease, a catastrophic upward lurch by HIV/AIDS, or the release of a highly contagious biological agent capable of rapid and widescale secondary spread, these developments produce at least limited gains against the overall infectious disease threat. However, the remaining group of virulent diseases, led by HIV/ AIDS and TB, continue to take a significant toll.

Economic, Social, and Political Impact

The persistent infectious disease burden is likely to aggravate and, in some cases, may even provoke economic decay, social fragmentation, and political destabilization in the hardest hit countries in the developing and former communist worlds, especially in the worst-case scenario outlined above:

- The economic costs of infectious diseases—espe-

cially HIV/AIDS and malaria—are already significant, and their increasingly heavy toll on productivity, profitability, and foreign investment will be reflected in growing GDP losses, as well, that could reduce GDP by as much as twenty percent or more by 2010 in some sub-Saharan African countries, according to recent studies.

- Some of the hardest hit countries in sub-Saharan Africa—and possibly later in South and Southeast Asia—will face a demographic upheaval as HIV/AIDS and associated diseases reduce human life expectancy by as much as thirty years and kill as many as a quarter of their populations over a decade or less, producing a huge orphan cohort. Nearly forty-two million children in twenty-seven countries will lose one or both parents to AIDS by 2010; nineteen of the hardest hit countries will be in sub-Saharan Africa.

- The relationship between disease and political instability is indirect but real. A wide-ranging study on the causes of state instability suggests that infant mortality—a good indicator of the overall quality of life—correlates strongly with political instability, particularly in countries that already have achieved a measure of democracy. The severe social and economic impact of infectious diseases is likely to intensify the struggle for political power to control scarce state resources.

> "Frequent and often sudden population movements within and across borders caused by ethnic conflict, civil war, and famine will continue to spread diseases rapidly in affected areas, particularly among refugees."

Implications for U.S. National Security

As a major hub of global travel, immigration, and commerce with wide-ranging interests and a large civilian and military presence overseas, the United States and its equities abroad will remain at risk from infectious diseases.

- Emerging and reemerging infectious diseases, many of which are likely to continue to originate overseas, will continue to kill at least 170,000 Americans annually. Many more could perish in an epidemic of influenza or yet-unknown disease or if there is a substantial decline in the effectiveness of available HIV/AIDS drugs.

- Infectious diseases are likely to continue to account for more military hospital admissions than battlefield injuries. U.S. military personnel deployed at NATO and U.S. bases overseas, will be at low-to-moderate risk. At highest risk will be U.S. military forces deployed in support of humanitarian and peacekeeping operations in developing countries.

- The infectious disease burden will weaken the military capabilities of some countries—as well as international peacekeeping efforts—as their armies and recruitment pools experience HIV infection rates ranging from ten to sixty percent. The cost will be highest among officers and the more modernized militaries in sub-Saharan Africa and increasingly among FSU states and possibly some rogue states.

- Infectious diseases are likely to slow socio-economic development in the hardest-hit developing and former communist countries and regions. This will challenge democratic development and transitions and possibly contribute to humanitarian emergencies and civil conflicts.

- Infectious disease-related embargoes and restrictions on travel and immigration will cause frictions among and between developed and developing countries.

- The probability of a bioterrorist attack against U.S. civilian and military personnel overseas or in the United States also is likely to grow as more states and groups develop a biological warfare capability. Although there is no evidence that the recent West Nile virus outbreak in New York City was caused by foreign state or non-state actors, the scare and several earlier instances of suspected bioterrorism showed the confusion and fear they can sow regardless of whether or not they are validated.

Discussion

Patterns of Infectious Diseases

Broad advances in controlling or eradicating a growing number of infectious diseases—such as tuberculosis (TB), malaria, and smallpox—in the decades after the Second World War fueled hopes that the global infectious disease threat would be increasingly manageable. Optimism regarding the battle against infectious diseases peaked in 1978 when the United Nations (UN) member states signed the "Health for All 2000" accord, which predicted that even the poorest nations would undergo a health transition before the millennium, whereby infectious diseases no longer would pose a major danger to human health. As recently as 1996, a World Bank/World Health Organization (WHO)–sponsored study by Christopher J.L. Murray and Alan D. Lopez projected a dramatic reduction in the infectious disease threat. This optimism, however, led to complacency and overlooked the role of such factors as expanded trade and travel and growing microbial resistance to existing antibiotics in the spread of infectious diseases. Today:

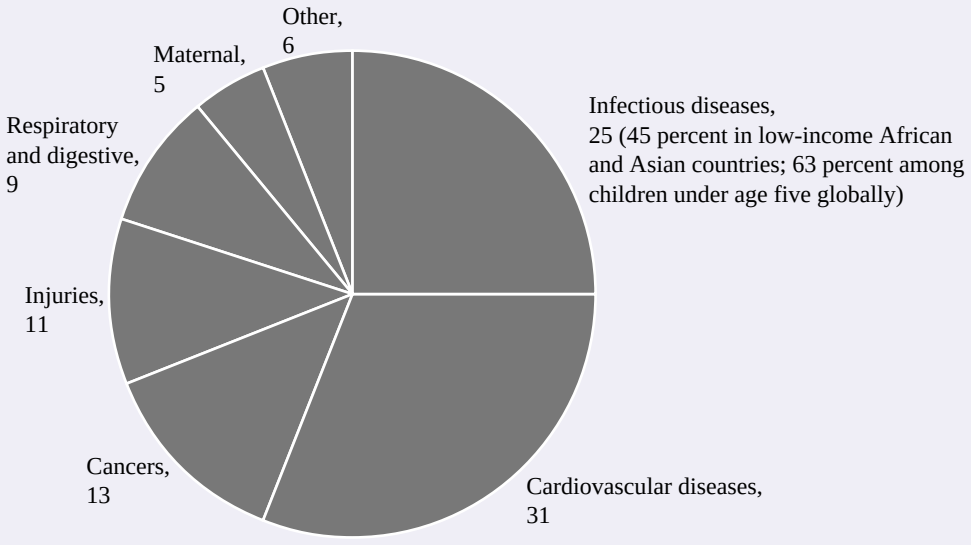
- Infectious diseases remain a leading cause of death (see Figure 1). Of the estimated fifty-four million deaths worldwide in 1998, about one-fourth to one-third were due to infectious diseases, most of them in developing countries and among children globally.

- Infectious diseases accounted for forty-one percent of the global disease burden measured in terms of Disability-Adjusted Life Years (DALYS) that gauge

Figure 1
Leading Causes of Death, 1998

53.9 million from all causes, worldwide.

Percent



Note: Cancers, cardiovascular, and respiratory/digestive deaths can also be caused by infections and raise the percentage of deaths due to infectious diseases even more.
Source: WHO, 1999.

the impact of both deaths and disabilities, as compared to forty-three percent for noninfectious diseases and sixteen percent for injuries.

- Although there has been continuing progress in controlling some vaccine-preventable childhood diseases such as polio, neonatal tetanus, and measles, a White House–appointed interagency working group identified at least twenty-nine previously unknown diseases that have appeared globally since 1973, many of them incurable, including HIV/AIDS, Ebola hemorrhagic fever, and hepatitis C. Most recently, Nipah encephalitis was identified. Twenty well-known diseases such as malaria, TB, cholera, and dengue have rebounded after a period of decline or spread to new regions, often in deadlier forms (see Table 1).

- These trends are reflected in the United States as well, where annual infectious disease deaths have nearly doubled to some 170,000 since 1980 after reaching historic lows that year, while new and existing pathogens, such as HIV and West Nile virus, respectively, continue to enter U.S. borders.

The Deadly Seven

The seven infectious diseases that caused the highest number of deaths in 1998, according to WHO and the Defense Intelligence Agency's Armed Forces Medical Intelligence Center (AFMIC), will remain threats well into the next century. HIV/AIDS, TB, malaria, and hepatitis B and C—are either spreading or becoming more drug-resistant, while lower respiratory infections,

Table 1. Examples of Pathogenic Microbes and the Diseases They Cause, Identified Since 1973

Year	Microbe	Type	Disease
1973	Rotavirus	Virus	Infantile diarrhea
1977	Ebola virus	Virus	Acute hemorrhagic fever
1977	*Legionella pneumophila*	Bacterium	Legionnaires' disease
1980	Human T-lymphotrophic virus I (HTLV 1)	Virus	T-cell lymphoma/leukemia
1981	Toxin-producing *Staphylococcus aureus*	Bacterium	Toxic shock syndrome
1982	*Escherichia coli O157:H7*	Bacterium	Hemorrhagic colitis; hemolytic uremic syndrome
1982	*Borrelia burgdorferi*	Bacterium	Lyme disease
1983	Human Immunodeficiency Virus (HIV)	Virus	Acquired Immuno-Deficiency Syndrome (AIDS)
1983	*Helicobacter pylori*	Bacterium	Peptic ulcer disease
1989	Hepatitis C	Virus	Parentally transmitted non-A, non-B liver infection
1992	*Vibrio cholerae O139*	Bacterium	New strain associated with epidemic cholera
1993	Hantavirus	Virus	Adult respiratory distress syndrome
1994	Cryptosporidium	Protozoa	Enteric disease
1995	Ehrlichiosis	Bacterium	Severe arthritis
1996	nvCJD	Prion	New variant Creutzfeldt-Jakob disease
1997	HVN1	Virus	Influenza
1999	Nipah	Virus	Severe encephalitis

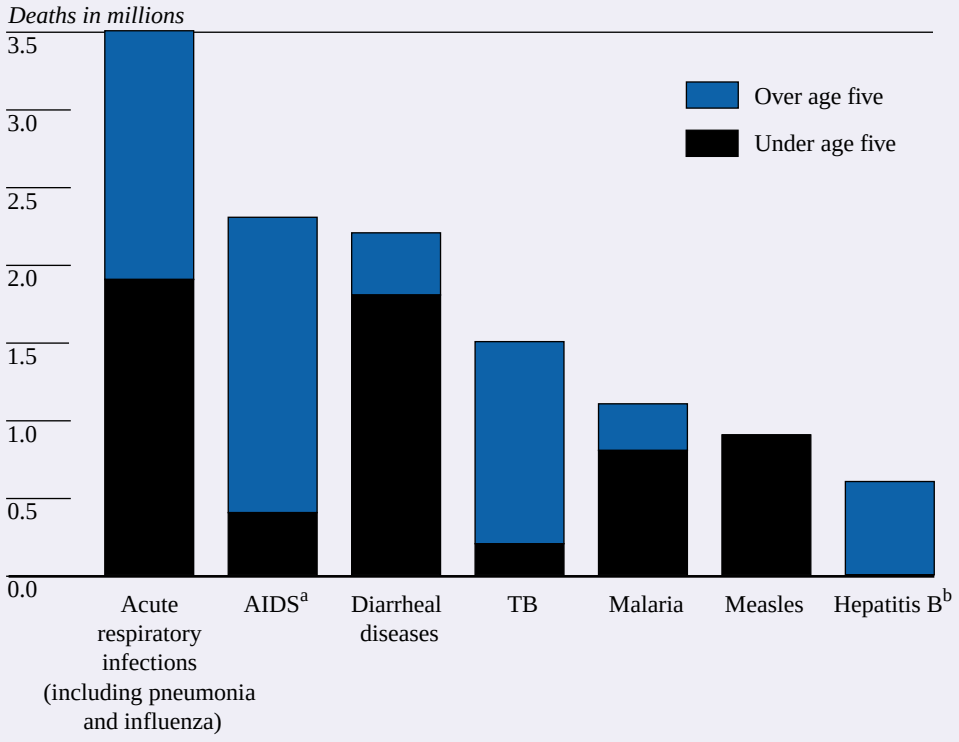
Source: U.S. Institute of Medicine, 1997; WHO, 1999.

diarrheal diseases, and measles, appear to have at least temporarily peaked (see Figure 2).[1]

HIV/AIDS. Following its identification in 1983, the spread of HIV intensified quickly. Despite progress in some regions, HIV/AIDS shows no signs of abating globally (see Figure 3). Approximately 2.3 million people died from AIDS worldwide in 1998, up dramatically from 0.7 million in 1993, and there were 5.8 million new infections. According to WHO, some 33.4 million people were living with HIV by 1998, up from ten million in 1990, and the number could approach forty million by the end of 2000. Although infection and death rates have slowed considerably in developed countries owing to the growing use of preventive measures and costly new multidrug treatment therapies, the pandemic continues to spread in much of the developing world, where ninety-five percent of global infections and deaths have occurred. Sub-Saharan Africa currently has the biggest regional burden, but the disease is spreading quickly in India, Russia, China, and much of the rest of Asia. HIV/AIDS probably will cause more deaths than any other single infectious disease worldwide by 2020 and may account for up to one-half or more of infectious disease deaths in the developing world alone.

TB. WHO declared TB a global emergency in 1993 and the threat continues to grow, especially from multidrug resistant TB (see Figure 4). The disease is especially prevalent in Russia, India, Southeast Asia, sub-Saharan Africa, and parts of Latin America. More than 1.5 million people died of TB in 1998, excluding those infected with HIV/AIDS, and there were up to 7.4 million new cases. Although the vast majority of TB infections and deaths occur in developing regions, the disease also is encroaching into developed regions due to increased immigration and travel and less emphasis on prevention. Drug resistance is a growing problem;

Figure 2
Leading Infectious Disease Killers, 1998



[a] HIV-positive people who died with TB have been included among AIDS deaths.
[b] Figure for hepatitis B is for 1997 and is not broken down by age.
Source: WHO, 1998, 1999.

the WHO has reported that up to fifty percent of people with multidrug resistant TB may die of their infection despite treatment, which can be ten to fifty times more expensive than that used for drug-sensitive TB. HIV/AIDS also has contributed to the resurgence of TB. One-quarter of the increase in TB incidence involves co-infection with HIV. TB probably will rank second only to HIV/AIDS as a cause of infectious disease deaths by 2020.

Malaria, a mainly tropical disease that seemed to be coming under control in the 1960s and 1970s, is making a deadly comeback—especially in sub-Saharan

Figure 3
Global HIV/AIDS Prevalence, 1998

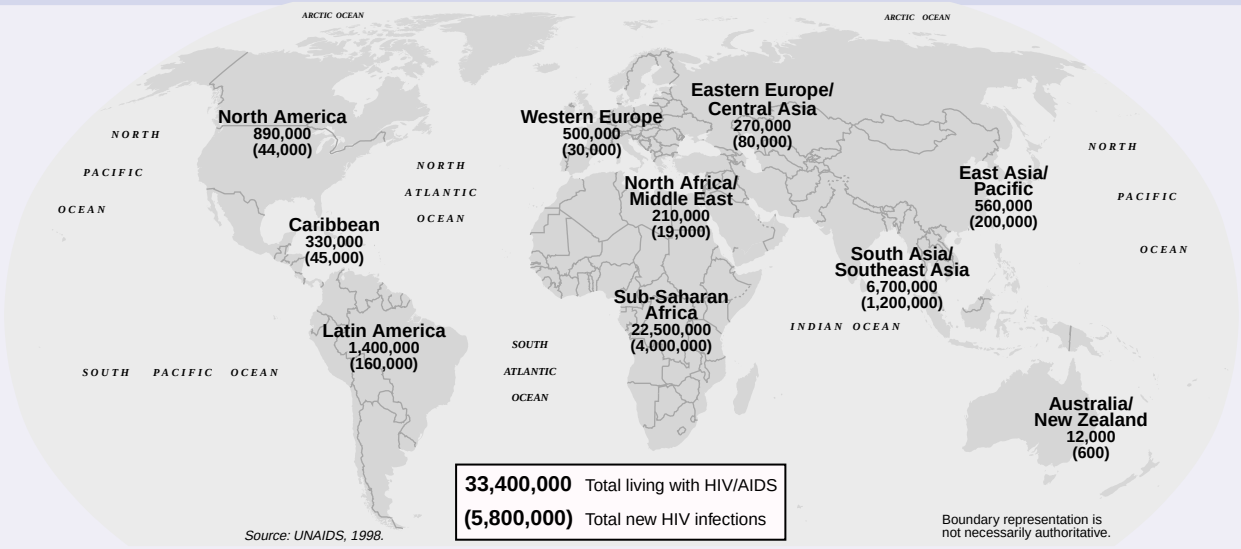
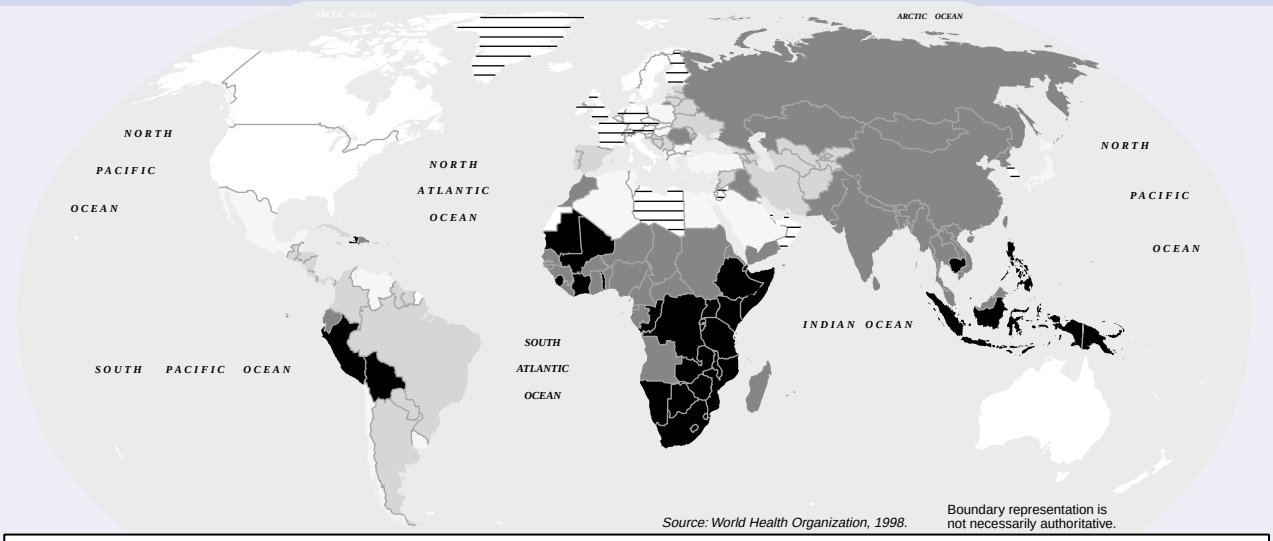


Figure 4
Estimated TB Incidence, 1997



Africa where infection rates increased by forty percent from 1970 to 1997 (see Figure 5). Drug resistance, historically a problem only with the most severe form of the disease, is now increasingly reported in the milder variety, while the prospects for an effective vaccine are poor. In 1998, an estimated 300 million people were infected with malaria, and more than 1.1 million died from the disease that year. Most of the deaths occurred in sub-Saharan Africa. According to the U.S. Agency for International Development (USAID), sub-Saharan

Figure 5
Malaria-Endemic Regions, 1997

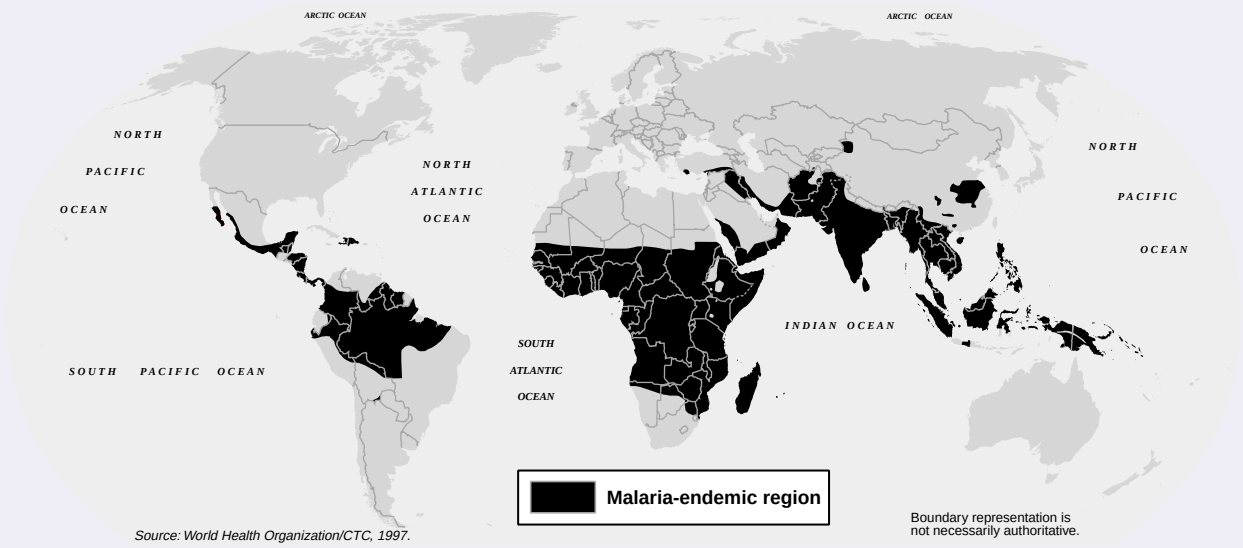
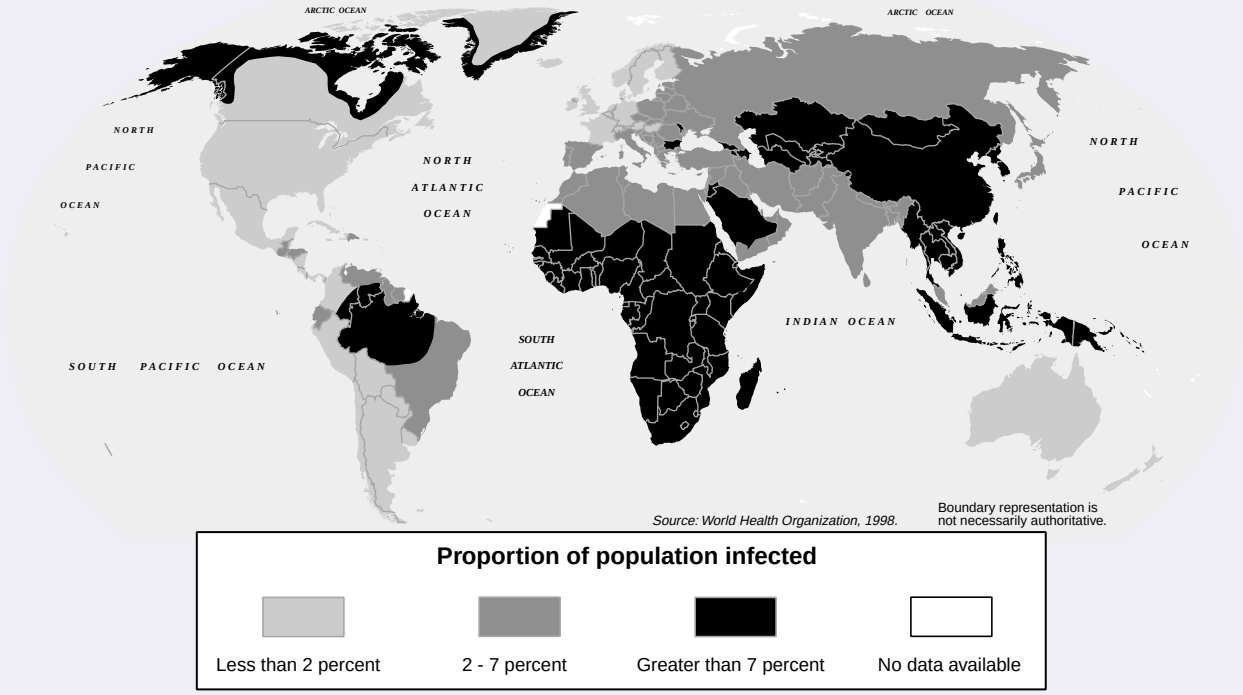


Figure 6
Estimated Hepatitis B Prevalence, 1997



Africa alone is likely to experience a seven to twenty percent annual increase in malaria-related deaths and severe illnesses over the next several years.

Hepatitis B and C. Hepatitis B, which caused at least 0.6 million deaths in 1997, is highly endemic in the developing world, and some 350 million people worldwide are chronic carriers (see Figure 6). The less prevalent but far more lethal hepatitis C identified in

Figure 7
Estimated Hepatitis C Prevalence, 1998

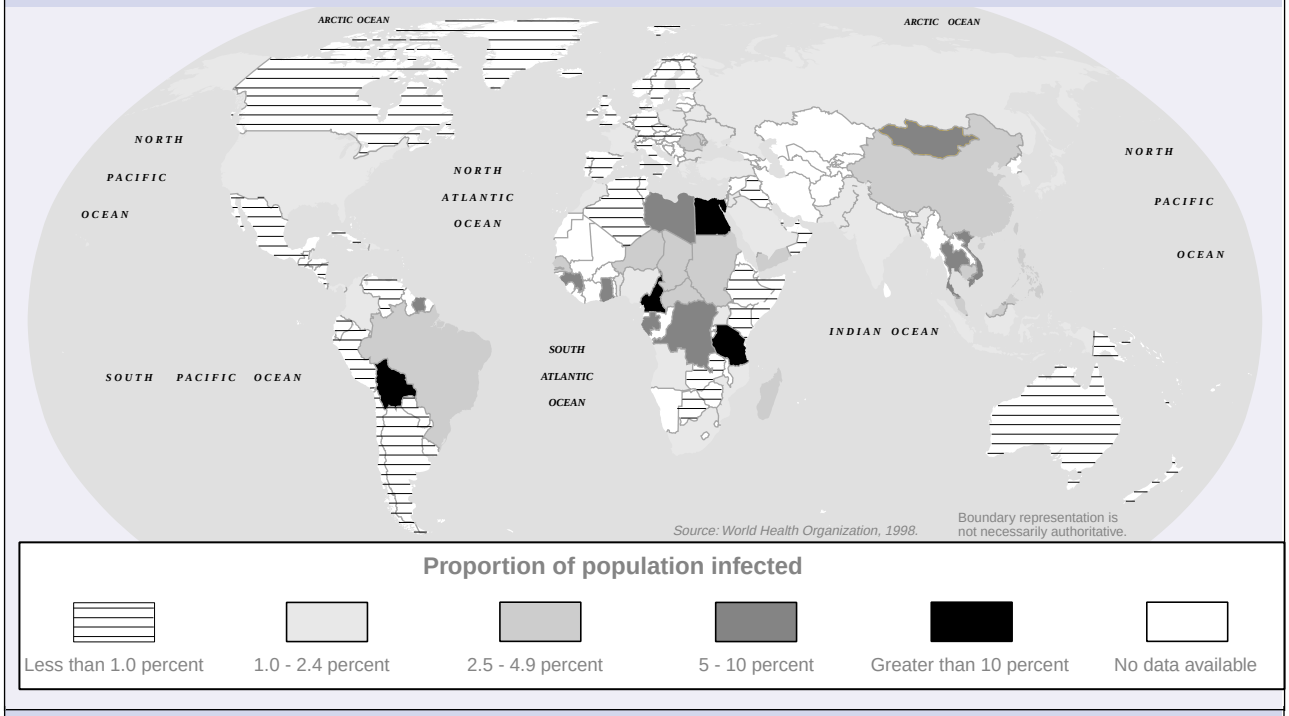
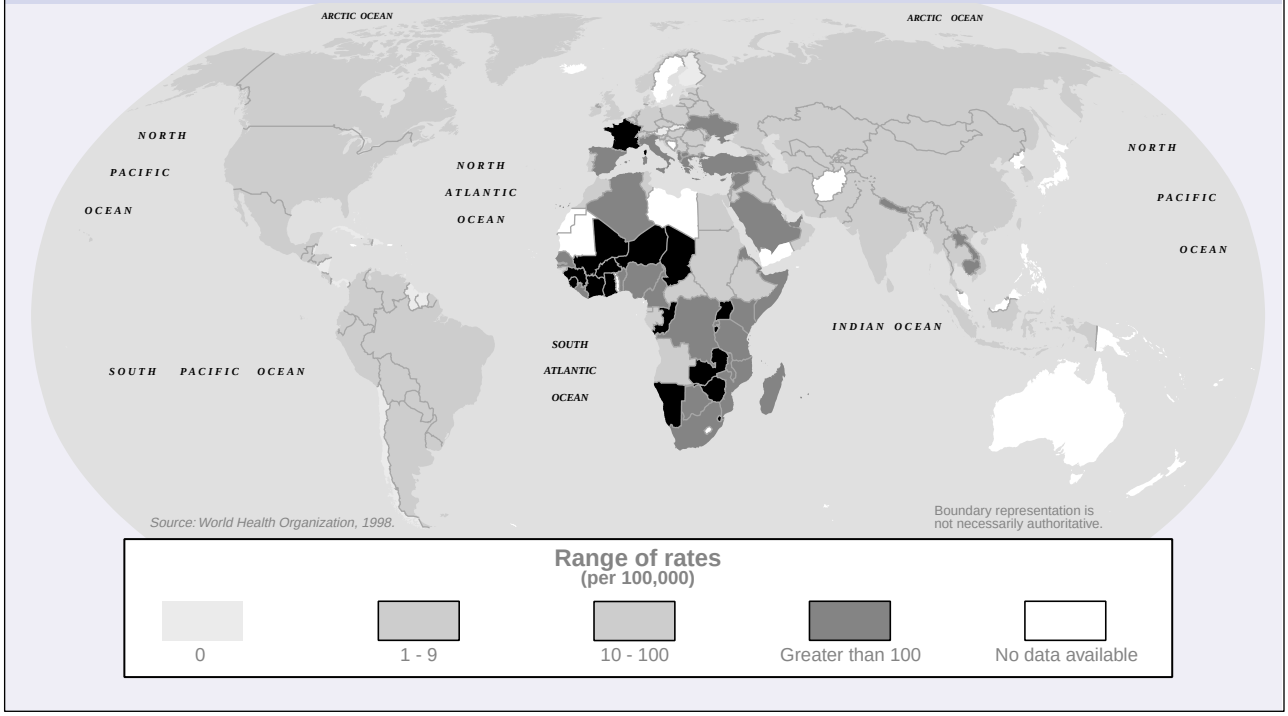


Figure 8
Reported Measles Incidence Rates, 1996



1989 has grown dramatically and is a significant contributor to cirrhosis and liver cancer. WHO estimated that three percent of the global population was infected with the hepatitis C virus by 1997 (see Figure 7), which means that more than 170 million people were at risk of developing the diseases associated with this virus. Various studies project that up to twenty-five percent of people with chronic hepatitis B and C will die of cirrhosis of the liver and liver cancer over the next twenty to thirty years.

Lower respiratory infections, especially influenza and pneumonia, killed 3.5 million people in 1998, most of them children in developing countries, down from 4.1 million in 1993. Owing to immunosuppression from malnutrition and growing microbial resistance to commonly used drugs such as penicillin, these children are especially vulnerable to such diseases and will continue to experience high death rates.

Diarrheal diseases- mainly spread by contaminated water or food—accounted for 2.2 million deaths in 1998, as compared to three million in 1993, of which about sixty percent occurred among children under five years of age in developing countries. The most common cause of death related to diarrheal diseases is infection with *Escherichia coli*. Other diarrheal diseases include cholera, dysentery, and rotaviral diarrhea, prevalent throughout the developing world and, more recently, in many former communist states. Such waterborne and foodborne diseases will remain highly prevalent in these regions in the absence of improvements in water quality and sanitation.

Measles. Despite substantial progress against measles in recent years, the disease still infects some forty-two million children annually and killed about 0.9 million in 1998, down from 1.2 million in 1993. It is a leading cause of death among refugees and internally displaced persons during complex humanitarian emergencies. Measles will continue to pose a major threat in developing countries (see Figure 8), particularly sub-Saharan Africa, until the still relatively low vaccination rates are substantially increased. It also will continue to cause periodic epidemics in areas such as South America with higher, but still inadequate, vaccination rates.

Table 2. Factors Contributing to Infectious Disease Reemergence and Associated Diseases

Contributing Factor(s)	Associated Infectious Diseases
Human demographics and behavior	Dengue/dengue hemorrhagic fever, sexually transmitted diseases, giardiasis
Technology and industry	Toxic shock syndrome, nosocomial (hospital-acquired) infections, hemorrhagic colitis/hemolytic uremic syndrome
Economic development and land use	Lyme disease, malaria, plague, rabies, yellow fever, Rift Valley fever, schistosomiasis
International travel and commerce	Malaria, cholera, pneumococcal pneumonia
Microbial adaptation and change	Influenza, HIV/AIDS, malaria, *Staphylococcus aureus* infections
Breakdown of public health measures	Rabies, tuberculosis, trench fever, diphtheria, whooping cough (pertussis), cholera
Climate change	Malaria, dengue, cholera, yellow fever

Source: Adapted from U.S. Institute of Medicine, 1997.

Factors Affecting Growth and Spread

With few exceptions, the resurgence of the infectious disease threat is due as much to dramatic changes in human behavior and broader social, economic, and technological developments as to mutations in pathogens (see Table 2). Changes in human behavior include population dislocations, living styles, and sexual practices; technology-driven medical procedures entailing some risks of infection; and land use patterns. They also include rising international travel and commerce that hasten the spread of infectious diseases; inappropriate use of antibiotics that leads to the development of microbial resistance; and the breakdown of public health systems in some countries owing to war or economic decline. In addition, climate changes enable diseases and vectors to expand their range. Several of these factors interact, exacerbating the spread of infectious diseases.

Human Demographics and Behavior

Population growth and urbanization, particularly

in the developing world, will continue to facilitate the transfer of pathogens among people and regions. Frequent and often sudden population movements within and across borders caused by ethnic conflict, civil war, and famine will continue to spread diseases rapidly in affected areas, particularly among refugees. As of 1999, there were some twenty-four major humanitarian emergencies worldwide involving at least thirty-five million refugees and internally displaced people. Refugee camps, found mainly in sub-Saharan Africa and the Middle East, facilitate the spread of TB, HIV, cholera, dysentery, and malaria. Well over 120 million people lived outside the country of their birth in 1998, and millions more will emigrate annually, increasing the spread of diseases globally. Behavioral patterns, such as unprotected sex with multiple partners and intravenous drug use, will remain key factors in the spread of HIV/AIDS.

Technology, Medicine, and Industry

Although technological breakthroughs will greatly facilitate the detection, diagnosis, and control of certain infectious and noninfectious illnesses, they also will introduce new dangers, especially in the developed world where they are used extensively. Invasive medical procedures will result in a variety of hospital-acquired infections, such as *Staphylococcus aureus*. The globalization of the food supply means that non-hygienic food production, preparation, and handling practices in originating countries can introduce pathogens endangering foreign as well as local populations. Disease outbreaks due to *Cyclospora spp*, *Escherichia coli*, and *Salmonella spp*. in several countries, along with the emergence, primarily in Britain, of Bovine Spongiform Encephalopathy, or "mad cow" disease, and the related new variant Creutzfeldt-Jakob disease (nvCJD) affecting humans, result from such food practices.

Economic Development and Land Use

Changes in land and water use patterns will remain major factors in the spread of infectious diseases. The emergence of Lyme disease in the United States and Europe has been linked to reforestation and increases in the deer tick population, which acts as a vector, while conversion of grasslands to farming in Asia encourages the growth of rodent populations carrying hemorrhagic fever and other viral diseases. Human encroachment on tropical forests will bring populations into closer proximity with insects and animals carrying diseases such as leishmaniasis, malaria, and yellow fever, as well as heretofore unknown and potentially dangerous diseases, as was the case with HIV/AIDS. Close contact between humans and animals in the context of farming will increase the incidence of zoonotic diseases—those transmitted from animals to humans. Water management efforts, such as dambuilding, will encourage the spread of water-breeding vectors such as mosquitoes and snails that have contributed to outbreaks of Rift Valley fever and schistosomiasis in Africa.

International Travel and Commerce

The increase in international air travel, trade, and tourism will dramatically increase the prospects that infectious disease pathogens such as influenza—and vectors such as mosquitoes and rodents—will spread quickly around the globe, often in less time than the incubation period of most diseases. Earlier in the decade, for example, a multidrug resistant strain of *Streptococcus pneumoniae* originating in Spain spread throughout the world in a matter of weeks, according to the director of WHO's infectious disease division. The cross-border movement of some two million people each day, including one million between developed and developing countries each week, and surging global trade ensure that travel and commerce will remain key factors in the spread of infectious diseases.

Microbial Adaptation and Resistance

Infectious disease microbes are constantly evolving, oftentimes into new strains that are increasingly resistant to available antibiotics. As a result, an expanding number of strains of diseases—such as TB, malaria, and pneumonia—will remain difficult or virtually impossible to treat. At the same time, large-scale use of antibiotics in both humans and livestock will continue to encourage development of microbial resistance. The firstline drug treatment for malaria is no longer effective in over eighty of the ninety-two countries where the disease is a major health problem. Penicillin has substantially lost its effectiveness against several diseases, such as pneumonia, meningitis, and gonorrhea, in many countries. Eighty percent of *Staphylococcus aureus* isolates in the United States, for example, are penicillin-resistant and thirty-two percent are methicillin-resistant. A U.S. Centers for Disease Control and Prevention (USCDC) study found a sixty-fold increase in high-level resistance to penicillin among one group of *Streptococcus pneumoniae* cases in the United States and significant resistance to multidrug therapy as well. Influenza viruses, in particular, are particularly efficient in their ability to survive and genetically change, sometimes into deadly strains. HIV also displays a high rate of genetic mutation that will present significant problems in the development of an effective vaccine or new, affordable therapies.

Breakdown in Public Health Care

Alone or in combination, war and natural disasters, economic collapse, and human complacency are causing a breakdown in health care delivery and facilitating the emergence or reemergence of infectious diseases. While sub-Saharan Africa is the area currently most affected by these factors, economic problems in Russia and other former communist states are creating the context for a large increase in infectious diseases. The deterioration of basic health care services largely accounts for the reemergence of diphtheria and other vaccine-preventable diseases, as well as TB, as funds for vaccination, sanitation, and water purification have dried up. In developed countries, past inroads against infectious diseases led to a relaxation of preventive measures such as surveillance and vaccination. Inadequate infection control practices in hospitals will remain a major source of disease transmission in developing and developed countries alike.

Climate Change

Climatic shifts are likely to enable some diseases and associated vectors—particularly mosquito-borne diseases such as malaria, yellow fever, and dengue—to spread to new areas. Warmer temperatures and increased rainfall already have expanded the geographic range of malaria to some highland areas in sub-Saharan Africa and Latin America and could add several million more cases in developing country regions over the next two decades. The occurrence of waterborne diseases associated with temperature-sensitive environments, such as cholera, also is likely to increase.

Regional Trends and Response Capacity

The overall level of global health care capacity has improved substantially in recent decades, but in most poorer countries the availability of various types of health care—ranging from basic pharmaceuticals and postnatal care to costly multidrug therapies—remains very limited. Almost all research and development funds allocated by developed country governments and pharmaceutical companies, moreover, are focused on advancing therapies and drugs relevant to developed country maladies, and those that are relevant to developing country needs usually are beyond their financial reach. This is generating a growing controversy between rich and poorer nations over such issues as intellectual property rights, as some developing countries seek to meet their pharmaceutical needs with locally produced generic products. Malnutrition, poor sanitation, and poor water quality in developing countries also will continue to add to the disease burden that is overwhelming health care infrastructures in many countries. So too, will political instability and conflict and the reluctance of many governments to confront issues such as the spread of HIV/AIDS.

Sub-Saharan Africa

Sub-Saharan Africa will remain the region most affected by the global infectious disease phenomenon —accounting for nearly half of infectious disease-caused deaths worldwide. Deaths from HIV/AIDS, malaria, cholera, and several lesser known diseases exceed those in all other regions. Sixty-five percent of all deaths in sub-Saharan Africa are caused by infectious diseases. Rudimentary health care delivery and response systems, the unavailability or misuse of drugs, the lack of funds, and the multiplicity of conflicts are exacerbating the crisis. According to the AFMIC typology, with the exception of southern Africa, most of sub-Saharan Africa falls in the lowest category. Investment in health care in the region is minimal, less than forty percent of the people in countries such as Nigeria and the Democratic Republic of the Congo (DROC) have access to basic medical care, and even in relatively well off South Africa, only fifty to seventy percent have such access, with black populations at the low end of the spectrum.

Four-fifths of all HIV-related deaths and seventy percent of new infections worldwide in 1998 occurred in the region, totaling 1.8-2 million and four million, respectively. Although only a tenth of the world's population lives in the region, 11.5 million of 13.9 million cumulative AIDS deaths have occurred there. Eastern and southern African countries, including South Africa, are the worst affected, with ten to twenty-six percent of adults infected with the disease. Sub-Saharan Africa has high TB prevalence, as well as the highest HIV/TB co-infection rate, with TB deaths totaling 0.55 million in 1998. The hardest hit countries are in equatorial and especially southern Africa. South Africa, in particular, is facing the biggest increase in the region.

Sub-Saharan Africa accounts for an estimated ninety percent of the global malaria burden (see Figure 9). Ten percent of the regional disease burden is attributed to malaria, with roughly one million deaths in 1998. Cholera, dysentery, and other diarrheal diseases also are major killers in the region, particularly among children, refugees, and internally displaced populations. Forty percent of all childhood deaths from diarrheal diseases occur in sub-Saharan Africa. The region also has a high rate of hepatitis B and C infections and is the only region with a perennial meningococcal meningitis problem in a

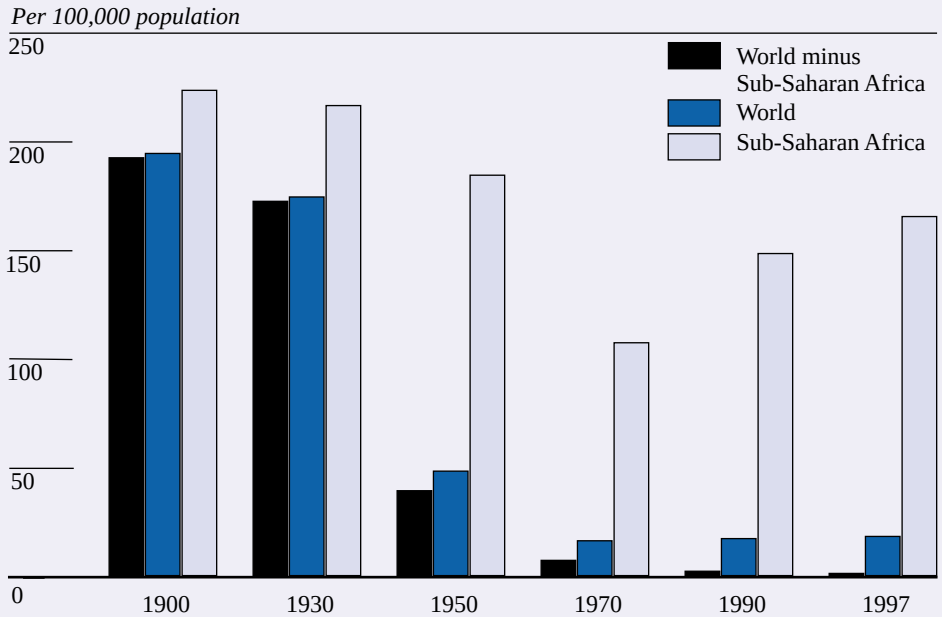
"meningitis belt" stretching from west to east. Sub-Saharan Africa also suffers from yellow fever, while trypanasomiasis or "sleeping sickness" is making a comeback in the DROC and Sudan, and the Marburg virus also appeared in DROC for the first time in 1998. Ebola hemorrhagic fever strikes sporadically in countries such as the DROC, Gabon, Cote d'Ivoire, and Sudan.

Asia and the Pacific

Although the more developed countries of Asia and the Pacific, such as Japan, South Korea, Australia, and New Zealand, have strong records in combating infectious diseases, infectious disease prevalence in South and Southeast Asia is almost as high as in Sub-Saharan Africa. The health care delivery system of the Asia and Pacific region—the majority of which is privately financed—is particularly vulnerable to economic downturns even though this is offset to some degree by much of the region's reliance on traditional medicine from local practitioners. According to the AFMIC typology, ninety to one hundred percent of the populations in the most developed countries, such as Japan and Australia, have access to high-quality health care. Forty to fifty percent have such access among the large populations of China and South Asia, while southeast Asian health care is more varied, with less than forty percent enjoying such access in Burma and Cambodia, and fifty to seventy percent in Thailand, Malaysia, and the Philippines. In South and Southeast Asia, reemergent diseases such as TB, malaria, cholera, and dengue fever are rampant, while HIV/AIDS, after a late start, is growing faster than in any other region.

TB caused one million deaths in the Asia and Pacific region in 1998, more than any other single disease, with India and China accounting for two-thirds of the total. Several million new cases occur annually—most in India, China, and Indonesia—representing as much as forty percent of the global TB burden. HIV/AIDS is increasing dramatically, especially in India, which leads the world in absolute numbers of HIV/AIDS infections, estimated at three to five million. China is better off than most of the countries to its south, but it too has a

Figure 9
Malaria Mortality Annual Rates Since 1900



Source: WHO, 1999.

growing AIDS problem, with HIV infections variously estimated at 0.1-0.4 million and spreading rapidly. Regionwide, the number of people infected with HIV could overtake Sub-Saharan Africa in absolute numbers before 2010.

There were 19.5 million new malaria infections estimated in the Asia and Pacific region in 1998, many of them drug resistant, and 100,000 deaths due to malaria. Acute respiratory infections, such as pneumonia, cause about 1.8 million childhood deaths annually—over half of them in India—while dengue (including dengue hemorrhagic fever/dengue shock syndrome) outbreaks have spread throughout the region in the last five years. Waterborne illnesses such as dysentery and cholera also take a heavy toll in poor and crowded areas. Asian, particularly Chinese, agricultural practices place farm animals, fowl, and humans in close proximity and have long facilitated the emergence of new strains of influenza that cause global pandemics. Hepatitis B is widely prevalent in the region, while hepatitis C is prevalent in China and in parts of southeast Asia. In 1999 the newly recognized Nipah virus spread throughout pig populations in Malaysia, causing more than 100 human deaths there and a smaller number in nearby Singapore.

Latin America

Latin American countries are making considerable progress in infectious disease control, including the eradication of polio and major reductions in the incidence and death rates of measles, neonatal tetanus, some diarrheal diseases, and acute respiratory infections. Nonetheless, infectious diseases are still a major cause of illness and death in the region, and the risk of new and reemerging diseases remains substantial. Widening income disparities, periodic economic shocks, and rampant urbanization have disrupted disease control efforts and contributed to widespread reemergence of cholera, malaria, TB, and dengue, especially in the poorer Central American and Caribbean countries and in the Amazon basin of South America. According to the AFMIC typology, Latin America's health care capacity is substantially more advanced than that of sub-Saharan Africa and somewhat better than mainland Asia's, with seventy to ninety percent of populations having access to basic health care in Chile, Costa Rica, and Cuba on the upper end of the scale. Less than fifty percent have such access in Haiti, most of Central America, and the Amazon basin countries, including the rural populations in Brazil.

Cholera reemerged with a vengeance in the region in 1991 for the first time in a century with 400,000 new cases, and while dropping to 100,000 cases in 1997, it still comprises two-thirds of the global cholera burden. TB is a growing problem regionwide, especially in Brazil, Peru, Argentina, and the Dominican Republic where drug-resistant cases also are on the rise. Haiti does not provide data but probably also has a high infection rate. HIV/AIDS also is spreading rapidly, placing Latin America third behind sub-Saharan Africa and Asia in HIV prevalence. Prevalence is high in Brazil and especially in the Caribbean countries (except Cuba), where two percent of the population is infected. Malaria is prevalent in the Amazon basin. Dengue reemerged in the region in 1976, and outbreaks have taken place in the last few years in most Caribbean countries and parts of South America. Hepatitis B and C prevalence is greatest in the Amazon basin, Bolivia, and Central America, while dengue hemorhagic fever is particularly prevalent in Brazil, Colombia, and Venezuela. Yellow fever has made a comeback over the last decade throughout the Amazon basin, and there have been several recent outbreaks of gastrointestinal disease attributed to E. coli infection in Chile and Argentina. Hemorrhagic fevers are present in almost all South American countries, and most hantavirus pulmonary syndrome occurs in the southern cone.

Middle East and North Africa

The region's conservative social mores, climatic factors, and high levels of health spending in oil-producing states tend to limit some globally prevalent diseases, such as HIV/AIDS and malaria, but others, such as TB and hepatitis B and C, are more prevalent. The region's advantages are partially offset by the impact of war-related uprooting of populations, overcrowded cities with poor refrigeration and sanitation systems, and a dearth of water, especially clean drinking water. Health care capacity varies considerably within the region, according to the AFMIC typology. Israel and the Arabian Peninsula states minus Yemen are in far better shape than Iraq, Iran, Syria, and most of North Africa. Ninety to 100 percent of the Israeli population and seventy to ninety percent of the Saudi population have good access to health care. Elsewhere, access ranges from less than forty percent in Yemen to fifty to seventy percent in the smaller Gulf states, Jordan and Tunisia, while most North African states fall into the forty-to fifty-percent category.

The HIV/AIDS impact is far lower than in other regions, with 210,000 cases, or 0.13 percent of the population, including 19,000 new cases, in 1998. This owes in part to above-average underreporting because of the stigma associated with the disease in Muslim societies and the authoritarian nature of most governments in the region. TB, including multidrug resistant varieties,

is more problematic, especially in Iran, Iraq, Yemen, Libya, and Morocco, with an estimated 140,000 deaths in 1998. Malaria is significant only in Iran, Iraq, and Yemen, but diarrheal and childhood diseases caused 0.3 million deaths each in 1998. Other prominent or re-emerging diseases in the region include all types of hepatitis, with Egypt reporting the highest prevalence worldwide of the C variety. Brucellosis now infects some 90,000 people; leishmaniasis and sandfly fever also are endemic in the region; and various hemorrhagic fevers occur, as well.

The Former Soviet Union and Eastern Europe

The sharp decline in health care infrastructure in Russia and elsewhere in the former Soviet Union (FSU) and, to a lesser extent, in Eastern Europe—owing to economic difficulties—are causing a dramatic rise in infectious disease incidence. Death rates attributed to infectious diseases in the FSU increased fifty percent from 1990 to 1996, with TB accounting for a substantial number of such deaths. According to the AFMIC typology, access to health care ranges from fifty to seventy percent in most European FSU states, including Russia and Ukraine, and from forty to fifty percent in FSU states located in Central Asia. This is generally supported by WHO estimates indicating that only fifty to eighty percent of FSU citizens had regular access to essential drugs in 1997, as compared to more than ninety-five percent a decade earlier as health care budgets and government-provided health services were slashed. Access to health care is generally better in Eastern Europe, particularly in more developed states such as Poland, the Czech Republic, and Hungary, where it ranges from seventy to ninety percent, while only fifty to seventy percent have access in countries such as Bulgaria and Romania. More than ninety-five percent of the population throughout the East European region had such access in 1987, according to WHO.

Crowded living conditions are among the causes fueling a TB epidemic in the FSU, especially among prison populations—while surging intravenous drug use and rampant prostitution are substantially responsible for a marked increase in HIV/AIDS incidence. There were 111,000 new TB infections in Russia alone in 1996, a growing number of them multidrug resistant, and nearly 25,000 deaths due to TB—numbers that could increase significantly following periodic releases of prisoners to relieve overcrowding. The number of new infections for the entire FSU in 1996 was 188,000, while East European cases totaled 54,000. More recent data indicate that the TB infection rate in Russia more than tripled from 1990 to 1998, with 122,000 new cases reported in 1998 and the total number of cases expected to reach one million by 2002. After a slow and late start, HIV/AIDS is spreading rapidly throughout the European part of the FSU beyond the original cohort of intravenous drug users, though it is not yet reflected in official government reporting. An estimated 270,000 people were HIV-positive in 1998, up more than five-fold from 1997. Although Ukraine has been hardest hit, Russia, Belarus, and Moldova have registered major increases. Various senior Russian Health Ministry officials predict that the HIV-positive population in Russia alone could reach one million by the end of 2000 and could reach two million by 2002. East European countries will fare better as renewed economic growth facilitates recovery of their health care systems and better enables them to expand preventive and treatment programs.

> "Infectious diseases are likely to slow socio-economic development in the hardest-hit developing and former communist countries and regions. This will challenge democratic development and transitions and possibly contribute to humanitarian emergencies and civil conflicts."

Diphtheria reached epidemic proportions in the FSU in the first half of the decade, owing to lapses in vaccination. Reported annual case totals grew from 600 cases in 1989 to more than 40,000 in 1994 in Russia, with another 50,000 to 60,000 in the rest of the FSU. Cholera and dysentery outbreaks are occurring with increasing frequency in Russian cities, such as St. Petersburg and Moscow, and elsewhere in the FSU, such as in T'bilisi, owing to deteriorating water treatment and sewerage systems. Hepatitis B and C, spread primarily by intravenous drug use and blood transfusions, are on the rise, especially in the non-European part of the FSU. Polio also has reappeared owing to interruptions in vaccination, with 140 new cases in Russia in 1995.

Western Europe

Western Europe faces threats from a number of emerging and reemerging infectious diseases such as HIV/AIDS, TB, and hepatitis B and C, as well as several zoonotic diseases. Its status as a hub of international travel, commerce, and immigration, moreover, dramatically increases the risks of importing new diseases from other regions. Tens of millions of West Europeans travel to developing countries annually, increasing the prospects for the importation of dangerous diseases, as demonstrated by the importation of typhoid in 1999. Some eighty-eight percent of regional population growth in the first half of the decade was due to immigration; legal immigrants now comprise about six percent of the population, and illegal newcomers number an estimated six million. Nonetheless, the region's highly developed health care infrastructure and delivery system tend to limit the incidence and especially the death rates of most infectious diseases, though not the economic costs. Access to high-quality care is available throughout most of the region, although governments are beginning to limit some heretofore generous health benefits, and a growing anti-vaccination movement in parts of Western Europe, such as Germany, is causing a rise in measles and other vaccine-preventable diseases. The AFMIC typology gives somewhat higher marks to northern over some southern European countries, but the region as a whole is ranked in the highest category, along with North America.

After increasing sharply for most of the 1980s and 1990s, HIV infections, and particularly HIV/AIDS deaths, have slowed considerably owing to behavioral changes among high-risk populations and the availability and funding for multidrug treatment. Some 0.5 million people were living with HIV/AIDS in 1998, down slightly from 510,000 the preceding year, and there were 30,000 new cases and 12,000 deaths, with prevalence somewhat higher in much of southern Europe than in the north. TB, especially its multidrug resistant strains, is on the upswing, as is co-infection with HIV, particularly in the larger countries, with some 50,000 TB cases reported in 1996. Hepatitis C prevalence is growing, especially in southern Europe. Western Europe also continues to suffer from several zoonotic diseases, among which is the deadly new variant Creutzfeldt-Jakob disease (nvCJD), linked to the bovine spongiform encephalopathy or "mad cow disease" outbreak in the United Kingdom in 1995 that has since ebbed following implementation of strict control measures. Other recent disease concerns include meningococcal meningitis outbreaks in the Benelux countries and leishmaniasis-HIV co-infection, especially in southern Europe.

International Response Capacity

International organizations such as WHO and the World Bank, institutions in several developed countries such as the U.S. CDC, and nongovernmental organizations (NGOs) will continue to play an important role in strengthening both international and national surveillance and response systems for infectious diseases. Nonetheless, progress is likely to be slow, and development of an integrated global surveillance and response system probably is at least a decade or more away. This owes to the magnitude of the challenge; inadequate coordination at the international level; and lack of funds, capacity, and, in some cases, cooperation and commitment at the national level. Some countries hide or understate their infectious disease problems for reasons of international prestige and fear of economic losses. Total international health-related aid to low- and middle-income countries—some $2-3 billion annually—remains a fraction of the $250 billion health bill of these countries.

WHO

WHO has the broadest health mandate under the UN system, including establishing health priorities, coordinating global health surveillance, and emergency assistance in the event of disease outbreaks. Health experts give WHO credit for major successes, such as the eradication of smallpox, near eradication of polio, and substantial progress in controlling childhood diseases, and in facilitating the expansion of primary health care in developing countries. It also has come under criticism for becoming top heavy, unfocused in its mission, and overly optimistic in its health projections. WHO defenders blame continued member state parsimony that has kept WHO's regular biennial budget to roughly $850 million for several years and forced it to rely more on voluntary contributions that often come with strings attached as the cause of its shortcomings.

The election last year (1998) of Gro Harlem Bruntland as Secretary General, along with a series of reforms, including expansion of the Emerging and Other Communicable Diseases Surveillance and Control (EMC) Division, has placed WHO in a better position to revitalize itself. Internal oversight and transparency have been expanded, programs and budgets are undergoing closer scrutiny, and management accountability is looming larger. Bruntland has moved quickly to streamline upper-level management and has installed new top managers, mostly from outside the organization, including from the private sector. She also is working to strengthen country offices and to make the

regional offices more responsive to central direction. WHO is increasing its focus on the fight against resurgent malaria, while a better-funded EMC is expanding efforts to establish a global surveillance and response system in cooperation with UNAIDS, UNICEF, and national entities such as the U.S. CDC, the U.S. DoD, and France's Pasteur Institute.

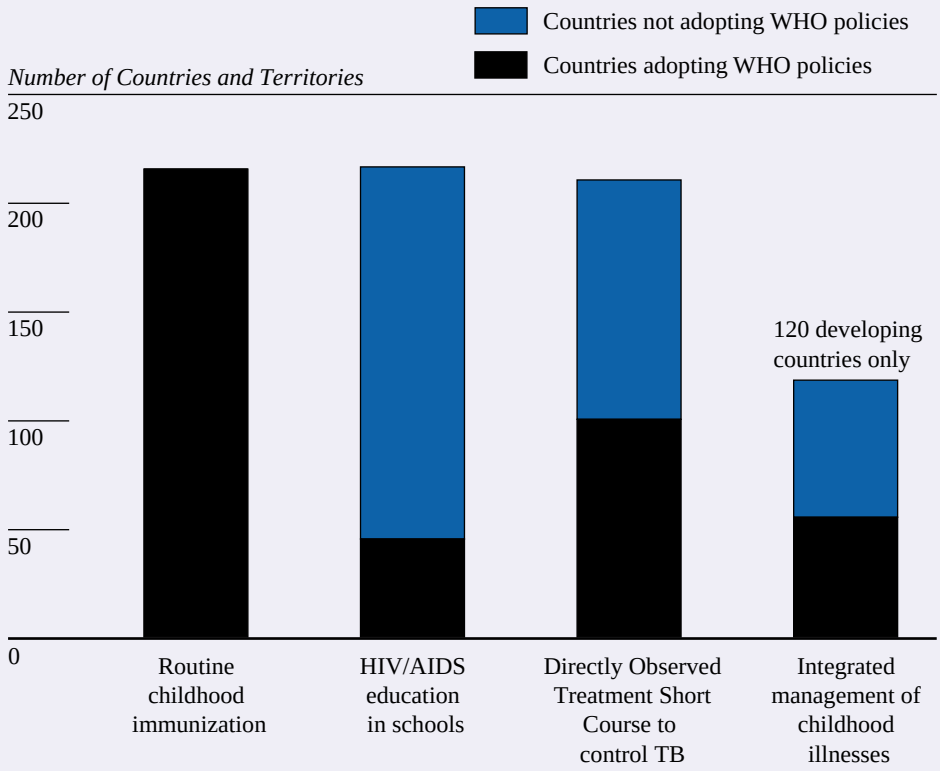
The World Bank

The growing sense that health is linked inexorably to socio-economic development, has prompted the World Bank to expand its health activities. According to a 1997 study by the U.S. Institute of Medicine, the most significant change in the global health arena over the past decade has been the growth in both financial and intellectual influence of the World Bank, whose health loans have grown to $2.5 billion annually, including $800 million for infectious diseases. Health experts generally welcome the Bank's greater involvement in the health sector, viewing it as efficient and responsive in areas such as health sector financial reform. Some remain concerned that the Bank's emphasis on fiscal balance can sometimes have a negative health and social impact in developing countries. Some developing countries resent what they perceive as the domination of Bank decision-making and priority setting by the richer countries.

Nongovernmental Organizations

Another major change in the global health arena over the last decade is the increasingly important role of NGOs, which provide direct assistance, including emergency shelter and aid, as well as long-term domestic health care delivery. NGOs also build community awareness and support for WHO and other international and bilateral surveillance and response efforts. At the same

Figure 10
Inadequate Commitment to Infectious Disease Control Policies at Country Level



Source: WHO, 1999.

Table 3. Projected Change in the Rank Order of Global Disease Burden for Leading Causes, Worldwide 1990-2020, According to the Optimistic Scenario

1990 Rank Order	Disease or Injury	2020 Rank Order
1	Lower respiratory infections	6
2	Diarrheal diseases	9
3	Conditions arising during perinatal period	11
4	Unipolar major depression	2
5	Ischemic heart disease	1
6	Cerebrovascular disease	4
7	Tuberculosis	7
8	Measles	25
9	Road traffic deaths	3
10	Congenital abnormalities	13
11	Malaria	24
12	Chronic obstructive pulmonary disease	5
13	Falls	19
14	Iron-deficiency anemia	39
15	Protein-energy malnutrition	37
16	War	8
17	Self-inflicted injuries	14
19	Violence	12
28	HIV	10
33	Trachea, bronchus, and lung cancers	15

[a]Of the six infectious diseases ranked in 1990, only lower respiratory infections, diarrheal diseases, and measles are trending downward as projected, while malaria is increasing and tuberculosis and HIV are growing far faster than projected. Nonetheless, more pessimistic experts have not developed an alternative model and generally adopt the projections of the Murray and Lopez model.

Source: Adapted from World Bank, WHO, 1996, edited by Christopher J. L. Murray and Alan D. Lopez.

time, health experts note that NGOs, like their governmental counterparts, are driven in part by their own self interests, which sometimes conflict with those of host and donor governments.

Bilateral Assistance

The United States, through USAID, the CDC, the National Institutes for Health (NIH), and the Defense Department's overseas laboratories, is a major contributor to international efforts to combat infectious diseases. It is joined increasingly by other developed nations and regional groupings, such as the European Union (EU), that provide assistance bilaterally, as well as through international organizations and NGOs. The Field Epidemiology Training Programs—run jointly by the CDC and WHO—as well as the EU-U.S. Task Force on Emerging Diseases and the U.S.-Japan Common Scientific Agenda, are key examples of developed-country programs focusing on infectious diseases.

National Limitations

A major obstacle to effective global surveillance and control of infectious diseases will continue to be poor or inaccurate national health statistical reporting by many developing countries and lack of both capacity and will to properly direct aid (see Figure 10) and to follow WHO and other recommended health care practices. Those areas of the world most susceptible to infectious disease problems are least able to develop and maintain the sophisticated and costly communications equipment needed for effective disease surveillance and reporting. In addition to the barriers dictated by low levels of development, revealing an outbreak of a dreaded disease may harm national prestige, commerce, and tourism. For example, nearly every country initially denied or minimized the extent of the HIV/AIDS virus within its borders, and even today, some countries known to have significant rates of HIV infection refuse to cooperate with WHO, which can only publish the information submitted by surveying nations. Only a few, such as Uganda, Senegal, and Thailand, have launched major preventative efforts, while many WHO members do not even endorse AIDS education in schools. Similarly, some countries routinely and falsely deny the existence of cholera within their borders.

Aid programs to prevent and treat infectious diseases in developing countries depend largely on indigenous health workers for their success and cannot be fielded effectively in their absence. Educational programs aimed at preventing disease exposure frequently depend on higher literacy levels and assume cultural and social factors that often are absent.

Alternative Scenarios and Outlook for Infectious Diseases

The impact of infectious diseases over the next twenty years will be heavily influenced by three sets of variables. The first is the relationship between increasing microbial resistance and scientific efforts to develop new antibiotics and vaccines. The second is the trajectory of developing and transitional economies, especially concerning the basic quality of life of the poorest groups in these countries. The third is the degree of success of global and national efforts to create effective systems of surveillance and response. The interplay of these drivers will determine the overall outlook.

On the positive side, reduced fertility and the aging of the population, continued economic development, and improved health care capacity in many countries, especially the more developed, will increase the progress toward a *health transition* by 2020 whereby the impact of infectious diseases ebbs, as compared to noninfectious diseases. On the negative side, continued rapid population growth, urbanization, and persistent poverty in much of the developing world, and the paradox in which some aspects of socio-economic development––such as increased trade and travel—actually foster the spread of infectious diseases, could slow or derail that transition. So, too, will growing microbial resistance among resurgent diseases, such as malaria and TB, and the proliferation or intensification of new ones, such as HIV/AIDS.

Two scenarios—one optimistic and one pessimistic—reflect differences in the international health community concerning the global outlook for infectious diseases. We present and critically assess these scenarios, elaborate on the pessimistic scenario, and develop a third, combining some elements of each, that we judge as more likely to prevail over the period of this Estimate.

The Optimistic Scenario: Steady Progress

According to a key 1996 World Bank/WHO study cited earlier that articulated the optimistic scenario, a *health transition*—resulting from key drivers, such as aging populations, socio-economic development, and medical advances—already is under way in developed countries and also in much of Asia and Latin America that is likely to produce a dramatic reduction in the infectious disease threat. The study projects that deaths caused primarily by infectious diseases will fall steadily from thirty-four percent of the total disease burden in 1990 to fifteen percent in 2020. Those from noninfectious diseases are likely to climb from fifty-five percent of the total disease burden to seventy-three percent, with the remainder of deaths due to accidents and other types of injuries. According to the study's ranking of major disease threats over this thirty-year time frame, noninfectious diseases generally will rise in importance, led by heart disease and mental illness, as will accidental injuries. TB will remain in seventh place in 2020, and HIV/AIDS will move from twenty-eighth place to tenth, with the two combined accounting for more than ninety percent of infectious disease-caused deaths among adults, almost all of them in developing countries. Lower respiratory infections will fall from the top spot to sixth place, however, while measles and malaria will drop precipitously from eighth and eleventh place to twenty-fourth and twenty-fifth, respectively (see Figures 11 and 12).

Scenario Assessment. Our overall judgment is that the "steady progress" scenario is very unlikely to transpire over the time period of this Estimate. Although the scenario captures some real trends, it overstates the progress achievable, while underestimating the risks.

- The global life expectancy increases projected by the optimists are likely to be substantially offset by HIV/AIDS and related diseases, such as TB, which are already causing a major reduction in life expectancy in the most heavily affected sub-Saharan African countries and will be spreading extensively throughout heavily populated Asia during the time period of the Estimate. Optimists acknowledge that HIV/ AIDS and TB will be the overarching infectious disease threats by 2020, but they understate the magnitude of that threat, while their projections of a steep decline in malaria deaths is belied by the disease's resurgence and growing death toll.

- The picture of steady socio-economic progress is not consistent with the most recent surveys of conditions in developing countries undertaken by the United Nations, the World Bank, and other international agencies. These studies point to a slowing of progress in basic social indicators in much of the developing world, even before the recent global financial crisis.

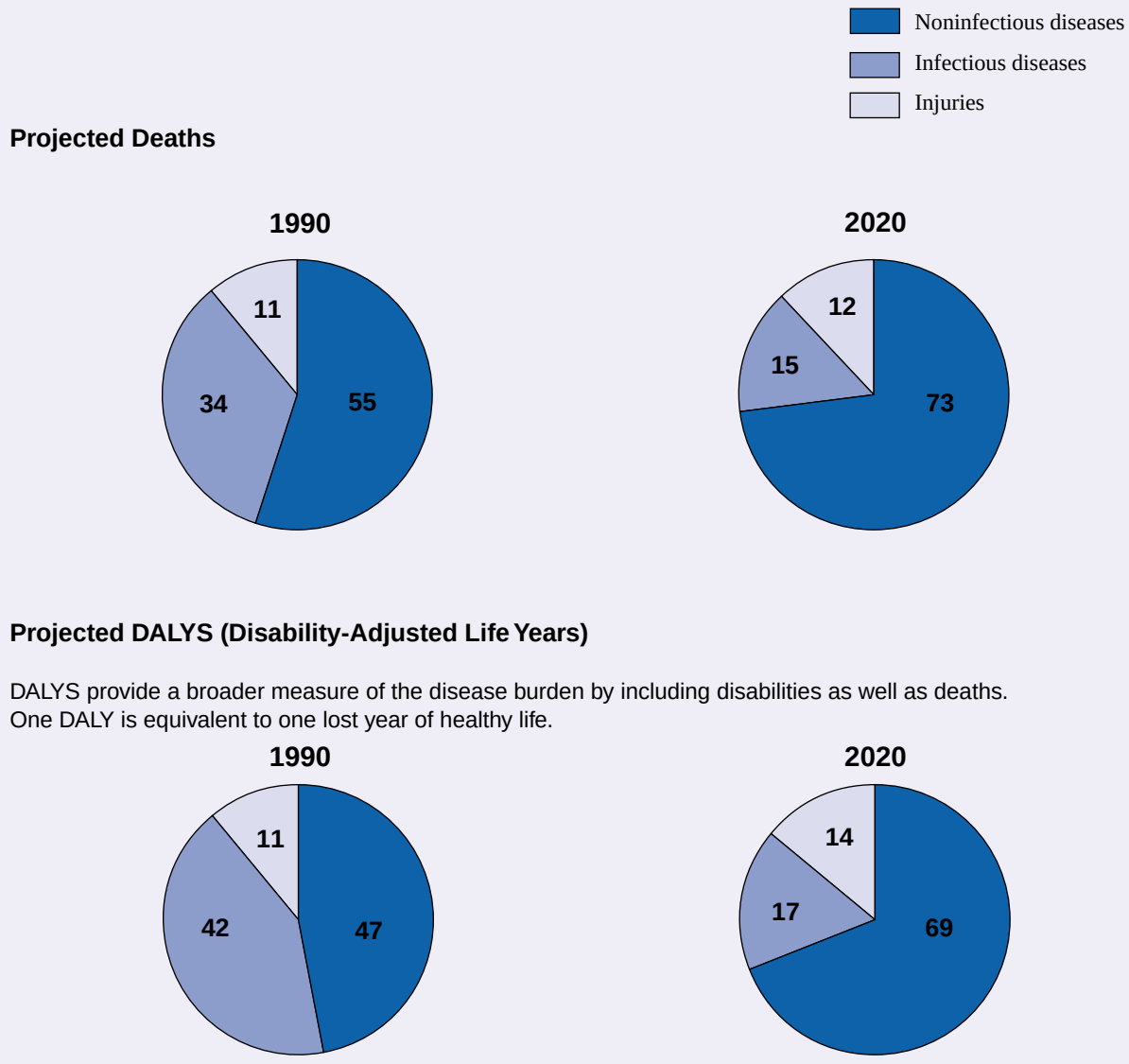
- Although we judge that economic growth is likely to continue, we are less confident that the dramatic reductions in poverty achieved in many countries in the last generation will be sustained. Growth is likely to be halting in many countries, owing to structural economic problems and the impact of recurring developing world economic crises.

- The rapidly expanding costs of many drugs, especially those that attack critical infectious diseases, such as HIV/AIDS and multidrug resistant TB and malaria, threaten to limit the sustainability of improved health care. Furthermore, despite economic growth, pressures on government budgets, especially from rising pension and other costs, may limit the prospects for increased health financing.

- The optimists may place too much emphasis on the steady progress of science, which is inconsistent with the demonstrated difficulty of developing new drugs

Figure 11
Projected Changes in the Global Distribution of Deaths and DALYS by Causes According to the Optimistic Scenario, 1990-2020

Percent



Sources: Adapted from World Bank; WHO; *The Global Burden of Disease*, edited by Christopher J. L. Murray and Alan D. Lopez, 1996.

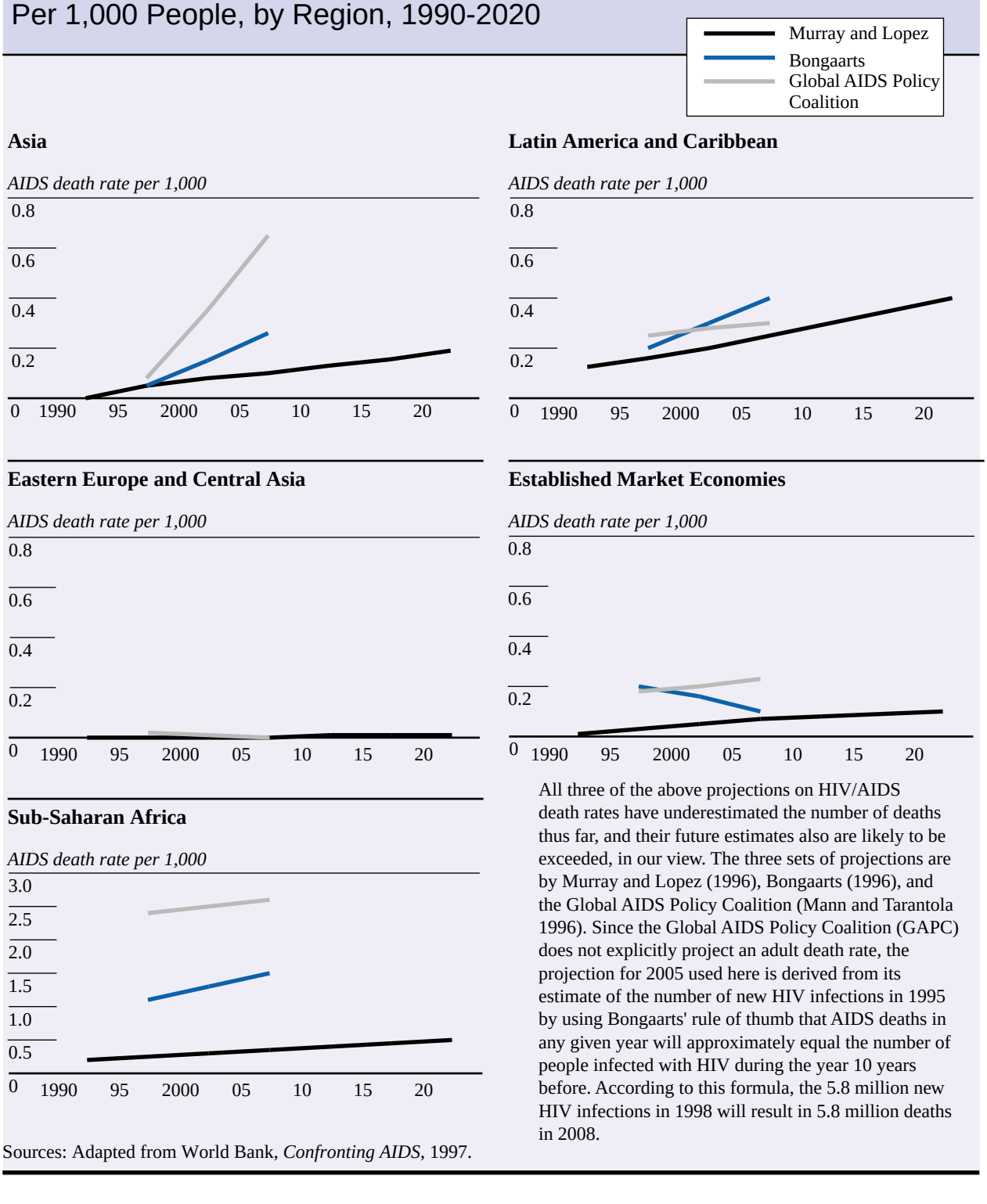
and vaccines for complex pathogens such as HIV and malaria.

The Pessimistic Scenario: Progress Stymied

Surprisingly, even the most pessimistic epidemiologists have done little to project the long-term implications of their analysis and simply adopt the longer term projections of the World Bank/WHO model in the absence of a worst-case model. We have developed a worst case scenario culled from a variety of epidemiological

Figure 12
Various Projected HIV/AIDS Death Rates Per 1,000 People, by Region, 1990-2020

Note scale change



All three of the above projections on HIV/AIDS death rates have underestimated the number of deaths thus far, and their future estimates also are likely to be exceeded, in our view. The three sets of projections are by Murray and Lopez (1996), Bongaarts (1996), and the Global AIDS Policy Coalition (Mann and Tarantola 1996). Since the Global AIDS Policy Coalition (GAPC) does not explicitly project an adult death rate, the projection for 2005 used here is derived from its estimate of the number of new HIV infections in 1995 by using Bongaarts' rule of thumb that AIDS deaths in any given year will approximately equal the number of people infected with HIV during the year 10 years before. According to this formula, the 5.8 million new HIV infections in 1998 will result in 5.8 million deaths in 2008.

Sources: Adapted from World Bank, *Confronting AIDS*, 1997.

and broader health studies. This scenario highlights the dangers posed by microbial resistance among reemergent diseases such as TB and malaria. It takes a more concerned view of new diseases and of the HIV/AIDS pandemic, in particular, and is skeptical about the adequacy of world health care capacity to confront these challenges. It emphasizes continuing and difficult-to-address poverty challenges in developing countries and projects an *incomplete health transition* that prolongs the heavy infectious disease burden in the least developed countries and sustains their role as reservoirs of infection for the rest of the world.

Scenario Assessment. Our overall judgment is that the "progress stymied" scenario, while more plausible than the optimistic scenario, is also unlikely to develop over the period of this Estimate. Although the pessimistic scenario provides an important counterpoint to the assumptions in the "steady progress" scenario, it understates the likely longer term impact of economic development, scientific progress, and political pressures in responding to the infectious disease threat.

- The demographic projections understate the likely impact of continued progress in reducing infant mortality.

- Improvements in the economic conditions of poor countries and the poorest within countries are probably more important for the infectious disease outlook than the widening "prosperity gap" both between countries and within countries. Although the outlook for sub-Saharan Africa remains bleak, for the rest of the world progress against infectious diseases would stall only under the most dire global economic scenario.

- The negative impact on health care delivery of privatization and the transitions in former communist states is likely to be most heavily felt in the immediate future. Free market reforms eventually will improve health care delivery.

- The current success of the "mutating microbes" in the race against scientific innovation will, in and of itself, call forth a greater research effort that will, over time, increase the likelihood of a reversal of this trend.

- The rapid spread of HIV/AIDS in developing and former communist countries is likely to reinvigorate international efforts to address the virus through both medical and behavioral approaches. It will especially give impetus to the search for a more cost-effective approach than at present.

- While growth in surveillance and response capabilities are slow, they are real and are unlikely to be reversed.

The Most Likely Scenario: Deterioration, Then Limited Improvement

According to this scenario, continued deterioration during the first half of our time frame—led by hard core killers such as HIV/AIDS, TB, and malaria—is followed by limited improvement in the second half, owing primarily to gains against childhood and vaccine-preventable diseases such as diarrheal diseases, neonatal tetanus, and measles. The scale and scope of the overall infectious disease threat diminishes, but the remaining threat consists of especially deadly or incurable diseases such as HIV/AIDS, TB, hepatitis C, and possibly, heretofore unknown diseases, with HIV/AIDS and TB likely comprising the overwhelming majority of infectious disease deaths in developing countries alone by 2020.

Scenario Assessment Because some elements of both the optimistic and pessimistic scenarios cited above are likely to appear during the twenty-year time frame of this Estimate, we are likely to witness neither steady progress against the infectious disease threat nor its unabated intensification. Instead, progress is likely to be slow and uneven, with advances, such as the recent development of a new type of antibiotic drug against certain hospital-acquired infections, frequently offset by renewed setbacks, such as new signs of growing microbial resistance among available HIV/AIDS drugs and withdrawal of a promising new vaccine against rotavirus because of adverse side effects. On balance, negative drivers, such as microbial resistance, are likely to prevail over the next decade, but given time, positive ones, such as gradual socio-economic development and improved health care capacity, will likely come to the fore in the second decade.

- The negative trends cited in the pessimistic scenario above, such as persistent poverty in much of the developing world, growing microbial resistance and a dearth of new replacement drugs, inadequate disease surveillance and control capacity, and the high prevalence and continued spread of major killers such as HIV/AIDS, TB, and malaria, are likely to remain ascendant and worsen the overall problem during the first half of our time frame.

- Sub-Saharan Africa, India, and Southeast Asia will

remain the hardest hit by these diseases. The European FSU states and China are likely to experience a surge in HIV/AIDS and related diseases such as TB. The developed countries will be threatened principally by the real possibility of a resurgence of the HIV/AIDS threat owing to growing microbial resistance to the current spectrum of multidrug therapies and to a wide array of other drugs used to combat infectious diseases.

- The broadly positive trends cited in the more optimistic scenario, such as aging populations, global socio-economic development, improved health care capacity, and medical advances, are likely to come to the fore during the second half of our time frame in all but the least developed countries, and even the least developed will experience a measure of improvement.

- Aging populations and expected continued declines in fertility throughout Asia, Latin America, the former FSU states, and sub-Saharan Africa will sharply reduce the size of age cohorts that are particularly susceptible to infectious diseases owing to environmental or behavioral factors.

- Socio-economic development, however fitful, and resulting improvements in water quality, sanitation, nutrition, and education in most developing countries will enable the most susceptible population cohorts to better withstand infectious diseases both physically and behaviorally.

- The worsening infectious disease threat we posit for the first decade of our time frame is likely to further energize the international community and most countries to devote more attention and resources to improved infectious disease surveillance, response, and control capacity. The WHO's new campaign against malaria, recent developed country consideration of tying debt forgiveness for the poorest countries in part to their undertaking stronger commitments to combat disease, self-initiated efforts by sub-Saharan African governments to confront HIV/AIDS, and greater pharmaceutical industry willingness to provide more drugs to poor countries at affordable prices are likely to be harbingers of more such efforts as the infectious disease threat becomes more acute.

- The likely eventual approval of new drugs and vaccines—now in the developmental stage—for major killers such as dengue, diarrheal diseases, and possibly even malaria will further ease the infectious disease burden and help counter the microbial resistance phenomenon.

Together, these developments are likely to set the stage for at least a limited improvement in infectious disease control, particularly against childhood and vaccine-preventable diseases, such as respiratory infections, diarrheal diseases, neonatal tetanus, and measles in most developing and former communist countries. Given time—and barring the appearance of a deadly and highly infectious new disease, a catastrophic expansion of the HIV/AIDS pandemic, or the release of a highly contagious biological agent capable of rapid and widescale secondary spread—such medical advances, behavioral changes, and improving national and international surveillance and response capacities will eventually produce substantial gains against the overall infectious disease threat. In the event that HIV/AIDS takes a catastrophic turn for the worse in both developed and developing countries, even the authors of the optimistic World Bank/WHO model concur that all bets are off.

Economic, Social, and Political Impacts

The persistent infectious disease burden is likely to aggravate and, in extreme cases, may even provoke social fragmentation, economic decay, and political polarization in the hardest hit countries in the developing and former communist worlds in particular, especially in the worst-case scenario outlined above. This, in turn, will hamper progress against infectious diseases. Even under the most likely scenario that posits some attenuation of the infectious disease threat in the second half of our time frame, new and reemergent infectious diseases are likely to have a disruptive impact on global economic, social, and political dynamics.

Economic Impact Likely To Grow Macroeconomic Impact

The macroeconomic costs of the infectious disease burden are increasingly significant for the most seriously affected countries despite the partially offsetting impact of declines in population growth, and they will take an even greater toll on productivity, profitability, and foreign investment in the future. A senior World Bank official considers AIDS to be the single biggest threat to economic development in sub-Saharan Africa. A growing number of studies suggest that AIDS and malaria alone will reduce GDP in several sub-Saharan African

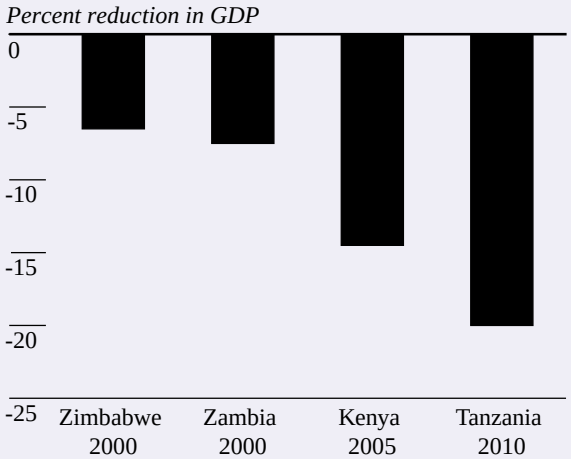
countries by twenty percent or more by 2010.

- The impact of infectious diseases on annual GDP growth in heavily affected countries already amounts to as much as a one-percentage point reduction in the case of HIV/AIDS on average and one to two percentage points for malaria, according to World Bank studies. A recent Namibian study concluded that AIDS cost the country nearly eight percent of GDP in 1996, while a study of Kenya projected that GDP will be 14.5 percent smaller in 2005 than it otherwise would have been without the cumulative impact of AIDS. The annual cost of malaria to Kenya's GDP was estimated at two to six percent and at one to five percent for Nigeria.

Microeconomic Impact

The impact of infectious diseases—especially HIV/AIDS—at the sector and firm level already appears to be substantial and growing and will be reflected eventually in higher GDP losses (see Figure 13), especially in the more advanced developing countries with specialized work force needs.

Figure 13
Projected Impact of AIDS on GDP of Selected Countries in Sub-Saharan Africa



Source: USAID, 1999.

- A recent study by the Zimbabwe Commercial Farmers' Union estimated that production losses due to HIV/AIDS in the communal and resettlement areas—the African farm-holder sector—is close to fifty percent.

- WHO estimates that small farmers in Nigeria and Kenya spend thirteen and five percent, respectively, of total household income on malaria treatment that would otherwise go to other forms of consumption of more benefit to the economy.

Although a 1996 World Bank–sponsored study of nearly 1,000 firms in four African countries focusing solely on the impact of AIDS-related employee turnover concluded that it was not likely to substantially affect firm profits, several individual firms and their AIDS consultants paint a much bleaker picture by 1999. Using broader measures of AIDS-related costs, such as absenteeism, productivity declines, health and insurance payments, and recruitment and training, they projected profits to drop by six to eight percent or more and productivity to decline by five percent. They are especially troubled by the high rate of loss of middle-and upper-level managers to AIDS and the dearth of replacements, as well as the loss of large numbers of skilled workers to AIDS in the mining and other key sectors. According to one expert, South African companies will begin to feel the full impact of the AIDS epidemic by 2005. One study of the projected impact of AIDS on employee benefit costs in South Africa concludes that benefit costs would nearly triple to nineteen percent of salaries from 1995 to 2005, substantially eroding corporate profits.

Fiscal Impact. Infectious diseases will increase pressure on national health bills that already consume some seven to fourteen percent of GDP in developed countries, up to five percent in the better off developing countries, but currently less than two percent in least developed states.

- By 2000, the cumulative direct and indirect costs of AIDS alone are likely to have topped $500 billion, according to estimates by the Global AIDS Policy Coalition at Harvard University. In Latin America, the Pan-American Health Organization in 1994 estimated it would take a decade and $200 billion to bring the cholera pandemic in the region under control through a massive water cleanup effort, or nearly eighty percent of total developing country health spending for that year. The direct costs of fighting malaria in sub-Saharan Africa in-

creased from $800 million in 1989 to $2.2 billion in 1997, largely owing to the far higher cost of treating the growing number of drug-resistant cases, and the trend toward higher costs is likely to continue.

AIDS, along with TB and malaria—particularly the drug-resistant varieties—makes large budgetary claims on national health systems' resources (see Figure 14). Policy choices will continue to be required along at least three dimensions: spending for health versus spending for other objectives; spending more on prevention in order to spend less on treatment; and treating burgeoning AIDS-infected populations versus treating other illnesses.

- Although prevention is cost-efficient—the eradication of smallpox has shaved $20 billion off the global health bill, and polio eradication would save as much as $3 billion annually by 2015—most countries will not be able to afford even basic care for those infected with diseases such as TB and HIV/AIDS. In Zimbabwe, for example, more than half the meager health budget is spent on treating AIDS. Yet, treating one AIDS patient for a year in sub-Saharan Africa costs as much as educating ten primary school students for one year.

- Public health spending on AIDS and related diseases threatens to crowd out other types of health care and social spending. In India, for example, simulated annual government health expenditures in the context of a severe AIDS epidemic in which total expenditures, including AIDS costs, are subsidized at twenty-one percent would add $2 billion annually to the government's health bill through 2010 and $5 billion with a government subsidy of fifty-one percent. In Kenya, HIV/AIDS treatment costs are projected to account for fifty percent of health spending by 2005. In South Africa, such costs could account for thirty-five to eighty-four percent of public health expenditures by 2005, according to one projection.

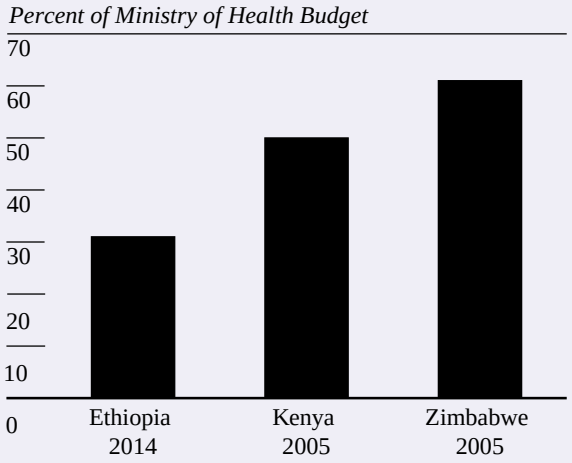
- Even given the budgetary dominance of AIDS, care is likely to be limited to the most basic of therapies. Few countries will be able to afford the high cost of multidrug treatment for HIV/AIDS—or for drug-resistant TB and malaria—ensuring that such diseases will continue to be highly prevalent. Only about one percent of HIV/AIDS patients even in relatively well off South Africa currently undergo multidrug treatment, for example, while it would cost Russia several billion dollars annually to provide such treatment for its surging HIV/AIDS case load—which is unlikely given its fiscal difficulties. In addition to the cost of the drugs, few countries can afford to build and maintain the health care infrastructure that makes effective treatment possible.

Disruptive Social Impact

At least some of the hardest-hit countries, initially in sub-Saharan Africa and later in other regions, will face a demographic catastrophe as HIV/ AIDS and associated diseases reduce human life expectancy dramatically and kill up to a quarter of their populations over the period of this Estimate (see Table 4). This will further impoverish the poor and often the middle class and produce a huge and impoverished orphan cohort unable to cope and vulnerable to exploitation and radicalization.

Life Expectancy and Population Growth. Until the early 1990s, economic development and improved health care had raised the life expectancy in developing coun-

Figure 14
Potential AIDS Treatment Costs in Selected Countries in Sub-Saharan Africa



Note: The number of AIDS patients seeking care is already overwhelming health care systems. In many hospitals in Sub-Saharan Africa, half of hospital beds are now occupied by AIDS patients.
Source: USAID, 1999.

tries to sixty-four years, with prospects that it would go higher still. The growing number of deaths from new and reemergent diseases such as AIDS, however, will slow or reverse this trend toward longer life spans in heavily affected countries by as much as thirty years or more by 2010, according to the U.S. Census Bureau. For example, life expectancy will be reduced by thirty years in Botswana and Zimbabwe, by twenty years in Nigeria and South Africa, by thirteen years in Honduras, by eight years in Brazil, by four years in Haiti, and by three years in Thailand.

Family Structure. The degradation of nuclear and extended families across all classes will produce severe social and economic dislocations with political conse-

Table 4. Projected Demographic Indicators for 2010 in Selected Countries With and Without AIDS

Country	Projected Child Mortality[1] Per 1,000 Live Births, 2010		Projected Life Expectancy, 2010	
	With AIDS	Without	With AIDS	Without
Sub-Saharan Africa				
Botswana	120	38	38	66
Burkina Faso	145	109	46	61
Burundi	129	91	45	61
Cameroon	108	78	50	63
Cote d'Ivoire	121	84	47	62
Dem. Rep. of Congo	116	97	52	60
Ethiopia	183	137	39	55
Kenya	105	45	44	69
Lesotho	122	71	45	66
Malawi	203	136	35	57
Namibia	119	38	39	70
Nigeria	113	68	46	65
Rwanda	166	106	38	59
South Africa	100	49	48	68
Swaziland	152	78	37	63
Tanzania	131	96	46	61
Uganda	121	92	48	60
Zambia	161	97	38	60
Zimbabwe	116	32	39	70
Latin America				
Brazil	31	21	68	76
Haiti	129	119	54	59
Honduras	55	29	60	73
Southeast Asia				
Burma	80	70	59	63
Cambodia	134	124	53	57
Thailand	25	21	73	75

[1]Probable deaths before age 5.

Source: Adapted from United States Bureau of the Census, 1998.

quences, as well. Nearly thirty-five million children in twenty-seven countries will have lost one or both parents to AIDS by 2000; by 2010, this number will increase to 41.6 million. Nineteen of the hardest hit countries are in sub-Saharan Africa, where HIV/AIDS has been prevalent across all social sectors. Children are increasingly acquiring HIV from their mothers during pregnancy or through breast-feeding, ensuring prolongation and intensification of the epidemic and its economic reverberations. With as much as a third of the children under fifteen in hardest-hit countries expected to comprise a "lost orphaned generation" by 2010 with little hope of educational or employment opportunities, these countries will be at risk of further economic decay, increased crime, and political instability as such young people become radicalized or are exploited by various political groups for their own ends; the pervasive child soldier phenomenon may be one example.

Destabilizing Political and Security Impact

In our view, the infectious disease burden will add to political instability and slow democratic development in sub-Saharan Africa, parts of Asia, and the former Soviet Union, while also increasing political tensions in and among some developed countries.

- The severe social and economic impact of infectious diseases, particularly HIV/AIDS, and the infiltration of these diseases into the ruling political and military elites and middle classes of developing countries are likely to intensify the struggle for political power to control scarce state resources. This will hamper the development of a civil society and other underpinnings of democracy and will increase pressure on democratic transitions in regions such as the FSU and sub-Saharan Africa where the infectious disease burden will add to economic misery and political polarization.

- A study by Ted Robert Gurr, *et al*., on the causes of state instability in 127 cases over a forty-year period ending in 1996 suggests that infant mortality is a good indicator of the overall quality of life, which correlates strongly with political instability. According to the research, three variables out of seventy-five—high infant mortality—which in developing countries owes substantially to infectious diseases; low openness to trade; and incomplete democratization accounted for two-thirds of demonstrated instability. The study defined "instability" as revolutionary wars, ethnic wars, genocides, and disruptive regime transitions. High infant mortality has a particularly strong correlation with the likelihood of state failure in partial democracies.

Infectious diseases also will affect national security and international peacekeeping efforts as militaries and military recruitment pools experience increased deaths and disabilities from infectious diseases. The greatest impact will be among hard-to-replace officers, noncommissioned officers, and enlisted soldiers with specialized skills and among militaries with advanced weapons and weapons platforms of all kinds.

- HIV/AIDS prevalence in selected militaries, mostly in sub-Saharan Africa, generally ranges from ten to sixty percent (see Table 5). This is considerably higher than their civilian populations and owes to risky lifestyles and deployment away from home. Commencement of testing and exclusion of HIV-positive recruits in the militaries of a few countries, is reducing HIV prevalence but it continues to grow in most militaries.

- Militaries in key FSU states are increasingly experiencing the impact of negative health developments within their countries, such as deteriorating health infrastructure and reduced funding. One in three Russian draftees currently is rejected for various health reasons, as compared to one in twenty in 1985, according to one Russian newspaper report.

- Mounting infectious disease-caused deaths among the military officer corps in military-dominated and democratizing polities also may contribute to the

Table 5. HIV Prevalence in Selected Militaries in Sub-Saharan Africa

Country	Estimated HIV Prevalence (*percent*)
Angola	40 to 60
Congo (Brazzaville)	10 to 25
Cote d'Ivoire	10 to 20
Democratic Republic of the Congo	40 to 60
Eritrea	10
Nigeria	10 to 20
Tanzania	15 to 30

Source: DIA/AFMIC, 1999.

deprivation, insecurity, and political machinations that incline some to launch coups and counter-coups aimed, more often than not, at plundering state coffers.

It is difficult to make a direct connection between high HIV/AIDS and other infectious disease prevalence in military forces and performance in battle. But, given that a large number of officers and other key personnel are dying or becoming disabled, combat readiness and capability of such military forces is bound to deteriorate.

- Infectious disease-related deaths and disabilities are likely to have the greatest impact on the capabilities of sub-Saharan militaries, particularly those that have achieved at least a modest level of modernization in weapons systems and platforms. Over the longer term, the consequences of the continuing spread of deadly diseases such as HIV/AIDS on the capabilities of the more modernized militaries in FSU states and possibly China and certain rogue states with large armies and modern weapons arsenals may be severe as well.

The negative impact of high infectious disease prevalence on national militaries also is likely to be felt in international and regional peacekeeping operations, limiting their effectiveness and also making them vectors for the further spread of diseases among coalition peacekeepers and local populations.

- Although the United Nations officially requires that prospective peacekeeping troops be "disease free,"

Mechanisms of Disease Entry Into the United States

The following are a few prominent methods of pathogen entry into the United States:

- *International travel.* More than fifty-seven million Americans traveled outside the United States for recreational and business purposes in 1998—often to high risk countries—more than double the number just a decade before. In addition, tens of millions of foreign-born travelers enter the United States every year. Travelers on commercial flights can reach most U.S. cities from any part of the world within thirty-six hours—which is shorter than the incubation periods of many infectious diseases.

- *Immigration.* Approximately one million immigrants and refugees enter the United States legally each year, often from countries with high infectious disease prevalence, while several hundred thousand enter illegally. The U.S.CDC has the authority to detain, isolate, or provisionally release persons at U.S. ports of entry showing symptoms of any one of seven diseases (yellow fever, cholera, diphtheria, infectious TB, plague, suspected smallpox, and viral hemorrhagic fevers). Although each individual must undergo a medical examination before entering the country, potentially excludable conditions may be in the incubating and therefore less detectable stages. Moreover, U.S. law prohibits the Immigration and Naturalization Service from returning refugees who have credible reasons to fear political persecution, including those refugees afflicted with infectious diseases.

- *Returning U.S. military forces.* Although U.S. military populations are immunized against many infectious diseases and are especially sensitized to detecting any symptoms before or after their return to the United States, not all cases are likely to be detected, especially among National Guardsmen and Reservists, who are far more likely to enter the civilian health care system and may not associate a later-developing illness with their overseas travel.

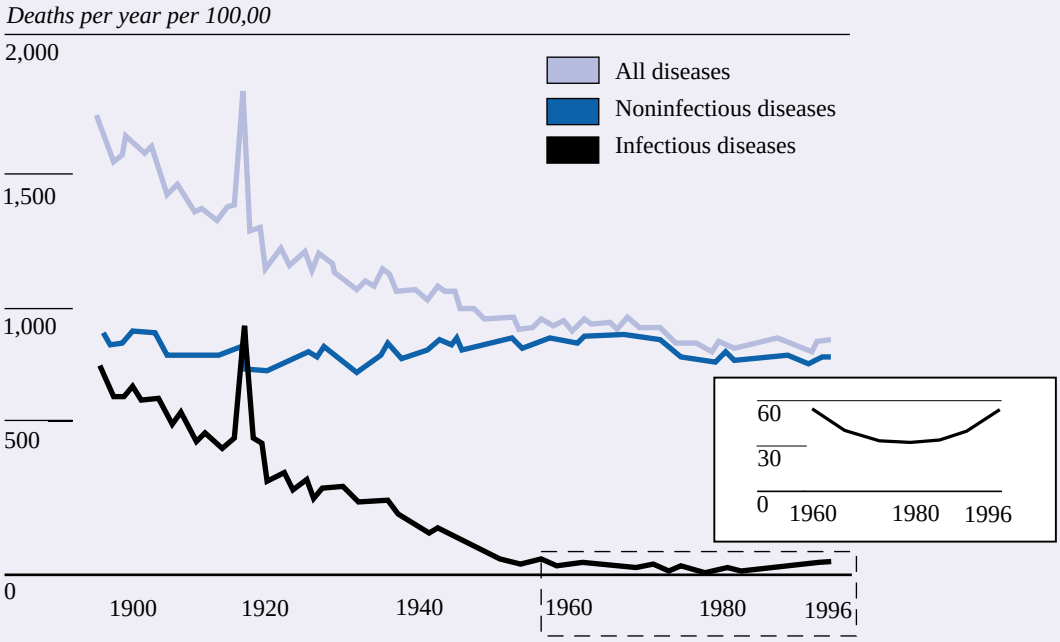
- *The globalization of food supplies.* Foodborne illnesses have become more common as the number of food imports has doubled over the past five years, owing to changing consumer preferences and increased trade. At certain times of the year, more than seventy-five percent of the fruits and vegetables available in grocery stores and restaurants are imported and, therefore, potentially more likely to be infected with pathogenic microorganisms, according to a foodborne disease expert.

Figure 15
Trends in Infectious Disease-Related Mortality Rates in the United States

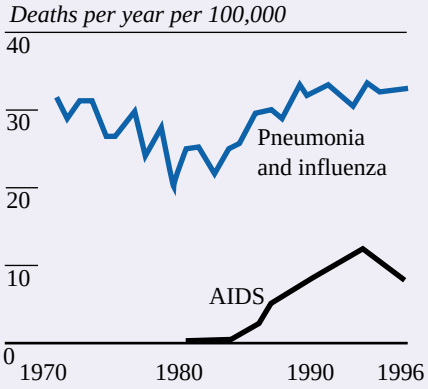
Note scale change

Infectious Disease Mortality in the United States

Infectious disease mortality in the United States has generally declined since 1900, but the trend has been up since 1980 when deaths reached a low of 36 per 100,000, as compared to 59 per 100,000 in 1996. Most of the increase owes to HIV/AIDS and, to a lesser extent, to pneumonia and influenza.

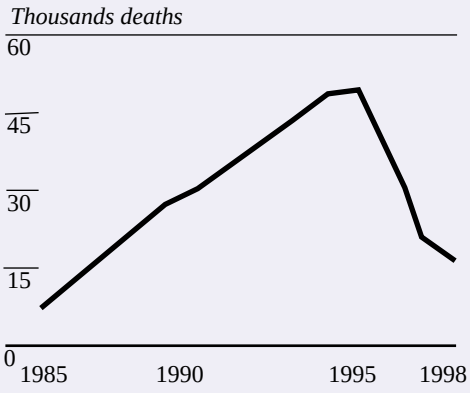


Pneumonia, Influenza, and AIDS Mortality



AIDS Deaths in the United States

Multidrug therapy has dramatically reduced HIV/AIDS deaths in the United States from their peak in 1995, but the rate is slowing as preventive measures ebb and microbial resistance increases.



Source: Adapted from Journal of the American Medical Association, January 6, 1999; CDC 1999.

it is difficult to enforce this rule with such methods as HIV testing, given the paucity of available troops and the potential noncompliance of many contributing states.

- Healthy peacekeeping forces will remain at risk of being infected by disease-carrying forces and local populations, as well as by high-risk behavior and inadequate medical care.

In developed countries, the political debate over AIDS and other infectious diseases is likely to focus on budgetary issues and negligence in the handling of blood and foodstuffs, as well as on treatment of infectious diseases.

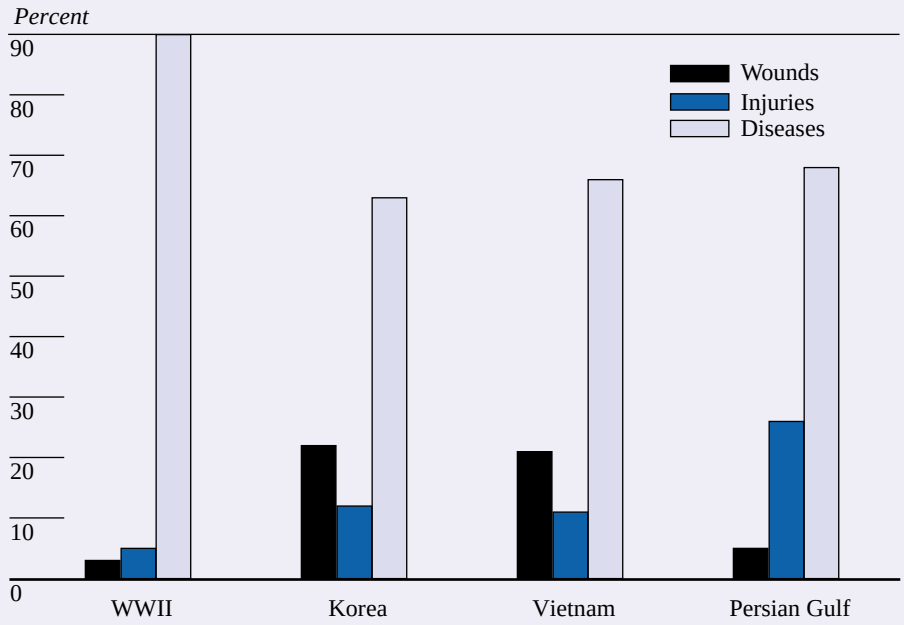
- HIV blood and other controversies in several European countries have sparked political uproars and led to the dismissal or prosecution of government officials, and have even contributed to the fall of some governments.

Infectious diseases also will loom larger in global interstate relations as related embargoes and boycotts to prevent their spread create trade frictions and controversy over culpability, such as in the recently ended three-year EU embargo of British beef, which was imposed to stop the spread of "mad cow disease". Developed countries, moreover, will come under pressure from international and nongovernmental organizations, as well as from developing countries, to deal with infectious disease-related instability and economic and medical needs in the hardest-hit countries. A growing controversy, in this regard, will be over drug-related intellectual property rights, in which developing countries will press for more and cheaper drugs from developed country pharmaceutical firms and resort to producing their own generic brands if they are rebuffed. States will remain concerned, as well, about the growing biological warfare threat from rogue states and terrorist groups.

Infectious Diseases and U.S. National Security

As a major hub of global travel, immigration, and

Figure 16
US Army Hospital Admissions During War



Source: DIA AFMIC, 1999.

commerce, along with having a large civilian and military presence and wide-ranging interests overseas, the United States will remain at risk from global infectious disease outbreaks, or even a bioterrorist incident using infectious disease microbes. Infectious diseases will continue to kill nearly 170,000 Americans annually and many more in the event of an epidemic of influenza or yet-unknown disease or a steep decline in the effectiveness of available HIV/AIDS drugs. Although several emerging infectious diseases, such as HIV/AIDS, were first identified in the United States, most, including HIV/AIDS, originate outside U.S. borders, with the entry of the West Nile virus in 1999 a case in point.

Threats to the U.S. Civilian Population

The U.S. civilian population will remain directly vulnerable to a wide variety of infectious diseases, from resurgent ones such as multidrug resistant TB to deadly newer ones such as HIV/AIDS and hepatitis C. Infectious disease-related deaths in the United States have increased by about 4.8 percent per year since 1980 to fifty-nine deaths per 100,000 people by 1996, or roughly 170,000 deaths annually, as compared to an annual decrease of 2.3 percent in the preceding fifteen years and an alltime low of thirty-six deaths per 100,000 in 1980 (see Figure 15). The U.S. CDC estimates that the total direct and indirect medical costs from infectious diseases comprise some fifteen percent of all U.S. health care expenditures or $120 billion in 1995 dollars.

Threats to Deployed Military Forces

Deployed U.S. military forces have historically experienced higher rates of hospital admission from infectious diseases than from battlefield combat and noncombat injuries (see Figure 16). In addition to disease transmission between deployed troops and indigenous populations, warfare-related social disruption often creates refugees and internally displaced persons that can pass infections along to U.S. military forces. Allied coalition forces may themselves bring infectious diseases into an area for the first time and transmit them to U.S. forces and the indigenous population.

Impact on U.S. Interests Abroad

In addition to their impact on the U.S. population, infectious diseases will add to the social, economic, and political strains in key regions and countries in which the United States has significant interests or may be called upon to provide assistance:

- Infectious diseases are likely to slow socio-economic development in developing and former communist countries and regions of interest to the United States. This will challenge democratic development and transitions and possibly contribute to humanitarian emergencies and military conflicts to which the United States may need to respond.

- Infectious disease-related trade embargoes and restrictions on travel and immigration also will cause frictions among and with key trading partners and other selected states.

The Biological Warfare Threat

The biological warfare and terrorism threat to U.S. national security is on the rise as rogue states and terrorist groups also exploit the ease of global travel and communication in pursuit of their goals:

- The ability of such foreign-based groups and individuals to enter and operate within the United States has already been demonstrated and could recur. The West Nile virus scare, and several earlier instances of suspected bioterrorism, showed, as well, the confusion and fear they can sow regardless of whether or not they are validated.

- The threat to U.S. forces and interests overseas also will continue to increase as more nations develop a capability to field at least limited numbers of biological weapons, and nihilistic and religiously motivated groups contemplate opting for them to cause maximum casualties.

NOTES

[1] All data concerning global disease incidence, including the World Health Organization (WHO) data, should be treated as broadly indicative of trends rather than accurate measures of disease prevalence. Much disease incidence in developing countries, in particular, is either unreported or under-reported due to a lack of adequate medical and administrative personnel, the stigma associated with many diseases, or the reluctance of countries to incur the trade, tourism, and other losses that such revelations might produce. Since much morbidity and mortality are multicausal, moreover, diagnosis and reporting of diseases can vary and further distort comparisons. WHO and other international entities are dependent on such data despite its weaknesses and are often forced to extrapolate or build models based on relatively small samples, as in the case of HIV/AIDS. Changes in methodologies, moreover, can produce differing results.

Exploring Capacity for Integration: University of Michigan Population-Environment Fellows Programs Impact Assessment Project

by Denise Caudill

Abstract: Since 1993, the University of Michigan Population-Environment Fellows Programs (PEFP) has linked the population and environment sectors of development both at the field level and in policy analysis. The PEFP and Denise Caudill of World Neighbors launched the Impact Assessment Project to develop a framework for assessing an integrated program. This article addresses project findings, including the successes, constraints, and obstacles of integrated/linked programs, as well as provides field examples from Ecuador and Madagascar. Denise Caudill, the coordinator for this project, offers lessons on the implications of implementing integrated/linked programs from the community to the national, regional, and international levels.

For millions of people living in at-risk ecosystems around the world, issues of survival, food security, natural resource use, family health, and family size are inseparable, all simply aspects of life. In recent years, the global community has recognized that sustainable development, population, and the environment are interrelated, and approaches to address these issues should be gender-equitable and linked or integrated. The convergence of views is evident in the platforms and plans of action resulting from the 1992 UN Conference on Environment and Development in Rio, the 1994 International Conference on Population and Development in Cairo, the 1995 World Summit for Social Development in Copenhagen, and the 1995 Fourth World Conference on Women in Beijing. The great challenge is to transform these global policies and platforms into effective, measurable, and sustainable programs.

Since 1993, the University of Michigan Population-Environment Fellows Programs[1] (PEFP) has been placing Fellows with a range of organizations around the world attempting to link the population and environment sectors. Given the absence of clear models for linkage, the PEFP has taken a decentralized approach, allowing host agencies to define what they mean by a population-environment (PE) linkage or integration.

Opportunities to capitalize on these years of experience and the wide network of organizational relationships were identified in October 1998 following a U.S. Agency for International Development (USAID) evaluation of the program. Among the new initiatives launched at that time was an evaluation project to begin the process of developing a framework for assessing integrated program approach, process, results, and impact—the Impact Assessment Project.

The first phase of the project is now complete. Phase one was designed to identify hypotheses and assumptions concerning the process, impact, and value added of linked/integrated interventions, and to begin developing a methodological framework for monitoring and evaluating such programs.[2]

The strategy for phase one was to convene short roundtable meetings at the field level with integrated/linked program practitioners to enable those participants to:

- share experiences in planning, implementing, and assessing integrated/linked programs;
- identify challenges and benefits of linkage;
- define assumptions and hypotheses related to the value-added nature of integrated/linked programs; and,

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Denise Caudill is the Impact Assessment Project Coordinator for the University of Michigan's Population-Environment Fellows Programs project and Action Learning Coordinator, World Neighbors.

- discuss specific measurable outcomes, indicators of the integration/linkage and methodology for assessment.

Workshops and field visits were arranged and co-sponsored with CEMOPLAF [Céntros Médicos de Orientación y Planificación Familiar] in Ecuador and John Snow Incorporated (JSI) in Madagascar, as the local partners. Participants in the workshops represented a wide range of local and international organizations involved and interested in the integration/linkage of population and environment.

For example, CEMOPLAF, the national family planning and women's health organization in Ecuador, has partnered with World Neighbors, a U.S.-based development organization, to work with hard-to-reach indigenous populations in rural areas was highlighted as a successful integration program. The first phase (starting in the early 1990s) of the partnership involved training CEMOPLAF staff in people-centered, capacity-building approaches. This cooperation soon evolved into an experimental integrated program in the Guaranda canton, in the Bolivar province of Ecuador. After three years, CEMOPLAF conducted a survey to assess the impact of the program noting that attitudes about sustainable agriculture had changed appreciably as had family planning awareness in the villages using the integrated approach.[3]

The Impact Assessment Project (IAP) Coordinator developed a conceptual model and participatory methodology for use in the workshops. The "Capacity Tree for Linked/Integrated Programs" was used to identify and analyze the various components in linked/integrated population and environment programming: organizational capacities, predisposing and enabling factors, and linked program activities, results, and indicators. Following is rendering of the tree that the IAP Coordinator created.

Lessons learned concerning the challenges of planning, implementing, and evaluating integrated/linked programs have been drawn from the experience and are summarized below.

Conceptual Model and Methodology Developed for Workshops

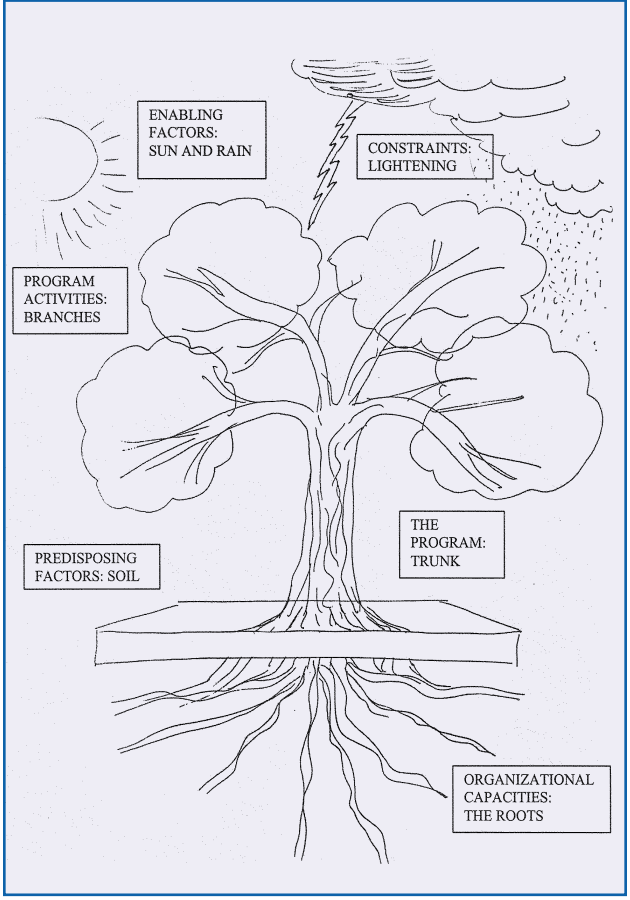
The conceptual model "Capacity Tree for Linked/Integrated Programs" proved to be useful in helping workshop participants identify and analyze the various components present in linked/integrated population and environment programming.

- The trunk represents the community or organization(s) through which the program takes place.
- The branches, limbs, and leaves represent the various program activities related to population, health, environment, and development.
- The roots represent the organizational capacities required to manage and sustain such programs.
- The soil represents the predisposing factors (economic, political, cultural, social environment) necessary for such growth.
- The sun and rain symbolize external enabling factors (resources, funding, services, positive leaders, and supportive policies).
- The lightening bolt represents external constraints and threats outside of the program's control.

Workshop Experiences

During this same period, two "Next Steps" meetings on population and environment integration brought

Figure 1. Capacity Tree for Integrated Programs



together practitioners in Washington, D.C.[4] These meetings reviewed progress to date on understanding if, how, and why linked interventions were effective and met targeted goals. Additionally, the sessions discussed ways USAID could integrate population-health-environment linkages into its strategic framework. The resulting ideas are blended in with those gained during the Ecuador and Madagascar field visits.

Key themes concerning the benefits, advantages, and reasons to integrate or link population, health, and environment were discussed in the Ecuador and Madagascar workshops and during the "Next Steps" meetings in Washington. Common factors were identified in all the meetings.

Benefits of Integration/Linkage

- *Obvious, Inherent Linkage*: Especially at the community level, life is naturally integrated. Problems have multiple causes and therefore need multi-disciplinary, multi-sector, and multi-level solutions.

- *Door-Openers:* Integrated programs allow for one activity to serve as an entry point for additional activities, by means of trust-building within the community and/or as a strategy for introducing new ideas and messages.

- *Community Based and Participatory:* Integrated programs require a high level of participation from the community people who are the principal actors, beneficiaries, and audience of the programs. Greater participation and capacity building can lead to more demand for services.

- *Responds to People's Needs:* Integrated programs are more responsive to community needs, are often community-specific, starting with the immediate priority needs of the people, regardless if those are population, health, or environment related.

- *Reaches More and Most Marginalized People*: The integrated approach has the potential to reach more people, especially the indigenous, marginalized, isolated, and under-served communities.

- *Strategy for Sustainability:* Among the results of an integrated program are outcomes that are more appropriate, concrete, and sustainable.

- *More Cost Effective:* Integrated/linked programs are seen to be more cost effective because of both practical (introducing two interventions at once is cheaper) and strategic reasons (working with organizations already known and trusted).

- *Greater Efficiency:* It is possible to avoid duplication, at both the program and community levels, and to manage, allocate, and leverage resources more efficiently while at the same time improving the work and reducing the effort.

- *Better Communication and Collaboration:* Integration improves communication, coordination, and cooperation between the program and participating communities and between the implementing organizations.

- *Improved Quality of Life is An Overall Goal:* Overall goals of integrated/linked population, health, and environment approaches are to improve the quality of life and well-being of people, and to achieve economic development and environmental equilibrium.

The common views held by participants, from policymakers to practitioners in the United States, Ecuador, and Madagascar, are positive indicators of the convergence of thinking at all levels about integration and linkage of population, health, and environment strategies. Other key factors mentioned at the field level in Ecuador and/or Madagascar were:

- Integration can facilitate access to and support by donors, and is a strategy to avoid "donor bombard-

Julio Beingolea, Ecuador Country Director for World Neighbors, CEMOPLAF's partner in integrated programs, reports back on small group results.

ment" at the program and community levels.

- Institutional learning and growth can come through taking a new look at program strategies, by integrating the needs of the community with the objectives of the institution.

- Integration can facilitate follow-up, information collection, and achievement of cross-cutting results and impact.

common set of goals and objectives for integration nor is there a common definition of the concept of integration. Thus, different and sometimes conflicting points of view persist between and within organizations.

- *Lack of Data and Evaluation Results:* There is a lack of data on the results of integration and a need for monitoring and evaluation of the complementary impacts, costs, and benefits.

> "The integrated approach has the potential to reach more people, especially the indigenous, marginalized, isolated, and underserved communities."

Constraints and Obstacles to Integration/Linkage

Key constraints and obstacles to integration and linkage were also discussed in Ecuador, Madagascar, and Washington meetings:

- *Funding Challenges:* The most common constraints identified were related to a lack of funding, a lack of donors for integration, sector-specific funding and reporting requirements, and short-term financing. One hypothesis raised in the Washington meeting was that "invisible integration" may be taking place at the program level. Sector-specific funds go in and sector-specific reports come out, but integration may be happening, unknown to the donor.

- *Partnership Problems:* Difficulties in coordination among partners was the next most common constraint, with specific problems named such as absence of coordination, conflicting strategies, lack of continuity, varying stages of program development among partners, and simply a lack of quality partners.

- *Lack of Political Will:* Lack of policy and support by governments, multilateral, and bilateral agencies, along with weak administration or other political influences comprises a third key area of constraint.

- *Lack of Understanding of Integration:* There is no

- *Complex and Risky Integration:* The approach is more complex and complicated than single sector programs, taking time and resources, and requiring more coordination and planning, with risk of failure and staff overload.

- *Sectoral Specialization Still Dominates:* There are few dedicated "champions" for integration. Traditional structures, divisions, vertical approaches, and centralized decision-making still dominate the field.

- *Challenges at the Community Level:* There can be a lack of community trust of the implementing organizations, non-acceptance of new ideas, and lack of community organizations. For programs, the challenges involve dealing with complexities of the local socio-economic situation, lack of knowledge of the area, language, culture, and needs of the people.

Enabling Factors for Integration/Linkage

Key enabling factors for integration/linkages were also discussed at the Ecuador and Madagascar workshops. In some cases the enabling factors can be seen as countervailing forces to the previously listed constraints.

- *Political Will:* There do exist positive governmental policies, supportive commitments by local authorities and staff of government ministries, and

participation by international and national organizations.

- *Institutional Partners:* Some inter-institutional coordination does take place, competent intermediary actors are at work, and there is movement toward decentralization and eco-regional planning.

- *Available Funding:* There are some existing financial resources and donors, though not many.

- *Predisposed Communities:* Community interest and enthusiasm are seen as strong factors, with established community organizations and structures to build upon.

- *Know-how:* There are emerging local initiatives, available technical assistance, and existence of integrated program examples.

- *Need and Opportunity:* There are great needs in terms of population, health, environment, and sustainable development along with interest and support of the public to attain economic stability and preservation of the ecological richness.

Organizational Capacity for Integration

In each workshop, participants were asked to think more deeply about the organizational capacities they listed in the Capacity Tree exercise and determine what those capacities would be in an integrated program. Eight key capacity areas were identified and described in the workshops in both countries

Possibilities for Integrated/Linked Program Activities, Results and Indicators

Workshop participants also experimented with the idea of linking different sectoral activities and themes. In these exercises, groups developed possible linked activities, and anticipated results and indicators for assessment. The exercises were challenging and may have been the first time some participants seriously considered how their work might be more holistic and linked to other issues. Although the exercises were somewhat artificial, not tied to program objectives, and done quickly in small groups, the experience enabled participants to think in very practical terms about integration of activities across sectors.

Lessons Learned

Roundtable Workshops are a Valuable Opportunity for Networking and Sharing

The workshops conducted in Ecuador and Madagascar were successful in bringing together a new and wide range of participants to creatively share experiences in implementing integrated/linked programs. Evaluation feedback from all three workshops indicated that participants enjoyed and benefited from the opportunity to exchange ideas with other organizations, to establish new organizational relationships, and to envision potential networks of organizations committed to working in integrated programs. The mix of participants was broad, with individuals from USAID, local governments, international organizations and national NGOs, representing population and family planning, health, and environment sectors. These workshops can also serve as catalysts for future collaboration and action.

Capacity Tree Proves To be a Dynamic Analytical Tool for Systematic Discussion of Opportunities and Constraints of Integration

Use of the conceptual model, Capacity Tree for Integration, as the central analytical tool in the workshops was of great interest to the participants and lead to creative reflection and discussion. Constructing the tree to identify the components of an integrated program was the essential first step in each workshop, with the subsequent exercises, analysis, and discussion based upon the unique, immediate results in each workshop. The use of the tree to identify more than simply the types of activities that may be linked or integrated enabled the participants to reflect more deeply on the meaning, purpose, challenges, and strategies of integrating/linking population, health, and environment in their work.

Definitions of Integration Must Include Explicit Goal Statements for Clarity

Defining integration/linkage of population with environment, health, and development may be influenced by different implied perspectives of goals, that is, if integration is seen as an end in and of itself and/or a means to another end.

Population is Best Discussed in the Broader Context of Health

In both Ecuador and Madagascar the concept of population was somewhat problematic. It was more difficult for participants to list quickly the activities that can be described as "population" compared to listing health or environment activities. In general, people are

Table 1. Organizational Capacity

CAPACITY	DESCRIPTION
Holistic vision	Know how to perceive and relate humans with nature according to life experiences (Ecuador)
	Coordination of actions Strengthening capacity to conceive a model of integrated development (Fianar, Madagascar)
	Clarity of the program's mission, roles, objective, activities, target populations Results orientation There when most needed Good understanding of how the program fits with other actors and at different levels Operational research (Tana, Madagascar)
Community organization	Lends itself to problems, needs and celebrations of the community, with the participation of both families and institutions that work as a team, leaders and followers seeking community development (Ecuador)
	Competence in community-based approaches (PRA/RRA, PAR) Aptitude to work well with local communities Able to do an effective site analysis Value local customs and traditions and include them in implementation of program activities (Tana)
	Knowledge of : Culture Customs/Behaviors Demography Felt or expressed needs Geography Community social organization (Tana)
Inter-institutional coordination	Take advantage of all the existing resources in the community, to broaden the coverage, and the quality of services. Participatory. United missions and shared commitments (Ecuador)
	Mutual sharing of knowledge and information about objectives, approaches, strategy, domains of intervention Improved level of knowledge of each about all (Fianar)
	Existence of coordinating bodies (Fianar)
Project planning and evaluation	In accordance with satisfying the felt needs of the community and institution (Ecuador)
	Preparation of a comprehensive plan which also includes the unique details for each actor From the outset, plan follow-up and evaluate (Fianar)
	Evaluations performed with the community Identify the needs of the community and the solutions Respond to needs that are multidisciplinary in nature Multidisciplinary Include experts from each sector (Tana)

Table 1. Organizational Capacity (continued)

Technical expertise and know-how	To have available trained staff, teams and materials, planning, and adequate logistical knowledge of methodologies for work in accordance with the activity and the group objective (Ecuador)
	Valuing and capitalizing on what has been learned (Fianar)
	Knowledge of training needs for the personnel Background of personnel Experience of personnel Training in many technical areas or other integrated disciplines Multidisciplinary approach (Tana)
Mobilizing financial resources	Existence of sources of financial assistance in health, environment, and development (Ecuador)
	Identifying needs for material needs of each program actor Comprehensive management of resources (Fianar)
	Auto-financing, gifts, loans, in-kind assistance Problem to solve: sector financing limitations where it is often impossible to mix financial sources for an integrated program Possible solution: more coordination between donors, creativity, and diplomacy (Tana)
Mobilizing material resources	Be able to count on infrastructure and base resources in order to be able to respond to interrelated demands (Ecuador)
	Clear strategies to identify financial needs and to search for and negotiate financial support Mechanism to put in place appropriate strategies (Fianar)
	Vehicles, medicines, equipment, medical supplies, mobile health team supplies, tools, office supplies, other Items common to all: vehicles, office supplies, tools Items unique to each program: medical supplies, agricultural supplies (Tana)
Mobilizing human resources	Trained in health, agriculture, and environment and available to work in any situation with positive attitude, strong self-confidence, sensitive to social problems and conservation of the environment (Ecuador)
	Strengthening the capacities of personnel Posting/hiring according to competencies Conflict management (Fianar)
	Consultation and meetings among the stakeholders Conflict resolution training Use of mediators (Fianar)

more comfortable discussing population activities under the umbrella category of health or reproductive health for political, cultural, and religious reasons. This preference seems a reasonable and strategic approach but could be a cause for concern if health does not include population-related needs and activities. In an integrated/linked population, health, and environment program, there must be commitment and "intentionality" to ultimately undertake population activities, including family planning.

Intuitive Confidence in Integrated Approach is Strong

From world capitals to remote communities, people representing population, health, environment, and development disciplines intuit that integration works. It feels and looks good and seems the right thing to do.

Community Capacity-Building for Improved Livelihood at the Center of Integration

- Conduct community based needs/assets diagnosis in a participatory manner, with shared input, analysis, and negotiation by project staff with community members.
- Respond to community-identified and analyzed priority needs first and then build on successes achieved and trust created. This process is more sequential than simultaneous.
- Involve community in planning, implementation, decision-making—more than an instrumental act, the involvement is in terms of co-ownership and

Table 2. Organizational Capacity, Ecuador

CAPACITY	DESCRIPTION
Leadership	Working toward collective interests, being creative, democratic, facilitator, respect the participation of followers
Supervision by division	Specific, directed, periodic, coordinated, in a specific time period
Creation of policy and guidelines	To have very clear and specific policies and guidelines for the institution and community work for each activity
Credit policies	Motivate people and make possible the accessibility to development activities of improved communities
Decentralized administration	To have an adequate institutional organization with defined policies, objectives, goals, guidelines and procedures, trained and committed staff in/for the execution of integrated development programs

Table 3. Organizational Capacity, Madagascar

CAPACITY	DESCRIPTION
Learning	Strengthening the capacities for financial and project management Strengthening the capacity for analysis (Fianar)
Organizational adaptability	Realism and able to self-evaluate and learn from others Keeping abreast of the latest developments (Tana)

management of the program—with the project taking a true pro-poor, pro-community approach.
- Create and work through groups, not just individuals—women's groups, user's groups, forest protection groups, and health and development coordination groups.

Continuum of Projects: Bounded by Single Sector Approaches at One End and Holistic Integrated Programs at the other with Many in the Middle

Many integrated programs are more accurately co-existing to parallel single sector projects, planned, implemented, and assessed separately within a broader institutional definition of program. The Ecuador experience demonstrates that health, population, environment, and development actors can address their respective issues/problems with the same people or groups from different sector perspectives while at the same time each supports the others.

Integrated Implementation Is Essential No Matter the Model

Regardless of the model, implications for implementation of an integrated/linked program include the following points:

- Integration needs to begin in the planning stage, starting with the needs/assets diagnosis step, and

Table 5. Possibilities for Integrated/linked Program Activities, Results, and Indicators, Ecuador

SECTOR THEMES	LINKED ACTIVITY	ANTICIPATED RESULTS	INDICATORS
Improved guinea pig breeding AND Family planning by women in community	Visits to the community, practical training in family planning, and breeding of guinea pigs	50 women trained in FP and guinea pig breeding 20 women who use the FP services	Number of users of FP, Number of improved guinea pig, Increased income
Soil conservation AND Family planning by men in the community	Training of adults in health and agriculture and FP counseling	50 men trained in FP 20 men using methods of family planning they learned about in the training 10 hectares cultivated and protected against soil erosion	Number of men trained and Number of FP users, Number of hectares protected
Reproductive health AND Improved crop cultivation and production	During coordinated agriculture and health visits and work days, take PAP smears	Better knowledge of techniques for crop cultivation and technology for prevention of cervical cancer	Number of women that get a PAP smear among families that are using improved crop cultivation
Improved crop cultivation and production AND Family planning by couples in community	Home visits for counseling in family planning and crop production	Knowledge and use of the different methods of family planning and improvement of crops by couples visited	Number of couples visited that are using FP methods Number of experimental tests and demonstration plots
Soil conservation AND Reproductive health	Visits by medical team during program activities	Optimizing program resources in health and soil conservation	Number of users attending, Number of families trained in soil conservation

continuing through the setting of objectives, activities, indicators, and means of verification, through the implementation and assessment steps.

is more effective, efficient, and sustainable, there is little evidence other than impressions, anecdotes, hopes, and hunches.

> "[T]he global community has recognized that sustainable development, population, and the environment are interrelated, and approaches to address these issues should be gender-equitable and linked or integrated."

- Coordination by staff of work schedules, plans, worksites, IEC messages, and approaches—follow-up and data collection are essential.

- Decentralized decision-making and strong support from CEMOPLAF leadership are important components in the Ecuador experience—flexibility and responsiveness to community opinion are key to the trust-building process.

- A move from parallel to integrated implementation is a logical first step.

Valid and Reliable Evidence of Effectiveness, Efficiency, and Sustainability is Weak

Data are missing to substantiate the confidence in integration/linkage. Programs have not actually assessed the integration effect. Although people in Washington, Ecuador, and Madagascar felt strongly that the approach

Significant Need for Process and Tools for Planning, Monitoring and Evaluation of Integration

Processes and tools are lacking. In the rush to identify indicators for integration, thought must be given to new processes for blending the accepted and expected sector-related methodology and indicators with context-specific integration outcomes.

Post-ICDP Challenge Is to Demonstrate Value of Integration for Conservation Programs

Conservation projects are moving away from Integrated Conservation and Development Programs toward facilitation of eco-regional planning processes that involve national and international policy issues. Questions remain concerning the implications of this at the community and project levels. To what extent are the environmental conservation organizations willing and/or interested to be active partners in integrated/linked community level work?

Table 6. Possibilities for Integrated/linked Program Activities, Results, and Indicators, Madagascar

SECTOR THEMES	LINKED ACTIVITY	ANTICIPATED RESULTS	INDICATORS
Land improvements, training on soil fertilization AND Family Planning	Training/awareness raising of the people about FP and improving agricultural land	Increased level of contraceptive prevalence, Increased agricultural production	Number of regular users, Area of improved land
Reproductive health, migration AND Valuing natural resources	Integrating more youth into agricultural production	Productive youth at home, Increase in employment rate	Decrease in the level of unemployment, Surfaces cultivated and put in production

Need to Stimulate Donor Investment in Integrated Programming

Programs that would like to take an integrated approach often have to break down integrated strategies to develop sector-specific funding proposals, and after receiving the funding try to find ways to do the integration, yet ensure that the sector-specific results can be reported—the "invisible integration" phenomenon. Donors could be more supportive in furthering the integration approach by strongly encouraging project partners to conceive, plan, prepare, and present integrated grant proposals in partnership.

Plans for Phase Two

Convene More Networking Workshops and Events

Facilitate additional awareness-raising workshops bringing together a wider range of health, conservation, and development organizations as a vehicle for sharing experiences and forming networks.

Implementation of Monitoring and Evaluation Partnership Projects

Facilitate action research process in at least two countries to develop participatory methodology and tools for planning, monitoring, and evaluation of the integrated/linked programs and accompany the programs in the use of this methodology over three-year period.

Develop and Disseminate Participatory Action Research and Evaluation Tools

Document and disseminate research results and methodology framework for participatory monitoring and assessment of linked/integrated population, health, and environment programs. ■

NOTES

[1] For more information on the PEFP, see Shannon England, "Making a Difference at the Intersection of Population, Environment, and Security Issues: A Look at the University of Michigan Population Fellows Program," *Environmental Change and Security Project Report* 5 (Summer 1999): 73-81.

[2] For more information and to request a copy of the full report, contact: University of Michigan, Population-Environment Fellows Programs, 109 Observatory, SPH II, Ann Arbor, MI 48109-2029; Tel: (734) 647-0222; Fax: (734) 647-4947; E-mail: popenv@sph.umich.edu.

[3] Denise Caudill, "Integration of Population and Environment: World Neighbors People-Centered, Capacity-Strengthening Approach," *Lessons from the Field: Integration of Population and Environment*. Oklahoma City, OK: World Neighbors, 1998: 11-20.

[4] These "Next Steps" meetings were co-sponsored by the U.S. Agency for International Development, the Woodrow Wilson Center, and the University of Michigan Population-Environment Fellows Programs.

Commentary: Debating Environment, Population, and Conflict

The environment, population, and conflict thesis remains central to current environment and security debates. During the 1990s, an explosion of scholarship and policy attention was devoted to unraveling the linkages among the three variables. While it can easily be argued that both the research and policy communities have made significant advances, the scholarly findings and policy lessons remain the subject of intense debate. The recent publication of a host of significant contributions to this debate dictated a special commentary section to supplement the lengthy book reviews provided in this 2000 issue of the Environmental Change and Security Project Report.

In the first article, leading figure Thomas Homer-Dixon and his colleagues from the University of Toronto respond to the prominent critique enunciated by fellow peace researcher Nils Petter Gleditsch from the International Peace Research Institute, Oslo (see box on Gleditsch's critique). Richard Matthew of the University of California, Irvine, comments on the five-year NATO Committee on the Challenges of Modern Society pilot study entitled Environmental Security in an International Context. *Geoffrey D. Dabelko joins Richard Matthew to draw conclusions from a March 2000 environment, population, and conflict workshop with leading scholars. In the last commentary, University of California, Irvine researcher Ted Gaulin briefly critiques Indra de Soysa and Nils Petter Gleditsch's* To Cultivate Peace: Agriculture in a World of Conflict, *portions of which were reprinted in issue 4 of the* ECSP Report.

The Environment and Violent Conflict: A Response to Gleditsch's Critique and Some Suggestions for Future Research

by Daniel M. Schwartz, Tom Deligiannis, and Thomas F. Homer-Dixon

Introduction

Nils Petter Gleditsch, senior researcher at the International Peace Research Institute, Oslo, has written a widely noted critique of recent research in the new field of environmental security (Gleditsch, 1998). Gleditsch's critique echoes and builds upon criticisms leveled by skeptics of environment-conflict research (e.g., Deudney, 1991; Levy, 1995; and Rønnfeldt, 1997). He identifies a number of specific "problems" of theory, conceptualization, and methodology, sometimes singling out the work of the team led by Thomas Homer-Dixon of the University of Toronto (henceforth referred to as the Toronto Group). In this article, we respond to these concerns and propose avenues for future research.

Methodological issues underpin Gleditsch's critique, and we therefore deal with them in detail. Gleditsch asserts that much environment-conflict research is methodologically unsound and fails to qualify as "systematic research." He contends it violates the rules of quasi-experimental methodology—used by conventional social scientists in lieu of true experimental methods that are not viable for many social scientific inquiries. This perspective is his starting point for identifying many of the specific problems in environment-conflict research. As a result, he disregards the detailed findings of the Toronto Group, the Swiss-based Environmental Conflicts project (ENCOP), and other research projects that do not meet his standards of evidence. We argue that Gleditsch's proposed approach is a methodological straightjacket that would, if widely adopted, severely constrain research in the field. We do not take issue with the quasi-experimental methodology per se. Rather, we show that the case-study method used by the Toronto Group has qualities that complement quasi-experimental methods.

In Section One, we address some of the conceptual and theoretical "problems" identified by Gleditsch and discuss his selective critique of the literature on the relationship between environmental scarcity and conflict. Gleditsch's critique does not address the validity of the specific findings that emerged from ENCOP and the Toronto Group. Instead, he treats these projects with a broad brush, at times associating them with other, less rigorous, research. Section two examines underlying methodological issues and addresses Gleditsch's concerns arising from his methodological perspective. The final section of the article looks forward and suggests avenues for future research on the environment-conflict nexus.

I. Conceptual and Theoretical Issues

Gleditsch identifies a number of common "problems" with the literature on environmental stress and conflict. This section responds to conceptual and theoretical criticisms aimed explicitly at the Toronto Group's research.

BACKGROUND

Norwegian peace researcher Nils Petter Gleditsch makes a nine-point critique of environment, population, and conflict literature in his seminal 1998 article, "Armed Conflict and the Environment: A Critique of the Literature." These nine points, summarized below, spurred Thomas Homer-Dixon and his colleagues at the University of Toronto to pen the response published here. Gleditsch, senior researcher at the International Peace Research Institute, Oslo, (PRIO) maintains the literature has the following characteristics.

1. There is a lack of clarity over what is meant by "environmental conflict";
2. Researchers engage in definitional and polemical exercises rather than analysis;
3. Important variables are neglected, notably political and economic factors, which have a strong influence on conflict and mediate the influence of resources and environmental factors;
4. Some models become so large and complex that they are virtually untestable;
5. Cases are selected on values of the dependent variable;
6. The causality of the relationship is reversed;
7. Postulated events in the future are cited as empirical evidence;
8. Studies fail to distinguish between foreign and domestic conflict; and,
9. Confusion reigns about the appropriate level of analysis.

Nils Petter Gleditsch. "Armed Conflict and the Environment: A Critique of the Literature." *Journal of Peace Research* Vol. 35, no. 3, 1998: 381-400.

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This article—"The Environment and Violent Conflict: A Response to Gleditsch's Critique and Some Suggestions for Future Research" by Daniel M. Schwartz, Tom Deligiannis, and Thomas Homer-Dixon—is drawn from the forthcoming November 2000 edited volume by Paul F. Diehl and Nils Petter Gleditsch entitled *Environmental Conflict* (Westview Press). This volume promises to make a significant contribution to the environment, population, and conflict literature. Following, is the table of contents for *Environmental Conflict*:

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Employing a Comprehensive Definition of Scarcity

Disputes among scholars about how to conceptualize environmental stress have long hindered research on the links between this stress and violent conflict. Essentially, these are disputes about the delineation of the independent, or causal, variable. Gleditsch faults much of the literature for being "unclear as to whether the causal factor is absolute resource scarcity or environmental degradation." He criticizes Homer-Dixon's concept of *environmental scarcity*—which integrates supply, demand, and distributional sources of the scarcity of renewable resources—suggesting it "muddies the waters," although he fails to explain why (Gleditsch, 1998: 387).

Following Stephan Libiszewski, Gleditsch adopts a distinction between conflicts that result from "simple resource scarcity" and those that result from "environmental degradation" (Libiszewski, 1992). Unfortunately, however, Libiszewski's distinction is a wholly inadequate starting point for research on the environmental causes of violence. First, as Gleditsch himself acknowledges, the two categories are not causally separate: degradation of an environmental resource, like cropland or fresh water supplies, can cause a straightforward—or "simple" scarcity of that resource. Second, degradation of an environmental resource is only one of two possible sources of a decrease in a resource's supply. "Degradation" refers to a drop in the quality of the resource; but cropland, fresh water, and the like can also be "depleted," which means the resource's quantity is reduced. If we restrict our analysis to conflicts caused by degradation of environmental resources, we will omit a main source of the reduced supply of these resources in many poor countries around the world.

Third, environmental degradation, the phenomenon Gleditsch wants us to emphasize, is exclusively a supply-side problem: if we degrade a resource, then there is less of it available. Any hypothesis linking environmental degradation to violence is linking, essentially, the reduction in the resource's supply to violence. However, if we want to explore the causes of violence, a resource's *absolute* supply is not interesting. What we should investigate, rather, is the resource's supply *relative to*, first, demand on the resource, and, second, the social distribution of the resource. The relationships between supply and demand and between supply and distribution determine people's actual experience of scarcity, and under any practical hypothesis, it is these relationships that influence the probability of violence. This is the reason that we include demand and distributional aspects in our definition of environmental scarcity.[1]

Fourth and finally, focusing on environmental deg-

radation alone tends to lead researchers to overlook or neglect key interactions—such as the processes we call *resource capture* and *ecological marginalization*—among supply, demand, and distributional pressures (Homer-Dixon, 1999: 73-80). *Resource capture* occurs when the degradation and depletion of a renewable resource (a decrease in supply) interacts with population growth (an increase in demand) to encourage powerful groups within a society to shift resource access (that is, to change the resource's distribution) in their favor. These groups tighten their grip on the increasingly scarce resource and use this control to boost their wealth and power. Resource capture intensifies scarcity for poorer and weaker groups in society. *Ecological marginalization* occurs when unequal resource access (skewed distribution) combines with population growth (an increase in demand) to cause long-term migrations of people 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 resource degradation (a decrease in supply) (Homer-Dixon, 1999: 177). Resource capture and ecological marginalization are often intimately inter-linked, with one leading to the other.

Some might argue that by including distributional issues in our definition of environmental scarcity, the Toronto Group makes the concept so broad as to be useless, because the group classes conflicts solely over resource distribution as environmental conflicts.[2] The argument is misguided. Uneven distribution never acts on its own: its impact is always a function of its interaction with resource supply and demand. In practical terms, the reason resource distribution is important is that the resources people want (that are, in other words, in demand) are in finite supply. Indeed, the Toronto Group found in its research that problems of declining resource supply and rising resource demand were always intimately entangled with uneven resource distribution.

For these four reasons, an exclusive focus on environmental degradation in environment-conflict research unreasonably restricts, distorts the scope of the research, and misses crucial aspects of the environmental challenges facing the developing world. It is better, we believe, to acknowledge explicitly that the fundamental issue is one of scarcity of renewable resources and that any treatment of this scarcity should encompass the exhaustive set of scarcity's sources: decreases in supply, increases in demand, and changes in distribution. The Toronto Group incorporates these three facets of scarcity in its tripartite definition of scarcity.

> "We argue that Gleditsch's proposed approach is a methodological straightjacket that would, if widely adopted, severely constrain research in the field."

Challenging Simonesque Optimism

At a more fundamental level, Gleditsch questions the very idea that humanity is facing increasing environmental scarcities. His critique seems to be guided by the assumption that the links between environmental scarcity and violence are overstated, because humanity shows astonishing capacity to adapt to scarcities (Gleditsch, 1998: 383-384 and 395). Markets stimulate human inventiveness and commerce that open up new sources of scarce resources, encourage conservation, and create technologies that allow substitution of relatively abundant resources for scarce ones. These adaptive processes certainly operate in many cases, as we have previously noted (Homer-Dixon, 1995; Homer-Dixon, 1999: 31-5 and 107-32). But Gleditsch does not acknowledge that societies often fail to adequately adjust to scarcity, with poverty, migrations, and institutional failure the result. Environmental scarcities unquestionably have profoundly debilitating effects on some economies, societies, and social groups.[3] Just because humans are remarkably adaptive in some cases does not mean that they are always adaptive.

Gleditsch seems particularly influenced by Julian Simon's cornucopian thesis that, based on the historical record, human societies can bring to bear on their resource scarcities sufficient ingenuity to prevent any decline in well-being over the long run (Simon, 1996). But Simon's techno-optimist arguments are too simplistic, for three reasons. First, he tends to project the truly extraordinary improvements in human well-being over the past two centuries linearly into the future, without much questioning or reflection. Yet, if we look back further than two hundred years, it is clear that human affairs

have my been marked by many 'non-linear' events—sudden, sharp changes in economic and social behavior—some of which have had decidedly negative effects on human well-being. The progress of the last two centuries is not the only evidence we should use to estimate our trajectory into the future.

Second, when Simon analyzes trends in human well-being, he usually uses highly aggregated data, such as statistical averages for all of humankind. Yet, when these data are disaggregated—that is, broken into sub-categories—Simon's optimism is less persuasive. For example, although both the percentage and absolute number of hungry people have fallen globally in the last twenty years, Latin America, South Asia, and especially sub-Saharan Africa have not seen reductions in the absolute number of hungry people.[4] Third and finally, close study of specific cases shows that societies do not always generate the ingenuity they need when and where it is needed (Lele and Stone, 1989). Although environmental and demographic stress often drives up the requirement for ingenuity in poor countries, a number of factors—including market failure, inadequate human capital, and political competition over scarce natural resources among powerful groups—can impede the flow of ingenuity (Homer-Dixon, 1999: 107-32).

> "Environmental scarcities unquestionably have profoundly debilitating effects on some economies, societies, and social groups."

Homer-Dixon and others have responded with considerable theoretical and empirical detail to the arguments of Simon and other techno-economic optimists (Homer-Dixon, 1999: 28-44; Cohen, 1995; Ahlburg, 1998). Nowhere does Gleditsch acknowledge these responses. The determinants of adaptation to scarcity are a major outstanding issue for researchers in this field. Gleditsch would better advance our understanding if he engaged with the various positions on the issue, rather than appearing to accept the arguments of the optimists at face value.

Bringing Nature into Social Theory

Gleditsch's skepticism about the seriousness of environmental scarcities is the starting point for a key element of his critique of the environment-conflict literature. He argues that the literature overstates the impact of environmental scarcities on violent conflict and, in the process, ignores other, perhaps more powerful causal variables. "Far too many analyses of conflict and the environment are based on… overly simplistic reasoning," he writes. "The greatest weakness in this respect is that much of this literature ignores political, economic, and cultural variables" (Gleditsch, 1998: 389). By deemphasizing environmental scarcities, Gleditsch correspondingly emphasizes other variables.

This approach implies that environmental stress may be no more than an intermediate or intervening variable between dysfunctional political and economic institutions and conflict. Thus, Gleditsch asks if environmental conflict "may be primarily an underdevelopment problem," because environmental degradation or "load" is strongly correlated with poverty (Gleditsch, 1998: 396). He seems to argue that conflict in developing countries is best explained by social causes, not by the physical influences of the natural environment. In the process, like many scholars of comparative development, Gleditsch marginalizes the physical circumstances of human society as explanatory variables; he appears to consider them to be, at most, secondary causes of social behavior. When it comes to violent conflict, they are merely aggravators of already existing social stresses. If this is his position, Gleditsch is making a classic endogeneity mistake: he is claiming that environmental problems are a consequence of, and endogenous to, the broader social system and that, therefore, any conflict caused by environmental problems is ultimately caused by social factors.

It is unquestionably true that social variables must be central to any adequate explanation of human conflict, whether in rich or poor countries. The Toronto Group discusses at length the political, economic, and cultural factors that interact with environmental scarcity to cause violence. The societies most vulnerable to environmentally-induced violence are those simultaneously experiencing severe environmental scarcity and various forms of institutional failure (especially failures of states and markets) that hinder social adaptation to the scarcity. The key role of social variables must therefore be acknowledged. However, this requirement does not mean that physical variables should be made fully endogenous to the social system and, consequently, turned into relatively uninteresting secondary causes of social conflict and stress.[5]

As Homer-Dixon has noted, there are three reasons why environmental scarcity should be considered at least

partly an exogenous factor in social behavior and conflict and why, therefore, environmental scarcity deserves research attention in its own right (Homer-Dixon, 1999: 16-18 and 104-6). First, environmental scarcity is not only influenced by social variables like institutions and policies; it can itself affect these institutions and policies in harmful ways. This is the case when shortages of a renewable resource, such as cropland or forests, motivate elites to seize control, through either legal or coercive means, of the resource's remaining stocks (*resource capture)*. In other words, we should not assume that social variables are completely independent and external starting points in the causal chain; it turns out that they can be affected by environmental scarcity, sometimes negatively. Second, the degree of environmental scarcity a society experiences is not, as it turns out, wholly a result of economic, political, and social variables, like failed institutions and policies; it is also partly a function of the particular physical characteristics of the society's surrounding environment. These characteristics are, in some respects, independent of human activities. For example, the vulnerability of coastal aquifers to salt intrusion from the sea and the depth of upland soils in tropical regions are physical "givens" of these environmental resources. Third, once environmental scarcity becomes irreversible—as when most of a country's vital topsoil washes into the sea—then the scarcity is, almost by definition, an external influence on society. Even if enlightened reform of institutions and policies removes the underlying social causes of the scarcity, because the scarcity itself is irreversible, it will remain a continuing burden on society.

The claim that environmental scarcity can be, in part, an exogenous variable, should not be confused with the claim (which we do not make) that environmental scarcity can have a direct impact on conflict. We argue that the link between environmental scarcity and conflict is most often indirect. Nevertheless, environmental scarcity can still have an exogenous impact on the social conditions that eventually lead to conflict.

Identifying Key Variables

Gleditsch claims that the Toronto Group and other researchers overlook important variables like regime type and democracy. However, the Group's full model does integrate regime-type variables into its analysis of the social and economic effects of environmental scarcities. In the scholarly literature on the origins of revolutions and civil violence, the variables of *opportunity structure* and *state capacity*, which are central to the Toronto Group's model, are recognized as integral aspects of regime type (Goodwin, 1997; Tarrow, 1994; Skocpol, 1979). Furthermore, in his recent work, Colin Kahl explicitly builds on the Toronto Group's model to further our understanding of how regime type affects the links between environmental scarcity and violence (Kahl, 1998).

More specifically, however, Gleditsch's suggestion that the Toronto Group is blind to the importance of regime type is, on close reading, actually a call for the inclusion of a *democracy* variable in environment-conflict models (Gleditsch, 1998: 389).[6] We agree with Gleditsch that a more explicit focus on democracy could be beneficial—as long as analysts are careful in their use of "democracy." As Homer-Dixon has argued, "the term *democracy* is used too loosely by lay commentators and experts alike. It commonly encompasses an extraordinarily variegated set of social phenomena and institutions that have complicated and multiple effects on the incidence of social turmoil and violence" (Homer-Dixon, 1999: 182).[7] Gleditsch deserves credit for advancing environmental conflict literature along this important theoretical path. If future research can address the difficult issues surrounding the precise definition and operationalization of democracy, important findings may yet emerge.[8]

Using Historical Evidence

Finally, Gleditsch claims that the Toronto Group's theory about the links between environmental scarcity and conflict is flawed, in part because it is founded on inferences about future scarcities. Gleditsch asserts that "Homer-Dixon, and many other authors. . .have stressed the potential for violent conflict in the future" without providing adequate empirical evidence of past or present linkages between environmental scarcities and violent conflict (Gleditsch, 1998: 393).[9]

Gleditsch is mistaken that the Toronto Group uses "the future as evidence" to substantiate its claims that there are links between environmental scarcities and conflict. In the process of developing its model, the Group has undertaken more than a dozen detailed historical case studies. These include studies of the Chiapas rebellion, the Rwandan genocide, violence between Senegal and Mauritania, civil conflict in the Philippines, and ethnic violence in Assam, India.[10] The historical analyses in these case studies were informed by the rich literatures on the causes of revolution, insurgency, and ethnic strife. Taken together, they are a foundation for the Toronto Group's larger theoretical model about linkages between environmental scarcity and violent conflict. None of the hypotheses in this model depends on events yet to come; rather, the model is informed by events that have already taken place.[11]

To support his claim that the Toronto Group uses the future as evidence for its model, Gleditsch takes issue with commentators who argue that water scarcity in the Middle East could lead to armed conflict in the future. Without referring to any research in particular, but having identified the Toronto Group by name at the beginning of the paragraph, Gleditsch concludes that this is a hypothesis "based on controversial theory and debatable extrapolations, rather than 'data' which may confirm the prediction" (Gleditsch, 1998: 394). Gleditsch thus conflates the findings of the Toronto Group with largely unsubstantiated claims by other writers regarding the potential for conflict over water resources.

The specific findings of both the Toronto Group and ENCOP are certainly worthy of detailed consideration in any discussion of links between environmental scarcity and conflict. In this case, Gleditsch did not to refer to the Toronto Group's thinking on the consequences of water scarcity. Had he done so, he would have noted a number of interesting hypotheses worthy of testing. Homer-Dixon argues that the world is not about to witness a surge of water wars. "Wars over river water between upstream and downstream neighbors are likely only in a narrow set of circumstances," Homer-Dixon writes. "The downstream country must be threatening to restrict substantially the river's flow; there must be a history of antagonism between the two countries; and, most importantly, the downstream country must believe it is militarily stronger than the upstream country. . . .There are, in fact, very few basins around the world where all these conditions hold now or might hold in the future" (Homer-Dixon, 1999: 139). The Toronto Group's research on water scarcity is, in fact, at odds with sensationalist claims about water wars.

II. Finding Our Way in the Wilderness

Underpinning many of Gleditsch's criticisms are deeper methodological issues pertaining to the conduct of social science inquiry. Gleditsch claims, for instance, that the Toronto Group fails to select cases appropriately, neglects to investigate the possibility of reverse causation, devises untestable models, overemphasizes the complexity of ecological-political systems, and lacks the tools to weight causal variables. These criticisms can only be understood in the context of Gleditsch's unduly narrow perspective on what constitutes "systematic research."

In this section, we first show that process-tracing within single cases should be an integral part of systematic research in the social sciences; this method complements more conventional quasi-experimental approaches. Drawing a distinction between *causal effects* and *causal mechanisms*, we then show why Gleditsch's criticisms of the Toronto Group's research—as identified in the previous paragraph—are unfounded. We also recap some of the key findings of the Toronto Group that Gleditsch overlooked as a result of his methodological bias. In short, we show that there are more than a "few lights in the wilderness" to guide future research into the relationship between environment and conflict.

Conducting Systematic Research

Gleditsch asserts that scholars have conducted little systematic research to date on the link between environmental scarcity and violent conflict (Gleditsch, 1998: 384-7). By "systematic" research, he seems to mean either experimental or quasi-experimental analyses. (He discusses statistical analyses and controlled-case comparisons in particular, but quasi-experimental methods can include counterfactual analyses and congruence procedures.) Gleditsch additionally contends that past research into the links between environment and conflict consisted merely of "exploratory case-studies" that failed to demonstrate causal connections (Gleditsch, 1998: 392).

In our opinion, Gleditsch has an overly circumscribed view of what counts as systematic research in the social sciences. Many social science methodologists have long recognized that systematic research includes not only experimental and quasi-experimental methods, but single-case methods as well.[12] Highly influential studies in the social sciences—such as Graham Allison's *Essence of Decision* (1971) and Arend Lijphart's *The Politics of Accommodation* (1975)—have used single case studies to build and test theories.[13]

At issue in this debate over the merits of the case-study method are fundamental ontological and epistemological questions pertaining to the nature of causation. Among competing views on how causation can be demonstrated, philosopher David Hume's arguments remain influential.[14] Hume asserted that causation could be demonstrated only by showing a high degree of covariance between types of events, which he termed *constant conjunction*. Hume's notion of constant conjunction underpins experimental and quasi-experimental methodologies in the social sciences; many researchers, including Gleditsch, appear to believe that it also vitiates the single-case method.

However, Andrew Bennett (1997) shows convincingly that Hume's notion of causality underpins not only experimental and quasi-experimental methods but the

single case-study method as well. Bennett notes that Hume recognized three "sources of causality," only one of which was constant conjunction. The other two were *temporal succession* and *contiguity*. Bennett argues that while constant conjunction is related to what methodologists term *causal effect*, temporal succession and contiguity are related to *causal mechanism*. The causal effect of an explanatory variable is defined by Bennett as "the change in probability and/or value of the dependent variable that would have occurred if the explanatory variable had assumed a different value." Causal mechanism, on the other hand, is defined as "the causal process and intervening variables through which causal or explanatory variables produce causal effects" (Bennett, 1997: 18-19). Both causal effect *and* causal mechanism are therefore essential and complementary facets of causality. While the experimental and quasi-experimental methods aim to gauge causal effect, they say little about causal mechanism. The single-case method, conversely, helps reveal causal mechanism but gives little indication of causal effect. In short, neither the experimental and quasi-experimental nor the single-case method is sufficient to demonstrate causation with any finality. It is equally evident, however, that the single-case method is a necessary tool to demonstrate causation.

An example from the natural sciences illustrates the distinction between causal effect and causal mechanism. Although the correlation between smoking and cancer has been known for many years, only within the last five years have researchers pinpointed exactly *how* smoking engenders cancer. That is, the causal effects were already known, but until recently the causal mechanisms remained unknown. The recent identification of these mechanisms has put the tobacco industry on the defensive, because they now find it harder to retreat to the claim that scientific proof is lacking.[15]

The distinction between causal mechanism and causal effect is also cogent for the social sciences. Timothy McKeown notes that only by distinguishing between causal effect and causal mechanism can one begin to understand why Allison's *Essence of a Decision* and Lijphart's *The Politics of Accommodation* had such momentous impact on the field of political science. Both seriously challenged long-standing theories: Allison's analysis of decision-making during the Cuban missile crisis undermined the notion of the state as a unitary, rational actor; and Lijphart's analysis of politics in the Netherlands challenged prevailing ideas about the impact of political cleavages. The important processes these authors identified in their case studies would have been overlooked in a statistical analysis. McKeown (1999: 172-174) asserts these case analyses had a large impact precisely because they highlighted *how* events unfolded by identifying their causal mechanisms.[16]

> "[A]n exclusive focus on environmental degradation in environment-conflict research unreasonably restricts, distorts the scope of the research, and misses crucial aspects of the environmental challenges facing the developing world."

Several leading philosophers of science have made similar points. Wesley Salmon (1984: 121), for example, argues in favor of explicating causal mechanisms: "The mere fitting of regularities into patterns has little, if any, explanatory force." Andrew Sayer (1992: 106-7) states that "what we would like... is a knowledge of *how* the process works. Merely knowing that *C* has generally been followed by *E* is not enough: we want to understand the continuous process by which *C* produced *E*..." And Abraham Kaplan (1964: 329) asserts that "we see better *why* something happens when we see better—in more detail, or in broader perspective—just *what* does happen."[17]

Bennett notes that the distinction between causal effect and causal mechanism has prompted a debate among methodologists about which of these two sources of causality is more important. Although some analysts suggest that causal effects are "logically prior to the identification of causal mechanisms" (King, Keohane, and Verba, 1994: 86), others insist that causal mechanisms are "ontologically prior" to causal effect (Yee, 1996: 84). Bennett dismisses this controversy, arguing that "causality involves both causal effects and causal mechanisms and its study requires a diversity of methods, some of which are better adapted to the former and some to the latter" (Bennett, 1997: 25).

Bennett's reluctance to confer priority on either causal effect or causal mechanism, however, does not suggest that the identification of one should not precede the identification of the other in terms of the practical task of puzzle solving in the social sciences. Indeed, when a research program is in its early stages and the underlying theory is still largely undeveloped, social science, it is impossible to control all variables that may affect the dependent variable under study; therefore, researchers must pick and choose their control variables carefully. Process-tracing helps identify those particularly worthy of control.[21] Also, process-tracing reveals variables and causal patterns that may not emerge from statistical analysis. For instance, the

> "The societies most vulnerable to environmentally-induced violence are those simultaneously experiencing severe environmental scarcity and various forms of institutional failure... that hinder social adaptation to the scarcity."

focusing first on causal mechanisms is probably the best strategy. Once researchers have discovered these causal mechanisms and elaborated the theory, they can then begin to estimate causal effects.[18] Thus George and McKeown emphasize the role that single-case methods (involving process-tracing) can play in the development of theory (George and McKeown, 1985: 34-41).[19]

With this methodological underpinning, the Toronto Group set out to perform a series of case studies of the causal links between environment scarcity and conflict. Although the possibility of such links had been recognized by previous scholarship, theory was rudimentary. Using a process-tracing approach, the Toronto Group conducted over a dozen case studies to better understand the causal mechanisms that might connect environmental scarcity to conflict. The results produced by the Toronto Group reflect the methodology used: the Group does make general claims about causal mechanisms (for example, at the end of his second *International Security* article on the subject, Homer-Dixon says explicitly that "environmental scarcity causes violent conflict"), but it has been careful to avoid making such claims about causal effects (nowhere in the Group's research reports are there any claims about the power of environmental scarcity relative to other potential causes of conflict).[20]

Without undertaking research into causal mechanisms, estimates of causal effect are far less illuminating, for two reasons. First, researchers will not know which potentially confounding variables they should control in their statistical tests; and, second, researchers may overlook key processes and causal relationships that are hidden in the data. In quasi-experimental methods of patterns of ecological marginalization and resource capture, which were discovered by the Toronto Group using process-tracing, are not obvious and would undoubtedly have remained hidden from statistical analysis. The Group's research suggests, however, that quasi-experimental and statistical methods should now be used to investigate these patterns.[22] This more inclusive understanding of systematic research helps us address five further concerns raised by Gleditsch about contemporary environment-conflict research: selection of cases on the independent and dependent variables; failure to consider that the dependent variable may in fact be an important cause of the independent variable; a propensity to develop untestable models; overemphasis on the complexity of ecological-political systems; and an inability to gauge the relative power of environmental scarcity as a cause of conflict.

Selecting Case Studies

Following Marc Levy (1995) and Carsten Rønnfeldt (1997), Gleditsch contends that choosing cases in which both environmental scarcity and violent conflict were known *a priori* to exist, violates a fundamental principle of research design that applies to both qualitative and quantitative analyses. Consequently, Gleditsch (1998:391-92) asserts this practice produces nothing more than "anecdotal evidence" to support its hypotheses.

Gleditsch's approach to research design appears to hinge on the assumption that causality is little more than causal effect. Causal mechanism is regarded as less important or is simply not considered at all. Although we agree that researchers must allow for variation on both

the independent and dependent variable if they want to estimate casual effect, we contend researchers will find such an approach less helpful in identifying causal mechanisms. If causal mechanism is believed to be an integral aspect of causality, then selecting case studies on the independent and dependent variable is hardly an egregious error in research design. Indeed, in order to understand whether there are causal links between environmental scarcity and violent conflict—and, if there are, *how* these variegated links work—it will be sometimes necessary to select cases in this manner. The Toronto Group therefore intentionally selected cases in which environmental scarcities and violent conflict were known *a priori* to exist (Homer-Dixon, 1999: 169-76). The Group then used *process-tracing* to determine if the independent and dependent variables were actually causally linked, and, if they were, to induce from a close study of many such cases the common mechanisms of causality and the key intermediate variables that characterized these links.

A related objection to selecting cases on both the independent and dependent variables is that the researcher might as a result, overlook possible confounding variables and spurious relationships. The researcher might, for instance, believe that data show a causal link between variables *A* and *B*, a link that fits the researcher's hypothesis nicely. But the researcher might fail to look for variable *C*, a variable that is linked to both *A* and *B* and is a cause of both. For example, environmental scarcity might appear to be a cause of conflict, but, in reality, not be a cause, if poverty is actually a cause of changes in both these variables. This concern, however, is misplaced, because vigilant case-study researchers should detect such situations. Eckstein (1975: 125-26) contends that such researchers can test "countertheories"—that is, theories about other likely causes of changes in the value of the dependent variable.[23] Just as the quasi-experimental researcher must anticipate variables to control, the case-study researcher must anticipate potentially spurious causal mechanisms.

Investigating Reverse Causation

A distinction between causal effect and causal mechanism helps us address Gleditsch's concern that violent conflict (the dependent variable in most research) may in fact be an important cause of environmental scarcity (the independent variable). Gleditsch (1998: 393-3) claims that environment-conflict researchers have neglected this possibility of reverse causation and have likewise failed to consider the possibility that environmental scarcity and violent conflict are related to each other in a positive feedback loop—that is, a vicious circle.

We do not deny that conflict may exacerbate environmental scarcity, but this possibility was not the focus of the Toronto Group's research. Nevertheless, we would argue that process-tracing offers an excellent way to discover reverse causality, because it unearths causal mechanisms. It allows researchers to trace causal mechanisms that unfold over long periods of time and thereby to investigate the impacts of past conflicts on subsequent environmental conditions. An approach that focuses on causal effects, however, cannot reveal reverse causation as easily. Although simultaneous equations can be used to model reverse causation, and although quasi-experimental methods, using lagged variables or congruence procedures, can be used to span time, a far more intuitive approach is to focus on causal mechanisms, because they will tell the researcher exactly *how* past conflicts exacerbated environmental scarcity.

Moreover, the quasi-experimental method can produce ambiguous results when attempting to differentiate between cause and effect. Consider the following example: When a barometer falls, deteriorating weather is likely to follow. Although it precedes the change in weather, the falling barometer clearly does not cause this change. Thus, we can not distinguish between cause and effect. If we understand the mechanism that causes the barometer to fall, however, we understand that cause and effect can only be differentiated once weather conditions *prior* to the barometer's fall are controlled (Miller, 1987: 34).

Constructing Testable Models

While Gleditsch contends that much of the environment-conflict literature to date is overly simplistic, he asserts that the Toronto Group is guilty of just the opposite mistake—that is, of developing overly complex models that are not testable (1998: 391-92). We believe that Gleditsch contradicts himself here by demanding a strict adherence to conventional research design while simultaneously agitating for an incremental and modular approach to theory building. Conventional research design forbids the omission of variables that are correlated with the key independent variable. Such an omission creates what Gary King, Robert Keohane, and Sidney Verba (1994: 168-176) term an *omitted variable bias*. Many of the variables considered by the Toronto Group are correlated with the key independent variable of environmental scarcity. If Gleditsch is suggesting that we drop these variables out of the equation in the name of testable models, he is also suggesting that we contravene a fundamental canon of conventional research design.

Since the Toronto Group did not adopt such a re-

search design, however, this internal contradiction does not directly concern us. Nevertheless, Gleditsch's agitation for less complexity is disturbing. If environmental scarcity were either a necessary or a sufficient cause of conflict, it would be possible to reduce our model's complexity. Of course, environmental scarcity is neither a necessary nor sufficient cause (there are few, if any, such causes of conflict). If, therefore, researchers are to make a nomothetic claim about the relationship between environmental scarcity and conflict, environmental scarcity must be part of what philosopher J. L. Mackie (1965) terms an *INUS* condition: it must be an *insufficient* but *necessary* component of a condition that is itself an *unnecessary* but *sufficient* cause of conflict.

> "[T]he Toronto Group and ENCOP, among others, is not only theoretically and conceptually intact, but also rests on sound methodological pillars."

Discovering INUS conditions is the goal of the case-study researcher. For environmental-conflict researchers, this entails unearthing the myriad and variegated ways in which environmental scarcity interacts with other social, economic, and political factors to engender conflict. We do not mean to suggest that a process-tracing approach eclipses the important goal of parsimony. Rather, by focusing on relevant causal mechanisms, process-tracing helps the environment-conflict researcher determine the boundaries of the INUS condition. Without a clear picture of these boundaries, simply dropping variables in the name of parsimony becomes a haphazard affair. Once these boundaries have been defined, however, estimating causal effects becomes a more precise procedure.

Dealing with Complex Systems

According to Gleditsch, the Toronto Group claims that ecological-political systems are more complex than strictly social or physical systems. He goes on to argue that this claim is unwarranted because "any social system is as complex as the theory developed to study it" (1998: 392). In other words, the complexity is in the mind of the beholder, rather than in the phenomenon itself. Actually, the Toronto Group does not argue that ecological-political systems are more complex. They argue simply that these systems are, intrinsically, exceedingly complex. No doubt many social, biological, and physical systems are just as complex or even more complex (although some unquestionably are not).

The problem of complexity exists in the real world. It cannot be wished away by assuming that it resides only in the mind of the researcher. Gleditsch's extraordinarily strong constructivist position on this issue is questionable both empirically and philosophically (Rescher, 1998). Researchers in a variety of fields increasingly acknowledge the reality of complexity and are developing powerful theories to understand complex systems. These theories raise serious questions about conventional (often mechanistic) explanations of social phenomena and about the conventional methodologies used to study these phenomena (Cowan, Pines, and Meltzer, 1994). Rather than denying complexity's existence, Gleditsch and other social scientists should explicitly acknowledge the problems it creates for their research and try to develop methods—such as those focusing on causal mechanisms—for dealing with it.

Weighting Causal Variables

Gleditsch implies that process-tracing within single case-studies does not allow researchers to gauge the relative weights of causal variables (1998: 384-386). He also suggests that the quantitative analysis by Wenche Hauge and Tanja Ellingsen (1998) is one of the few attempts to test systematically the relationship between environmental scarcity and conflict. These researchers, he notes, did find a statistically significant relationship between environmental degradation and violent conflict, but they concluded that economic and political variables were more important than environmental variables. Thus, Gleditsch implicitly accepts the notion that independent variables can be assigned weights that indicate their relative causal power. Gleditsch, of course, is hardly alone here. Causal weighting is widely considered to be the ultimate goal of statistical analyses, and the lack of ability to weight variables using single case studies is considered this method's foremost drawback.

The practice of causal weighting, however, has its problems. Elliott Sober (1988) contends that the standard statistical technique of analysis of variance

(ANOVA) does not actually yield causal weights. Rather, it identifies the *difference* that various causes can make in an observed effect. Ascertaining the difference, Sober maintains, is distinct from ascertaining a causal weight. Similarly, Richard Lewontin (1976) argues that, although causal weighting may be appropriate when the relationships among variables are additive, it is misguided when the relationships are interactive. Lewontin contends that analysis of variance produces uninterpretable results when dealing with interactive variables.

If environmental scarcity is one component of an INUS condition, as argued above, then environment-conflict researchers are not dealing with additive relations among causal variables. Rather, these relationships are interactive. Environmental scarcity, for example, interacts with a society's ability to supply social and technical ingenuity. If the society can supply abundant ingenuity in response to its environmental problems, then severe social disruptions will probably be avoided; if it cannot, then negative outcomes, including conflict, are much more likely.

Interactivity is hardly limited to the relationships among variables in ecological-political systems. Most social systems exhibit interactivity among variables. That so many researchers treat the relationships among variables in social systems as additive does not reflect the reality of these systems. Rather, it reflects misguided attempts by researchers to avoid dealing with the reality of the *complexity* of these systems.

III. Suggestions for Future Research

In Gleditsch's final section, entitled "The Way Ahead," he asserts that "critique will serve to advance the field only if it stimulates more satisfactory research" (Gleditsch, 1998: 395). Although we do not agree that all work on environment and conflict has been unsatisfactory, we do agree that debates in the field, such as the one we are engaged in here, can provide the spark for new research agendas. In this spirit, we draw on the above remarks to make some suggestions for future work. These suggestions fall in five categories: filling data gaps, operationalizing key variables, specifying contextual factors, dealing with complexity, and encouraging methodological pluralism.

Filling Data Gaps

We agree with Gleditsch that serious data gaps impede research on the links between environment and conflict. There is a particular lack of good data on the extent and degree of soil, water, and forest degradation in developing countries; data on resource distribution and resource-use practices are also poor. The field therefore needs a more systematic and rigorous approach to data collection. Because this research crosses so many disciplinary boundaries, systematic data collection must involve intimate collaboration with experts in a wide range of disciplines, including soil science, hydrology, forest ecology, and the political economy of community resource use.

In our efforts to improve the foundation of data on which we build our environment-conflict research, however, we must recognize that not all good data are *quantitative*: process-tracing of single cases, in fact, generates thick descriptions of environment-conflict linkages—descriptions rich with *qualitative* data. More local case studies are needed, which build upon research done to date, and test and refine existing hypotheses at the local level.

Operationalizing Key Variables

If environment-conflict researchers want to estimate causal effect, it is essential that they include in their analyses key variables identified by environment-conflict research. In order to include these variables, efforts must turn towards their operationalization.

The Toronto Group has identified a number of variables that play a pivotal role in the link between environment and conflict. For instance, as noted above, the quantity of ingenuity a society supplies in response to environmental scarcity can play a key role in determining its ability to adapt to that scarcity. The supply of ingenuity, then, is an independent variable that should be included in any statistical analysis attempting to measure the causal effect of environmental scarcity on conflict (Homer-Dixon, 1999: 107-114).

But, operationalizing this variable is not a straightforward task. Researchers need an adequate measure of ingenuity. The Toronto Group has identified other measures that should be included in any complete statistical analysis—and that therefore require operationalization—including state capacity and social segmentation, as well as the aforementioned processes of resource capture and ecological marginalization (which can potentially be represented as single variables).[24]

Specifying Contextual Factors

Empirical research has now identified some causal mechanisms linking environmental scarcity and violence. However, much more work remains to be done to determine precisely the intervening and interacting

variables—the contextual factors—affecting the strength of these processes. Under what circumstances, exactly, do these processes unfold? In the following, we refer to some of the specific findings of the Toronto Group, and suggest some contextual factors worthy of further investigation.

- By setting in motion processes of resource capture and ecological marginalization, environmental scarcity often increases the wealth gap between those elites that take advantage of the opportunities scarcity offers and those marginal groups that suffer the brunt of scarcity. How does the degree of state autonomy affect these two processes? To what extent would better-defined and enforced property rights reduce the predatory behavior of elites?

- The multiple effects of environmental scarcity increase demands on the state, stimulate intra-elite behavior, and depress state tax revenues. Such pressures can weaken the administrative capacity and legitimacy of the state. How does institutional design affect state capacity in the presence of these pressures? How do international economic forces both aggravate and mitigate these pressures?

- Narrow distributional coalitions (e.g., coalitions of rent-seekers that work to redistribute the economy's wealth in their favor) often block institutional reform—including reform of markets, property rights, judicial systems, and the state's resource-management regimes—essential to reducing environmental scarcity or alleviating its harsh effects. To what extent does scarcity provoke such behavior? Can a robust civil society counteract the obstructionist behavior of these narrow distributional coalitions?

Dealing with Complexity

At the methodological level, we need to explore how causation works at the interface between the physical/ecological and social worlds. Environment-conflict research brings us face to face with some of the most intractable issues in philosophy of science, specifically whether causal generalizations describing the social world have the same status as those describing the natural world. Because systems in both these domains are fundamentally complex—characterized by huge numbers of components, causal interactions, feedback loops, and nonlinearity—environment-conflict researchers can gain insights from complexity theory. We urge greater receptivity to the concepts and findings of this rapidly developing field.

Encouraging Methodological Pluralism

In order to deal with the research challenges described above, we encourage our colleagues to accept a degree of methodological pluralism. The various methods available to us make up a diverse set of arrows in the quiver of the social scientist, and we should choose the arrow most likely to hit our target. Statistical and quasi-experimental methodologies are needed to identify correlations and causal effects; process-tracing of single cases is needed to specify causal mechanisms. These two general approaches should not be used in isolation from each other; rather, we should try to exploit the synergies that are possible when they are used in parallel by collaborating researchers. For instance, statistical analysis can identify outliers and anomalous cases that deserve focused attention using process-tracing; in turn, process-tracing can identify key interacting variables and scope conditions that should be incorporated into statistical tests of the environment-conflict hypothesis.

Methodological pluralism, however, is not a license for shoddiness. Researchers should be held to high standards of evidence. This paper has demonstrated that the environment-conflict research of the Toronto Group and ENCOP, among others, is not only theoretically and conceptually intact, but also rests on sound methodological pillars. We hope that future researchers will use this body of evidence to deepen our understandings of the linkages between environmental scarcity and violent conflict.

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NOTES

[1] The three main sources of environmental scarcity include reduced supply, increased demand, and skewed distribution. See Homer-Dixon (1999: 47-72).

[2] An anonymous reviewer of this article raised this objection, as well as David Dessler (1999: 100-101).

[3] The literature supporting this claim is so vast it cannot be summarized. An excellent survey can be found in, World Bank (1992). See also Midlarsky (1999) who provides compelling empirical evidence on the intimate connections between scarcity (including resource scarcity), inequality, and social conflict. Dasgupta (1993) provides an economic analysis of the effect of resource scarcity on communities in the developing world. Good and relatively current surveys of the state of the environment in China and India, which together constitute about forty percent of the world's population, are Smil (1993) and Repetto (1994).

[4] Recent data from the Food and Agriculture Organization (FAO, 1999a) shows that the percentage of undernourished people in all three regions has either remained steady (sub-Saharan Africa) or fallen (South Asia and Latin America). However, the absolute number of undernourished people over the past thirty years has either grown (sub-Saharan Africa and South Asia), or remained relatively stable overall (Latin America). See also FAO, 1999b.

[5] Dan Deudney (1999), has recently coined the phrase *social-social theory* for theories that presume social events have only social causes; he uses *nature-social theory* for theories in which natural variables play a significant causal role.

[6] Gleditsch writes that 'words such as "democracy" or "autocracy" do not occur in the model. In view of the extensive theoretical literature "relating the degree of democracy to civil violence . . . a democracy variable should have been included explicitly."

[7] For an excellent treatment of the variegated nature of democracy, see Collier and Levitsky (1997).

[8] The differentiation of the "democracy variable," in the State Failure Task Force's Phase II report, represents an attempt to move in this direction. See Esty, et al (1999: 52-53).

[9] "Much of the literature," Gleditsch writes, "deals with conflicts of interest involving *potential* violence rather than with *actual* violence. . . . The argument is entirely in terms of *future* wars, which may happen." (Italics in original.)

[10] Several of the Toronto Group's historical case studies are reproduced in Homer-Dixon and Blitt (1998).

[11] ENCOP similarly relied upon a large number of historical case studies during the course of the project research. These case studies are published, along with their theoretical findings in a three volume work, Bächler, et al (1996). This volume contains: M. Abdul Hafiz and Nahid Islam, "Environmental Degradation and Intra/Interstate Conflicts in Bangladesh;" Mohamed Suliman, "Civil War in Sudan: the Impact of Ecological Degradation;" Mohamed Suliman, "War in Darfur or the Desert versus the Oasis Syndrome;" Peter B. Okoh, "En-

vironmental Degradation, Conflicts, and Peaceful Resolution in Nigeria and between Nigeria and Neighboring States;" Stephan Klotzli, "The Water and Soil Crisis in Central Asia: A Source for Future Conflicts?"; Stephen Libiszewski, "Water Disputes in the Jordan Basin Region and Their Role in the Resolution of the Arab-Israeli Conflict;" Gunther Bächler, "Rwanda: The Roots of Tragedy, Battle for Elimination on an Ethno-Political and Ecological Basis."

[12] See, for example, Eckstein (1975); Campbell (1975); George (1979); George and McKeown (1985); Dessler (1991); Yee (1996); Bennett (1997); and McKeown (1999).

[13] This point is made in McKeown (1999: 172-174). Non-experimental methods have also been widely used in the natural sciences. See McKeown (1999: 171), and Eckstein (1975: 114-115).

[14] Hume was, in fact, highly skeptical of our ability to show causation. His analysis of causation was meant to ascertain the bare epistemic facts that undergird our intuition of causality.

[15] See Grady (1996: 3). A similar distinction between causal effect and causal mechanism has implications for other areas in the natural sciences as well. For instance, although scientists have known for nearly a century that aspirin relieves pain, it is only within the last few years that they have discovered the causal mechanisms behind this pain relief. See Garavito (1999: 108).

[16] Although qualitative quasi-experimental methods, such as the comparative case study, can also detect causal mechanisms, the single-case method is often a more efficient means of discovering these processes. Moreover, because control is extremely difficult to achieve in the comparative method, it is questionable if causal mechanisms can be more accurately detected than with the single-case method.

[17] Kaplan also argues that descriptions, which are often differentiated from explanation, may themselves be explanatory, 'because the "how" may provide a "why" and not just a "what".' Noted philosopher of science, Rom Harré (1985: 40), makes a similar point when he asserts, "In practice we never rest content with laws for which there is no explanation." One notable criticism of this approach is made by Kincaid (1994: 117), who argues that causal mechanisms can always be discovered at deeper levels (e.g. at psychological or even neurophysiological levels). King, Keohane, and Verba make a similar point (1994: 86). We believe this criticism ultimately fails, however, because a researcher must always conduct their research at a chosen level of analysis, and the causal mechanisms they seek should correspond to the level of analysis of their research. Moreover, if deeper causal mechanisms are discovered, and if they support the theory, then the theory will only be more robust.

[18] Research is sometimes sparked by a preliminary correlation analysis that offers a promising avenue for further research (e.g. the Democratic Peace). Nevertheless, we maintain that a full-blown statistical analysis of these preliminary findings would benefit greatly from case-study research into causal mechanism. The research process then, should be viewed as an *iterative* one, with quasi-experimental and case-study methods complementing one another.

[19] Although the logic for separating the testing and building of theories in quantitative methodologies is sound, Campbell (1975:178-193) shows that this partition is not necessary in case-study research. Campbell convincingly demonstrates that the problem of *ex post facto* hypothesizing is overcome in the 'pattern matching' methodology—from which process-tracing was conceived—because this procedure opens the possibility that an hypothesis initially generated by a particular case could subsequently fail to be supported by the same case. Also, see Collier (1993: 115).

[20] Although the above quote from Homer-Dixon's *International Security* article does not refer explicitly to causal mechanism, the underlying approach taken throughout the article consists of an explicit attempt to discover these processes. It is therefore reasonable to assume that the nomothetic claim made is this article refers to causal mechanisms.

[21] The common mistake among researchers is to omit a variable that should be controlled in a statistical analysis. This can result in what statisticians refer to as a Type I error, where the null hypothesis is true but researchers decide it is false. However, it can be equally dangerous to include a variable that should not be controlled. This can result in a Type II error, where the null hypothesis is false but researchers decide it is true. Cartwright (1979: 429-32) points out that an "irrelevant" control variable can always be found that annuls or reduces a true relationship. A Type II error can also be committed by failing to include a suppressor variable; that is, a variable that, once controlled for, unmasks a true relationship. To avoid both Type I and Type II errors, we suggest that researchers use process-tracing to determine the appropriate control variables.

[22] A parable recounted by Diana Baurmind (1983:1297) illustrates why research into causal mechanisms can be invaluable in discovering control variables. "The number of never-married persons in certain British villages is highly inversely correlated with the number of field mice in the surrounding meadows. Marital status of humans was considered an established cause of field mice by the village elders until the mechanism of transmission were finally surmised: Never-married persons bring with them a disproportionate number of cats relative to the rest of the village populace and cats consume field mice. With the generative mechanisms understood, village elders could concentrate their attention on

increasing the population of cats rather than the proportion of never-married persons." Glymour et al. (1987:19-21) oppose Baumrind's "generative" account of causality. They argue that in fact "never-married persons" *do* cause variation in field mice, even if the causation is indirect, and nothing in the story prevents the use of covariance analysis on uncontrolled samples to discover that the intervening variables is the density of cats. But this belies the process that social scientists use to discover control variables. Without an investigation of the causal mechanisms, it is doubtful that the density of cats would have been included in a statistical analysis.

[23] Although it is not possible for case-study researchers to consider all possible spurious relationships, neither is it possible to include all possible confounding variables in a statistical model. David Dessler (1999: 101) adopts this approach when he suggests that environment-conflict researchers "Test causal claims not against the *null hypothesis* but against rival substantive accounts of political violence in the cases analyzed."

[24] The State Failure Task Force's Phase II report makes significant strides in this direction. Unfortunately, data limitations seriously impeded their ability to adequately operationalize some key variables. See Esty, et al (1999).

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Environment and Security in an International Context: Critiquing a Pilot Study from NATO's Committee on the Challenges of Modern Society

by Richard A. Matthew

In Pakistan's North-West Frontier Province, the combination of severe environmental stress and diffuse, violent conflict along the Afghanistan border might seem to provide an excellent example of the relationships examined in the NATO Committee on the Challenges of Modern Society's (CCMS) new report on *Environment and Security in an International Context*.[1] At first blush, one might conclude that environmental stress in this region is escalating the conflict. However, on closer examination it seems that the effect of environmental stress is mixed. Sometimes it acts to reinforce or trigger conflict, while other times it motivates people to reduce tensions and cooperate to solve problems. It has proven very difficult to model the varying effects of environmental stress in an accurate way. The co-chairs of this CCMS pilot study have undertaken the arduous task of developing a general model of environmental stress and conflict applicable to the entire world. In my experience, modeling a small region of a country abounding with many factors pulling in different directions is so complex that it is impossible to be satisfied with the results.

Although the problem is an exceedingly complex one, the new CCMS report on environment and security is very lucid and well organized. It asks several explicit questions: What is environmental security? How can we model it? What sort of information would be useful to policymakers? And what sort of responses are available?

Much of the value of the NATO/CCMS and Science Programme work on environmental issues is in the process of bringing people together to focus on certain challenges, view them from new perspectives, and, perhaps, come to a shared understanding. These benefits may add value to the task force experience beyond what is written in the report, but I shall consider only the text of the report, recognizing that it is a small part of a valuable and important initiative.

In many ways, it is a bold report. It is bold not only in its recommendations but also in that it addresses the question of complexity very directly, unlike many other policy documents. This is a source of strength, but it also introduces some theoretical problems, which are the focus of my comments.

The report begins by noting that NATO has a long-standing interest in non-traditional security issues, and that environmental stresses are emerging as one of these issues. As anybody who studies environmental history knows, a number of scholars believe that environmental stress has been the driving force behind many events in human history.[2] The report is not introducing new issues. What is new is that a set of institutions that traditionally have not looked at these issues are now starting to examine them.

Among the questions that have divided scholars and policymakers recently are whether security institutions

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ought to be studying this set of issues, whether these issues are best addressed by security institutions, and whether these institutions bring a certain value to the process that is not found elsewhere. It is important to mention these concerns since many of the conclusions in this report are similar to those of work undertaken by development organizations and other organizations.

One might be encouraged by the apparent convergence of thinking among institutions that ostensibly have little in common. Indeed, one possible value of rethinking security is that this can provide a framework in which dialogue can take place among different groups and institutions, largely free of preconceptions and prejudices. Of course, one might also raise the concern that military institutions are moving into areas already occupied by the development and other communities, and wonder if this will lead to better outcomes in the long run.

One of the fears of those critical of security institutions examining environmental stress is that they will study it from a perspective or with a mindset that simply reinforces or extends their traditional mandates. Critics worry that particular environmental issues will be identified as important, while others will be neglected because they do not fit well into a traditional security framework. Environmental problems identified as security issues, and hence likely to receive support from governments and publics, could begin to monopolize resources. Critics are concerned that the neglected issues might be those most important to the developing world, and that the ultimate result of military involvement will be to reinforce inequalities in the international system

A different type of concern is that once the state of the environment has been characterized as a security problem in ways relevant to security institutions, a pathway has been created towards the eventual use of force and coercion.

These familiar concerns do not seem justified by the CCMS report. Instead of narrowing the concept of environmental security to cases that could benefit military interests, this report opens the concept up. The authors do this by taking a very liberal position on the social impacts of environmental stress by defining conflict very broadly. By being so broad, the authors are able to be very inclusive. There are many roles for many different institutions. There are clear suggestions of the importance of inter-agency dialogue and cooperation. There is no sense that now is the time for the military to become involved and start solving problems others have not been able to address effectively.

Being broad, however, does introduce some problems in terms of modeling the phenomenon of environmental stress and conflict or insecurity. The authors of the report are clearly aware of this. Early on, they write, “It is not environmental stress in isolation that characterizes the nature of conflict between groups, but other factors.” (My emphasis)

Insofar as other factors include things like poverty and inequality, the report validates policies aimed at promoting development and social justice. In being so inclusive, however, it also reproduces a problem that is widespread in the field of environmental security. Today one wants to learn not that many factors—including environmental ones—lead to stress, but rather the extent to which environmental stress is related to conflict. Put another way, how much leverage will reducing environmental stress give us over conflict and insecurity? By using a very inclusive model, it becomes difficult to distinguish cases in which environmental stress is actually contributing to conflict in important ways, and ought to be managed, from cases in which it is other factors that are important. Equally worrisome, if we simply assume that environmental stress is always a part of the problem and therefore must be dealt, we may actually be neutralizing what some historical work suggests is an important progressive element in a lot of social conflict situations. We may actually make the situation worse, because it is often environmental stress that causes people to cooperate on problems and resolve some of the social tensions that exist. In other words, one wants to know (a) whether one should devote resources to environmental stress in a given case, and, if so, then (b) when the deployment of these resources is likely to be most effective. A model that does not distinguish among those cases where environmental stress needs to be addressed, those where it is playing a minor role, and those where it may be having a diffuse therapeutic effect, makes it difficult for policymakers to act with confidence.

The authors of this report have provided a very comprehensive conceptual model. The next phase might be to clarify those feedback mechanisms that are reinforcing conflict outcomes and those that are offsetting them, and the conditions under which these dynamics are operative. Then the model can be pared down and researchers and policymakers can try to identify time sensitivities to see which variables should be addressed immediately and how they can apply resources most efficiently to obtain desirable outcomes. Unfortunately, I am not sure that this sort of fine grain predictive modeling can be accomplished given the complexity of conflict. We may have no choice, ultimately, but to use very general conceptual models such as this as a starting point for detailed case specific analysis that can yield clear policy preferences.

A good example of this modeling concern is the second phase of the State Failure Task Force project.[3] The task force's report suggests that researchers should only focus on large environmental stresses in a specific area over a short time period because beyond that point, the issues become too complicated to trace out causal relationships. This may not be right, but it is worth noting that the Correlates of War Project researchers invested much time into modeling conflict so that they would be able to predict it, and they were unsuccessful. Understanding and predicting conflict are big challenges, and perhaps the CCMS model goes as far as researchers can with very general, abstract models.

There are a few specific items in this report that I would like to raise questions about. One is the proposed typology of environmental conflict cases, the topic of chapter three. I disagree with the authors' claim that a typology has to meet certain complexity requirements. A typology requires a clear organizing principle. That is what a typology is. For example, one can collect food eaten at a meal and organize it in a number of different ways, such as by fat content, by the cost of it, or by its shelf life. Each of these might be valuable for a certain end. But if I divided the food into green food, food that comes from the ocean, and food that has a lot of protein, one might ask me why I was organizing food stuffs into this particular typology? What is my ordering principle? In this report, readers need to be told what logic informs the division into migration conflicts, ethnic conflicts, and resource scarcity conflicts. These do not seem to cover all cases of conflict-surely some conflict is caused by disputes over status, wealth, injustice, or power but lacks any ethnic, environmental, or migration component. Nor does it seem that these three cases always have a significant environmental dimension, although they might in some distant and indirect fashion. Nor, finally, does it seem that only these cases ever have a significant environmental component. The conflict in Kakadu National Park in Australia is between those committed to the spiritual value the land holds for some indigenous peoples and those seeking to exploit the uranium it contains. I do not want to suggest that the report's typology is not valuable, but rather that its value needs further explanation.

This same problem is repeated in chapter four on integrated risk assessment where the authors present sixteen syndromes of environmental stress. This stands in sharp contrast to Thomas Homer-Dixon's work, which simplifies environmental stress into three categories of scarcity (supply-induced, demand-induced, and structural).[4] One of the benefits of Homer-Dixon's categorization is that it is very easy to understand and use. The CCMS model proposes sixteen syndromes generating four conflict types with five levels of intensity, which results in 320 different cases. The value of this level of differentiation needs to be carefully explained, because one might justifiably feel overwhelmed by its complexity and hence inclined to raise questions about its validity. Certainly the world is complex; but models aimed at the policy world ought to reduce this complexity in a manner that has some explicit value, rather than reflect it. Perhaps the problem is that there is no

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analytical filter that distinguishes how often these sixteen syndromes appear or how likely it is that they will connect to the various levels of intensity in the various conflict situations. Including such a filter would provide the reader with a clear sense of the benefits of using this approach rather than Homer-Dixon's simple tripartite structure.

Finally, it is premature to discuss indicators and identify thresholds, as the authors attempt to do. Obviously it would be tremendously valuable to be able to say, here are the key indicators of environmentally-induced conflict, and here are the thresholds that, once surpassed, contribute to or trigger or generate conflict. But the conceptual model does not actually provide a basis for identifying indicators or thresholds. I suspect the authors are fully aware of this, which may explain why, in the end, the report moves away from prediction, its stated objective, and towards prevention and risk management, which are much more compelling policy approaches.

In this context, it is difficult to disagree with the recommendations of the report. The authors provide a logical and compelling set of prescriptions.

In the end this report reaffirmed my personal belief that environmental stress and conflict are often related in significant ways. However, it also reaffirmed my belief that we are a long way from developing a simple model that will adequately explain this relationship or provide us with the means to make useful predictions. This may not please policymakers who want clear evidence of cause and effect, predictive models, and assurance that if they do X, Y will or will not happen. But these are very difficult demands to satisfy.

The authors of the report do a good job in conveying the complexity of this issue. Their general conceptual model is successful in reminding us that many factors can and do lead to conflict. Moreover, in some cases, environmental stress will be one of these, and perhaps even the dominant factor. Therefore the study of conflict ought to include consideration of environmental stresses. Attempts to reduce conflict or resolve conflict ought to carefully consider the potential benefits of addressing environmental problems and promoting sustainable environmental policies.

I am less convinced, however, that the authors make a compelling case that the next step is to refine this work into a predictive model. I suspect this would be a very large and costly step, and I doubt that the probability of success is very high.

The report is concise, engaging and useful, but it might better serve as the foundation for: (a) further discussions about vulnerability, risk management, and conservation measures; (b) case specific analyses of environmental stress as a strategy for conflict prevention or resolution; (c) inter-agency and transnational dialogue about the environmental security paradigm; and (d) exploration of the roles of conventional security institutions within the context of this paradigm.

NOTES

[1] Gary Vest, Principal Assistant Deputy Under Secretary of Defense for Environmental Security and Kurt Lietzmann, Head of Division, Nature Conservation and Nuclear Safety, Federal Ministry for the Environment, Germany co-chaired and co-authored this NATO/CCMS pilot study on environment and security. This commentary is an extension on comments made at an Environmental Change and Security Project meeting, held on 1 September 1999, featuring the pilot study's release in the United States.

[2] See for example, Jared A. Diamond, *Guns, Germs, and Steel: The Fates of Human Societies*. New York: W.W. Norton and Co., 1999; Clive Ponting, *A Green History of the World: The Environment and the Collapse of Great Civilizations*. London: Penguin Books, 1993; Brian M. Fagan, *Floods, Famines, and Emperors: El Niño and the Fate of Civilizations*. New York: Basic Books, 1999; and Richard E. Leakey, *The Origin of Humankind*. New York: Basic Books, 1996.

[3] In response to a request from Vice President Al Gore in 1994, the Central Intelligence Agency established the "The State Failure Task Force," a group of independent researchers to examine comprehensively the factors and forces that have affected the stability of the post-Cold War world. The Task Force's goals were to identify the factors or combinations of factors that distinguish states that failed from those, which averted crises over the last forty years. The study represents the first empirical effort to identify factors associated with state failure by examining a broad range of demographic, societal, economic, environmental, and political indicators influencing state stability. To read excerpts of the report, please see Daniel C. Esty, Jack A. Goldstone, Ted Robert Gurr, Barbara Harff, Marc Levy, Geoffrey D. Dabelko, Pamela T. Surko, and Alan N. Unger, "State Failure Task Force Report: Phase II Findings." *Environmental Change and Security Project Report* 5 (Summer 2000): 49-72.

[4] See for example, Thomas F. Homer-Dixon, *Environment, Scarcity, and Violence*. Princeton, NJ: Princeton University Press, 1999 or Thomas Homer-Dixon and Jessica Blitt, eds, *Ecoviolence: Links Among Environment, Population, and Security*. Lanham, MD: Rowman and Littlefield, 1998.

Environment, Population, and Conflict: Suggesting a Few Steps Forward

by Richard A. Matthew and Geoffrey D. Dabelko

The thesis that environmental stress and population change contribute to violent conflict has undergone intensive examination over the last ten years.[1] Both case study and quantitative efforts have sought to unpack the complex mix of causal factors leading to violent conflict. Historically neglected in the study of conflict, environmental stress has moved into mainstream debates for a combination of reasons including the findings of new research on the pervasiveness and magnitude of environmental degradation, opportune political timing, and the search for an orienting post-Cold War security paradigm.

On 19 March 2000, a group of scholars assembled at the University of California, Irvine to examine the current state of environment, population, and conflict research and to discuss the most promising directions for future research.[2] Dividing their discussions into findings, methodology, and next steps, these frequent contributors to the literature engaged in a lively debate over the precise nature of causal dynamics and the most appropriate methods for investigating environmental-social linkages.[3]

Consensus on key issues was not forthcoming and the seemingly contradictory claims advanced by different researchers dictate the need for additional research and methodological diversity in the field of inquiry. Yet a number of important, unifying themes emerged from the discussions that give this sub-field a clear history, identity, and future. From our perspectives as co-chairs of the workshop, we seek to group points of convergence and highlight areas of continued dispute. We hope this reporting facilitates the entry of new researchers into the field, the clarification of next steps for active scholars, and the utilization of findings by practitioners.

Common Themes, Diverse Perspectives

Methods

- The multiple methodologies applied to the environment as a cause of conflict thesis have identified a number of causal pathways, both general and case specific, with a higher level of confidence in the latter. All findings agree on the importance of intervening political, economic, and social variables, something various investigators have termed capacity, vulnerability, or ingenuity.[4] These societal variables appear critical in determining whether or not a country or a society can adapt to environmental and demographic stress in a manner that avoids conflict.

  Despite some convergence of conclusions, fundamental differences among prominent research efforts remain. The Toronto Group,[5] commonly associated with a case study approach, places environmental and demographic stress at the center of its causal diagrams. Need, in the form of various scarcities, contributes to the conditions that precipitate violence. Conversely, some elements of the Oslo Group[6] utilize quantitative methods and find that abundance of natural and mineral resources correlates with violence. Greed then, rather than need, contributes to violence in a different set of cases also experiencing conflict according to this body of research.[7] These need versus greed causal claims remain to be satisfactorily reconciled.

- Differences along the lines of preferred methodologies persist as they do in other realms of social science. Large N quantitative and theory-driven studies may have reached points of diminishing returns, at least until a new wave of in-depth case studies can be conducted. These methodologies have proven valuable for identifying associations of variables. Yet, in the absence of extensive fieldwork, it is difficult to move to the next step of developing truly persuasive causal arguments.

- Insofar as large N studies are concerned, data quality and quantity currently available are mixed over space and time functions. Furthermore, the incredible complexity of the conflict stories in individual cases provides a constant cautionary reminder of the impediments to designing generalizable analyses and uncovering generalizable conclusions that are not highly abstract and hence of limited interest or value. These methods of statistical inquiry remain vital to the field, however, as checks on case studies, while providing guidance for more detailed research into particular cases or types of cases that may be fruitful.

- For theory-driven work such as that undertaken by Thomas Homer-Dixon,[8] the acknowledged critical next step is developing far more nuanced understandings of causal mechanisms and intervening variables through more finely detailed case studies. It is vital at this juncture that the next interdisciplinary wave of researchers move into the field to do fine grain analysis that is informed by and sensitive to local conditions. Such work is needed to better understand the interactions among environmental, political, economic, and social variables. One clear need is to generate better understandings of the elements and dynamics of adaptation to environmental stress.

- If environment, population, and conflict research is to be policy relevant and tell as complete and accurate a story as it possible to tell, it is going to have to break free of the Western knowledge base and its institutions. More frequent and meaningful participation of developing country scholars and practitioners is critical to understand better the dynamics of many of the cases in which the linkages among these variables would appear to be most pronounced. Although some efforts have been made in this direction,[9] the research remains largely conducted by European and North American scholars and practitioners despite the overwhelming focus on Southern cases. North-South collaborative work is difficult to establish, time-consuming, and often expensive. Yet it is fundamental to real progress in the evolution of this line of research inquiry.

- Despite the recognition for some years of the need to study the null cases, or cases where environmental and demographic stress are severe but no conflict is present, attempts to address this explicit research need remain scattered and have clearly not yet reached critical mass. The call for more case study work includes a call to investigate why the dogs bark in some cases but not in others in the face of similar levels or forms of environmental stress. Such case studies could also provide a window into the forces generating various forms of cooperation in the face of shared stress. This cooperation, the potential basis for environment confidence or peace-building, represents an under-explored but critical next step in understanding environment, population, and conflict linkages.[10]

Data

- Prominent investigations by research groups such as the State Failure Task Force,[11] the Oslo Group, the Toronto Group, NATO's Committee on the Challenges of Modern Society,[12] and the Environmental Conflicts Project (ENCOP),[13] have all come to the conclusion that we do not have enough reliable environmental data. Just how much water is being used in different cases? What is the air quality in major urban areas and how is it changing over time? What is the actual rate of deforestation in a given area, or the real amount of arable land available? This is the common—and entirely valid—complaint of many researchers who rely on environmental data. Working with large gaps and unreliable or incommensurable measurements, it is difficult to move beyond crude analyses and back-of-the-envelope projections. The anecdotal, inaccurate, and fragmentary quality of much of the data used today further underscores the importance of fine grain fieldwork.

- Similar problems exist with the intervening variables most models use. For example, attempts to operationalize and measure critical concepts such as capacity, vulnerability, or ingenuity are often compromised by a lack of appropriate data, especially data across space and time boundaries.

Suggesting a Few Steps Forward

In many ways the research conducted during the 1990s on environment, population, and conflict has been

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compelling and influential. It has penetrated the field of security studies, breaking through concepts and theories that staunchly resisted change for decades. It has propelled environmental studies in a bold—and controversial—new direction. It has guided a flurry of policy innovation and interagency cooperation in the United States and abroad. But at the close of the 1990s, the results of several major research initiatives seemed to do little more than reiterate or clumsily dispute claims made by Homer-Dixon, Norman Myers,[14] and others at the start of the decade. The engine driving the research seems to have stalled. This is equally true outside the academic world. Governmental efforts have been bleached of innovation and controversy by the politics that demands consensus or insists that particularly sensitive issues be set aside. Turkish demands to eliminate references to freshwater in the NATO/CCMS pilot study present a glaring example of this kind of problem.

The degree to which the findings of recent studies recall those of earlier ones, or seem exceptionally unfocused and constrained, has led some observers to conclude that the field of inquiry is itself exhausted. This is far from true or even likely. What is needed today is a new wave of meticulous fieldwork generating case studies that will provide fuel for a new round of theory development. We believe that contemporary communications technologies conspire to create the false and arrogant impression that we generally have a good sense of what is happening on the ground in the far reaches of the globe. This facile, ungrounded expertise, which shifts the emphasis of scholarship to highly abstract debates, is proving the death of any authority the social sciences may once have had—clearly no substitute measures up to fieldwork insofar as understanding and modeling complex causal networks linking social and ecological systems is concerned.

The UCI discussions pointed to a needed direction for research that focuses on cases where environmental stress is present but a spectrum of outcomes from cooperation to conflict occurs. This approach will be critical in helping resolve the Oslo Group-Toronto Group argument of need versus greed as precipitators of conflict. It will also help answer the conflict versus cooperation questions that have been asked repeatedly by critics of the field, yet remain to be answered.[15]

In addition to the work required to improve our understanding of complex environment-population-conflict linkages, the sub-field is, inevitably perhaps, plagued by lingering problems over the nature of causality and the most productive and appropriate methodologies.[16] These problems vex other fields of inquiry and the environmental and demographic stress interactions should not be held to a higher standard than is the case in investigations of other causal variables. In other words, some of the criticism is based on unrealistic expectations or demands, which have not been met anywhere in the social sciences.

This is not to say that the causal and methodological debates should be terminated. These methodological debates will help sort out the very different conclusions drawn from various research programs. As workshop participant and methodology expert David Dessler emphasized, it is critical to return to the basic distinctions among association, correlation and causation when evaluating research and drawing scholarly conclusions and policy lessons. Focusing on methodological limitations would likely lead to more cautious causal claims and to narrow differences between opposing research conclusions. Progress must be ongoing and interactive; theory guiding research, leading to a reworking of theory, identifying further research needs, and the repetition of this evolutionary process. In this case, what is really needed today is more high quality research that might help drain the sea of some of its competing, abstract, and highly similar models and concepts.

The efforts to untangle the linkages among environment, population, and violent conflict have accomplished a great deal in a short period of time. Environmental and demographic stress are firmly on research and practitioner agendas, as these stresses are understood to be part of the complex causal mix that shapes the character and behavior of our social systems. Although their impacts often are felt early and/or indirectly in the causal chain,[17] environmental and population variables have been added—rightly—to the basket of more traditional causes of violent conflict. This attention is given despite the inability to provide precisely weighted linkages (arguably an unreachable standard in the realm of complex social phenomena). Reaching this threshold of inclusion and consideration is a tangible contribution made in the last ten years of research, one that holds promise and relevance to both scholarly and policy communities. Having raised as many questions as it has answered, the field of inquiry must now conduct the more varied and in-depth fieldwork that will allow us to build on the foundation of knowledge that exists today.

NOTES

[1] For an extensive list of works in the field, see the bibliographic guide to the literature published in the Woodrow Wilson Center's annual *Environmental Change and Security Project Report*, available on-line at http://ecsp.si.edu.

[2] This workshop was co-sponsored by the University of California, at Irvine's Focused Research Group on International Environmental Cooperation and the Woodrow Wilson Center's Environmental Change and Security Project. The workshop was made possible by support from the co-sponsors and the International Studies Association workshop program.

[3] See the participant list at the end of this article.

[4] In 1998, Phase II of the U.S. State Failure Task Force results focused on "capacity" and "vulnerability" in an environmental sub-model. Thomas Homer-Dixon of the University of Toronto utilizes the term "ingenuity." In response to a request from Vice President Al Gore in 1994, the Central Intelligence Agency established the "The State Failure Task Force," a group of independent researchers to examine comprehensively the factors and forces that have affected the stability of the post-Cold War world. The Task Force's goals were to identify the factors or combinations of factors that distinguish states that failed from those, which averted crises over the last forty years. The study represents the first empirical effort to identify factors associated with state failure by examining a broad range of demographic, societal, economic, environmental, and political indicators influencing state stability. To read excerpts of the report, please see Daniel C. Esty, Jack A. Goldstone, Ted Robert Gurr, Barbara Harff, Marc Levy, Geoffrey D. Dabelko, Pamela T. Surko, and Alan N. Unger, "State Failure Task Force Report: Phase II Findings." *Environmental Change and Security Project Report* 5 (Summer 2000): 49-72; Thomas Homer-Dixon, *Environment, Scarcity, and Violence*. Princeton, NJ: Princeton University Press, 1999; Thomas F. Homer-Dixon, "The Ingenuity Gap: Can Poor Countries Adapt to Resource Scarcity?" *Population and Development Review* 21 (September 1995): 587-612; Daniel M. Schwartz, Tom Deligiannis, and Thomas Homer-Dixon, "The Environment and Violent Conflict: A Response to Gleditsch's Critique and Some Suggestions for Future Research." *Environmental Change and Security Project Report* 6 (Summer 2000): 77-94.

[5] The Toronto Group commonly refers to the work of Thomas F. Homer-Dixon and colleagues affiliated with the University of Toronto. Homer-Dixon has led three major

research projects in the 1990s, producing a large number of qualitative case studies on environment, scarcity and violence. See citations listed in endnote 5. Toronto Group research can be accessed at http://www.library.utoronto.ca/www/eps/state.htm.

[6] The Oslo Group commonly refers to a set of researchers affiliated with the International Peace Research Institute, Oslo (PRIO). PRIO researchers have made both qualitative and quantitative contributions to the environment, population and conflict literature, including a set of prominent critiques. See Nils Petter Gleditsch. "Armed Conflict and the Environment: A Critique of the Literature." *Journal of Peace Research* 35:3 (May 1998): 381-400; Wenche Hauge, and Tanja Ellingsen. "Beyond Environmental Scarcity: Causal Pathways to Conflict." *Journal of Peace Research* 35:3 (May 1998): 299-317; Nils Petter Gleditsch, ed. *Conflict and the Environment*. Dordrecht: Kluwer Publications, 1997; Dan Smith and Willy Østreng, eds. *Research on Environment, Poverty and Conflict: A Proposal*. (PRIO Report 3/97) Oslo: Fridjtof Nansen Institute and International Peace Research Institute, Oslo, 1997; Indra de Soysa and Nils Petter Gleditsch. "To Cultivate Peace: Agriculture in a World of Conflict." *Environmental Change and Security Project Report* 5 (Summer 1999): 15-25; Indra de Soysa and Nils Petter Gleditsch. "The Natural Resource Curse: Are Civil Wars Driven by Need or Greed?" Paper presented at the International Studies Association annual convention. Los Angeles, CA, 14-18 March 2000; Paul F. Diehl and Nils Petter Gleditsch, eds. *Environmental Conflict*. Boulder, CO: Westview Press, forthcoming 2000.

[7] Indra de Soysa and Nils Petter Gleditsch. "The Natural Resource Curse: Are Civil Wars Driven by Need or Greed?" Paper presented at the International Studies Association annual convention. Los Angeles, CA, 14-18 March 2000.

[8] See Thomas F. Homer-Dixon, "On the Threshold: Environmental Changes as Causes of Acute Conflict." *International Security* 16:2 (Fall 1991): 76-116; Thomas F. Homer-Dixon. "Environmental Scarcities and Violent Conflict: Evidence from Cases." *International Security* 19:1 (Summer 1994): 5–40; Thomas F. Homer-Dixon. *The Environment, Scarcity, and Violence*. Princeton, NJ: Princeton University Press, 1999. See also Colin H. Kahl. "Population Growth, Environmental Degradation, and State-Sponsored Violence: The Case of Kenya, 1991-93." *International Security* 23:2 (Fall 1998): 80-119.

[9] For example, developing country participation in research is an explicit principle for research conducted through the Global Environmental Change and Human Security Project <http://www.gechs.org>.

[10] See Ken Conca, "Environmental Cooperation and International Peace." *Environmental Conflict.* Paul F. Diehl and Nils Petter Gleditsch, eds. Boulder, CO: Westview Press, forthcoming 2000; Ken Conca and Geoffrey D. Dabelko, eds. *Environmental Peace-Making* (manuscript in preparation).

[11] *Esty et al.*, 1998. See endnote 4 for a description of the State Failure Task Force.

[12] Germany and the United States co-chaired a three-year pilot study of environment and security with a special focus on environment, population, and conflict ending in 1999. See Kurt M. Lietzmann and Gary D. Vest. *Environment and Security in an International Context*. NATO/Committee on the Challenges of Modern Society, 1998. See also Issue 5 of the *Environmental Change and Security Project Report* for excerpts of the pilot study report.

[13] ENCOP was a major Swiss research project co-directed by Günther Baechler of the Swiss Peace Foundation and Kurt Spillmann of the Center for Security Studies and Conflict Research at the Swiss Federal Institute of Technology. ENCOP researchers conducted over forty qualitative case studies on environment, population and conflict. ECOMAN, succeeded ENCOP in the late 1990s to focus on the environment, population and conflict linkages in the Horn of Africa. See Günther Baechler, Volker Böge, Stefan Klötzli, Stephan Libiszewski and Kurt R. Spillmann. *Kriegsursache Umweltzerstorung. Okologische Konflikte in der Dritten Welt und Wege ihrer friedlichen Bearbeitung.* [Ecological Conflicts in the Third World and Ways for their Resolution.] Vol. I, Zurich: Ruegger Verlag, 1996; Günther Baechler and Kurt R. Spillmann, eds. *Environmental Degradation as a Cause of War*, Vol.s 2-3. Zurich: Ruegger Verlag, 1996; Günther Baechler. "Why Environment Causes Violence: A Synthesis." *Environmental Change and Security Project Report* 4 (Summer 1998): 24-44; Günther Baechler. *Violence through Environmental Discrimination: Cause, Rwanda Arena, and Conflict Model*. Dordrecht: Kluwer Academic Publishers, 1999.

[14] Norman Myers, *Ultimate Security: The Environmental Basis of Political Stability*. New York: W.W. Norton and Co., 1993.

[15] Conca, forthcoming 2000; Conca and Dabelko, forthcoming.

[16] David Dessler, "Review of *Environment, Scarcity, and Violence*." *Environmental Change and Security Project Report* 5 (Summer 1999): 100-101.

[17] While current research suggests this early and/or indirect environmental and demographic causal contribution, it is worth briefly noting that environmental change does not always occur in a linear fashion. The natural environment's propensity to have thresholds, that when crossed, can lead to sudden environment shifts (such as in temperature or precipitation patterns), raises the distinct possibility that environmental stress may play more direct and precipitating roles in violence.

To Cultivate a New Model: Where de Soysa and Gleditsch Fall Short

by Ted Gaulin

There is a tendency in the environmental security literature to criticize the work of Thomas Homer-Dixon.[1] Primary among the critiques, are that his models are too complex,[2] that key terms are vague,[3] and that, when stripped down to their essence, his models do not tell us anything new.[4] Yet research efforts that seek to improve upon Homer-Dixon's work have not produced models with more explanatory power or models that contain new insights. Indeed, in many instances, such efforts take us backwards rather than forwards in our understanding of the dynamics of human vulnerability and conflict. One example of this is an article by Indra de Soysa and Nils Petter Gleditsch entitled "To Cultivate Peace: Agriculture in a World of Conflict."[5]

In "To Cultivate Peace," de Soysa and Gleditsch argue that a lack of physical, human, and social capital—what they call poverty—reduces agricultural production, which often leads to violent conflict. Their point is well taken, and their discussion of the interactions that give rise to violence (e.g. rent seeking, urban bias, etc.) is interesting. However, a careful analysis of the basic causal processes that de Soysa and Gleditsch describe, reveals that *they are covering the same terrain previously covered by Homer-Dixon*. To be sure, the terms used by the different authors vary but the meanings and processes are the same. For example, in Figure 1 (following page), where I have sketched out de Soysa and Gleditsch's basic argument, one sees that in both models, the outcome is largely determined by the presence or absence of physical, human, or social capital. De Soysa and Gleditsch call the lack of these attributes "poverty;" Homer-Dixon calls the lack of these attributes an "ingenuity gap." In both models, it is a lack of adaptive capacity, whether one calls it poverty or an ingenuity gap, that leads to deleterious social effects. In de Soysa and Gleditsch's model, the focus is on low agricultural production; in Homer-Dixon's model, low agricultural production is one of five negative social effects. In both models, the negative social outcome is the proximate cause of violent conflict and, in both cases, violence has a positive feedback into the system. For de Soysa and Gleditsch, conflict exacerbates the conditions of poverty; in Homer-Dixon's model, it exacerbates scarcity and reduces ingenuity.

In short, the model proposed by de Soysa and Gleditsch bears an uncanny resemblance to the Homer-Dixon model of which they are critical. Of the two, Homer-Dixon's is more elaborate because it attempts to explain more. For example, Homer-Dixon's model covers cases in which negative social effects besides agricultural decline lead to violent conflict. In this respect, Gleditsch and de Soysa have succeeded in avoiding what they view as one of the problems with Homer-Dixon's work, namely the high level of complexity. However, in doing so, they have produced a model that is largely derivative[6] and has less explanatory power than its progenitor.

The value of the linkage de Soysa and Gleditsch make between low agricultural production and conflict is limited in so far as low agricultural production is presented as the outcome of a complex and vague set of processes packaged into the concept of poverty. In contrast, Homer-Dixon's model shows that environmental scarcity, rendered destructive due to the lack of social ingenuity, is an important force behind low agricultural production.

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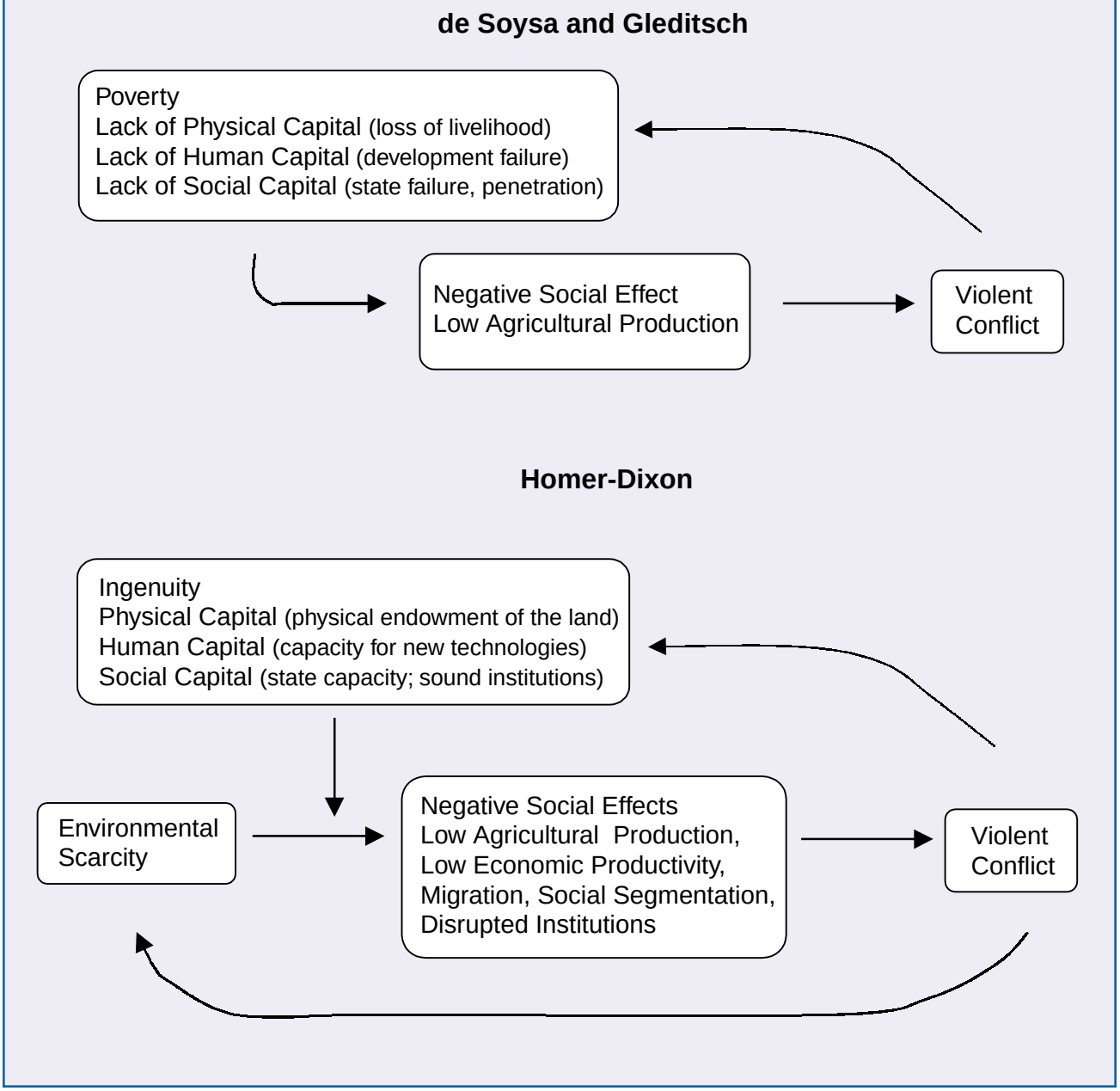
Figure 1. Comparison of the de Soysa / Gleditsch Model and the Homer-Dixon Model



Given the enormous amount of environmental damage that can be traced to agricultural practices, Homer-Dixon's argument makes a good deal of sense and in spite of its complexity, is analytically more focused.

The authors' characterization of agriculturally induced conflict as "apolitical"[7] is unpersuasive. As Harold Lasswell argued over fifty years ago, politics is, at base, about the authoritative allocation of *resources*. When citizens of a particular country do not have enough to eat because state failure or development failure causes agricultural decline, then the ensuing conflict is essentially *political*. One might also ask why the authors seem to conceptualize subsistence conflicts as a post-cold war phenomenon. Historians have long believed that a subsistence crisis was an important cause of the French Revolution.[8] Similarly, scholars have argued that chronic food shortages in the 1980s among Latin American peasants made revolutionary movements in those countries particularly compelling, and these revolutionary movements fomented much conflict.

The larger disappointment, however, is that de Soysa and Gleditsch have produced a model that essentially covers the same ground previously covered by Homer-Dixon. Moreover, their model is less compelling than Homer-Dixon's and it adds little to our understanding of the dynamics of human vulnerability and conflict.

When one puts the de Soysa-Gleditsch model in the context of other attempts to improve upon or refute Homer-Dixon's theoretical work (I think of the models proposed in the NATO and CIA studies summarized in this journal), one must conclude that this has not been a very productive approach to improving our understanding of the complex ways in which environmental scarcities interact with social systems. It would, perhaps, be far more fruitful to undertake more extensive fieldwork in areas facing severe environmental scarcities (as Colin Kahl and others are doing), and then adjust our environment-conflict theories in the light of this detailed empirical evidence.

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NOTES

[1] Critiques include Dabelko, 1999; Dessler, 1999; Deudney, 1999; Dalby, 1999; and Frédérick, 1999. For more on Thomas Homer-Dixon's work, see, for example, Thomas F. Homer Dixon, "On the Threshold: Environmental Changes as Causes of Acute Conflict," *International Security* 16 (Fall 1991): 76-116; Thomas F. Homer-Dixon, "Environmental Scarcities and Violent Conflict: Evidence from Cases.," *International Security* 19 (Summer 1994): 5-40; and Thomas F. Homer-Dixon, *Environment, Scarcity, and Violence* (Princeton, NJ: Princeton University Press, 1999).

[2] Gleditsch, 1998.

[3] Ibid.

[4] Levy, 1995.

[5] de Soysa and Gleditsch, 1999.

[6] In addition to the basic model, other key elements of de Soysa and Gleditsch echo the work of Homer-Dixon. For example, de Soysa and Gleditsch describe a process called "preemption" in which one party arrogates the limited resources of another group to forestall future shortages. This parallels Homer-Dixon's concept of "resource capture."

[7] de Soysa and Gleditsch, 1999: 21.

[8] Schama, 1989.

COMMENTARY: TRADE AND THE ENVIRONMENT AFTER SEATTLE- PERSPECTIVES FROM THE WILSON CENTER

Free trade, seen by many as the engine of world economic growth, has once again become the subject of bitter dispute. Nowhere was this more evident than at the meeting of the World Trade Organization (WTO) in Seattle at the end of 1999. There, environmentalists joined with trade unionists and advocates for developing countries in staging mass protests. These diverse groups claimed the WTO is unrepresentative and undemocratic, overlooking environmental interests and those of the world's poor in favor of big business. Inside the negotiating halls, the United States and the European Union clashed over agricultural subsidies and genetically modified organisms (GMOs). Developing country representatives complained that they remained marginalized in the official talks.

As a first step in addressing these complex linkages, we at the Wilson Center have drawn upon Wilson Center speakers and fellows, past and present, to comment on trade and the environment in the wake of Seattle. Future activities of the Environmental Change and Security Project will promote dialogue and exchange on this topic and we are especially pleased that William Krist (formerly of the American Electronics Association) has joined the Center as a senior policy scholar to facilitate these debates.

WILLIAM M. DALEY, SECRETARY OF COMMERCE

Remarks excerpted from address at a Wilson Center Director's Forum on trade and the environment, sponsored by the Environmental Change and Security Project on 22 November 1999. Please see the report on this speech and the accompanying roundtable in the meeting summary section of this report.

"I have a unique position in all this [the link between trade and the environment]. I am the voice for business and competition in the Administration. And I am responsible for a big part of the environment. You may not know this, but the largest agency at Commerce is the National Oceanic and Atmosphere Administration (NOAA), which manages fisheries, endangered species, and coastal ecosystems. So, I know the pressures that growth can put on the environment, and the need to protect places like our National Marine Sanctuaries. But I also know the needs of the business community. That is what the Administration's trade and environment policy is all about.

"Let me say, at Commerce, I insist on close cooperation between NOAA and our trade people in ITA [International Trade Administration]. "[W]e now have a very effective approach, where all concerns are voiced and addressed before there is a crisis. Take, for example, our recent agreement with forty-two nations to build back Atlantic tuna and swordfish populations. We include strong enforcement provisions, and we believe it is WTO-compliant.

Let me briefly outline what Commerce brings to the table at the WTO and beyond. First, we are leading the charge on lowering trade barriers that also pay environmental dividends. The top issue is ending fish subsidies that lead to too many boats, chasing too few fish. This, plus our efforts on international agreements, will help protect the

world environment.

And we are moving on other fronts. We want the WTO to reduce tariffs on environmental and clean energy products, which would make them cheaper and more widely available. Since America makes some of the best of this technology in the world, I have asked my staff to develop an aggressive program to increase our exports of these products. I believe we can at least double them to $18 billion, in five years.

One final point on WTO. I know that many of you are concerned that the WTO can over-ride international environmental agreements. And worse yet, that they can override U.S. law. Both the President and the Vice President have been very clear on this one. Nations have the right to set environmental standards, based on sound science, at the levels they believe are necessary—even if these are higher than international standards. This principle is absolutely consistent with WTO rules.

Second, at [the Department of] Commerce, we will be looking for new partnerships that expand trade and protect the environment. Let me use forestry management as an example. Obviously, we should be working to develop a global forestry industry that is sustainable in the long run. This means we must remove distorting tariffs—which we have proposed in the WTO. It also means developing better tools to monitor the health of forests. And we believe one way to achieve this is by a marriage of the forest products, and space industries.

Today I am calling on them to begin working on that partnership. I hope it will develop new management tools that use satellite remote sensing to improve forest conservation. At the heart of this is doing a better job of sharing and using these satellite images around the globe. We will be the catalyst for opening the dialogue.

Before closing, let me make a final point. We cannot achieve any of these goals—despite the commitment of this [Clinton] administration—without your help. No way, no how. The fact is, we need your patience and your participation. This is a very new issue.

Mikhail Gorbachev, Former President of the Soviet Union and President, Green Cross International

Remarks excerpted from his speech at a Director's Forum at the Wilson Center on 7 December 1999.

…[O]bjectively there are many problems and challenges that nations cannot meet alone. And therefore, there [is] a need to develop a global approach, a global vision and global institutions, in order to identify and harmonize interests and find ways out of these difficult situations….

But today the whole paradigm of development is changing, not just the end of the Cold War, the civilization is changing. And these are overlapping processes and we should rethink the world and develop new policies that will be consistent with these challenges and develop the new context in which we [will] live….I believe that the environment is the number one item on the agenda of the twenty-first century….

Only one third of mankind has decent living conditions. Two thirds are in bad shape. They do [not] have enough to eat and they live in misery as you well know. But, if by providing decent living conditions for only one third of mankind, we still face environmental crisis, the root cause is that the very foundations, the very fundamentals of our existence may be wrong….[T]he civilization that mankind selected has resulted in real conflict between man and nature.

In the twentieth century, the population of the world grew four times. In the beginning of the century, the world was producing $60 billion less of gross product a year. Now the same amount is produced in just one day. So imagine what kind of pressure that puts on the environment.

At the beginning of the century, mankind used 300 cubic kilometers of water. Now mankind uses 4,000 cubic kilometers of water, which is more than [a] tenfold increase. Everywhere we are in conflict with nature. The natural environment that produced mankind, the natural environment that resulted in our long evolution, is being destroyed today. And in this we are destroying the very conditions of our existence.

So it [is] not just that we need a good environment for the town or in a village or in a region or—of course that [is] necessary. Of course that [is] where we begin to create an environmental awareness. What is more important, we need to change the very modes of economic activity. We need to critically reassess the way of life that leads to this kind of situation.

Now let [us] imagine everyone wants to live according to the American standards. Where are the resources for this kind of energy, for the fuel? It [is] simply unacceptable…we need to preserve nature and find har-

mony so that each nation, within the framework of its history, culture and mentality, cooperating with others, finds its own way.

At Green Cross International, we have been working on the preparation of the Earth Charter. It [is] a kind of set of ecological commandments…It is addressed to everyone—to politicians, to businessmen…Politics and business need a push from civil society. There should be mechanisms to influence politicians and businessmen because society [will not] like environmental problems that much. Even social problems, they accept with a lot of difficulty and certainly not environmental problems.

Another project that we [Green Cross International] are doing with UNESCO . . . is a project for environmentalized education. Education at all levels, in primary school and all the way to university level, to study the environment and to study every problem or every discipline, how to [respect] the environment.

…[A project that is of] great importan[ce] for Russia and the United States [is] the environmental legacy of the arms race….

We are also working on the consequences of . . . the wars in the Gulf. . . . the very brief use of weapons resulted in the poisoning of the soil, and in poisoning with oil products, and particularly fifty percent of strategic reserves of freshwater and strategic aquifers of Kuwait have been polluted. A similar situation is now becoming clear in . . . Yugoslavia. Petro-chemical factories were bombed and the Balkans have now been possibly polluted.

And finally we have a freshwater project. We have begun this project in the Middle East. It is very difficult there to negotiate the interests of different sides. We are supported by the leaders of Middle Eastern countries, and I believe that we will be able to be a very important project that will be a precedent to solve not only [the Middle East's own] problems but other problems of drinking water and of freshwater….

To conclude my remarks let me say this. If the environmental movements in the United States, in Russia, and in Brazil, and China, and Europe [can] work effectively, then we can hope to do a great deal. I would like you in the United States to help us in developing a very strong organization. In the United States, a strong environmental organization is emerging, an affiliate of Green Cross in the state of Georgia. The governor will be helping us to develop a regional branch—a state branch of Green Cross. That [is] very important.…

Andrea Durbin, Director, International Program, Friends of the Earth-U.S.

Seattle: What it Meant and Where To Go From Here?

The World Trade Organization (WTO) meetings in Seattle have put international trade issues and the way in which trade policy is made under new public scrutiny. The old way of conducting global trade talks—where governments negotiated agreements in closed, exclusive settings—proved unacceptable to ordinary people and even to many governments, especially those from the developing world. The protests' fundamental message was that global institutions like the WTO need to be democratic and accountable and that economic rules must be balanced and should promote social values, such as environmental, labor, and human rights protections.

Since Seattle, protests at the World Economic Forum in Davos, Switzerland and the World Bank/International Monetary Fund (IMF) meetings in Washington, D.C. have amplified that message. A new social movement of environmental, labor, human rights, students, and other groups is growing in the United States. This movement—which joins the calls of developing country activists—recognizes the inevitability of globalization, but contends that it must be changed so it elevates social values, and does not leave them behind. It is calling for the economic rules of the game to change so they put the public interest before the corporate interest. Environmental organizations, like Friends of the Earth (FoE), are calling for specific reforms of the trading system, which include:

1. Democratizing Trade: In Washington and Geneva

In Seattle, President Clinton acknowledged the need to democratize trade policy and to make the WTO more transparent and accountable to people. FoE believes democracy starts at home. Before we can reform the WTO, we should first reform the way the United States makes trade policy. Today, the corporate sector provides input into United States' trade policymaking process, but the public is largely shut out. U.S. positions on trade therefore reflect the corporate interest, not environmental, human rights, and labor interests. This must change before the United States can credibly

argue for a more democratic WTO.

If the public has a greater voice in the domestic trade policymaking process, better, more balanced trade policy and more public confidence in international trade will result. FoE recommends that the U.S. trade advisory system be opened to environmental organizations and other public interest groups, and that public notice be given when the U. S. government uses the WTO to threaten other countries' environmental laws. The United States Trade Representative's (USTR) office should not be able to decide on its own whether to challenge an environmental law of another country without input from the public and appropriate environmental agencies.

> "Nations have the right to set environmental standards, based on sound science, at the levels they believe are necessary-even if these are higher than international standards."

2. Change the Balance of Power from Trade to Environment

A decade of advocacy has led environmental organizations to the conclusion that one of the main obstacles to environmental reform of trade policy is the USTR. Even though USTR lacks environmental expertise and is perceived as being beholden to business interests, it plays the lead role in setting U.S. policies on trade and the environment. In the lead up to Seattle, USTR blocked the environmental community's calls for WTO reforms that would have reduced threats to environmental laws. The solution to this problem is to give environmental agencies like the Environmental Protection Agency (EPA) and the Council on Environmental Quality (CEQ) the lead role in setting the environmental aspects of U.S. trade policy. USTR would then be responsible for representing these positions in trade negotiations. Until the balance of power shifts from USTR to environmental agencies, environmental reform of trade will be hard to achieve.

3. Environmental Reforms of the WTO: More Neutralizing than Greening

Since the WTO's establishment in 1995, environmentalists have pointed to conflicts between its trade rules and environmental protection laws. These rules undermine governments' ability to use trade measures to protect the environment or to enact environmental laws that impact trade. The environment has been on the losing end of every environmental dispute that has reached arbitration at the WTO. In the United States, the Clean Air Act and Endangered Species Act have been weakened as a result of a WTO ruling. In Europe, attempts to keep hormone-injected beef off the market have been overturned. In Japan, U.S. complaints about proposed fuel efficiency regulations have led to a weakening of the regulations. In the past five years, the WTO's trade rules have been used to both weaken existing environmental laws and "chill" the development of new laws and regulations for fear that they will impede free trade.

Environmental organizations have called for the environmental reform of trade rules so they will not be used to undermine environmental protection goals. *Environmental groups are not trying to convert the World Trade Organization into an environmental organization* as some business representatives have alleged. In fact, that assumption is far from the truth. The WTO does not have the competency to deal with environmental issues, nor should it. In reality, what FoE wants, is to reduce the WTO's involvement in environmental policymaking so trade rules do not interfere with environmental laws.

What this requires are some substantive rule changes to grant greater deference to environmental and health laws and to change the dispute resolution process at the WTO. The rule changes should:

- Provide deferential treatment to local, national, and international environmental and public health laws;
- Protect the right to limit the harmful effects of resource extraction and methods of production;
- Protect the consumer's right to know labeling programs;
- Protect the right to use purchasing power to protect the environment;
- Protect the right to strong environmental standards that err on the side of caution in the face of scientific uncertainty; and,
- Establish the right to full-disclosure of the WTO's

activities and deliberations, as well as the ability to participate in proceedings that affect public health and the environment.

4. Conduct Environmental Assessments of Trade and Investment Agreements

It is now widely acknowledged that trade impacts the environment. It should become routine policy to conduct environmental assessments of trade and investment agreements early in the negotiating process to anticipate the problems and provide for policy recommendations that mitigate or avoid these problems. These assessments should follow the National Environmental Policy Act, and provide for public input.

Next Steps

The level of protests in Seattle was unprecedented and will continue to grow until real changes are made. The test now will be whether and how soon governments will respond to the calls for changing the way in which trade policy is made and whose interest it serves.[1]

MARTIN ALBROW, WOODROW WILSON CENTER FELLOW AND PROFESSOR OF SOCIOLOGY, UNIVERSITY OF SURREY, ROEHAMPTON, U.K.

Is it confusion to want both free trade and the good society, or just the latest version of pragmatic politics, trying to find compromises between irreconcilable, equally logical alternatives?[2]

Seattle was primarily an event in the new global politics, in which, as in any other type of politics, parties make unholy alliances in their quest to control the agenda. Pure principle is a casualty, but there is a fine line between the assertion of principle and dogma. I would defy anyone to show that the idea of free trade in principle either excludes or includes worker's rights. Yet many will go to the barricades on either side, and the lack of a determinable outcome fuels the demand to end ambiguity. The point is not the logic of the arguments but the ambition to be in charge of the situation.

> "Established trade rules and practices have run up against deeply held notions of national sovereignty and concerns for environmental protection, health, human rights, labor rights, and the safety of the workplace."

This further suggests a widespread conviction that there is something to be in charge of, namely, global politics itself. *The importance of Seattle is that it intimates the coming consolidation of political alliances in the struggle to determine the direction of global economy and society.* We should not be surprised that the alliances are unholy: first world labor unions with third world religious representatives; transnational corporations with poor fisher people. Parties in national politics formed out of coalitions of interest, not ideology; we can expect the same in global politics.

Not all is confusion. The opposing sides reduce the complexity to one slogan, to being for or against globalization—no matter what that might mean. For the pragmatist, it just means we have reached this point and, in the words of President Clinton, "can[not] turn the clock back."[3]

Ten years of academic exploration of complexity of "globalization" shows how we can not just be for or against it when it often means contradictory things. Thus, removing barriers to free trade is globalizing; so, too, is imposing global labor standards. The WTO, the International Labor Organization (ILO), and the International Forum on Globalization are all agents of globalization in different ways. But away with these academic niceties!

Globalization as a concept is the main casualty of Seattle. There is now little hope of saving it from being simply a device for political rhetoric. The concept, which

has expressed, more than any other, the way the world of the 1990s was different from what went before has now fallen a victim of the very changes it proclaimed. As a battle cry, it will echo in history. For intellectual direction in the new global governance, we will have to develop a new language from now.

STACY D. VANDEEVER, ASSISTANT PROFESSOR OF POLITICAL SCIENCE, UNIVERSITY OF NEW HAMPSHIRE

He is co-editor of Saving the Seas: Values, Scientists, and International Governance *and* Protecting Regional Seas: Developing Capacity and Fostering Environmental Cooperation in Europe, *a conference proceedings volume published by the Wilson Center's Environmental Change and Security Project and the East European Studies and the West European Studies programs.*

The World Trade Organization negotiations in Seattle gave us a preview of the complicated trade and environmental issues policymakers will be facing in the twenty-first century. Established trade rules and practices have run up against deeply held notions of national sovereignty and concerns for environmental protection, health, human rights, labor rights, and the safety of the workplace. Now that some of the smoke is clearing from Seattle (and Y2K hysteria has passed), it is time to take stock and draw a few lessons.

Lesson 1: Trade is rule-based, not "free." Saying that WTO participants negotiate "free trade agreements" is a misnomer. International trade, like domestic trade, is based on a detailed set of rules and norms governing conduct. So although WTO agreements (like the GATT agreements before them) have succeeded in "freeing" trade from many of the tariffs that burdened it previously, trade is by no means free—as evidenced by the WTO agreements themselves, which are hundreds, often thousands, of pages long and filled with narrow and broad exceptions of all kinds.

The groups that gathered in Seattle were thus not debating the merits of trade and whether it should be "free" or "not free." Rather, they were debating what the rules of international trading should be. The protestors who traveled to Seattle were only too aware of this and have been educating society at large by posing pertinent questions: Do we want an international trading system that is deaf to the voices of child labor and human rights abuses? Do we want one that is indifferent to the plight of endangered species and the global environment? Does it matter that some societies object to genetically altered organisms more than others? The rules for twenty-first century international trade will continue to grapple with questions of this kind.

Lesson 2: More than ever, trade politics is a volatile combination of domestic politics and foreign policy. Political leaders and scholars alike pin vast hopes on the WTO liberal trade regime, expecting it to increase prosperity; alleviate poverty; protect labor rights; promote international peace, democratization, and societal openness; preserve the environment; lessen human rights abuses; increase market competition and efficiency; benefit consumers; and so on. Obviously, each and every one of these goals cannot be maximized at the same time. Choices will need to be made, as evidenced by President Clinton looking to the WTO to provide more access to foreign markets for U.S. companies, more environmental protection, integration of China into international (*read: Western*) institutions, and increased labor protection for children. Clinton's list reflects both his foreign policy goals and the pressures he is under from American interest groups.

Against this background, none of today's political players can afford to ignore the neoliberal trade agenda. Those involved in making foreign policy, for instance, cannot set policy on security and the environment without checking for WTO compliance and consistency with economic policy. Likewise, organized domestic interests no longer have the luxury of ignoring trade policy (and policymakers no longer have the luxury of being ignored). Today's trade politics involves not just the traditional players of labor unions and domestic manufacturers but also a plethora of public interest advocates. Whether advocating environmental protection, consumer rights, human rights, food safety, religious freedom, indigenous peoples, democratization, or international development, such groups simply cannot accomplish their goals without directly engaging in the trade rules debate. Furthermore, they are systematically educating their members and political allies about this fact. Prior to the American elections later this year, candidates at all levels will continuously be asked to reconcile their positions on trade with those on the environment, human rights, and related issues.

Lesson 3: The protests will continue, so be prepared.

The protests in Seattle were not a one-time occurrence. While WTO reformers and opponents decried the violence (and the police conduct), the media attention emboldened the protestors, and the failure of the negotiations succeeded in raising their political profile. The protestors now have too much at stake to give up the fight for trade rules more attuned to their interests. That said, open hostility to open markets and international trade, like that sometimes espoused by Pat Buchanan, is unlikely to catch on in most Western democracies. We have too much to lose by wholesale restrictions on trade. But consumer protection, environmental protection, and labor rights are here to stay. Most consumers believe that dolphins and child laborers should not die for cheaper consumer goods and that the contents of food should not be a secret. These people are unlikely to change their minds any time soon.

> "Contrary to [the] Western conception, it is possible for human communities and wildlife to live together, but this only happens if the community is given responsibility for the resources of its land."

Officials in Seattle were clearly unprepared for the protests. No doubt, future host cities will be better prepared. It is policymakers who continue to look and sound unprepared. If they plan to wait and see, hoping this moment of liberal trade-skepticism will pass, they may be surprised again.

Anju Sharma, Centre for Science and Environment, New Delhi, India

Remarks excerpted from an interview following a Wilson Center public seminar on 20 April 2000, featuring the release of Sharma's co-edited volume, Green Politics: Global Environmental Politics. *Please see the Meeting Summary section for the full text of the interview between Sharma and Justine Kwiatkowksi, Editorial Assistant,* Wilson Quarterly.

...I am not so sure how much the protests in Seattle and Washington were linked. In Seattle, the protesters were concerned with issues such as Tibet and saving turtles. These are worthy goals, but they[are] what I call "sovereign issues," and the actions the protesters were advocating would infringe on the rights and sovereignty of other nations. The protesters were asking industrialized countries to put pressure on India and other Southern Hemisphere nations to deal with such sovereign issues, which is unfair...

...[Few] Southern countries had an overview of what goes on in global environmental negotiations....Poor countries do not know what is going on in these negotiations, yet their environmental and economic future depends on the outcome....

[The Centre for Science and Environment] would also like to start a dialogue so that people everywhere perceive the importance of democracy in a global context—especially countries in the Northern Hemisphere, which often overlook the need for equality and justice in their environmental negotiations.

...Environmental negotiations become "business transactions" when the interests of the business world overtake a country's agenda. At major environmental conferences, developed countries tend to take positions that the industries in their countries want them to take. For example, at the Climate Change Convention, the United States took the position that their automobile and oil industries had instructed them to take. American car and oil businesses feared that their counterparts in developing countries would gain a competitive edge if the United States agreed to global environmental commitments, and so these native U.S. industries attempted to co-opt the process.

Clinton and Gore made it easy for American business to take over in that they did not talk to the Congress first to get a unified opinion—they just rushed off to the climate change meeting without a coherent opinion. That vacuum allowed the industries' perspective to dominate. And this conference is only one example of the North's failure to withstand business pressure. There are many others.

...The management of national parks is a good example of how this tension [between economic development and environmental protection] has manifested itself in India. India has adopted a Western concept of national parks—essentially declaring certain areas inaccessible to human beings. But that is not practical for our country with a large and expanding population, not to mention a tradition of a symbiotic relationship between the people and the land. This Western method has isolated Indian communities from wildlife management, in many ways stunting their understanding of the importance of preserving the environment—and thereby working against the very goals the policy set out to achieve....

Contrary to [the] Western conception, it is possible for human communities and wildlife to live together, but this only happens if the community is given responsibility for the resources of its land. If they have a vested interest in preserving the land and understand that it is their future, they will protect it....

The Centre for Science and the Environment where I work in New Dehli advocates a separate [global] organization, one that acts as a counterweight to the WTO and addresses both environmental and development issues. Or, alternately, the UN could get its act together and become a more democratic and streamlined organization. As to whether it is possible or not, I am not sure. People have spoken about a separate organization, but if the current political nexus continues, it will not happen. It is in the current interests of the United States to keep the WTO dominant, and the United States determines most of what happens in the global environmental realm.

STEPHEN CLARKSON, PROFESSOR OF POLITICAL ECONOMY, UNIVERSITY OF TORONTO, CANADA, AND A FELLOW AT THE WOODROW WILSON CENTER

The author of Trudeau and Our Times *and other works on Canadian politics, Clarkson is currently researching whether WTO and NAFTA constitute an "external constitution" for the three North American states of Canada, the United States, and Mexico.*

Martin Albrow *[see above]* lamented that the concept of globalization had become the casualty of political rhetoric and had in the process lost its analytical utility. As a result he feels that a new language is needed to describe what is happening to global governance.

Until we get such a new lexicon, we may have to make do by transposing our present political vocabulary to the supranational. In so doing, it becomes apparent that, in the gradual development since World War II of a supranational political order, the creation in 1994 of the WTO marked a major and exciting advance. This substantial addition to the existing set of international institutions and regimes that comprise the emerging system of global governance was distinguished by what we could consider an embryonic constitutional order.

The evidence of what I call the "new constitutionalism" is as follows.

- The WTO is an institution with an international juridical personality that exists autonomously from its signatory member states.
- The WTO governs the trading behavior of its member states with hundreds of pages of rules based on fifty years of trade policy development culminating in the breakthroughs achieved during the Uruguay Round (1986-94). The scope of these norms has been vastly expanded to include trade in services and agricultural products, including an elaborate set of provisions governing the way scientific standards are to be applied to the trade of sanitary and phytosanitary goods such as genetically modified food. These rules have to be incorporated in the domestic law of the signatory states. Because in some cases this required radical changes in the regimes of the signatory states—obliging them, for instance, to alter their agricultural protection schemes from quotas and other quantitative restrictions to tariffs—they constitute substantial amendments to these states' own legal orders.
- Through its Trade Policy Review Board the WTO shows it has an administrative function. It monitors the extent to which the member states are implementing its trade rules and publishes oversight reports on each country noting where progress has been made and specifying which measures need to be changed.
- Through continuing negotiations the WTO has

been able to expand its rules, demonstrating a legislative capacity to alter the regulatory framework of its members in their financial services and telecommunications sectors.
- The WTO defines rights for its constituent players, notably those of transnational corporations (TNCs) vis-á-vis member states.

> "Today, the corporate sector provides input into United States' trade policymaking process, but the public is largely shut out. U.S. positions on trade therefore reflect the corporate interest, not environmental, human rights, and labor interests."

- The WTO boasts an enforcement capability that enables it to apply these rules and impose a high degree of discipline on its member-states. This judicial mechanism gives the WTO's norms incomparably more heft than the idealistic formulations to be found, for instance, in the Universal Declaration of Human Rights or the many worthy conventions of the International Labor Organization. Commercial conflicts between members are to be resolved by an independent dispute settlement board whose rulings (following the inevitable appeal to an Appellate Body) the member-states are bound to accept on pain of retaliation. This is in effect a global judiciary whose rulings declare that legislation democratically enacted by states is illegal because it contravenes the WTO's norms.

Clearly, this commercial constitutional order is only embryonic:

- Its membership is still not universal. China, Russia and a number of much smaller states have not yet been admitted.
- Its scope is uneven. Some rules such as trade-related intellectual property rights (TRIPs) are extremely elaborate and demanding whereas other issues such as labor standards are virtually ignored.
- Its effectiveness is still not fully established. Washington's threat to boycott the proceedings was enough to dissuade the European Union from launching a dispute with the United States over the Helms-Burton Act's violation of WTO rules.
- Its legitimacy is disputed. Cultural nationalists in France and Canada, consumers throughout Europe, and environmentalists in all countries are incensed at the WTO's dispute rulings which have consistently privileged free-trade norms over considerations of cultural diversity, long-term health risks, or environmental sustainability.
- Its responsiveness is asymmetrical. The information, entertainment and pharmaceutical TNCs got what they wanted in TRIPs, but labor and environmentalists have been largely excluded from the WTO's deliberative process.

The resulting democratic deficit lies at the heart of the anger displayed outside the closed doors of the official negotiating rooms in Seattle. These demonstrators showed the world, for the first time, components of a global civil society in action.

I have used the familiar constitutional metaphor to explain the WTO's character and functions. If my explanation is persuasive, what does it suggest about the challenges facing the WTO's next stage?

Given the many conflicts of interest between North and South, between the United States and the EU, between TNCs and social activists, it is unlikely that even a tranquil Seattle would have yielded a consensus on the Millennium Round's negotiating agenda. In other words, the WTO's legislative process may well mark time—not a bad thing when so many of its rules have still to be tested in action by interpretation via dispute settlement panels.

This judicial action is likely to be much more responsive to the views expressed in Seattle's streets. Up until now, the dispute panels have been fixated on rendering judgments based on the black letter of the WTO's rules. Henceforth they will be much more conscious that they have to keep in mind a second audience that is far broader than the trade lawyers and government officials with whom they were concerned in the first years of the late 1990s. Without a single new rule being drafted, the panelists and members of the Appellate Body could decide to privilege the references to international environmental treaties and to import into their judg-

ments the values of social justice that lurk, explicit and implicit, in the WTO texts.

The administration of the global trading system is also likely to make more room for representations from civil society. The already considerable efforts made by the WTO to increase its transparency will be enhanced as it tries to become more sensitive to general demands for more people-friendly, less corporate-dominated global governance.

The global trade regime as constitutionalized six years ago was deeply flawed by its excessive incorporation of TNC interests and its inadequate responsiveness to civil society's values. Seattle's streets offered a stage for frustration over this imbalance to be expressed. To thrive in its role of supranational governing body, the WTO must anchor its constitutional legitimacy in a praxis that is sensitive to the multiple publics that will be monitoring every dispute settlement ruling it makes.

We may not yet have a language for expressing this new reality, but Seattle has changed the way we use our old notions and gives hope that they may yet be applied creatively at the supranational level of governance.

KENT HUGHES, FORMER ASSOCIATE DEPUTY SECRETARY OF COMMERCE, AND PUBLIC POLICY SCHOLAR, WOODROW WILSON CENTER

Hughes is currently working on a book tracing the development of national competitiveness as an idea and a political force in the United States particularly during the Bush and Clinton administrations.

It is easy to downplay the Seattle demonstrations as just an exercise in street theater.

None of the other commentators *[See above]* made the mistake of simply dismissing the demonstrators. For the most part, they see the demonstrators as raising serious questions about what rules should apply to an increasingly global society. I share the other commentators' concerns about child labor, environmental degradation, and the importance of human rights. I do, however, want to add a few points:

- Certain trends will persist regardless of whether global negotiations take place. Whether referred to as globalization or by a more exact vocabulary, ideas, products, investments, and technologies will continue to flow from one nation to another. America is no exception. Today, Americans listen to African pop, buy more salsa than ketchup, and follow the rush of Japanese children to buy Pokemon characters. Economies are also more tightly linked as the volume of international commerce grows. And we are continuing the trend to trading parts rather than products at the same time as companies are adopting a just-in-time approach to inventories. The combination is making trade sanctions more costly in terms of growth and jobs.

- Even if no global round of trade negotiations takes place for another decade, the trend to global economic and cultural ties will continue. New technologies, cross border partnerships, and the growing ease of communications will help to increase the volume of international trade. Specific trade agreements on a regional or sector specific basis are likely—and will only augment the trend.

- Interest groups, workers, environmentalists, and consumers in every country of the world share an interest in trade, growth, and innovation. Billions of people still aspire to move out of poverty and into a world of greater health, better education, and relative prosperity. To reach even a 1960s level of European prosperity, the combined populations of India and China alone would put enormous pressure on available resources and the environment unless technology changes. Growth is often associated with higher levels of pollution and greenhouse gases; but higher incomes are also associated with stable populations and a demand for greater environmental protection. Growth matters in the United States, too. It is growth and innovation that promise our children greater health, a cleaner environment, and greater prosperity.

- Recent experience has been tenacious in teaching us that markets depend on a set of complex institutions. The difficult transition from centrally planned economies to market-based democracies, the Asian financial crisis, and the economic stagnation in many countries—all are reminders that markets are embedded in customs and cultures that evolve over time. Today's fast-moving American markets grew out of two centuries of development in the public

as well as the private sphere. This long experience taught us the need for providing safety nets, setting up retirement programs, and developing standards to protect workers and consumers.

- America needs to develop a strategy for global engagement in what will surely be a thoroughly global century. It is an imperative that nurtures our ideals as well as favoring our interests. The American economy is closely linked to the rest of the world; we suffer from the costs of world-wide pollution; and we are only a plane ride away from any disease. By bringing world poverty into our living rooms, modern communications have created an added moral dimension in seeking development and equity around the world as well as at home.

America's global strategy will evolve in response to achieving hoped for successes as well as facing new challenges. As a start, I propose a five-step approach. We need to:

1. Broaden the dialogue on international economic policy by considering everything from more inclusive congressional hearings to a reformed advisory approach for U.S. trade policy;

2. Continue to press for domestic and global growth with equity. Trade is an important part of that agenda but so are global standards on everything from accounting to workplace safety;

3. Forge global agreements to protect the global commons. We should be able to distinguish between standards that are designed largely to protect a domestic interest and those that are focused on shared environmental concerns;

4. Make a commitment to global health. Recent proposals for developing vaccines targeted at tropical diseases are an important start; and,

5. Strengthen global and national institutions. Greater transparency in decision-making can yield better results and build popular support. U.S. foreign assistance can be targeted at helping interested countries improve their ministries of labor and the environment. The Organization for Economic Cooperation and Development has taken an important step in developing proposed codes of conduct that apply to multinational corporations based in OECD member countries.

At times, America has tried to lead by example and, at other times, by active engagement in the world. Today we need to pursue both. It is a case of "doctor heal thyself," but also help to heal others.

TAMAR GUTNER, ASSISTANT PROFESSOR OF POLITICAL SCIENCE, AMERICAN UNIVERSITY

Dr. Gutner authored "Cleaning up the Baltic Seas: The Role of Multilateral Development Banks," in Protecting the Regional Seas: Developing Capacity and Fostering Cooperation in Europe, *a conference proceedings volume published by the Wilson Center's Environmental Change and Security Project and the East European Studies and the West European Studies programs.*

Critics of the World Trade Organization (WTO) used the institution and its late 1999 ministerial meetings in part as a proxy for deeper criticism of globalization and trade liberalization. But to what extent is reform of the WTO itself the answer to problems caused by world trade? Clearly, there is scope for improving the WTO's ability to address environmental, labor, and human rights issues. But fixing the institution is only part of the solution.

Pressure to reform the WTO is part of a broad trend where international organizations are being asked to take on a variety of new policy issues that did not exist when these institutions were created. Perhaps the most dramatic illustration of this is NATO's shift from a collective defense organization designed to deter Soviet attack, to one involved in fighting inside non-member states, where the driving issues are ethnic conflict and human rights abuses. The United Nations, too, has struggled to address new demands for peacekeeping operations in intra-state conflicts where its mandate is not always clear, such as in Somalia and Bosnia. The World Bank is constantly adding new issues—from gender to judicial reform—to its bread-and-butter work promoting economic development. And the IMF's recent involvement in multi-billion dollar economic "bail-outs" is far from its original mandate of overseeing the par value system

and helping countries with temporary balance of payments deficits. All of these institutions have come under attack for doing a poor job juggling their growing number of mandates, yet simultaneously there are calls for these institutions to continue taking on new policy issues.

This loading up of new mandates reflects the fact that patterns of global governance are becoming both more diffuse and complex, heightening the need for stronger international organizations with a greater capacity to address global and regional issues. Yet instead of a stronger set of global institutions, we are seeing performance difficulties that reflect, in part, what has been called "mandate congestion."

Looking at the WTO's evolution from the Global Agreements on Tariffs and Trade (GATT), we see that its mandate has also broadened over the years, from an initial emphasis on promoting trade liberalization by reducing tariff barriers on goods, to addressing non-tariff barriers, trade in services, intellectual property rights, agriculture, and other sectors. The WTO also has more power than its predecessor to settle trade disputes among states. Now many are calling for the WTO to add regulation of labor and environmental standards to its work. Such regulation can play an important role in reducing the negative side effects of more open trade.

Politically, it is difficult to imagine the WTO adopting these new standards since many of its member states see these issues as infringing on their sovereignty. Unlike the World Bank and IMF where voting on the executive board is weighted, the WTO operates on a "one country, one vote" basis. This structure reduces leverage for countries like the United States to push the WTO to address labor and environmental issues. In addition, the WTO is not home to a large, relatively autonomous bureaucracy, as are the World Bank, IMF, and United Nations. Its secretariat of 500 people is among the smallest of major international organizations. While all international organizations can be said to be "member-driven," this claim has more force with the WTO, since its major actions are the rules agreed to through sets of interstate negotiations.

Rather than loading up the WTO with responsibilities it may not be equipped to handle, it is important to build closer links of cooperation with the other institutions that may be more appropriate fora—such as the International Labour Organization (ILO), or the United Nations Environment Programme (UNEP). Such cooperation will involve better equipping these institutions—or providing them with political support—to monitor or enforce the programs and treaties under their purview. Governments can also focus more attention on redressing areas where the agreements they make under one institutional framework clash with agreements under another, such as areas where global environmental agreements conducted under UNEP's auspices clash with trade rules agreed upon through the WTO.

Pressure from civil society will play a key role in the WTO reform process, but this pressure is best focused on member state governments in general, and trade ministries in particular—the primary sources of changing the WTO. Stronger national regulations are also the key to raising labor and environmental standards. Finally, activists can press their governments to strengthen other international organizations and to raise public awareness about the comparative advantages and responsibilities of the lesser-known organizations. ■

NOTES

[1] For more information on Friends of the Earth's position on the WTO, view the web-site at http://www.foe.org/international/wto.

[2] In his recent book *The Global Age: State and Society Beyond Modernity*, Albrow argued that globalization provided opportunities but no guidelines.

[3] "Larry King Live," 23 December 1999.

OFFICIAL STATEMENTS

Below are excerpts from recent official statements in which environment and population issues are prominently cited in the context of security and national interests. The Wilson Center encourages readers to inform the ECSP Report *of other related public statements.*

STATEMENTS BY WILLIAM J. CLINTON
President of the United States

Excerpts from President Clinton's remarks to the People of New Zealand, Antarctic Centre, Christchurch, New Zealand
15 September 1999

...The overwhelming consensus of world scientific opinion is that greenhouse gases from human activity are raising the Earth's temperature in a rapid and unsustainable way. The five warmest years since the fifteenth century have all been in the 1990s; 1998 was the warmest year ever recorded, eclipsing the record set just the year before, in 1997.

Unless we change course, most scientists believe the seas will rise so high they will swallow whole islands and coastal areas. Storms, like hurricanes and droughts both, will intensify. Diseases like malaria will be borne by mosquitoes to higher and higher altitudes, and across borders, threatening more lives—a phenomenon we already see today in Africa.

...In 1992, the nations of the world began to address this challenge at the Earth Summit in Rio. Five years later, 150 nations made more progress toward that goal in Kyoto, Japan. But we still have so much more to do.

...[We] have a big responsibility because America produces more greenhouse gases than any other country in the world. I have offered an aggressive program to reduce that production in every area. We are also mindful that emissions are growing in the developing world even more rapidly than in the developed world, and we have a responsibility there.

...[T]he largest obstacle to meeting the challenge of climate change...is the continued...idea that the only way a country can become wealthy and remain wealthy is to have the patterns of energy use that brought us the Industrial Age. In other words, if you [are] not burning more oil and coal this year than you were last year, you [are] not getting richer; you [are] not creating more jobs; you [are] not lifting more children out of poverty. That is no longer true.

We now know that technologies that permit breathtaking advances in energy conservation, and the use of alternative forms of energy, make it possible to grow the economy faster while healing the environment, and that...it is no longer necessary to burn up the atmosphere to create economic opportunity.

...We are committed to doing more at home and to do more to help developing nations bring on these technologies, so they can improve living standards and improve the environment. [In] 1987, the international community came together in Montreal and agreed to stop the use of chemicals that deplete the ozone layer. Experts tell us that if we keep going, the ozone hole will shrink, and by the middle of the next century the ozone hole could actually close, so that, miracle of miracles, we would have a problem created by people solved by people, and their develop-

ment. This is the sort of thing we have to do with climate change-and the stakes are even higher....

Excerpts from President Clinton's State of the Union Address, Washington, D.C.
27 January 2000

...America must help more nations to break the bonds of disease. Last year in Africa, ten times as many people died from AIDS as were killed in wars-ten times. The budget I give you invests $150 million more in the fight against this and other infectious killers. And today, I propose a tax credit to speed the development of vaccines for diseases like malaria, TB [tuberculosis], and AIDS. I ask the private sector and our partners around the world to join us in embracing this cause. We can save millions of lives together, and we ought to do it....

...The greatest environmental challenge of the new century is global warming. The scientists tell us the 1990s were the hottest decade of the entire millennium. If we fail to reduce the emission of greenhouse gases, deadly heat waves and droughts will become more frequent, coastal areas will flood, and economies will be disrupted. That is going to happen, unless we act.

Many people in the United States...and lots of folks around the world still believe you cannot cut greenhouse gas emissions without slowing economic growth. In the Industrial Age that may well have been true. But in this digital economy, it is not true anymore. New technologies make it possible to cut harmful emissions and provide even more growth.

...In the new century, innovations in science and technology will be the key not only to the health of the environment, but to miraculous improvements in the quality of our lives and advances in the economy.

...These steps will allow us to lead toward the far frontiers of science and technology. They will enhance our health, the environment, the economy in ways we [can not] even imagine today. But we all know that at a time when science, technology, and the forces of globalization are bringing so many changes into all our lives, [it is] more important than ever that we strengthen the bonds that root us in our local communities and in our national community.

> "We must understand that the old conception of global security-with its focus almost solely on armies, ideologies, and geopolitics-has to be enlarged."
>
> - Albert Gore

. . . . . .

Statements by Albert Gore, Jr.
Vice President of the United States

Excerpts from Vice President Gore's remarks to United Nations Security Council Opening Session, New York, N.Y.
10 January 2000

Let me thank the distinguished members of the Council for the...willingness to greet the dawn of this new millennium by exploring a brand new definition of world security.

Today marks the first time...that the Security Council will discuss a health issue as a security threat. We tend to think of a threat to security in terms of war and peace. Yet no one can doubt that the havoc wreaked and the toll exacted by HIV/AIDS do threaten our security. The heart of the security agenda is protecting lives-and we now know that the number of people who will die of AIDS in the first decade of the twenty-first century will rival the number that died in all the wars in all the decades of the twentieth century. When ten people in sub-Saharan Africa are infected every minute; when eleven million children have already become orphans, and many must be raised by other children; when a single disease threatens everything from economic strength to peacekeeping-we clearly face a security threat of the greatest magnitude.

This historic session not only recognizes the real and present danger to world security posed by the AIDS pandemic...this meeting also begins a month-long focus by this Council on the special challenges confronting the continent of Africa. The powerful fact that we begin by concentrating on AIDS has a still larger significance: it sets a precedent for Security Council concern and action on a broader security agenda. By the power of example, this meeting demands of us that we see security through a new and wider prism, and forever after, think about it according to a new, more expansive definition. For the past half century, the Security Council has dealt with the classic security agenda-built upon common efforts to resist aggression, and to stop armed

conflict. We have witnessed wars among nations, and violence on the scale of war within nations, for many reasons:

- Because of claims of religious or racial superiority.
- Because of lust for power, disguised as ideology or rationalized as geo-strategic doctrine.
- Because of a sense that a small place or a larger region-or the whole world-was too small to allow for the survival and prosperity of all, unless the powerful could dominate the weak.
- Because of the tendency of too many to see themselves solely as separate groups, celebrating and defending their exclusivity, by demonizing and dehumanizing others.
- Because of poverty, which causes the collapse of hopes and expectations, the coming apart of a society, and makes people first desperate, then freshly open to evil leadership.

> "[E]nvironmental threats should be seen for what they are-namely, threats to our security."
>
> - Madeleine Albright

But while the old threats still face our global community, there are new things under the sun-new forces arising that now or soon will challenge international order, raising issues of peace and war....From this new vantage point, we must forge and follow a new agenda for world security, an agenda that includes:

- The global environmental challenge, which could render all our other progress meaningless, unless we deal with it successfully.
- The global challenge of defeating drugs and corruption, which now spill across our borders.
- The global challenge of terror-magnified by the availability of new weapons of mass destruction so small they can be concealed in a coat pocket.
- The new pandemics, laying waste to whole societies, and the emergence of new strains of old diseases that are horrifyingly resistant to the antibiotics that protected the last three generations.

Our new security agenda should be pursued with determination, adequate resources, and creative use of the new tools at the world's disposal that can be used to bring us together in successful common efforts-tools such as the Internet and the emerging global information infrastructure-which, if used imaginatively, will enable new depths of insight and cooperation by nations, nongovernmental organizations, and citizens at all levels. Our task is not merely to recognize and confront these challenges, but to rise to our higher ideals, and work together to make our brightest dreams real in the lives of our children. In order to succeed, I believe, along with growing billions around this planet, that we must create a world where people's faith in their own capacity for self-governance unlocks their human potential, and justifies their growing belief that all can share in an ever-widening circle of human dignity and self-sufficiency.... A world in which parents are free to choose the size of their families with the confidence that the children they bring into this world will survive to become healthy adults, with economic opportunity in prosperous and peaceful communities. A world where we educate girls as well as boys, and secure the rights of women everywhere, as full members of the human family.

All this and more constitutes the great global challenge of our time: to create and strengthen a sense of solidarity, as we seek a newer world of security for all-security not only from loss of life and the ravages of war, but security from constant fear and degradation, and from a loss of the quality of life and liberty of spirit that should belong to all. If we are to succeed in addressing this new security agenda, we must recognize that because of our rapid growth in population, and the historically unprecedented power of the new technologies at our widespread disposal, mistakes which once were tolerable can now have consequences that are multiplied many-fold.

For example, for almost all the years of recorded history, people could do whatever they wished to their environment, and do little to permanently harm it. People could wage war in the world, and do nothing to destroy it. But now, threats that were once local can have consequences that are regional or global; damage once temporary can now become chronic and catastrophic. As a world community, we must prove to our citizens that we are wise enough to control what we have been smart enough to create. We must understand that the old conception of global security-with its focus almost solely on armies, ideologies, and geopolitics-has to be enlarged. We need to show that we not only can contain

aggression, prevent war, and mediate conflicts, but that we can work together to anticipate and respond to a new century with its new global imperatives. The human mind-our ingenuity, our dreaming, our restless quest to do better-created this moment. Now the human will-not of one individual, not of one nation or group of nations-but the collective will of truly united nations, must master this moment. We must bend it in the direction of life, not death; justice, not oppression; opportunity, not deprivation-a new security for the new world we now inhabit....

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Statements by Madeleine K. Albright
U.S. Secretary of State

Excerpts from Secretary of State Albright's remarks to the National Association for the Advancement of Colored People (NAACP) in New York, N.Y.
13 July 1999

...Neither numbers nor statistics, are adequate to describe the human destruction being caused by [AIDS], especially in Africa....

The imperative in Africa now, as in our own country a decade or so ago, is to face squarely the reality of this disease, for we know that with national leadership, international assistance and local interventions, the tide can be turned. Uganda was among the first nations to be devastated by AIDS, but it fought back. President Museveni has urged every cabinet minister, every school, every church, and every business to promote AIDS awareness, prevention, and treatment. Ugandans call this "the big noise," and it has cut HIV infection rates by fifty percent.

Today, the big noise is starting to be heard in more and more African nations. The United States has helped by urging others to heed Uganda's example, and by steering to Africa more than one-half of the $1 billion we have invested in the global fight against AIDS. But so much more needs to be done. So I can pledge this morning that I will do all I can to see that we will do more-and that we stick with this fight until its won....

Excerpts from Secretary of State Albright's remarks entitled "An Alliance for Global Water Security in the Twenty-first Century" at the National Defense University, Washington, D.C.
10 April 2000

...[N]ot even [President] Theodore Roosevelt drew then the connection that this university does now between the defense of American security and the protection of the world environment. As our armed forces can attest, that connection has been on display throughout the past decade.

In the former Soviet Union, we have been helping to dismantle nuclear and chemical weapons facilities safely. And we know that easing that region's environmental challenges must be part of any real democratic transition there.

We also know that regional conflicts pose a major threat to international stability, and that competition for natural resources can contribute to political extremism and civil strife. Somalia was an example of this, and the Congo now is another.

And as we have seen in Africa, Haiti, and the Balkans, environmental problems slow [the] recovery from conflict, and make the transition to stability that much harder.

With the Cold War long since over, the need to respond to natural disasters has placed new pressure on our armed forces. During the past two years, we have sent troops to aid recovery efforts in Southeast Asia, the Caribbean, Central America, and Mozambique.

Beyond this, there is an even more basic connection. Our citizens cannot be secure if the air we breathe, the food we grow, and the water we drink are at risk because the global environment is in danger.

The Clinton Administration came to office understanding these linkages. And that is why, in its first year, we established the positions of Under Secretary of State for Global Affairs, the Deputy Under Secretary of Defense for Environmental Security, and an environmental director at the National Security Council....

Since coming to office, President Clinton and Vice President Gore have made it clear that environmental threats should be seen for what they are—namely, threats to our security.

That is why four years ago, Secretary of State Warren Christopher explicitly incorporated environmental goals into the mainstream of U.S. foreign policy. And we have been acting on that basis ever since.

Our priorities for the year 2000 include President Clinton's "Greening the Globe" initiative, under which USAID, will allocate $150 million to the conservation of tropical forests.

We are asking the Senate to ratify the Desertification Convention and to back efforts to reverse the life-stealing loss of agricultural land, especially in Africa. We are also urging the Senate to approve the Biodiversity Convention, for we cannot ensure our future without safeguarding our biological base. We are

working toward an agreement that would ban or severely restrict the production of twelve of the world's most deadly and persistent toxins. And we are asking Congress to restore full funding for international family planning, which reduces environmental stress, while saving human lives.

And we are waging a worldwide diplomatic campaign to combat global climate change. This is the Administration's highest environmental priority. By now, the scientific consensus is clear that the earth is getting warmer. If we don't address the problem, the economic and ecological consequences will be enormous-drought in some areas, floods in others, rising sea levels, and spreading disease.

The United States has the world's largest economy. Our scientists have designed the best environmental technology. And our society is by far the largest emitter of the gases that cause global climate change. So we have both the capacity and the obligation to lead.

That is why the Administration has taken bold strides to control greenhouse gas emissions while also growing our economy-and why we are striving to shape an effective world response. The Kyoto Protocol was an essential first step. We are committed to completing its rules in a manner that will pave the way for U.S. ratification. Getting those rules right will help the environment while also promoting economic gains. We cannot solve this problem alone. Soon, fifty percent of global emissions will come from developing countries. And that is why we are seeking their meaningful participation...

As a diplomat, I have seen firsthand the tensions that competition for water can generate, and the suffering that mismanagement and shortages can cause.

...I have been to village after village, especially in Africa, where the term "water shortage" translates not into brown lawns and wilted flowers, as in our suburbs, but into whole communities of people prostrated by dehydration and weakened by disease.

Today, around the world, more than one billion people lack access to safe drinking water. More than two billion live in countries experiencing some kind of water stress. At least five million people die every year from water-related illness. That [is] more than the population of Maryland.

And pollution is the great thief of freshwater, despoiling an ever-growing fraction of the world's supplies. Of every two major rivers and lakes on the planet, one is seriously sick. On every continent, freshwater ecosystems have been harmed. And half the world's wetlands have disappeared. Moreover, studies show that the squeeze on water resources will tighten as populations grow, demand increases, pollution continues, and global climate change accelerates.

As competition for water intensifies, further disagreements over access and use are likely to erupt. And unless properly managed, water scarcity can be a major source of strife, as well as a roadblock to economic and social progress.

...[T]he World Water Forum... [declared] that "every person, everywhere, should have access to enough safe water at an affordable cost." Together, we must address the water crisis in three ways. The first is technical, because our problems result far less from how much water we have, than from how much we waste. For example, agriculture accounts for seventy percent of global water use; yet irrigation systems squander as much as three out of every five gallons pumped. Better technologies, such as drip irrigation systems, and improved measurement and forecasting can reduce water use substantially while still getting the job done. The result is more crop per drop; a better payoff for the farmer, and a smaller environmental cost...

Second, [addressing the water crisis] requires good economics....[W]ater is wasted because it is underpriced. Direct and indirect subsidies are common in both developed and developing countries. These subsidies are often built into investments that serve primarily those who are already well off. For example, the residents of many urban shantytowns can only obtain fresh water from peddlers, at a price far higher than that charged by local utilities...

[I]ncentives must be found for more water-related investments and technology. Using the right techniques, and developing sound-pricing policies can help a nation get the most out of their water resources. But it cannot guarantee water security. As is common, those resources extend across national lines. There are more than 300 shared river basins and aquifers in the world. And two out of every five people rely upon them.

These people are dependent not only on what they do themselves, but also on the practices of their neighbors who live up the river or across the lake, or who draw water from the same underground source....The ability to work together is critical, but will likely be complicated by political, social, economic, and even cultural considerations. And this is where the third element, diplomacy-comes in...

...But there are other issues that we need to deal with overseas. A good example is in the Middle East, one of the world's most environmentally-stressed areas-stressed in other ways also, but environmentally-stressed areas-where the United States chairs a working group on water resources. Its purpose is to encourage techni-

cal cooperation, and bring parties together with donors for the purpose of increasing water security for all.

In Central Asia, the former Soviet Republics inherited from their Communist predecessors a legacy of "ecocidal" practices. The two river systems of the Aral Sea Basin are sorely degraded. Improvements will depend on multilateral cooperation and the proper integration of technical and political resources. And as I said, I [will] visit the region next week, and I hope to explore these issues with the local leaders.

In Southeast Asia, the Mekong River Basin is the primary source of economic survival for nearly a quarter billion people. But pollution, poorly-placed dams, and flooding may prevent the area from realizing its potential. A stronger political commitment from within the region, and better coordination from without, would improve the Mekong River Commission's ability to address these issues.

The longest river in the world is the Nile, whose waters flow through half a dozen countries in Central and Northeast Africa. Within the past year, these countries have made significant progress in working together. And this is good, because an agreement governing the development and management of basin resources would go far to reassure potential donors and combat the poverty that burdens much of the local population.

More Africans lack access to safe water now than a decade ago. Almost half the people on the continent suffer from water-related disease. The result is economically crippling and, from a humanitarian standpoint, flat-out unacceptable.

The African Development Bank declared recently that the lack of integrated management for most of the continent's fifty-four transboundary water bodies is a potential threat to regional stability. The Bank approved a new plan for water resources management and pledged to help riparian countries work together. And the United States will back this effort.

...I am proposing a global alliance for water security in the twenty-first century...open to all who comprehend the urgency of working together to conserve transboundary water, manage it wisely, and use it well....

Technically, we will build capacity and identify options for improving conditions on the ground. We will spur training in water management techniques, and encourage water engineers to forge relationships across national lines. We will support early warning and other means for reducing tensions and increasing confidence. We will promote the development of water sharing agreements and institutions capable of implementing them....

Second, we will be inviting representatives from key donor countries to Washington in early summer to talk further about how we can better help others deal cooperatively with regional water issues. Our focus will be on supporting nations that show a willingness to develop and implement constructive strategies. And our goal will be to assure that donor assistance is not haphazard and at cross purposes, but rather coordinated and complementary.

Third, we will strongly support efforts by the World Bank and private foundations to see that investments in water-related projects reflect and encourage sound management practices.

Fourth, with the support from Congress, the State Department is contributing $2 million to start a new fund within the United Nations Development Programme to improve regional water management. Our goal is to bring the parties together to discuss and resolve transboundary water problems, and we encourage other countries to contribute, as well.

And, finally, we will seek to develop a more regular and mutually productive dialogue with the scientific and academic communities on water-related issues....

Overall, the goals of our alliance must be to dramatically improve the management of transboundary water resources; eliminate water as a source of regional instability; and use cooperation on water as a basis for bringing nations together on other issues....

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Statements by David B. Sandalow
Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs

Excerpts from Assistant Secretary Sandalow's remarks on "Protecting and Conserving the World's Forests" at the National Press Club, Washington, D.C.
6 January 2000

...[W]e value forests for all these reasons: their rich biological diversity, their many ecological services, their role in disaster prevention, their many products-so ubiquitous in our lives-the habitat they offer, and the way they help our spirits soar.

...In the past decade, the world has lost an average of thirty-eight million acres of forest per year....But the clearing of forests is not the only challenge. Around the world, the health of forests is threatened by air pollution, increases in insect infestations, invasive species and disease, catastrophic fire, and other human-induced environmental hazards.

First, roughly seventy-five percent of the world's forests are found in just sixteen countries (Russia, Brazil, Canada, the United States, China, Indonesia, Democratic Republic of Congo, Peru, India, Mexico, Colombia, Bolivia, Venezuela, Sudan, Australia, and Papua New Guinea). Indeed, roughly fifty percent of the world's forests are found in just the first four countries (Russia, Brazil, Canada, and the United States).

Second, forests are found within the sovereign territories of many countries, with different cultures, political systems, and levels of development. Any strategies to protect forests must recognize and respect these vastly different circumstances.

> "[W]hat is taking place in Ethiopia today is a man-made disaster. Without the war, there would be no famine."
>
> - Benjamin Gilman

...There is no one-size-fits-all solution to protecting the world's forests. The world's forests and their circumstances are too diverse....What can we do to protect and conserve the world's forests?

Move forward with the Tropical Forest Conservation Act. The U.S. Congress has shown great leadership by enacting the Tropical Forest Conservation Act. This statute authorizes reduction of official debt owed to the U.S. Government by countries with significant tropical forests, in return for conservation measures.

Adopt multilateral standards for forest lending. Every year, national governments support forest sector investments worth hundreds of millions of dollars with export credits and investment guarantees. In doing so, governments should promote sound forest practices.

Address subsidies. There is a need to address government subsidies that promote over-logging and distort trade. Such subsidies can skew resource decisions, cost tax revenues, and damage ecosystems. Some experts estimate that these subsidies total billions of dollars per year worldwide, but more information is needed. We should gather information about the scope and nature of subsidies affecting the forest sector that may be environmentally damaging and trade-distorting and develop appropriate responses worldwide.

...Invest in remote sensing. Satellite observation and new technologies such as the Global Positioning Systems (GPS) are critical tools for assessing, monitoring, and managing forests. Remote sensing played a central role in almost all forest fire programs in Brazil, Mexico, Russia, and Southeast Asia during the 1997-98 El Niño. Last year, the G-8 agreed to a U.S.-proposed initiative to enhance the use of remote sensing as a tool in managing forests and responding to forest fires. We will actively pursue this initiative, with a view to creating and maintaining databases and facilitating access to such information around the globe.

Use the power of the market. The marketplace can be a powerful tool for protecting and conserving forests. But too often, markets fail to value essential forest services. Certification and labeling programs, along with industry codes of conduct, can help correct this problem. Another important tool for valuing forests is carbon trading. Forests play a central role in the global carbon cycle; we must find new and innovative ways to value the carbon-absorbing services that forests provide.

Focus UN discussion on practical results. Since 1995, governments from around the world have come together under the auspices of the UN Commission on Sustainable Development (CSD) to discuss approaches for conserving the world's forests. Governments have identified more than 135 proposals for action. In the years ahead, we should build on this work. When the Intergovernmental Forum on Forests meets next month, it should take the next step, which is to focus on implementation of what has already been agreed. We should move forward to shape a transparent, practical, results-oriented forum-one focused not on talk but action....

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Statements by Benjamin A. Gilman
U.S. Congressman from New York,Chair, House Committee on International Relations

Excerpts from Congressman Gilman's remarks at a House International Relations Committee hearing on the "Looming Famine in Ethiopia," Washington, D.C. 18 May 2000

...The war is inextricably linked to the famine, which is the focus of our hearing today. In southeastern Ethiopia and in parts of the central highlands, food shortages have reached a critical stage. Eight million of Ethiopia's sixty million citizens are at risk of starvation. Nearly a billion metric tons of food are required, and the United States is prepared to supply half of it.

The cycle of famine in Ethiopia will not be broken, however, for as long as the government continues to spend a third of its budget on the military. The International Institute for Strategic Studies estimates that Ethiopia spent $467 million on its military last year, a dramatic increase over previous years. Economic development efforts have been put on hold while scarce resources are committed to the war effort.

...[W]hat is taking place in Ethiopia today is a man-made disaster. Without the war, there would be no famine. The decisions of the governments of Ethiopia and Eritrea have directly contributed to the dire condition of their populations.

This is the same pattern we saw in the early 1980s when the horrific Dergue regime under Mengistu used famine to make war on its own people. How regrettable that the current governments of Eritrea and Ethiopia, which had valiantly fought against the Dergue, now share this aspect with it....

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Statements by George W. Bush
Governor of Texas

Excerpts from Governor Bush's remarks on "A Distinctly American Internationalism" at the Ronald Reagan Presidential Library, Simi Valley, California
19 November 1999

...Our first order of business is the national security of our nation—and here both Russia and the United States face a changed world. Instead of confronting each other, we confront the legacy of a dead ideological rivalry-thousands of nuclear weapons, which, in the case of Russia, may not be secure. And together we also face an emerging threat-from rogue nations, nuclear theft, and accidental launch. All this requires nothing short of a new strategic relationship to protect the peace of the world.

In an act of foresight and statesmanship, [Senator Richard Lugar and Senator Sam Nunn] realized that existing Russian nuclear facilities were in danger of being compromised. Under the [1991] Nunn-Lugar program, security at many Russian nuclear facilities has been improved and warheads have been destroyed.

Even so, the Energy Department warns us that our estimates of Russian nuclear stockpiles could be off by as much as thirty percent. In other words, a great deal of Russian nuclear material cannot be accounted for. The next president must press for an accurate inventory of all this material. And we must do more. I [will] ask the [U.S.] Congress to increase substantially our assistance to dismantle as many of Russia's weapons as possible, as quickly as possible...

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Statements by Kofi Annan
Secretary-General, United Nations

Excerpts from Secretary-General Annan's remarks on the Occasion of World Environment Day, New York, N.Y.
5 June 2000

We may be at the dawn of a new millennium, but the environmental problems we face are painfully familiar. They may even be getting worse. Despite the Earth Summit, and despite success stories like the Montreal Protocol to protect the ozone layer, human beings continue to plunder the global environment.

Unsustainable practices remain deeply embedded in the fabric of our daily lives. We are failing to protect resources and ecosystems. We are failing to invest enough in alternative technologies, especially for energy. We are failing even to keep the debate alive. These are deeply troubling trends. I recommend four priorities for reversing them.

First, we need a major public education effort. Understanding of the challenges we face is alarmingly low. Corporations and consumers alike need to recognize that their choices can have significant consequences. Schools and civil society groups have a crucial role to play.

Second, environmental issues must be fundamentally repositioned in the policymaking arena. The environment must become better integrated into mainstream economic policy, and the surest way is through green accounting.

Third, governments must not only create environmental agreements, they must enforce them. They can, for example, cut the subsidies that sustain environmentally harmful activities each and every year. They can also devise more environment-friendly incentives for markets to respond to.

And fourth, we need sound scientific information. This is the only basis for effective policy, yet large gaps in our knowledge remain.

Technological breakthroughs that are unimaginable today may well solve some of the environmental challenges we face. But it would be foolish to count on them and to continue with business as usual. The theme for this year's World Environment Day says it best: the year 2000 begins the environment millennium; the time to

act is now. There will be no easy solutions. Unpleasant ecological surprises lie ahead. But the start of the new century could not be a more opportune time to commit ourselves-peoples as well as governments-to a new ethic of conservation and stewardship.

Excerpts from Secretary-General Annan's remarks as the Commencement Speaker for Class of 2000, Stanford University, Stanford, California
11 June 2000

...[O]ne of our main responsibilities is to leave to successor generations a sustainable future.

...The world needs you to take the lead in safeguarding the global environment.

We have long been aware that unsustainable practices remain deeply embedded in the fabric of our daily lives. What was shocking was not so much the state of the environment, as the state of the debate on the environment. In a nutshell, the need for sustainable development is failing to register on the political radar screen.

That is something that should concern us all, not least because half the world's jobs depend directly on the sustainability of ecosystems. Scientists and others who study these matters may have disagreements here and there; that is the nature of inquiry. But they are unanimous in saying we face extraordinarily grave challenges. They say that if freshwater consumption trends continue, by the year 2025 two out of every three people on Earth will live in "water stressed" countries. They say that if population and land-use trends continue, the world will face a real threat to global food security by mid-century. And they say that if emissions and energy trends continue, global warming will only accelerate.

Already, we can see portents of a world that has failed to take climate change seriously. As the warming trend has accelerated, weather patterns have become more volatile and extreme. Economic losses from natural disasters in 1999 alone totaled approximately $100 billion-more than the cost of all such disasters in the 1980s...

...[A]ll too often a collective blindfold seems to descend on those in a position to make a dif-ference...[M]anagement of the environment is viewed as a luxury, not a necessity. All too often, the issue is framed as an intractable conflict between economy and ecology, when, in fact, sustainable development offers a roadmap for reconciling the two. All too often, it is thought that safeguarding the environment means giving up the fight against poverty or setting aside other vital concerns. But unless we find a way to sustainably manage the environment, poverty will grow more entrenched, and even peace may remain out of reach.

...The Kyoto Protocol on climate change can begin to control carbon emissions-if it is ratified and implemented, not least by the United States, the world's largest producer of greenhouse gases...

...All of you, as consumers, can help protect the environment through your individual choices. And as citizens and voters, you can put pressure on governments not only to reach environmental agreements, but also to enforce them.

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Statements by Mark Malloch Brown
Administrator, United Nations Development Programme

Excerpts from Administrator Brown's remarks at the U.N. Security Council Special Session on HIV/AIDS, New York, N.Y.
10 January 2000

... At a time when the industrialized world has relaxed in the face of a declining incidence of new HIV infections, Africa is under siege: many times more people are being killed from the disease in sub-Saharan Africa each year than in the world's wars.

... HIV/AIDS has a qualitatively different impact than a traditional health killer such as malaria. It rips across social structures, targeting a young continent's young people, particularly its girls; by cutting deep into all sectors of society it undermines vital economic growth-perhaps reducing future national GDP size in the region by a third over the next twenty years. And by putting huge additional demand on already weak, hard to access, public services it is setting up the terms of a desperate conflict over inadequate resources.

...Change must begin by confronting the region's troubled inheritance: extensive migrant labor, social norms and gender inequality making it hard for women and girls to deny men sex-leading to HIV incidence rates among girls three or four times higher than boys.

Let me propose to this council a set of actions:

First, resources....The U.S., with 40,000 new cases annually, spends approximately $10 billion annually from all sources for prevention, care, treatment and research, whereas approximately $165 million is spent on HIV/AIDS related activities in Africa where there are four million new cases a year. We must mobilize more.

Second, a coordinated response. I currently chair the committee of UNAIDS co-sponsoring organizations-

UNICEF [United Nations Children's Fund], UNDP, UNFPA [United Nations Population Fund], UNESCO [United Nations Economic, Cultural, and Social Organization], WHO [World Health Organization], the World Bank, and UNDCP [United Nations International Drug Control Programme]. Together, we and the bilaterals, the private sector, and NGOs must do more at the country and global levels. We applaud the formation of the International Partnership Against HIV/AIDS in Africa which is a foot in the door to private-sector supported affordable care.

Third, UNICEF, WHO, and the World Bank together with UNAIDS and a number of innovative foundations have begun to innovate new public-private partnerships that by guaranteeing a market for affordable vaccines will incentivize drug company research and development. The African market for international pharmaceuticals now accounts for less than 1.5 percent of the industry. This "pull" must be combined with the "push" to increase basic public health research spending.

Fourth, we cannot lapse into a global two-tier treatment regime: drugs for the rich; no hope for the poor. While the emphasis must be on prevention, we cannot ignore treatment-despite its costs. We must work with the cooperation of the pharmaceutical industry to bring down treatment costs.

Finally, we cannot break this epidemic in isolation from the broader development context. Weak government, poor services and economic failure translate directly into failed vaccine and contaminated blood supply chains. More broadly it means the failure of schools, families, workplaces and economies to be able to meet the challenge. In this region where official development finance is drying up, I find myself fighting to reverse UNDP's own projection that our program resources for Africa next year will be only a third of what they were five years ago. Amidst the good news of more help for HIV/AIDS, progress on debt relief, and some improvement in private sector flows, the overwhelming fact is the region's basic development needs are not being met. There is a money gap and a governance and capacity gap. Neither the finance nor the institutions and policies are adequately in place.

> "[I]t is high time to revisit the notion of security and fully appreciate the role of global health for the future of the [United States] and the entire system of international cooperation."
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> - Gro Harlem Brundtland

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Statements by Klaus Töpfer
Executive Director, United Nations Environment Programme

Excerpts from Executive Director Töpfer's remarks on "Environmental Security, Stable Social Order, and Culture" at the Teri Silver Jubilee Conference Series, New Delhi, India
21 February 2000

...The great economic and social issues of our time are intimately linked with the quest for political stability. But a more significant long-term development of the past few years has been the intensification of the debate concerning the impact of the current ecological crises on the political stability of nations, and regions and even within societies.

Today, people around the world, particularly in the developing world are struggling to survive in the face of growing deserts, dwindling forests, declining fisheries, poisoned food, water, air and climatic extremes and weather events that continue to intensify-floods, droughts and hurricanes.

The question that must be asked is whether the scarcity of renewable resources-such as cropland, forest, freshwater and fisheries-could precipitate violent civil or international conflicts? There are clear signs that environmental scarcities could contribute to violent conflicts in many parts of the world. In the coming decades, accelerating environmental pressures could transform the very foundations of the international political system.

...Let us take the availability of water first. Supplies of fresh water are finite. The populations of water-short countries today, estimated to be 550 million, are expected to increase to one billion by the year 2010. Water shortages will be especially adverse for agriculture in general and irrigation agriculture in particular. As the demand grows and in the absence of clear consensus on how best to use shared water resources for the benefit of all, that

competition has the potential of erupting into acrimonious disputes.

...An even greater threat to future human welfare is through the undermining of the productivity of the land through accelerated soil erosion, increased flooding and declining soil fertility. The growing number of people affected by desertification-estimated to be one billion-are not simply waiting to be touched by the magic wand of development. They are literally "losing ground," as their lands suffer more and more from the effects of this disease.

...Conflicts could occur when political and economic institutions and processes degrade environmental settings, and place individuals and populations at risk....The half decade since the demise of the Cold War has been characterized by numerous attempts at redefining the notion of security.

The classical conception of security in world politics is rooted in Walter Lippmann's famous contention that security is about the possession by a state of a level of military capability sufficient to avert the danger of having to sacrifice core values, if it wishes to avoid war, and is able, if challenged, to maintain them by victory in such a war.

This traditional conception of security is now being challenged by the emergence of new issues. As military threats have subsided or disappeared, other threats, especially environmental ones, have emerged with greater clarity. It is thus possible to argue that environmental care is an essential component of national or international security.

Armed force is impotent in the face of ecological breakdown. It is relentless ecological degradation, rather than any external enemy, which poses the gravest threat to international and national security today. Clearly, any aspect which threatens the survival of the planet and its human and non-human inhabitants should be treated as a security threat. International security has to rest on the elimination of the real scourges of humankind-hunger, disease, illiteracy, poverty, and deterioration of the earth's life systems.

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Statements by Nafis Sadik
Executive Director, United Nations Population Fund

Excerpts from Executive Director Sadik's remarks on "Population-A New View for the New Millennium" at the Carnegie Council, New York, N.Y.
28 February 2000

...It would be too much to say that the global community has learned how to balance resources and population. But the basics are in place. Poverty and rapid population growth play an important role in environmental destruction: but so does the unconsidered exploitation of resources.

...Population projections for the early part of this century assume continuing and accelerating declines in fertility, longer life spans and a gradual aging of world population....But it is also true that in many countries low fertility has not yet become the norm: Africa in particular has only recently begun its move towards smaller families. Many things, from economic collapse to AIDS, could prevent long-term fertility decline from taking hold in the poorest countries with the fastest population growth. In other, more fortunate, developing countries, fertility is falling rapidly, but past high fertility will fuel rapid population growth for some time to come. Believe me, there is no "birth dearth." Globally, there are over a billion young people between fifteen and twenty-four, the parents of the next generation. Good information and high-quality services will guarantee smaller families in this group and long-term fertility decline: meanwhile, the new generation represents a resource for development. With wise investment, they will power economic growth to support the other new generation, the growing numbers of older people.

...We have almost certainly seen the last doubling of world population: but the demand for labor in industrial countries combined with large numbers of young people in developing countries means that there will be increased migration pressures....But they do mean that policymakers at all levels in all countries have to consider their options very carefully. All our experience in population contradicts the old adage that "all politics are local." Today, all politics are international. National decisions must be made in the knowledge that they will have global effects: and events outside national borders will increasingly have an effect within them. The need for international cooperation in policymaking has never been greater

...There is broad and deep agreement today that population policies have a place in development planning; and that, whether they are dealing with fertility or migration, they succeed to the extent that they respect choice and human rights. This is a profound change from the time when population was seen in some countries as irrelevant and in others as a matter for governments, not individual decision....Improved understanding has been encouraged by the international dialogue which began in the 1960s under United Nations auspices....Through a generation of experience, discus-

sion and action, developing countries and donors alike have learned that there are no short cuts to good population outcomes. Population policies must speak directly to the people with whom they are concerned.

...Most women in developing countries have a very long way to go before they can make their own decisions about fertility and family planning. Extreme poverty, illiteracy, and ill-health, compounded by a tradition of male superiority, limit their decision-making power.

...In an environment of inequality and active discrimination, women can make few choices of any kind about their lives, and their contribution to development is much more limited than it need be. Yet we have seen more change in this area in the last generation than in any comparable period. Over the last thirty years of the millennium, the female half of humanity began to make itself heard.

...Indeed, social investment, especially in health and education, and for women as well as men, fights the root causes of poverty, and has been shown to be in some ways a precursor to economic growth.

Experience has brought a more balanced view of development-not economic and trickle-down but centered on human rights and human potential. Successful population policies are at the heart of human-centered development.

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Statements by Gro Harlem Brundtland
Director-General, World Health Organization

Excerpts from Director-General Brundtland's remarks at the Council on Foreign Relations on "Why Investing in Global Health is Good Politics, New York, N.Y. 6 December 1999

...[It is] an illustrative sign of change that the Council of Foreign Relations, traditionally known to be driving the debate on national and international security, has invited the Director-General of the World Health Organization to talk about the need to invest in global health.

...[W]e need to redefine the notion of security in the age of globalization...[I]t is high time to revisit the notion of security and fully appreciate the role of global health for the future of the [United States] and the entire system of international cooperation.

...[G]lobal issues really start to matter for people's daily lives. Global issues trigger popular response. Global issues are paving their way to the limelight of decision-makers. And maybe we are seeing that national political leaders, many of whom remain confined within the logic of their nation-states, are lagging behind their electorate's perception of security.

...[The] Global Health Council conducted a nationwide public opinion survey aimed at assessing what Americans know and think about global infectious diseases....Global health matters for their own health and security and for the future of their children. Conditions of ill-health around the world directly and indirectly threaten the lives of large numbers of Americans.

Over the course of the last fifty years, at least five times as many Americans have died from communicable diseases that have come to the U.S. from developing countries, than have died in all the military conflicts of the same period. Even the most ardent isolationists will not be able to argue that the United States can handle this challenge by turning inwards. With globalization-on which this nation's prosperity so much depends-all of humankind today paddles in a single microbial sea-and we have to conclude: There are no health sanctuaries.

...Diseases cannot be kept out by rear guard defensive action. The separation between domestic and international health problems is losing its usefulness as people and goods travel across continents. Two million people cross international borders every single day, about a tenth of humanity each year. And of these, more than a million people travel from developing to industrialized countries each week.

Health is tradable-as is ill-health. Health may indeed be the single most important bridge to tie together-whether we like it or not-the destinies of the fortunate and the unfortunate.

What is emerging today is a notion of "human security." The levels of ill-health in countries constituting a majority of the world's population pose a direct threat to their own national economic and political viability, and therefore to the global economic and political interests of the United States and all other countries. Territorial dispute is no longer the prime source of conflict. It is increasingly rooted in general misery, aftermaths of humanitarian crises, shortage of food and water and the spreading of poverty and ill-health.

So, investing in global health is investing in national security. This very notion has diverse and profound implications for the way we perceive national investments, foreign aid and, private-public collaboration. The awareness of these shifts is gradually sinking in. The U.S. Department of State has defined public health as an area of attention in its own strategy for defending national interests. And it is indeed a small sign of changing times

when the Clinton Administration, for the first time in U.S. history, has added a global health specialist to the staff of the National Security Council....Let me dwell on three arguments for U.S. investment in global health.

First about protecting people...From food safety, through disease spread by airline passengers, to the danger of bacteriological attacks from rogue states and terrorists; protecting U.S. citizens means improving global health levels; improving international food standards; and by concerted attempts help limit the spread of deadly virus and bacteria; and international action to contain terrorist elements.

...This leads to the second argument: the economic gain. There are moral and ethical arguments why the United States and other developed countries should invest in halting the global AIDS epidemic which is accelerating at a dreadful pace in Southern Africa-or join forces to stop the spread of tuberculosis and join us in Rolling Back Malaria.

...Looking at the world, we have to be clear about it: So far the war on poverty has failed. Differences are spreading inside countries and between countries. This degrades us and threatens us. It looms as a threat to the environment-not only that of the poor-but of all of us.

...We need effective and targeted policies. General programmatic declarations aimed at poverty reduction rarely bring much success. However, there is a growing and solid body of evidence, which shows that investing in health reduces poverty. In fact, health may be far more central to poverty reduction than macro-economists have previously thought. We have cost-effective health interventions to reduce dramatically the excess burden of disease among the poor. Remember smallpox eradication. Witness the great reductions in mortality from the spread of other immunizations.

[P]rivate involvement is absolutely necessary. But there is no way in which this can replace a strong public commitment to global health-through investments, dedicated research and political attention....It is about extending democracy and the rule of law to another level-to the global level. And hand-in-hand with this lies the crucial need for promoting certain global public goods-of which health is a critical one.

Today, ninety percent of resources allocated to health are spent on ten percent of the world population-the wealthy part-whereas ten percent of the resources go to cover ninety percent of the disease burden, which lies with the poor.

This clearly has to change. And it can be changed as we begin to take seriously the interdependence and the enlightened self-interest which should lead the developed world to take global health seriously....At WHO we are working on presenting a realistic and combined package of interventions-based on existing technology and knowledge-addressing the leading health killers of poverty. I believe that with around ten billion dollars the world could realistically make a giant leap towards halving the number of fellow human beings living in absolute poverty by 2015.

It will not be a blueprint for action-but a clear illustration of concrete interventions-or products if you like-that are likely to lead to very concrete results. This is about human security-and ultimately about national and international security.

...[I]nvesting in global health is indeed good politics, it is good economics and it is good for national and international security. It means addressing up front the many components of global health; reproductive health, immunization, environmental health, nutrition, the emerging tide of non-communicable diseases such as cancer, heart disease and diabetes and the growing burden from mental health disorders.

...Health is truly a bridge to peace, an antidote to intolerance, a source of shared security.

One of the key challenges to everyone who will help build the twenty-first century will be to find the anchor points for a better common future. Health is one of them. The question that each and everyone of us has to answer is: Can we face up to that challenge? ■

New Publications

Environmental Change, Adaptation, and Security
Steve C. Lonergan, Editor
Dordrecht: Kluwer Academic Press, 1999. 432 pp.

Reviewed by Simon Dalby

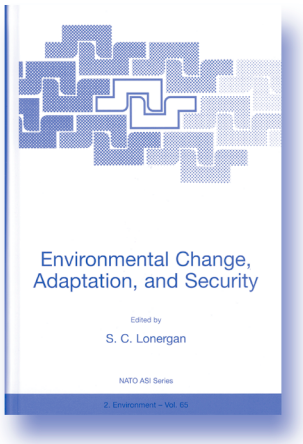
This four hundred-page volume contains the proceedings of the NATO advanced research workshop on "Environmental Change, Adaptation and Security" held in Budapest in October 1997. Twenty-seven edited chapters organized into seven sections comprise versions of all the papers presented at the workshop, making this a complete record of this meeting. The decision to print the entire set of papers makes for an uneven collection of styles, approaches, and academic quality which the editor and his assistants have obviously worked very hard to massage into a readable and editorially consistent volume.

There are very diverse views in these pages and a variety of different perspectives on what counts as both security and environment. This will interest those who find the broad conceptual matters congenial and probably frustrate those who wish to follow a narrowly focused empirical research agenda. Environment here is understood in general terms and security is about much more than armed conflict and overt violence. Notable in the titles of the first three sections of the book is the specification of matters in terms of human security, which, while not explained in an introduction, obviously gestures at the formulation of security as a matter of more than states, or for that matter, the military concerns of NATO. This theme runs through the rest of the book; obviously, the notion of security here is much broader than traditional understandings in terms of national security and alliance politics.

Section one has four conceptual chapters that offer some overall reflections on the debate. Michael Redclift's chapter opens the discussion by arguing that environmental change is not the given premise from which the debate should start. Rather he argues that the global economy has increasingly turned the environment into a matter of competition and conflict as competing corporations struggle to appropriate resources from all over the world. The consequences are that development wins out over sustainability repeatedly, and ensures that environmental security is not practically addressed. Richard Matthew's chapter also tackles the big picture by focusing on what he calls disequilibria between the political views of liberals and realists, rich and poor, institutions and needs, social and ecological systems, which added together summarize the current crisis. These are then reinterpreted through a reading of Rousseau's *Social Contract* to explore the politics of global environmental change. Marvin Soroos argues for an understanding of security that gets beyond traditional definitions in national security studies and stimulates thought about the larger threats to human well-being. He concludes ruefully, that experience suggests that societies will opt for avoidance, defense, and adaptation to environmental change, rather than take the better option of prevention. Philippe Le Prestre's chapter, the final one in the first section, focuses on how to conceptualize the political processes of adaptation in the face of both known risks and, more importantly, large scale uncertainty.

The second section consists of four chapters on matters of resources and human security, starting with David Greene's analysis of the continued high dependence of the transportation sector on petroleum and the effects of Organization of Petroleum Exporting Countries' actions on world energy prices. For economic reasons as well as

environmental concerns, he argues that high US dependence on oil needs policy attention. Chapter six, by Mike Brklacich and Shona Leybourne, reviews concepts of food security, suggesting, among other things, the importance of understanding food in terms of individual and community access and entitlements. Chapter seven by Samir Allal and Martin O'Conner, focuses on the question of the "ecological distribution" of water resources in the Jordan-Israel-Palestine area, and the necessity of political actors to understand that they have to operate on the basis of some shared interests if solutions to water supply questions are to be found. Sandor Kerekes discusses the environmental dimensions of post-Soviet economic development in Hungary in chapter eight, concluding that much of the gain in environmental performance has been achieved by the closure of polluting Soviet era factories.



Its not quite clear why chapter eight is not included in the third section on regional perspectives, which explore everything from water supplies in Istanbul, the vulnerabilities of Pacific islands to environmental change, to the environmental situation in Kyrgyzstan. The seven chapters in this section show the eclectic approaches to the overall theme of the book most clearly, and inevitably raise the question as to whether all these authors are really talking about the same topic. Environment is a common theme, but security is only implicit in some of these chapters. Chris Cocklin's chapter nine on the Pacific islands' vulnerability to environmental change and more specifically, to the increased vulnerabilities of many societies as a result of the economic "development" strategies of establishing mines and forestry exports, is a detailed academic analysis. On the other hand, Kazimir Karimov and Razia Gainutdinova's discussion of Kyrgyzstan's environment in chapter thirteen is only a very brief overview.

Barbara Jancar-Webster's chapter 10 offers an analysis of the institutional dimensions of adaptation to post-Soviet situations and concludes that the focus on developing appropriate institutions for applying for European Union or NATO membership may not produce the necessary capabilities for adapting to and handling potential environmental problems. Cocklin is more optimistic arguing that in the case of the Pacific Islands' regional strategies in negotiating international agreements on climate change and related matters have suggested the possibilities of considerable cooperation among those states. Ilter and Gul Turan's analysis of the water supply situation in Istanbul focuses on the theme of urbanization and the consequences of the rapid shift of populations in developing states into urban areas. Security here is interpreted as guaranteed water supplies to urban consumers. In chapter twelve, K.S. Losev and M.D. Ananicheva briefly discuss recent trends in greenhouse gas emissions in Russia, echoing the point in chapter eight that emissions have been reduced as a result of economic decline rather than technical innovation. Chapter fourteen by Adele Finco and Peter Nijkamp offers a discussion of technical aspects of land use sustainability analysis and policy evaluation with an application to the Po delta in Italy. The final chapter (fifteen) in this section by A. Makarenko and Z. Klestova suggests, but does not demonstrate in any detail, the applicability of Makarenko's mathematical modeling procedures to global questions.

Section four addresses transboundary problems, first with chapter sixteen by Elena Nikitina and Vladimir Kotov, on the question of Norilsk Nickel's sulfur dioxide emissions, from their smelters on the Kola Peninsula, which remain a problem despite various mitigation attempts. The political crisis in Russia has made policymaking and environmental enforcement more difficult requiring an adjustment from top down national and international arrangements to a more complex political process that deals with local authorities and the enterprises involved directly. B. Constantinescu and Roxana Bugoi discuss the social adaptation to the Chernobyl accident in chapter seventeen emphasizing the importance of prompt and accurate government information in such a crisis. Aaron Wolf discusses the persistent question of "water wars" in chapter eighteen linking questions of resources once again to traditional security discussions of armed conflict. Wolf's analysis supports other work that suggests that the possibilities of war breaking out over inter-state water disputes are fairly remote. Violence and conflict over water resources are usually internal to states and stop short of full-scale warfare.

Section five covers matters of institutional capacity and adaptation. In chapter nineteen, Joanne Caddy returns to the themes introduced in chapter ten, suggesting the importance of innovative institutional arrangements in the transition economies of Central and Eastern Europe. Radioactive contamination in Russia is the theme of chapter twenty. In particular, L. Uspenskaya is concerned about the Kyshtym accident near Chelyabinsk in 1957 that contaminated a large area. The only effec-

tive method of dealing with this accident was the construction of a strictly enforced exclusion zone, or a "radiation reserve" where, ironically, long-term increases in biodiversity due to the lack of human activity have been documented. Sedar Guner uses game theory to investigate the possible state alliance combinations in conflict over water in the Euphrates and the Tigris rivers in chapter twenty-one. This chapter precedes a consideration of Romanian environmental strategies by Daniela Constantin, who suggests that "mosaic ecodevelopment," starting with small local areas and gradually extending sustainable development over the whole country, coupled with careful communication, nongovernmental organization participation, and more general behavioral changes, offers the most promising possibilities for the future. The final chapter of this section is by Edward Barbier and Thomas Homer-Dixon, who discuss the fact that the resource-rich poorest countries often remain poor with conflict over the allocation of resources occurring, while economic diversification and growth are stalled.

Chapter twenty-four by Dilrom Fayzieva on water pollution in Uzbekistan and chapter twenty-five by Alexi Danchev on climate change in Bulgaria constitute the sixth section on health, environment, and security. Fayzieva documents the health effects of degraded water supplies in Uzbekistan and, noting the effects of degradation around the Aral Sea in combination with the poor economic situation in the region, paints a bleak picture of the complex causes of widespread childhood illness. Danchev suggests that climate change may aggravate the already serious health problems in Eastern Europe, but that people's perceptions of matters needing attention focus on short-term concerns with crime and health services rather than ameliorative measures in anticipation of long-term disruptions. This discussion implicitly suggests, again, the more general difficulties of addressing climate change issues, given long-term uncertainties and pressing short-term problems.

The last two chapters deal with measurement issues: Peter Nijkamp on natural resource issues and the importance of decision support systems in agricultural policy analysis; and Steve Lonergan, Kent Gustavson, and Mark Harrower on mapping insecurity at the global scale. Nijkamp focuses on the definitional debate about sustainable development and the important considerations of carrying capacity, soil and water quality, and especially, their critical threshold values in scenario analysis. Mapping insecurity at the global level takes the questions of indicators to the largest scale and sketches out some of the components of an index of human insecurity. Combining the understanding that environment is a complex part of violence and change in poorer parts of the world, and that security is not a matter of interstate warfare the authors develop an "index of human insecurity." This human security index draws in part from work done on developing humanitarian and famine early warning systems, but suggests that longer term predictions may be of more use for development planning and that a few key indicators coupled with an effective mapping system, may be most useful in identifying key areas of insecurity. Not surprisingly, the data for the 1990s, as well as projections into the future, suggests that sub-Saharan Africa contains the most insecure populations on earth. Interestingly, Pakistan, Afghanistan, and the Arabian penninsula are also featured as insecure.

The dialogue with NATO partners for peace states in Eastern Europe and the former Soviet Union is well represented in these pages. This volume is a useful contribution to discussions of global problems, even as the locale from which the writers work obviously influences the perspectives and priorities of the authors. As a snapshot of the current debates about sustainable development and the uneasy links between such concepts and the literature on rethinking security, this volumes' eclecticism is noteworthy. Rather than a weakness, it suggests the multiplicity of concerns under the rubric of environmental security and the importance of understanding such discussions as a useful focus for attention to pressing problems rather than as a tightly defined analytical lens through which to view the world. That said however, some introductory comments about the broader agenda of human security, and the process that brought the authors together in Budapest in 1997 would be helpful to an audience beyond the environmental security cognoscenti. Possibly placing the editor's own contribution, which includes a useful discussion of what insecurity means, or Marvin Soroos' contribution, or both, at the beginning as an introductory section, might have provided a more thorough conceptual basis for the disparate themes in the individual papers.

Above all, two things about the current environmental security debate are clear in this collection. First, are the limitations of various disciplinary perspectives in terms of how they define matters. Economists, geographers, and political scientists often do not start from similar assumptions about the world and how to study it. While this is accentuated by the regional focus of many of the authors in this volume, the conceptual assumptions are not always consistent. Second, and related to this limitation, is the unavoidable matter of the classical concerns of politics. As is especially clear in the chapters by Michael Redclift and Richard Matthews,

the larger questions of humanity's place in the order of things, and the consequent assumptions about how human affairs ought to be arranged, are unavoidable when global environmental considerations are discussed. However important the technical discussions are, and they matter greatly, the case that security is a fundamentally political matter is squarely put, even if often only implicitly, in the pages of this volume.

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Ecology, Politics, and Violent Conflict
Mohamed Suliman, ed.
London: Zed Books, 1999. 288 pp.

Reviewed by Leif Olhsson

If you really wish to get confirmation of the existence of a phenomenon such as the hypothesized link between ecological disruption and potentially violent political and social outcomes, then you should go to changes in language, according to Fatima Babiker Mahmoud, a contributing author in this edited volume, *Ecology, Politics, and Violent Conflict*.

If you are a *naziheen* in Sudan, you will know of this link from bitter personal experience. The term was coined in the early eighties to cover a new pattern of migration caused by environmental crisis. Before the advent of this type of migration, migrants were referred to simply as "rural people" (*igleemiyeen*). The term differentiaties between migrants and refugees in the sense that when a person is a *nazih*, he or she is moving within national boundaries. It is also so specific to the drought-displaced that, in general usage, the war-displaced, who are mainly from southern Sudan, are referred to simply as "Southerners."

The number of *naziheen* in Sudan today may be more than three million. About half of them live in or near Khartoum in miserable squatter settlements, subject to regular *kashas*, rounding-ups by the police, often with the object of assembling train-loads of forced labor for the large commercial farms. In contrast to international refugees (e.g. from Eritrea), or even war-displaced people, none of the *naziheen* qualify for support from UNHCR [United Nations High Commissioner for Refugees].

If you are a *nazih* woman, you are particularly vulnerable. Wearing your traditional clothing from, say the Nuba region, you immediately become a target of abuse, not only by the police, but by men in general. Even in their migrant homes, *nazih* women face greater risk of violence than in their place of origin, since the level of violence in migrants' homes tends to rise.

This is how Mahmoud portrays the link between ecological disruption and violence, primarily against women, in today's Sudan. It is an understanding that can only come from detailed studies and privileged inside knowledge. It is also one of the great strengths of the book *Ecology, Politics, and Violent Conflict*, edited by Mohamed Suliman.

It is a strength which is replicated in another case study of Sudan, by Abdel-Galil Elmekki, which concerns the large-scale changes in the country's food-producing sector. In an extremely well-reasoned chapter, he gives a detailed account of the roots of the food crisis in Sudan. The enigma to be explained is succintly formulated: why is it that producers of food are the first and most seriously affected by famine?

The explanation is that access of peasant communities to food is declining at both the production and exchange levels. Farmers in eastern and western Sudan are no longer capable of producing enough sorghum and millet, as a result of both land degradation and forced changes in the production process. As a result of what ironically was termed the "bread-basket" policy, sorghum and millet no longer are produced in order to provide people with food, but as a contribution to the country's balance of payments. In the process, the large-scale mechanized farming sector has become one of the most powerful lobbying groups, completely marginalizing small-scale farmers, who can neither produce enough for their own needs, nor afford the produce offered on the market.

At the bottom lies a system of perverted government-induced subsidies favoring the interests of large-scale mechanized farmers, the end result of which has turned out to be both starvation and ecological disaster in a context of civil war and massive flows of internal and external refugees. The case of Sudan thus, underpins the links between ecology, politics, and violent conflict, sought for by the book.

Starting out the book, however, the reader gets a healthy inoculation against too simplistic notions of such

links. Nicholas Hildyard's criticism of proponents of the "blood and babies" family of theories is a passionate, yet balanced, treatment of the basic theoretical issues encountered whenever a treatise is attempted that involves violent conflicts of seemingly ethnic origin, in a context of continuing population increase. Neither ethnicity, nor scarcity are "primordial" causes of conflict—both, in Hildyard's terms—are socially constructed or induced phenomena, open to manipulation by actors with an agenda based on self-interests.

By placing Hildyard's thoughtful piece at the very beginning of the book, the editor, Mohamed Suliman, promises a fruitful intellectual journey to come. To a large part, such promises are fulfilled—Günther Baechler's theoretical chapter deserves mention—but in some cases they are not.

Unfortunately, Suliman's own chapter on "The Rationality and Irrationality of Violence in Sub-Saharan Africa" belongs to the latter group. An expert on the conflicts in the Horn of Africa, Suliman deserves credit as an editor for bringing to the light contributions like the two chapters on Sudan mentioned. But he would have been wise to abstain in his own chapter from an attempt to gain easy points through rather empty denunciations of cultural essentialism and neo-malthusianism. Here, serious researchers are lumped together with authors of best-selling books, and all of them discarded in little more than a paragraph on the grounds that "only a combination of unfavourable factors will make [people] cross the threshold between war and peace." This is a straw-man type of argument, since every serious author, including several of those discarded, would be very careful to make the same point.

Likewise, Suliman's own point, that "the most pernicious [factors leading to conflict] are the denial or limiting of people's access to renewable natural resources, and ecological degradation," is well worth emphasizing—but it also conforms to precisely the link that a whole strand of environment and conflict research, including some of the researchers previously dismissed, has gone to considerable lengths to problematize and illuminate.

Having said this, the overall evaluation of the book, of course, depends on its intended readership. As one in a row of "readers" for the interested general public or undergraduate courses it may fill a certain need. The replications of already published material are not a drawback for this purpose, although some of the pieces would then have benefitted from a different style of writing. As an edited volume for the scientific readership (as its style of writing would imply), there remains—apart from several highlights mentioned—certain weaknesses. As a final example, the chapter on climate change has much to do with politics, but the link to violent conflict (as the chapter heading promises) is absent. Similar comments could be made about other chapters.

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Hydropolitics in the Third World: Conflict and Cooperation in International River Basins

Arun P. Elhance
Washington, DC: United States Institute of Peace Press, 1999. 309 pp.

Reviewed by Ariel Dinar and Shlomi Dinar

Hydropolitics in the Third World is a major contribution to our understanding of conflict and cooperation patterns among states that share international river basins. Arun Elhance, a scholar on international water resource management, has prepared for readers of various disciplines a comprehensive analytical framework that covers several aspects of international waters, such as hydrology, geography, history, economics, politics, and international relations. This book is the first attempt at applying a robust analytical approach that compares and analyzes conflict and cooperation in several river basins. All previously known works were case studies that examined only one international river basin.[1] What can the reader gain from reading this book and what are the main assets of the book?

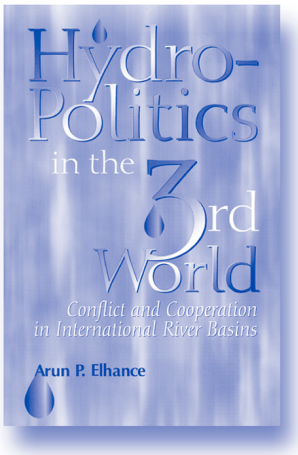
First, the book is an endless source of information on the geography, hydrology, and politics of the riparian countries sharing six of the major international river basins around the world. The case studies in the book include the Paraná-La Plata in Latin America, the Nile in Africa, the Jordan and the Euphrates-Tigris in the Middle East, the Ganges-Brahmaputra-Barak in the Indian sub-continent, and the Mekong basin in South East Asia.

Second, Elhance presents an analytical framework that guides the reader through a rigorous analysis of hydropolitics in each basin and a synthesis for all basins. The reader is exposed to eye-opening information on one of the most interesting trends in the world—conflict and cooperation over the most precious resource, water. In addition, scholars of all disciplines can apply this approach developed by Elhance to other river basins, and make use of the framework since conflicts

around international river basins are the rule rather than the exception. The waters of these basins are just as rare and scarce as cooperative solutions to the conflicts.

In terms of international relations, Elhance not only discusses many traditional and emerging concepts, but also adds tremendous insights into the manner in which politics on water and environment interact—a very important issue since the end of the Cold War.

Unfortunately, for overall implications of hydropolitics and international relations, the river basins chosen do not permit analytical generalization because of the hydropolitical uniqueness of each basin. Nonetheless, Elhance's comparative case study approach does produce some "contingent generalizations" which can be beneficial as the states within the different basins often face similar constraints and objectives under which they conduct their relations.



One very important aspect of water, of which the reader is constantly reminded, is the interdependency of riparian countries. This interdependency draws nations into a web, compelling them to interact with each other, yet making them vulnerable to the vagaries of uncertain interstate relations, the anarchic state of the international system, domestic politics, and geo-politics. The picture is even more complex when colonial-era legacies are present, where contested national borders become a conflicting issue, and where identities and other political conflicts are embedded in the water conflict and vice versa. Thus, nations are often faced with both sensitivities and vulnerabilities in terms of their riparian relations.[2]

To his credit, Elhance also stresses the importance of geography to the international relations between riparian states. This often forgotten variable in conflict, cooperation, war, or peace in international relations, is of great importance to hydropolitics. As such, geography shapes hydropolitics and often dictates the positions and foreign policies of states vis-á-vis a waterway. For example, a nation such as Turkey that is the upstream state in the Tigris and Euphrates basin, is a potentially hegemonic nation since the rivers both originate from its territory. Yet, hegemony in terms of geography can sometimes mean nothing when a state is not able to exploit its hegemonic potential (i.e., the hydrological assets). Ethiopia for example, is an upstream state where more than eighty percent of the Nile waters originate. *It is unable, however, to exploit its position given its inferior economic status and its military and political stance in comparison with the political and economic power of Egypt.*

Elhance also notes that the inability to assert hegemony affects the relationship between security and sovereignty. In the case of Egypt, the Nile River is crucial to the state's survival as evidenced in the past, when the Egyptian government has threatened to go to war over the river if the water flowing into Egypt is threatened or altered in any way. In a similar manner, water has already had a role in instigating a war between Israel and Syria and is a great issue of contention between the two countries as they negotiate a peace treaty. [3] This brings us to a central question: Will states actually go to war over shared water resources? This has been a topic of great interest and debate among several scholars that is still unresolved.[4] What is certain, according to Elhance, is that conflicts over shared waters of international river basins will continue to undermine interstate relations for the near future.

In several of the regions, such as the Ganges-Brahmaputra-Barak Basin, water is linked to a political conflict. This linkage is important to such an extent that, Elhance argues it is difficult to imagine the states in the basin making a substantial improvement in their contentious bilateral and multilateral relations if issues relating to the division and sharing of water are not resolved. On the other hand, as Elhance reiterates, basins such as the Jordan are afflicted with a protracted conflict where the main obstacle to cooperation is embedded in identities and territorial disputes. Regions where the low politics (water) cannot be separated from the high politics (protracted conflict) also involve domestic politics and the influence of pressure groups on the policies and negotiating positions of states. Still, as the nations of the Jordan River basin continue their reconciliation, a final peace agreement will not be possible without an equitable division, or at least a fair division of the waters. This conflict, however, demonstrates the problematic nature of water. In some regions, the inseparability of water from the protracted conflict or the centrality of water in the state's international relations, makes water the subject of high politics.

As Elhance illustrates when introducing the example of the Mekong River, only when states have committed themselves to cooperation and are also "ripe" in terms of their domestic and international environments, can they then commence negotiations over the waterway they share. In addition, only then can international organizations and other nongovernmental organizations be able to mobilize and assist states in realizing their shared interests. Thus, cooperation is very much linked to the

overall political environment among states and their perceptions of one another. It is important to note, however, that nongovernmental organizations, epistemic communities, and international organizations can often put pressure on governments or mobilize citizens to support a certain political track even if the government itself would not have initiated the political track alone. At the same time, cooperation, as the Mekong River basin demonstrates, can also be a derivative of the realization among the riparian states that a water crisis may be realized if the they do not take immediate cooperative action.

There are also several areas of the book where Elhance's argument is weak. First, we find it very unfortunate that the most important contribution of the book—the analytical framework—is hidden in an appendix at the end of the book. One would expect to have the analytical model at the front of the book, followed by the case study chapters, the comparative analysis, and conclusions.

Second, the restriction of the book to "hydropolitics in the third world" is an artificial construct. The model developed by the author has relevance to cases in the developed world as well. Why should it be restricted only to the third world? We feel that extending the discussion to include a wider range of conditions pertaining to the variables used in the comparative model (such as the country's level of development), would add value to the book. Elhance extrapolates from the analysis of present situations to future predicted scenarios, but he ignores other contemporary basins also in need of analysis. This practice, in our view, is a missed opportunity to demonstrate the robustness of the analytical framework. To Elhance's credit, he does generalize some of his findings in the conclusion section, but in our view, this brief mention is not enough.

Third, Elhance approaches cooperation with a narrow focus. The fact that mainly water-related cooperative projects are discussed and used to explain trends in behavior of riparian states may have biased the conclusions of the comparative analysis. Cooperative theory suggests that the larger the "cake," the more likely the arrangement is to be stable and sustainable. Experience indicates that there are many venues of cooperation that are outside the water arena.[5] Use of relative advantages in neighboring economies may add needed aspects to cooperation. Here we suggest the notion of sub-coalitions, as was suggested by Richard Just and Sinaya Netanyahu.[6] The basic issue that does not get the attention it deserves, is whether or not full cooperation (Grand Coalition) among all riparian states is a necessary condition for conflict resolution in the basin, or that cooperation among a sub-group of riparian states shall be the first objective and over time this cooperation will strengthen and the sub-group will expand.

Finally, while Elhance admits that his book only focuses on states (although he does mention the importance of separatist movements such as with Eritrea, Kurdistan, and Kashmir/Panjab), his argument could have benefited from a more rigorous analysis and discussion of the influence and effects of emerging states and national entities on already established states' hydropolitics. This impact on hydropolitics is especially important with the introduction of new actors after the Cold War.

Despite the deficiencies described above, we recognize the fact that not every issue can be addressed in one study or model. *Hydropolitics in the Third World* is one of the building blocks in the process of establishing the necessary analytical framework for the science of hydropolitics, as well as the challenging field of water diplomacy. It is our hope therefore, that our criticism will offer ideas for further research in this important field.

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NOTES

[1] For example, see John Waterburry, *Hydropolitics of the Nile Valley*. Syracuse, N.Y.: Syracuse University Press, 1979; John V. Krutilla, *The Columbia River Treaty: The Economics of an International River Basin Development*. Baltimore: Johns Hopkins University Press, 1967; Aaron T. Wolf, *Hydropolitics along the Jordan Valley: Scarce Water and its Impact on the Arab-Israeli Conflict*. Tokyo: United Nations University Press, 1995; and B.G. Verghese, *Waters of Hope: Integrated Water Resources Development and Regional Cooperation within the Malayan-Ganga-Brahmaputra-Barak Basin*. New Delhi: Oxford and IBH Publishing Co, 1990.

[2] Kenneth A. Waltz, "Structural Causes and Economic Effects," *Theory of International Politics*. Reading, MA: Addison Wesley Publishing Company, Inc, 1979.

[3] In the negotiations between Syria and Israel that are currently (as of May 2000) at a stalemate, water plays a key role. If Israel withdraws from the Golan Heights it will lose control over the tributaries, which feed into the Jordan River.

Any agreement with Syria will include a detailed agreement on the control, management and division of the tributaries' waters. For background information, see for example, Itamar Rabinovich, *The Brink of Peace: The Israeli-Syrian Negotiations*. Princeton, N. J.: Princeton University Press, 1998; and Helena Cobban, *The Israeli-Syrian Peace Talks 1991-96 and Beyond*. Washington, D.C.: United States Institute of Peace Press, 1999.

[4] Aaron T. Wolf, "Conflict and Cooperation along International Waterways." *Water Policy*. 1:2 (1998): 251-265; Thomas F. Homer-Dixon, "On the Threshold: Environmental Changes as Causes of Acute Conflict," *International Security*, 16:2 (Fall 1991); Thomas F. Homer-Dixon, *Environment, Scarcity and Violence*. Princeton, N.J.: Princeton University Press, 1999.

[5] See for example Peter Rogers, "The Value of Cooperation in Resolving International River Basin Disputes." *Natural Resources Forum*, 17:2 (1993): 117-31, for the case of the Ganges-Brahmaputra and Haim Ben Shachar, Gideon Fishelson, and S. Hirsh. *Economic Cooperation and Middle East Peace*. London: Weidenfeld and Nicolson, 1989, for the case of the Middle East.

[6] Richard E. Just and Sinaya Netanyahu, "International Water Resource Conflicts: Experience and Potential." In Just, Richard E. and Sinaya Netanyahu (Eds.), *Conflict and Cooperation on Trans-Boundary Water Resources*. Boston, CT: Kluwer, 1998.

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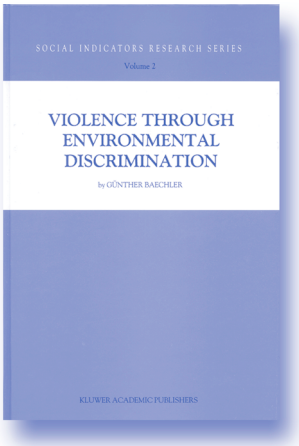
Violence Through Environmental Discrimination: Causes, Rwanda Arena, and Conflict Model
Günther Baechler
Dordrecht: Kluwer, 1999.

Reviewed by Simon Dalby



Günther Baechler was the director of the Environment and Conflicts Project (ENCOP) supported by the Swiss Peace Federation in the 1990s. This volume draws heavily on the work of the project and its case studies. Although not officially ENCOP's final report, much of this volume effectively acts as such. It provides a summary of the theoretical framework as well as a synthesis of the findings of the empirical material. While much of the project material has appeared in summary form in articles and book chapters, including in the Environmental Change and Security Project Report, this volume offers a full-length elaboration of both the model and the findings. As such, this volume is a most useful addition to the environment and conflict literature.

The basic premise in the study follows much of the literature in the field in arguing that political conflicts in the underdeveloped world have identifiable material roots. In exploring the chains of causation that link environmental factors to conflict, Baechler develops a complex model that emphasizes political factors within states as crucial to predicting the eruption of violence. The ENCOP findings confirm other research, which suggests that environmental conflicts are mostly internal to particular states and unlikely to cause inter-state conflict in the immediate future. Unraveling the important causal factors and the circumstances that are likely to lead to organized conflict, if not to full-scale warfare, is not an easy task although this volume carefully lays out the causal connections. But, Baechler wants to do more than revisit this research; he tries to extend the analysis to suggest some practical ameliorative measures that will take the pressure off rural resources and hence prevent conflicts occurring. This attempt at ameliorative measures leads him back to a discussion of security and sustainable development towards the end of the book.

While much of the environment and conflict research focuses on the question of environmental degradation as a factor in causing conflict, Baechler emphasizes that the other side of the coin, the transformation of environments by human action on the largest scale, is also an important part of the current processes. In particular the actions of industrialization, the development of a fossil-fueled economy, and the expansion of industrial agriculture in the second half of the twentieth century have been major factors in the transformation. Right from the first page of chapter one, Baechler uses Vandana Shiva's term "maldevelopment," to make the connections between violence, poverty, and environmental degradation in Africa explicit. But more generally he discusses this within the framework developed by Karl Polanyi, of the "Great Transformation" from traditional agricultural to modern industrial society in Europe which has directly driven many of the large-scale environmental changes of the last few centuries. Crucially Baechler suggests that maldevelopment in Africa, in particular, is part of the larger consequences of the "Great Transformation."

These conceptual considerations suggest clearly that conflict is a result of the disruptions of development

and transformation rather than a result of solely indigenous causes. This connection is crucial to the discussion in this volume and a very useful contribution to the larger literature linking environment and conflict. While some researchers might demur at the broad generalization that the places that are likely to have environmental conflicts are arid grasslands and mountain areas, which have been only partly disturbed by the processes of industrial transformation, this volume has the very considerable advantage of making the geographical factors of conflict much more explicit than is often the case in this environment and conflict literature. Focusing on the particular kinds of environments that are involved in conflicts simplifies both the relevant causations to be studied, and also narrows the often loose definitions of both "environment" and "resources" included in models that try to offer very broad generalizations about the processes of environmental conflict.

Using the African "maldevelopment" cases where violence is directly linked to the environment and the lack of development, Baechler suggests that these processes must also clearly be understood in terms of the unfortunate history of colonization and the economic marginalization of rural populations. Discussing these marginalized people, as the title of the volume suggests, in terms of environmental "discrimination," may not be the ideal terminology. But, discrimination does convey the crucial point of the whole volume, that many people do not have access to either the resources they need, or economic alternatives to these resources, for political reasons, and are often forced to fight to survive as a consequence. The Rwanda case study that forms the empirical demonstration of the ENCOP model however emphasizes that environmental factors were not the crucial cause of the violence there in the 1990s. Rural discrimination there was overlain with powerful ethnopolitical fractures that were mobilized by elites in a desperate genocidal bid to maintain power in a crisis situation.

Parts of this book read more like a technical report than a scholarly monograph, but apart from some minor irritants like the unusual designation of quotation marks, the volume is easily accessible. The detailed summary presented in the introductory pages clearly lays out the overall argument of the volume. Appendices and a detailed bibliography are also useful scholarly additions to the field. The last substantive chapter argues convincingly that thinking about practical policy initiatives requires linking the debates about rethinking security, conflict research, and the possibilities of sustainable development.

The volume closes in chapter eight with a brief discussion of the "Borana solution" to the potential conflicts between fourteen ethnic groups in an area in East Africa. Here cooperation and an intricate agreement forestalled conflict and generated a locally sustainable pattern of resource use as well as an agreed arrangement for enforcing the agreement. Baechler suggests that there is much to be learned from this case, but this reviewer was disappointed that much more was not made of this analysis. In particular, Baechler would have strengthened the volume, if he had explicitly worked the Borana solution back into the model on the one hand, and, on the other hand, if the crucial question of keeping central state officials out of the way to allow a local solution to be worked out, was discussed in more detail.

How all this might lead to alternative modes of "off farm" rural economic employment that reduce the strain on agricultural resources in other situations needs much further work. Hopefully, the results of such research will be forthcoming in future volumes based on the current research in Africa that has followed on from the ENCOP analyses. What is abundantly clear in this important volume is the necessity of understanding violence as a part of contemporary social transformation, and of understanding the political specificities of particular environmental contexts in predicting conflict, as well as in suggesting ameliorative actions.

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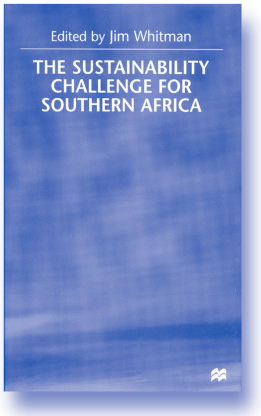
The Sustainability Challenge for Southern Africa
Jim Whitman, Editor
New York: St. Martin's Press, Inc., 1999. 299 pp.

Reviewed by Shanda Leather

This book is the result of a collaborative effort by a team of southern African practitioners and academics who on the environmental challenges facing their region. As is stated in the preface, the authors are attempting to investigate the sources of sustainability and stability in the region from a global security perspective. By examining a variety of topics from this viewpoint, the contributors are seeking to emphasize the importance of political comprehension that is inclusive and recognizes that collaboration between states in this region may be essential to ensure environmental and political sustainability.

The introductory chapter lays out the global security approach in a comprehensive manner, beginning

with fundamental definitions and discussions of sustainable development, global security, global civil society, and indeterminism. The theoretical groundwork is well set, and a framework through which we can view a variety of topics is very clearly defined. Unfortunately, the remaining topically-oriented chapters do this with a wide-ranging level of success.



Chapters on global security, regional cooperation in the sustainable development of tourism, sustainable water development, and population and energy are well-developed and seek to examine these topics in new and innovative ways. All of these chapters attempt to broaden the traditional political definitions of security and incorporate innovative ways of looking at resource sustainability. The authors incorporate the global security approach through discussions of cross-boundary resources and the interdependence of populations and states, and very clearly support the statement in the first chapter that the link between the global and the regional security is two way.

Discussions of more traditional economic topics such as economic integration, sources of sustainable development, and cooperation for intra-regional trade are less successful in incorporating the global security perspective, and as a result, read as little more than literature surveys on the topics. Several of these chapters simply present the variety of theories one after another and leave little room for innovative thinking. For example, in the literature on human development, there has now been over a decade-long desire to expand discussions to include a wider definition of human security. An understanding and awareness of this debate is reflected by the authors of the chapters on those topics in their ability to think more broadly and introduce a wide range of possible directions for southern Africa. Although less well developed, this broadening debate has also taken place within the literature on development economics and environmental economics, and it would have been welcoming to see some of those discussions and innovative ways of approaching the topics incorporated here.

An inherent weakness in a book incorporating topically-oriented chapters by a variety of authors is that it will lack an overall common theme. In the case of this volume, there are many direct and specific policy recommendations throughout the book, some more constructive and innovative than others. The final chapter is dedicated not to reiterating these recommendations, but to identifying common themes that emerge from the chapters. The various authors come together in this final chapter and refer to these themes as "policy pressure points." The authors assert that it is essential for these overall issues to be addressed in order to create the environment for the other specific policy recommendations to be effective. Listed briefly, these themes are: democracy, equity, cooperation, policy monitoring information systems, and a shared value system. These are broad and cross-cutting themes that get right to the crux of a global security oriented approach to

Environment and Security in the Amazon Basin

Sponsored by the Latin American Program and the Environmental Change and Security Project of the Wilson Center, this series of three meetings on Environment and Security in the Amazon Basin was a wide-ranging and stimulating discussion on politics and policy in the Amazon Basin. The first meeting covered the following topics: environmental and sustainable development initiatives in the Amazon Basin; the roles of local, national, and international actors; the evolving Brazilian national security perspective; and the rising threat of drug trafficking in the region. The second meeting focused on environmental policy in the Brazilian Amazon and featured Mary Helena Allegretti, Special Secretary for the Coordination of Amazonian Policy in Brazilian Ministry of the Environment, while the last meeting examined Brazil's SIVAM Project and its implications for the Amazon. Issue 7 of the *ECSP Report* will feature a comprehensive report of the three meetings.

sustainable development. Unfortunately, these themes remain underdeveloped, and other than expanding on what is meant by each, no recommendations are given as to how this group would recommend proceeding towards them.

In general, I was disappointed by this volume. There is precious little available about sustainable development in southern Africa that is written by authors from the region. I had hoped that this would prove an exception, and that it would turn up some innovative ideas and stimulate discussion. Aside from one or two authors, my general sense is that the volume restates much of the northern development literature with African voices. There is debate and there are innovations within the region, and the book would have been stronger had some of that more recent literature been reflected here. That said, it is good to see a collaborative effort bringing together professionals from across the southern African region. If the challenges to sustainable development are to be met within the global security perspective promoted in this volume, it will only be successful through collaboration and cooperation.

Shanda Leather is a Project Associate at the Woodrow Wilson Center's Environmental Change and Security Project and the Editor of the PECS Newsletter.

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Nature's Place: Human Population and the Future of Biological Diversity

Richard P. Cincotta and Robert Engelman
Washington, DC: Population Action International, 2000. 80 pp.

Reviewed by Jessica Powers

> "The more fundamental causes [of biodiversity loss] are rooted in the contemporary human condition, especially as they are amplified by the explosive growth in human numbers in the last three centuries."
>
> Michael Soulé, 1991[1]

Such is the premise upon which *Nature's Place* looks at the impact of human population pressures on Earth's biodiversity. Richard Cincotta and Robert Engelman report on biologically diverse and species-rich regions that are particularly threatened from population pressures and by the extractive and destructive practices of human beings. The causes and consequences affecting these biodiversity "hotspots" are explored in this Population Action International (PAI) report, and several recommendations are made to improve decision-making and policymaking, as well as offer further avenues of research.

More than 1.1 billion people now live within the twenty-five global biodiversity hotspots, identified by Conservation International. The term "hotspots" is a concept that Norman Myers, Russell Mittermeier, and other ecologists have defined as the most threatened species-rich regions on earth. About twenty percent of the world's population lives in these biologically diverse areas, and these numbers of people are only projected to increase, thus expanding the need for "additional land, water, waste-absorbing sinks" to support them. Ecologists estimate that at least half of the world's terrestrial species live within these hotspots, but human population growth and migration have made conservation efforts simultaneously more difficult and more important. According to the PAI report, "By 1995, population density (people per square kilometer) in the global biodiversity hotspots was, on average, almost twice that of the world as a whole." Conservation is thus threatened given the Earth's finite resources and a growing population. On the other hand, conservation is also advocated as way to preserve these finite resources.

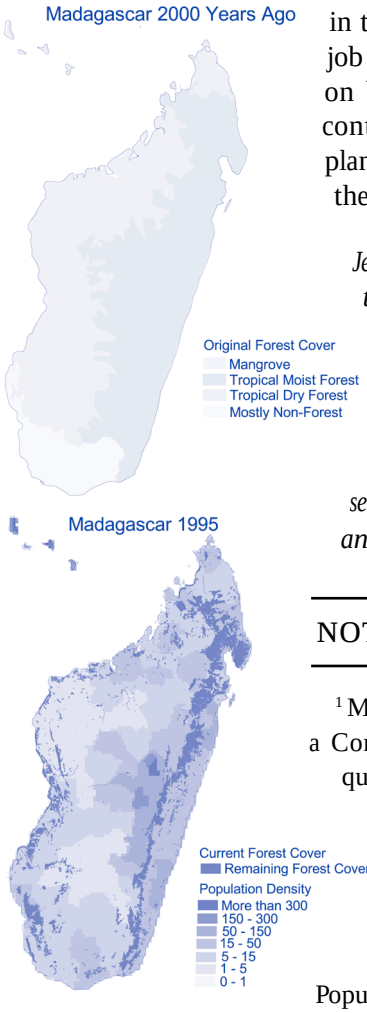
What are some of the direct causes of biodiversity loss? Cincotta and Engelman explore the linkages in the literature and identify some key causes including habitat loss and fragmentation, deforestation, biological invasion, pollution, and over-harvesting of fish and agricultural products. Other factors to consider in looking at the relationship between biodiversity and human population growth, according to the authors, include the role of indigenous people, the impact of migration and land inequity, the impact of development and urbanization, the increased use of land for agricultural purposes, and the contrast between poverty and inequity on the one hand, and consumption patterns in the wealthier nations on the other. To illustrate the severity of the many causes and consequences of biodiversity loss, Cincotta and Engelman highlighted the case of Madagascar, one of the twenty-five identified hotspots.

The Case of Madagascar

Madagascar, detached from the African continent more than 140 million years ago, is separated from the mainland by the Mozambique Channel, and is the fourth largest island in the world. Ecologists have shown that about eighty percent of Madagascar's plants are endemic to the island. All twenty-nine lemur species were unique

to Madagascar, with sixteen of the species having been exterminated since the arrival of humans on the island.

While rich in biological material, Madagascar, like many of its African neighbors, is afflicted by extreme poverty and has a debt nearly equal to its gross national product. According to the Population Reference Bureau, the average annual income in the last decade was about $200 per capita. Furthermore, Madagascar has a population of about fifteen million that is growing at about 2.7 percent a year. Malagasy women have, on average, between five and six children during their lives with a life expectancy of only about fifty-three years. The impact of AIDS will further decrease life expectancy, but nevertheless, by the year 2020, Madagascar is predicted to have a population of more than thirty million. This growth represents a doubling of its current population in only twenty years.



Since the arrival of humans on the island of Madagascar roughly 2000 years ago, the dry deciduous forest of western Madagascar has been radically fragmented, as have the mangrove forests along the coast. (*See maps of Madagascar from 2000 years ago and as of 1995.*[2]) Deforestation, unmonitored cattle ranching, and the charcoal production industry, especially since 1950, all threaten Madagascar's tropical forest habitats. Rapid population growth, massive poverty, economic underdevelopment, and political instability have had an impact on the species-rich but ecologically sensitive island of Madagascar. Thus, these socio-political factors combined with the highly endemic nature of species on Madagascar has led to island being designated as one of the world's hotspots.

Different research projects have used satellite imagery to study the effects that population growth, widespread poverty, an absence of effective development infrastructure, and the attendant development resources and techniques have on deforestation and species survival. In conducting their analysis, the authors relied upon data from organizations such as the Word Conservation Monitoring Centre that have been actively involved in conserving remaining vegetation on Madagascar.

In sum, this PAI report is an excellent overview of the interaction between human population growth and activity and Earth's biological diversity. The report offers several feasible recommendations for lessening the impact of human population in the identified hotspots and does a solid job of synthesizing different research efforts on biodiversity. Additionally, this report contains many useful graphs, charts, explanatory boxes, and photos that elucidate the points made in the text.

Jessica Powers is an Editorial Assistant at the Woodrow Wilson Center's Environmental Change and Security Project and Managing Editor of the Environmental Change and Security Project Report.

❑ *Please see the Meeting Summaries section for an ECSP meeting on this report and its findings.*

NOTES

[1] Michael E. Soulé, "Conservation: Tactics for a Constant Crisis," *Science* 253 (1991): 745, quoted in Richard P. Cincotta and Robert Engelman, *Nature's Place: Human Population and the Future of Biological Diversity*. Washington, DC: Population Action International, 2000: 53.

[2] Maps reprinted with permission from Population Action International. ECSP would like to thank Richard Cincotta, Robert Engelman, and Jennifer Wisnewski of PAI for their assistance with the maps.

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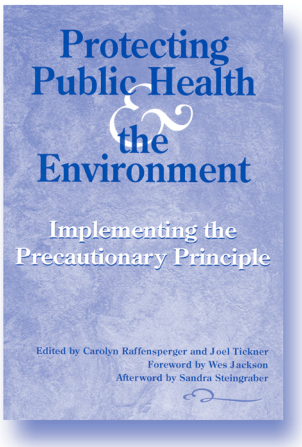
Protecting Public Health and the Environment: Implementing the Precautionary Principle
Carolyn Raffensperger and Joel Tickner, eds.
Washington DC: Island Press, 1999. 385 pp.

Reviewed by Kate O'Neill

The precautionary principle (PP) has taken on an important role in current debates over international and national environmental law and policy. It is a complex principle, in both its definition and implementation, and debates over its relevance tend to generate more heat than light. Briefly stated, at its core lies the notion that "preventive action should be taken in advance of scien-

tific proof of causality" (p.8). Its origins lie in the German system of environmental regulation, and it became prominent on the international scene as part of the 1992 Rio Declaration on Environment and Development. Since then, it has appeared in many national and international environmental rules and agreements, including the Cartagena Protocol on Biosafety, signed in Montreal in January 2000.

The PP (potentially) marks a radical shift in environmental policy with its mandate to change the substance and guiding principles of policymaking towards proaction and greater caution, a far more fundamental change than procedural measures, such as environmental impact assessments. Powerful economic interests frequently oppose the PP. This book tackles some of the more difficult questions surrounding the PP at different levels and stages of policymaking, most notably, the key issues of implementation and the role of scientific knowledge versus legal expertise. The essays collected here came out of the 1998 Wingspread Conference on Implementing the Precautionary Principle. Attended by a group of 35 academics, scientists, activists, government researchers, and labor representatives from the United States, Canada, and Europe, the conference goal was to bring the PP to the forefront of public health discussions in the United States. At the same time, the book has an international focus, drawing on examples from international agreements, Scotland, and Sweden.



Its strengths, in particular, lie in three excellent overview chapters (i.e., those by Andrew Jordan and Timothy O'Riordan, David Santillo, *et al.*, and R. Michael M'Gonigle) that discuss the history and evolution of the concept from political and legal perspectives. They also clarify some of the definitional ambiguities associated with the PP. For international scholars and practitioners, most useful are the discussions in chapters and appendices of the increased frequency of the PP in international agreements. The discussion does lack, however, a focus on the specific problems of implementing the principle under international law or how implementation issues vary among countries and political systems. Most significantly, though, the book tackles theoretical and empirical implementation issues at the national and subnational levels. Cases and examples are very diverse (perhaps too much so), and the contributors to the volume discuss a wide range of actors. Legal, economic, community/grassroots, and scientific perspectives are all represented. To an extent, the diversity in length, style, and focus of the essays detracts from the book's overall coherence. However, it still makes for a good introduction to the subject of the PP as it applies to U.S. policy, and how it has been implemented or applied overseas and in international law.

Kate O'Neill is Assistant Professor in the Department of Environmental Science, Policy, and Management at the University of California at Berkeley.

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Promoting Reproductive Health: Investing in Health and Development
Shepard Forman and Romita Ghosh, Editors
Boulder, London: Lynne Rienner Publishers, 2000. 315pp.

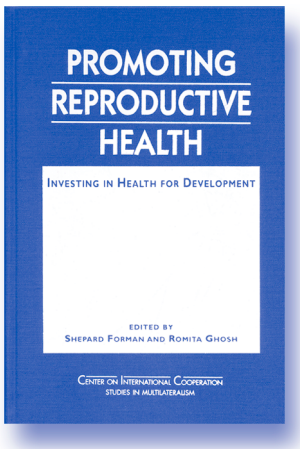
Reviewed by Simona Wexler

Promoting Reproductive Health: Investing in Health for Development outlines policies, programs, and financing that developing countries have implemented following the International Conference on Population and Development (ICPD) held in Cairo, Egypt, in 1994. Six case studies looking at Bangladesh, Egypt, Indonesia, Mexico, South Africa, and Tanzania are presented to illustrate the progress and failures made in the reproductive health front since 1994. The case studies were authored by a joint collaboration between an international team of experts and the Center on International Cooperation (CIC) at New York University. A chapter of the book is devoted to the assistance provided by two donor countries: the United States and the United Kingdom.

According to Simeen Mahmud and Wahiduddin Mahmud, who authored the case study on Bangladesh, there are mixed results on the reproductive health front in that country. Although considerable progress was made even before the ICPD conference of 1994, the status of women's reproductive health "remains compromised despite the fact that women's childbearing burden has been halved." Access to reproductive health services, for instance, continues to be problematic. Furthermore, women's access to public health facilities is often hampered by "the widespread but unofficial collection of user fees."

Hind Khattab, Lamia El-Fattal, and Nadine

Shorbagi analyze the case of Egypt, which hosted the 1994 ICPD conference. According to the authors, although Egypt has made significant progress in contraceptive health and family planning, the level of health care is in dire need of improvements. Egypt has implemented many of the recommendations that came out of the 1994 meeting, and as a result, cooperation between nongovernmental organizations (NGOs) and the government has improved. Additionally, the government's efforts to improve health services for women in poorer areas have increased. However, donor and recipient's fears that "reproductive health will replace family planning, with grave consequences for rates of population growth and overall development" is hampering further progress in reproductive health.



The reproductive health debate in Indonesia, as analyzed by Terence Hull and Meiwita Iskandar, is being hijacked by a pernicious debate on topics such as abortion and the spread of STDs (sexually transmitted diseases). Stern resistance to "sex education, counseling, and contraceptive services for unmarried people" is commonplace. Indonesia's reproductive health problems have been endemic for sometime and were not caused, the authors conclude, by the severe economic crisis of the late 1990s.

Mexico's political establishment strongly favored implementing the Cairo agenda, and in 1997, reproductive health language was introduced for the first time in Mexico's Health Law. As in the case of Egypt, commitment to the ICPD platform has generated productive cooperation between NGOs and the governmental organization. The research conducted by the authors of this study, Yolanda Palma and Jose Luis Palma, concludes that despite sustained public funding of Mexico's reproductive health care programs, reduced support by international donors may cause problems in certain areas such as "testing of innovative strategies."

Barbara Klugman, Marion Stevens, and Alex van den Heever outline South Africa's reproductive health program. Although the authors describe South Africa as "one of the most progressive countries in the world from a policy point of view," its precarious overall health care system is stymieing access to available reproductive health care services. However, the authors are optimistic about South Africa's future as its government is still working toward a post-apartheid system.

Tanzania, the last country analyzed in the book, appears to have had the most problems implementing the ICPD platform. Margaret Bangser details how Tanzania's debt, dismal poverty, and lack of political commitment have undermined progress in the reproductive health care sector. Bangser points out how Tanzania's reliance on funding from international donors is driving the reproductive health agenda to meet donor rather than people needs.

Concluding chapters on donors and lessons learned from the case studies highlight how complex a problem reproductive health is for both donor and recipient countries, and how important it is to invest in this field despite the many obstacles. Overall, the book provides a well-researched and comprehensive look at how the seven countries analyzed in the case studies have benefited from implementing the ICPD agenda, and what improvements need to be made to fully achieve the goals set out in Cairo.

Simona Wexler is Program Associate in the Environmental Change and Security Project, and is Senior Editor of the Environmental Change and Security Project Report. *She is also Coordinator for the Nonproliferation and Information Technology Projects.*

❑ *For more information on the Center for International Cooperation, please visit their website at: http://www.nyu.edu/pages/cic/.*

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Population and the World Bank: Adapting to Change

Washington, DC: World Bank, 1999. 52 pp.

Reviewed by Clair M. Twigg

Population and the World Bank: Adapting to Change a part of the World Bank's Health, Nutrition, and Population (HNP) Series, was written to provide a clear and concise overview of the current application of the 1997 HNP Strategy. This briefing is a discussion of World Bank efforts in these fields and was designed to inform the World Bank's board of directors and staff, and the general public about the Bank's ongoing activities. Its specific objective is to focus on the ways in which the Bank "is responding to the new approaches to population called for by the 1994 International Conference

on Population and Development (ICPD) and to the changing demographic realities in borrower countries on which ICPD is based." The discussion is of current trends and efforts in dealing with population dynamics and reproductive health initiatives.

In the roughly thirty years that the World Bank has been working in population-related fields, it has made extensive investments in education, health, and family planning with much success. Although its initial objective was simply to halt the growth of population, a result of declining global mortality, the current status of the world's people, and the ways in which many organizations approach human development have changed dramatically. Despite increases in life expectancy and child survival rates, and some decreases in maternal mortality, many challenges remain, including the high number of ill-timed pregnancies, high maternal mortality, the high risk of infection of HIV/AIDS, and inadequate access to reproductive services.

One of the benefits of this report is that the overview of Bank activities in the HNP sector is broad and comprehensible for many. As such, it is easy to see the different problems that arise in application of population activities. Different cultural obstacles such as the lack of access to education for some girls and the inadequacy of maternal health care facilities are just a few of the many problems that plague the areas in which the World Bank is working. The three HNP goals, "ensuring that investments improve outcomes for the poor, with particular attention to vulnerable groups; enhancing the performance of health care systems by promoting equitable access to preventive and curative services; and securing financing for services including reproductive health and family planning," are broad and somewhat vague.

What is new in this report is the emphasis on the desire to increase effectiveness of HNP activities by undertaking the following: examining the link between demographic changes, not necessarily population growth, and the effects they have on health, education, and other aspects of social development and the environment; the need for policies and action to be adaptable to different countries with different problems; the need to understand and take into account cultural factors which affect local sentiments on population and health issues; the Bank's ability to implement plans and support them over a long period of time; and, continued staff development so they maintain the skills essential to continue succeeding.

In sum, this publication appropriately meets its mission of informing a wide audience about the current state of World Bank activities in the HNP sector. In addition, the report's pointed examples and final appendices give the reader both a context and statistical platform from which to work. This report is an excellent summation of a larger set of activities.

Clair M. Twigg is Project Assistant at the Environmental Change and Security Project.

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Coastal Waters of the World: Trends, Threats, and Strategies
Don Hinrichsen
Washington, D.C.: Island Press, 1998. 275 pp.

Reviewed by Karin Mueller

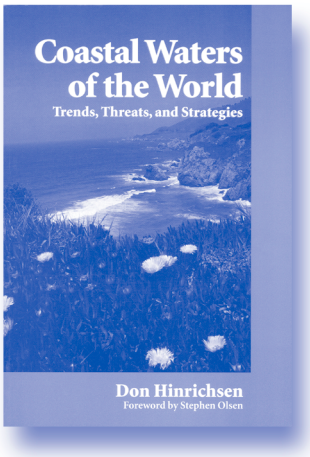
> "Two-thirds [of the planet's population] live within 400km of a coast. Nothing more dramatically illustrates that fact than a satellite photograph of the earth taken at night. Viewed from space, an uninterrupted river of light flows around the world's coastlines."
>
> Don Hinrichsen, 1998

In the interest of placing coastal area concerns higher on the list of government priorities and furthering better management of these areas, Don Hinrichsen has written *Coastal Waters of the World: Trends, Threats, and Strategies*. In his book, Hinrichsen states that no matter where we live, we are all still interconnected to the world's oceans through watershed drainage systems and rivers. Because we are dependent on coastal areas for our very existence, Hinrichsen asserts that safeguarding these areas is one of the planet's most challenging management jobs.

To better understand the threats facing these areas and the challenges coastal water management presents, *Coastal Waters of the World* explores three themes: 1) population growth and pollution; 2) development and the conversion/destruction of coastal resources; and, 3) lack of effective and implemented coastal management plans. It is notable that Hinrichsen fails to discuss rising sea levels as a threat to coastal areas. However, his explanation for this omission is convincing given the immediacy of the three threats on which he focuses.

To illustrate the problems of population growth and pollution, development trends, and ineffective management strategies in specific ways, Hinrichsen provides fourteen case studies from each of the world's regions. While each case study is unique, the three themes listed

above, serve as a common thread. Each study details how increased population, pollution, development, and poor management has affected the area. Hinrichsen also provides excellent insight into the differing issues facing each particular coastal body of water, and discusses the region's history relevant to coastal waters, and any treaties, governing strategies, and management plans currently in effect. If available, he follows with an example of how one group, organization, or country in the area has been successful at coastal water management. He concludes each case study with a list of important issues to be considered in that region.



The examples provided by Hinrichsen's fourteen case studies illustrate that the same trends and problems face coastal communities around the world. Overfishing, untreated sewage and industrial waste, pesticides, runoff pollution, deforestation of upland and coastal forests, clearing mangrove swamps and wetlands, mining, and runaway urbanization are just some of the common themes found in each case study. However, Hinrichsen shows how each region must find its own unique solution to coastal water management problems. For example, in Ecuador shrimp ponds are now being built adjacent to the mangrove swamps, resulting in less pollution and preserving the mangroves for water filtration and habitat. On the Tiny Apo Island in Southeast Asia, officials have preserved a portion of its coral reef, which has allowed dwindling fish stocks to recover and the local tourism industry to thrive in a sustainable way. In Singapore, sewage lines and treatment plants were built to treat wastewater and farms were moved away from riverbanks to reduce pollution entering streams and the oceanfront.

Coastal Waters concludes with a chapter on "lessons learned" from past management experiences and offers ideas on how to make coastal management more sustainable. As Hinrichsen states in his endnotes, the ideas presented in this section are an amalgamation of work from many institutions and individuals. Hinrichsen highlights the need for an interdisciplinary, coordinated effort by all stakeholders to work together toward a common set of goals. He also points out the importance of continued political support and leadership; mandating one national institution to have authority over management of coastal areas; and, building support on the local and national level for management plans. Hinrichsen concludes by suggesting a list of nine priority actions, which he admits could be expanded indefinitely.

The presentation of Hinrichsen's research is quite effective and should be a useful resource to practitioners, policymakers, and academics alike. It illustrates to policymakers the complexity and urgency of coastal water management and provides tangible examples of how areas within each region have resolved the problems specifically. Hinrichsen's case studies should be particularly useful for anyone conducting general research on coastal water management or research in any one of the regions his case studies cover.

Karin Mueller is an Editorial Assistant for the Woodrow Wilson Center's Environmental Change and Security Project (ECSP) and is Production Editor of all ECSP Publications. She is also Editorial Assistant for the Cold War International History Project and Web Editor for both projects.

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Life Out of Bounds: Bioinvasion in a Borderless World

Chris Bright

The Worldwatch Environmental Alert Series

New York: W.W. Norton. 1998. 287 pp.

Reviewed by Joseph P. Dudley

This book summarizes the problems caused by the proliferation of non-native species of plants and animals in ecosystems throughout the globe. Biological invasions of the earth's terrestrial and aquatic ecosystems by non-indigenous species of organisms have become a major threat to agricultural productivity and global biological diversity. Weedy, exotic species of plants and animals (most introduced or established through human intervention) now dominate vast areas of the earth's surface. Economic losses directly or indirectly attributable to biological invasions may be on the order of thousands of billions of U.S. dollars, annually.

This book is a highly readable overview of the many problems and issues associated with the invasive effects of non-native species on biological systems. The author presents sufficient summary data and examples from the primary literature to keep scientists and specialists engaged, while not overwhelming his general audience with technical jargon or statistical evaluations. The endnotes provide an excellent vehicle for entry to the source literature for those interested in further study of this important topic.

Global Environmental Change and Human Security Project Web Site

The Global Environmental Change and Human Security Project (GECHS) has recently overhauled its web site to include new links and updates. An interdisciplinary research project that strives to advance research and policy efforts in the area of human security and environmental change, GECHS is a core project of the International Human Dimensions Programme on Global Environmental Change (IHDP). Directed by Steve Lonergan, a geographer at the University of Victoria, the basic objectives of the project are threefold: 1) to promote research activities in the area of global environmental change and human security; 2) to promote dialogue and encourage collaboration among scholars from around the world; and 3) to facilitate improved communication (and cooperation) between the policy community, other groups, including nongovernmental organizations and the research community.

Different publications such as *AVISO*, a public-policy briefing series and a collaborative effort of GECHS and the Environmental Change and Security Project, are available on-line at the GECHS web site. The U.S. Agency for International Development through a cooperative agreement with the University of Michigan Population Fellows Programs, the Canadian International Development Agency, and the University of Victoria all generously support the *AVISO* series.

Visit GECHS' web site at: http://www.gechs.org

The author provides numerous historical examples, and a tremendous range of recent and modern examples, of the profoundly disruptive effects that biological invasions may have on both natural and agriculture ecosystems. The author emphasizes the often overlooked fact that many, if not most, biological invasions are mediated or facilitated by human interventions. The increasing homogenization of global landscapes by domesticated or human-adapted species of plants and animals (cultivars as well as commensals[1]) is described, and discussed in terms of both modern and historical contexts.

The security implications of breakdowns in food production systems or disease outbreaks caused or promoted by biological invasions are noted with reference to particular examples (such as fisheries collapses in the African Great Lakes), but does not form a central focus of the discussion. Nonetheless, this book will be a valuable resource for those interested in the effects of present or future "environmental scarcities" on human welfare. The ongoing global proliferation of virulent, pesticide-resistant pests and diseases, and our current dependence on a narrow range of genetically homogenous lineages of a few staple food crops (e.g. corn, wheat, rice, potatoes, cassava), point to an increasingly high probability of a future Malthusian crisis in world food production.

Joseph P. Dudley is a Diplomacy Fellow of the American Association for the Advancement of Science at the Secretariat for the United States-Asia Environmental Partnership at the U.S. Agency for International Development. ■

NOTES

[1] A cultivar is an organism of a kind originating and persistent under cultivation. A commensal relates to two kinds of organisms in which one obtains food or other benefits from the other without damaging or benefiting it.

ECSP MEETING SUMMARIES

1 June 1999

Preserving the Atmosphere as a Global Commons

MARVIN S. SOROOS, PROFESSOR OF POLITICAL SCIENCE AND PUBLIC ADMINISTRATION,
NORTH CAROLINA STATE UNIVERSITY

❑ *The following is a transcript of Marvin Soroos' presentation*

I have devoted most of my career to studying international environmental problems and efforts of the world community to address them. Early on, I became interested in Garrett Hardin's "Tragedy of the Commons" idea and how that might be applied to the international and global scene. Much of the discussion of international commons focuses on fairly small common resource issues. But my contention has been that internationally, we have some very important commons that all peoples of the world share, and they have some of the same problems of overuse and misuse that we see so apparent with commons at other levels. In the global context, we of course have the oceans and the seabed, outer space, Antarctica, and the topic which I will be discussing with you today, the atmosphere, which I contend is also an example of a global commons, one that is overused and misused.

There are two kinds of problems that arise with use of the atmosphere as a sink for many types of pollutants, which humanity has been doing for quite some time. On the one hand, there are what are called transport and deposit problems where pollutants are sent up into the atmosphere in one location, they are carried by wind currents considerable distances over international boundaries, and then the pollutants are deposited somewhere else, creating environmental problems. The other type, on which I will focus today, are ones in which the pollutants human beings send up into the atmosphere actually change the chemical composition of the atmosphere in ways that influences how it moderates the flow of energy coming from outside, primarily from the sun, and also energy radiated from the earth back into the atmosphere. The problems we face with the atmosphere and the threats to our well-being are an important type of security that fits in the general category of environmental security. And so, in my writing, I have not only looked at atmospheric problems from the standpoint of the atmosphere being a commons, but have also looked at them as a security problem that humanity needs to address.

My book, *Preserving the Atmosphere as a Global Commons*, looks at international efforts to deal with a variety of atmospheric problems. There are quite a number of books that deal specifically with ozone depletion or with climate change. I think this is one of the few that deals with a whole gamut of threats to the atmosphere posed by various types of pollutants. What I have tried to do in the book is to look at the whole development of international law, or what are commonly called international regimes, to address atmospheric problems. The thing that struck me quite quickly in getting into this subject is that in contrast to the other global commons that I mentioned earlier—

the oceans, outer space and Antarctica—we do not have an overarching law of the atmosphere. We have an overarching body of international law that has developed so we can talk about a law of the sea, which now is primarily in the form of the Law of the Sea Convention of 1982. We can also talk about a law of the outer atmosphere, which is based on the Outer Space Treaty of 1967, and a law of Antarctica, the foundation of which is the Antarctic Treaty of 1959. But the atmosphere, which is a global commons that we rely on very much, is largely responsible for the type of environment that made it possible for humanity and all the other species to exist on the planet earth. We simply do not have an overarching law [in this case]. There is relatively little mention made of the atmosphere in international law in any treaties. There are few that even mention the atmosphere specifically. Instead, what we have had in the place of an overarching law is what I would call "problem specific regimes." We have dealt with specific problems and created international legal mechanisms that regulate the pollutants that contribute to those problems. We have done this on separate tracks without very much interaction between them. In the book, *The Endangered Atmosphere*, I discuss four regimes and I am going to briefly summarize what we have succeeded in doing with each of them.

Problem-Specific Regimes

The first regime concerns the atmospheric testing of nuclear weapons, which we have addressed with the partial Test Ban Treaty of 1963. The second one concerns transboundary air pollution, which has been primarily a European and North American problem, although it is showing up in other areas such as the Far East now. We do have a regime that is centered in the European region on that subject. The third is the regime that we have created to deal with the protection of the ozone layer. And the fourth is the one that I think is of most concern these days, that is the regime that addresses the issue of global climate change. These are the four regimes that comprise most of what we might call international law pertaining to the atmosphere.

The first of these regimes is a rather interesting one in that it deals with atmospheric testing of nuclear weapons. The primary treaty, the Limited Test Ban Treaty of 1963, is usually categorized as an arms control agreement. But if you look at the impact of the agreement, it did not do much to limit the development of nuclear arms because while it did prohibit the testing of nuclear weapons in the atmosphere, it did nothing to cease the testing of weapons in other environments, such as underground. And so the nuclear arms race continued without much loss in momentum. But as far as impact is concerned, this agreement does make some significant contributions to environmental aspects of atmospheric forms of pollution. What is interesting, looking back at that regime, is that there were over five hundred nuclear tests that were conducted in the atmosphere by the United States, Soviet Union, China, France, and the United Kingdom between 1945 and 1980. There were periods in the middle 1950s and then in 1961 and 1962 when there were multiple tests being conducted many weeks, and some of the tests were huge ones, particularly those conducted by the Soviet Union in 1962. There was concern at that time that these tests were contributing to a problem of radiation in the atmosphere and ultimately radiation that was distributed around the world.

The science, as far as the impacts of these so-called "global doses," was not very definitive. And, in fact, the major impetus for the Test Ban Treaty of 1963 seemed to be more the political context, the political fallout after the Cuban Missile crisis, and the feeling that we needed, at that time, to have a significant agreement with the Soviet Union to try to defuse tensions. But from the standpoint of an environmental treaty, one might say that this has been pretty much an open and close success story. After 1963, the United States, Soviet Union, and United Kingdom conducted no nuclear tests in the atmosphere. France continued to test until 1974—they had just begun testing in 1960 and felt the need to continue doing so. They stopped then, partly as a response then to pressure from New Zealand and Australia to cease their tests in the South Pacific. China, which only began its program in 1964, conducted its last test in 1980. Since 1980, no nuclear tests have taken place in the atmosphere, at least none that are officially acknowledged, although there are some allegations that some perhaps have been [conducted].


Marvin Soroos

The second regime, the one that deals with transboundary air pollution, also had a Cold War origin. We knew for some time that acidification was causing some problems in the European area, particularly in southern Scandinavia. It was only in the late 1960s that Swedish scientist Savant O'Dane presented evidence that conclusively showed that the acidification problem in southern Sweden and Norway was largely not due to pollutants originating in those countries, but rather to pollutants coming from places such as the

United Kingdom, continental Europe, and even areas of Eastern Europe. Strangely, it was the Helsinki Accord of 1975 that gave impetus to the creation of the regime we that we now know as LRTAP, Long Range Transboundary Air Pollution. In the Geneva accord, there is a provision that there should be some concrete forms of cooperation between East and West on subjects such as energy and transportation. Also mentioned was that transboundary pollution could also be a subject of cooperation. Leonid Brezhnev followed up the Helsinki meetings and was quite emphatic that what he wanted was cooperation on this air pollution problem. And so he called for a high level meeting on this subject. One was finally held in 1979, after the West finally said this is something we would be willing to do. Originally, the West resisted this notion. This meeting led to a framework agreement on the problem of pollution that crosses international boundaries as acid, forming pollution such as that which originates from sulfur dioxide and nitrous oxides. That agreement was a very weak one. It did not have any requirements for reducing air pollutants. Six years later, there was a protocol that was appended to this agreement which did provide for a thirty percent reduction in sulfur dioxide emissions in European areas. The agreement also, in theory, could have covered the United States and Canada, but the United States never ratified that particular protocol. So, the emphasis has been in the European region.

This emphasis came after Germany made a significant switch from being an opponent of dealing with transboundary air pollution through treaty responsibilities to a strong proponent. The switch came after they realized that the Black Forest region of their country, and in fact all forests of central Europe, were being significantly harmed by what appeared to be these acid-forming pollutants. The agreement was reached in 1985, and subsequent ones were added on nitrogen oxides and volatile organic chemicals in later years. In 1994, there was a revised sulfur protocol that is quite significant in that it is a much more refined form of international regulation. Rather than having all countries reduce their sulfur dioxide by thirty percent, now we had differentiated reductions that were based on a computer simulation model. The model took into account the extent to which acid deposition in Europe exceeded what were called critical loads: the level at which there would be significant environmental damage. The computer model also took into account where the pollutants that caused excess deposition originated. A target figure was set for each country based on what it contributed to excess pollution in other countries. Some negotiations followed, but basically the agreement follows the guidelines which were established through the computer model known as RAINS. So the agreement developed a quite sophisticated regime, and one that now has, I think, made significant progress in addressing the acidification problem in the European region. It has not so much reduced the pollution as stopped the increasing severity of the problem. There is still quite a ways to go, but in many respects, I think it is a fairly successful regime that has set a pattern for some of the other regimes that we will be talking about in a moment.

Let us turn to the third regime. It addresses the threats to the stratospheric ozone layer. The problem of chlorfluorocarbons (CFCs) getting up into the stratosphere and attacking the ozone molecules was only realized in the early 1970s. At that time, there was something of a scientific theory or hypothesis that this is what happened to CFCs and that this could pose a serious threat to the ozone layer. Over the next ten years, there was a considerable amount of research to try to determine whether this theory, first introduced by two scientists at the University of California, Malina and Roland, in fact described a real problem or not. And by the mid-1980s it seemed as if there was growing evidence that this was the case. Then in 1985 we had the reporting of the Antarctic ozone hole.

With the international regime that has been created, the first step was the framework agreement in 1985 which is known as the Vienna convention, followed up quite quickly by the Montreal Protocol of 1987. Many of us would say that the Montreal Protocol is perhaps the most significant international environmental agreement that has been reached addressing any kind of subject related to the environment. It required a fifty percent reduction in CFC emissions over the next ten years. There was also a freeze on halons that was included in it. But what is also significant here is the scientific evidence that we were already observing a thinning of the ozone layer, not just over Antarctica, but to a lesser extent over other parts of the Earth. The projection suggested that for the future things looked a lot more ominous than we had thought previously. That agreement, the Montreal Protocol, was amended in 1990, 1992, and 1995 so that we have a complete phasing out of most of the chemicals that have been identified as threats to the ozone layer: CFCs, halons, and several others. Originally, with the London amendments of 1990, we set the year 2000 as the date for total phaseout but in Copenhagen, in 1992, we moved deadlines up to 1996 for CFCs, and 1994 for halons.

What, in effect, we have had with the ozone depletion problem is a series of international agreements that

constitute what all of us would say has been a major diplomatic success. We addressed a serious global environmental problem in which a lot of the science was still rather uncertain, and the manifestations of the problem were not particularly overwhelming. Even by the 1990s, one might say these manifestations were rather difficult to observe. But we did have a successful anticipatory response, and many would conclude that this is what we need with climate change. We were able to deal with the ozone depletion problem in a comprehensive manner and one that would seem to bode well for the ozone layer of the future. Maybe by the middle of the twenty-first century or a little later, if we abide by the terms of that agreement we are going to have that layer pretty much back to where it was before we started generating these chemicals that attack it. So, that is a major success story. So, we have two major success stories, you might say, and one partial one. That brings us to the climate change regime.

The Climate Change Regime

For those of you who may not be familiar with all the steps on this, we began the negotiations in 1991. A little over a year later at the Earth Summit [United Nations Conference on Environment and Development, Rio de Janeiro] in 1992, we finalized and put up for signature the Framework Convention on Climate Change, which follows the pattern of the 1979 agreement on the transboundary air pollution in the 1985 Vienna convention on the ozone layer problem. It does go a little bit further than these other sort of foundation agreements in that, in addition to calling attention to the indications that we have a significant problem, it states that we need to cooperate on further research, and we need to cooperate in efforts to address it in a general way. This agreement did set a rather ambitious goal of preventing dangerous, anthropogenic interference with the global climate system. Some would say that we have already done that and perhaps we had already done it by 1992, but the goal was a very high and compelling one and one that, hopefully, we would be able to achieve in large measure. The agreement also suggested that developed countries were largely responsible for this problem, and therefore they should take the first major steps to address it. And finally, it did set a goal (it was officially called an aim, not a mandatory requirement but an aim) that the industrial countries should bring their emissions of greenhouse gases down to 1990 levels by the year 2000. It did not seem like a particularly ambitious goal at the time, as we will see in a moment, but it has proved to be an elusive one.

As with the other regimes we have been talking about, several years went by before we had any further agreements. The nations that ratified this agreement began meeting in what are called Conferences of the Parties (COP) in 1995 in Berlin. At that time, it was decided that we needed to do more than the framework convention. In 1997, the third of these meetings, which was to be held in Kyoto, was set as the one at which we would have some kind of protocol for other type of official agreement which would have binding limitation on the emissions of greenhouse gases for the industrial countries. We of course looked forward to that Kyoto meeting, but as the weeks drew near to it, it appeared as if the differences between the United States and the European countries would perhaps make it impossible to have a very significant agreement.

But, in the final analyses, because of the final night's effort to try to come up with a significant agreement, we had a document called the Kyoto Protocol come into existence. It does provide for binding reductions upon those countries that ratify this agreement. The reductions apply to a package of six greenhouse gases, the primary ones being carbon dioxide, methane, and nitrous oxides. The agreement provided for differentiated agreements, with Europe accepting an eight percent reduction from 1990 levels in the timeframe from 2008 to 2012. The United States surprised the rest of the world and many of us in the United States by agreeing to a seven percent reduction. Japan agreed to a six percent reduction. Some countries were allowed increases, such as Australia, which was allowed an eight percent increase. The average for the industrial countries would be a 5.2 percent reduction. The agreement also included a number of what are called flexibility mechanisms; now we refer to them as Kyoto mechanisms. These were important to the United States in particular, but also to other countries referred to as the "Umbrella Group," including Australia, because they allow us to achieve some of our reductions in other countries through emissions trading, otherwise known as "joint implementation," or with the less developed countries the term is, "through a clean development mechanism." We would invest in projects that would reduce greenhouse gases in those countries.

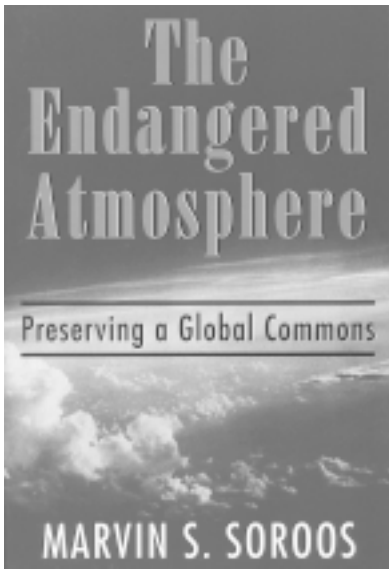
Finally, last year we had the Buenos Aires Convention of the Parties, which addressed many of the issues that were question marks in the Kyoto agreement. There were many issues that were unresolved at Kyoto, and in the final night they were simply left dangling there with the assumption that they would be resolved at future Conferences of the Parties. They involved specific rules about things like joint implementation and clear development mechanism, emissions trading, sequestering carbon in forests, and so forth. In Buenos Aires, rela-

tively little progress was made in answering those questions and spelling out the details of Kyoto, but it was agreed that by the COP in 2000, hopefully, those issues would be resolved.

Critical Questions

What follows are some critical questions that we need to ask about the climate change regime and especially the Kyoto agreement to assess whether we are progressing towards a solution to the problem and can, in any way, achieve this high goal of preventing dangerous anthropogenic interference with the global climate system.

The first question is, does the agreement go far enough? Well, I think the answer to this is quite obvious. I do not think that anyone felt that the Kyoto agreement was the final solution to this problem, but that it was really just a first step in the direction of limiting the flow of greenhouse gases into the atmosphere. But, when you look at the five percent reduction to which the industrial countries have committed themselves, and compare that to the projections that the Intergovernmental Panel on Climate Change has put forward as to the reductions that would be necessary to stabilize the concentrations of greenhouse gases in the atmosphere, there is a large discrepancy. This panel is suggesting that for CO_2 and methane, we should be looking at a fifty to eighty percent reduction. Five percent is just a minor first step in that direction and it only applies to the industrial countries. It does not include, of course, China, India, and all of the developing countries that are rapidly increasing their emissions. Even if we in the industrial world comply with what we said we would at Kyoto, we are still going to see an increase in the amount of greenhouse gases going into the atmosphere.



While spending some time, recently, at the National Center for Atmospheric Research in Boulder, Colorado, and I asked some of the scientists that deal with the subject about their perceptions of the Kyoto Protocol. Their view essentially was that five percent is just a very arbitrary kind of figure. There is no scientific basis for suggesting that it would really significantly address the problem. They also pointed out that if we are reducing the amount of sulfur dioxide going to the atmosphere and simultaneously creating sulfates, which have a cooling effect because they block out a certain amount of radiation, maybe we would just about compensate for reductions in sulfur dioxides that are coming as a result of both the transboundary air pollution regime I was talking about and efforts by the United States and Canada to do likewise in our part of the world. So, their perception is that the Kyoto Protocol does not go very far towards solving the problem.

The second question is, will the Kyoto Protocol ever come into force? And here, I would mention that we are already a year and a half or so from Kyoto. Seven countries have ratified the agreement and under international law you are probably aware that until a nation ratifies an agreement, it is not in any way obliged to comply with the provisions of it. The seven countries that have ratified it are Antigua and Barbuda, El Salvador, Fiji, the Maldives, Panama, Trinidad and Tobago, and Tuvalu—not what you would call very significant contributors to the problem. They are all countries that stand to be seriously impacted by global climate change, particularly sea level rise, so it is understandable that they would be in the forefront of ratifying this agreement. For this agreement to come into force, fifty countries that account for at least fifty-five percent of the carbon dioxide emissions of the industrial countries have to ratify it; they are called "Annex One Countries." The United States accounts for thirty-six percent of those emissions and the chances of the United States ratifying the Kyoto protocol are absolutely nil unless something dramatic occurs to change the atmosphere. The Russian Federation accounts for seventeen percent. So, those two countries already get us beyond the point that if they do not ratify it, then even if all the other countries among the industrial countries ratify it, we are still not going to get to that fifty-five percent level. So, the ratification problem is one that, I think, is a real concern at this point.

A third question is will the Annex One countries, the industrial countries, comply with the commitments that they have made? And I think here, the chances again appear to be very bleak. If you look at the aim set in the framework convention of getting down to 1990 levels by the year 2000, it is quite apparent that that is not going to happen. We do not have a whole lot of time to achieve that aim. The United States is now about sixteen percent above where we were in 1990. The European community is six percent above, Japan is about

five percent above, and Australia is twenty-four percent. Germany has reduced their levels of greenhouse emissions by about eight percent, but this is due to taking over what was formerly East Germany and closing down a lot of the inefficient fossil fuel plants and manufacturing facilities. Some moves have also been made in the United Kingdom, which has changed a lot of its energy generation from coal to natural gas, taking advantage of their North Sea resources. So, the 1990s have not been a period of stabilization, but rather a period of increase. If you look at the case of the United States and the commitments we made at Kyoto, we would have to reduce emissions by seven percent more to achieve those goals. The signs are that that is not realistic at all, especially since we are increasing our emissions each year and there are no indications that we have made any serious efforts to limit them. The European countries would have to reduce by about fourteen percent, and so on. Even in Europe, where several European governments have been the real pushers behind this, there has been a lot of difficulty in getting their act together to agree on, for example, a common carbon tax that many consider is a necessary ingredient in any program for limiting emissions. So, things do not look particularly optimistic on that score. And then the question is, what happens if we fail to comply with the rather modest objectives of the Kyoto Protocol? What does that mean for what we ultimately have to achieve? I am also concerned that, before long, the protocol is going to lose its credibility. It is going to become quite clear that it is not going to be ratified and it is not going to have compliance, and where does that leave us as far as the overall negotiation process? Can we sit down together again in the future and make proposals that others will consider credible? It just seems to me that it is going to take some real diplomatic ingenuity to get the whole process back on track.

Key Factors

There are several factors that complicate the whole process. The first is the indeterminacy of the science of climate change. There is a lot of scientific evidence that would seem to suggest that we have a real problem out there: that greenhouse gases are building up. There seems to be evidence of global average mean temperatures rising. There seems to be evidence of a myriad of types of impacts that could be attributed to these changes. But if you ask the scientists, as I did at the National Center for Atmospheric Research, who have been arguing the seriousness of this problem and the need to start responding to it, if we are really sure about this, they will say no, not really. They will tell you that there are climate systems, there is a tremendous amount of variation in them, and it is hard to say that any one bit of scientific fact is the smoking gun that will prove climate change to those that are skeptical of the whole thing. I think many of us are persuaded that this problem is serious and we do need to do something about it, but as long as there are those out there that can say we have not proven it yet, it seems as if that is a major obstacle, at least in the United States, to taking the kind of action that is necessary to address it.

The second problem is the complexity of the emergent climate change regime. All things being equal, I think we are much better off with fairly simple agreements that do not have a lot of complicated provisions in them that need to be worked out. Unfortunately, with the climate change regime, we have gotten into a situation where we do have a lot of detail, a lot of technical aspects to it that we have been trying to work out since Kyoto. This is an ongoing process, and hopefully, a lot of these issues will be resolved by the year 2000. Timeframes, baselines, monitoring provisions, reporting certification, verification, funding compliance, and so forth. It just goes on and on. I was reading a report on the recent technical workshop on mechanisms under articles six, twelve, and seventeen of the Kyoto Protocol, and it is just amazing all of the issues that each one of these matters involves. It is not just that these are technical questions; there are a lot of issues of national interest that underlie them. You cannot just leave it to the specialists to try to work these things out and hope that they will come up with a politically acceptable solution. We seem bogged down in all of this technical detail while the problem is getting worse and worse, and we need to be moving much more rapidly in the grander scheme to address this problem.

A third difficulty is differentiated commitments. Rather than having an across the board certain percentage reduction for all countries, we have gotten into the game of each country having its own goal. Now, Europe, as a whole, accepted an eight percent reduction, but they have what is called a bubble, and within the European group each country has a different goal. The idea is that they will average an eight percent reduction. But some countries like Spain and Ireland are allowed increases where as others, such as Germany and Denmark, are going to reduce more than eight percent and hopefully counteract that. It would be one thing if these differentiated responsibilities were based on some type of logical criteria that we could all agree upon and would be fair to all countries, but, as it stands now, it is pretty much based on what each country is willing to do. Each country makes the best case it can for limited commitments on their part while maximizing the commitments

of other countries. This is very much the case in Australia, where they seemed to applaud their negotiators at Kyoto for getting an eight percent increase, whereas most of the rest of the developed countries must make decreases. But they say we are a special case. It is not hard for most countries to argue that they are special cases too, and therefore they should have less commitment to reduce greenhouse and other gases.

The final problem that pervades this whole process is what I call the stalemate between the North—particularly the United States—and the Southern countries or developing countries. We have taken the position, at least the Clinton administration has with strong suggestions from Congress, particularly the Senate, that until developing countries are willing to make significant commitments to limit their greenhouse gases, the Clinton administration is not going to put the Kyoto protocol up for ratification before the Senate. The South, of course, is arguing that they are not responsible for the build-up of most of the greenhouse gases that we have seen thus far and that their level of emissions is so much lower than that of the industrial countries. Under the framework convention and other agreements that have come since, the official international position is that we in the industrial countries are going to take the first step. When Argentina made the suggestion that maybe we should include voluntary commitments by developing countries on the agenda for COP-4 in 1998, they were strongly criticized by the Group of Seventy-Seven (G-77) and China for breaking ranks. They are just adamant that until we in the industrial world show that we are serious about dealing with this problem, they are not going to make commitments. I do not know how that stalemate is going to be resolved but it certainly is a major obstacle to the ratification of the agreement in the United States, which is critical to the Kyoto Protocol coming into effect.

4 June 1999

Water: Conflict or Cooperation & Food Security in a Changing World

Steve Lonergan, Professor, University of Victoria and Director, Global Environmental Change and Human Security Project (GECHS)
Aaron T. Wolf, Assistant Professor, Oregon State University
Michael Brklacich, Associate Professor, Carleton University

Shared fresh water resources and food security should be critical development and human security concerns for policymakers today. Three distinguished scholars made the case for the importance of water and food during a recent policy briefing hosted by the Environmental Change and Security Project (ECSP). These presentations marked the first in a series of briefings associated with a new set of policy papers entitled *AVISO*, a joint effort of ECSP and the Global Environmental Change and Human Security Project (GECHS). The effort is supported by the Canadian International Development Agency and the U.S. Agency for International Development through a cooperative agreement with the University of Michigan.


Steve Lonergan

Geographer Aaron Wolf of the University of Oregon highlighted trends in declining water quality and quantity worldwide. Despite common rhetoric around likely water wars in the near future, Wolf finds little evidence for conflict over water between states. On the contrary, shared water resources have been the central component of thousands of international agreements. To address current fresh water quality and quantity challenges, Wolf listed a number of policy recommendations drawn from his *AVISO* paper.

- *Water dispute amelioration is as important, more effective, and less costly, than conflict resolution. Watershed commissions should be developed for those basins which do not have them, and strengthened for those that do.*

- *Water-related assistance needs to be coordinated and focused, relating quality, quantity, groundwater, surface water, and local socio-political settings in an integrated fashion. Funding should be commensurate with the responsibility assistance agencies have for alleviating the global water crisis.*

- *Universities and research agencies can best contribute to alleviation of the water crisis in three major ways: 1) acquire, analyze, and coordinate the primary data necessary for good empirical work; 2) identify indicators of future water disputes and/or insecurity in regions most at risk; and 3) train tomorrow's water managers in an integrated fashion.*

- *Private industry has historically taken the lead in large development projects. As the emphasis in world water shifts to a smaller scale, and from a focus on supply to one on demand management and improved quality, private industry has much to offer.*

Inherent in our recognition that the most serious problems of water security are those at the local level, is the attendant recognition that civil society is among the best suited to address local issues.

Geographer Michael Brklacich of Carleton University outlined troubling trends in food security. Brklacich stressed that food shortages stem from distributional problems where growing populations do not have sufficient

food purchasing power. Absolute food shortages are less critical than this inability of the world's poor to purchase often-available food. Brklacich highlighted a number of research and policy priorities drawn from his *AVISO* paper:

Michael Brklacich

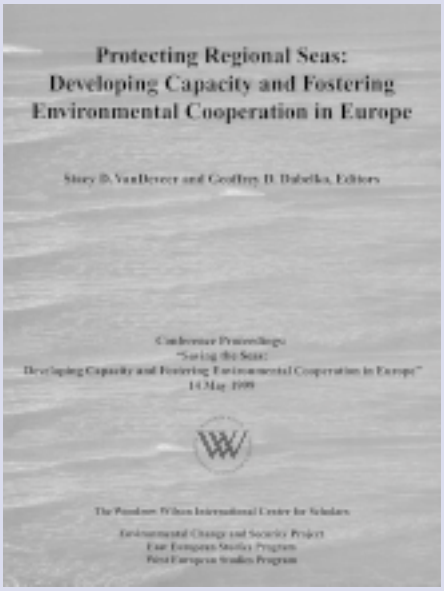
- Food security must be tied to human security.
- Enhanced use of participatory research methods is needed.
- Greater emphasis on urban food security is required.
- A better understanding of differential vulnerability and coping strategies is required.
- Strengthening agricultural research in developing countries is also needed.
- Promoting conservation of land and water resources is another priority.

❑ *For copies of the* AVISO *articles, please contact the Global Environmental Change and Human Security Project at: University of Victoria, P.O Box 3050, Victoria, BC V8W 3P5, CANADA or visit the GECHS web site to download copies at: http://gechs.org/index.htm.*

Protecting Regional Seas: Developing Capacity and Fostering Environmental Cooperation in Europe

Stacy D. VanDeveer and Geoffrey D. Dabelko, Editors

On 14 May 1999, the Woodrow Wilson International Center for Scholars assembled a group of scholars and practitioners to discuss the similar challenges of pollution that undercut the marine ecosystems and the economic potential and health of surrounding human populations of the Baltic, Mediterranean, and Black Seas of Europe. Entitled "Saving the Seas: Developing Capacity and Fostering Environmental Cooperation in Europe," the conference was held at the Center in Washington, D.C. This conference proceedings volume reflects the scholarship and debate featured at that conference and contains chapters that compare and analyze the state of environmental management in each of the three regions including the structure, funding, and effectiveness of each sea's protection program. The goal of the conference and of these proceedings is that scholars and policymakers may draw valuable lessons for replicating success stories and avoiding failed pathways for future environmental management programs.



Generous funding for *Protecting Regional Seas: Developing Capacity and Fostering Environmental Cooperation in Europe* and the May conference was provided by the Woodrow Wilson Center and by the U.S. Agency for International Development's Office of Population through a cooperative agreement with the University of Michigan Population Fellows Programs.

For more information or to obtain a copy of the conference proceedings volume contact the Project at (202) 691-4130 or by email at ecspwwic@wwic.si.edu.

9 June 1999

West Africa: A Briefing on Food Security, Environment, and Population Issues for Under Secretary of State Frank E. Loy

Christine Elias, Director, International Cooperation, World Resources Institute
Pietronella van den Oever, Task Manager, Social Development Training Program, World Bank Institute
Rajul Pandya-Lorch, Director, 2020 Vision Initiative, International Food Policy Research Institute
Mustapha Soumaré, Special Assistant to the Director UNDP Africa, United Nations Development Programme
James Buizer, Director, Research and Applications, Office of Global Programs, National Oceanic and Atmospheric Administration
Jeff Drumtra, Senior Africa Policy Analyst, U.S. Committee for Refugees

On 9 June ECSP hosted a meeting for Under Secretary of State for Global Affairs Frank E. Loy prior to his visit to West Africa in mid-June. The session provided an opportunity for experts from the non-governmental sector to share their knowledge about the region and answer specific questions from the Under Secretary and his staff. The session was structured to give an overview of environmental conditions, population and health trends and food security challenges in the region as a whole before examining more specific situations in several countries.

A high proportion of the economic activity in the Sahel region of West Africa is based on the use of natural resources. The predominance of agriculture and livestock rearing as a livelihood strategy means that human security directly depends on the state of the natural environment and the availability of sufficient natural resources. This region is suffering from widespread land degradation due in part to local land management practices, but more importantly as a result of climatic variability and the exploitation of marginal lands. As soils are degraded and agricultural production is expanded, the biodiversity of the region is reduced, leading to a loss of genetic resources that could contribute to a diverse and sustainable agricultural system. These losses jeopardize the food security of the local populations and ultimately result in high economic and social costs.

Also contributing to the increasing human insecurity of the region is the rising rate of population growth over the past decades. In 1998 the growth rate for West Africa stood at 2.9 percent, at which rate the population of the region will double in approximately twenty-four years. Part of the story behind this growth rate is a positive one: reductions in infant and child mortality following large-scale vaccination campaigns. However, this gain has been slow and life expectancy at birth for the region still remains around fifty.

These high fertility rates are sustained by a combined pattern of: early childbearing, low contraceptive prevalence, and a custom of virtual universal marriage for women starting in their mid-teens. Socio-economic factors continue to be compatible with early and sustained child bearing, and a West African woman is likely to give birth to an average of 6.4 living children during her reproductive life span. As a result of past high fertility, a large population momentum has built up, with forty-six percent of the population in the region under the age of fifteen.

The final general topic outlined in this meeting was that of food security in West Africa and more generally in all of sub-Saharan Africa. Almost two-fifths of the sub-Saharan African population is food insecure, meaning, they do not have consistent access to sufficient food to sustain a healthy and productive life. Insecurity occurs at a variety of levels from household to national and depends on variables including productivity, markets and individual

income. This insecurity is a trend that is expected to accelerate substantially, so that by 2010, thirty-nine percent of the population will face food insecurity. Agricultural sector development is essential to ensuring food security and good nutrition for all, but as outlined above there are additional environmental challenges to achieving this in West Africa.

After looking at overall trends in the region, the focus of the meeting shifted to examine three specific country topics with regional importance, namely desertification in Mali, climate change in Senegal and refugees in Guinea.

Mali, a landlocked country, is dominated by the Sahara desert, which covers two thirds of the country. Only thirty percent of the remaining arable land is cultivated, and a pattern of shifting cultivation and cutting for fuel-wood leads to the deforestation of 50,000 hectares a year. Past interventions aimed at combating desertification have found limited success, primarily because they were aimed at addressing the physical symptoms rather than the socio-economic root causes of unsustainable land use. More recently, integrated approaches aimed at addressing the issue of desertification have found more success. Today, Mali is one of the West African countries most advanced in implementing legal instruments to combat climate change and desertification. Even so, there are still challenges to be met in ensuring active participation and partnership at the regional and local level within Mali. One critical element in this process is that the government must work to create an enabling environment within Mali to ensure an integrated and sustainable development package that addresses not only the symptoms, but also the causes of continued environmental degradation.

Climate change is another element in the complex pattern of environmental degradation in West Africa. Although there is a great deal of debate about the magnitude or type of impact that might occur in West Africa, it is generally accepted that climate change can further stress human and environmental systems that are already under considerable strain. Regional changes in temperature and precipitation will lead to climate variability and more frequent incidents of events such as floods, drought and tropical storms. When these events are combined with human systems unable or unwilling to undertake short-term adaptive measures, as is the case in West Africa, severe losses are inevitable. These changes are particularly relevant for coastal states like Senegal because of the high level of coastal exposure and the high proportion of the population dependent on rain-fed agriculture for their livelihood and human security.

The final specific topic addressed in the meeting was that of refugees in Guinea. Guinea hosts more refugees than any other country in Africa, and is ranked fifth globally in number of refugees. The country is currently home to between 400,000 and 500,000 displaced people, primarily from Sierra Leone but also with significant numbers from Liberia. Since 1989 there have been several waves of refugees from these two countries fleeing the violence in their home states. Ninety percent of these refugees live in the western and eastern forest zones in Guinea—two of the poorest regions of the country. Refugee populations survive by sharecropping, working as laborers and selling firewood. The conditions faced by the refugee populations are similar to conditions elsewhere; poor infrastructure, poorly managed food distribution, poor access to medical care, and personal insecurity. Although Guinea hosts an unusually large number of refugees, the challenges posed in dealing with that population are mirrored across the region in dealing with smaller refugee flows and are reflective of general challenges in all of West Africa.

Frank Loy

This meeting highlighted many of the challenges to improving human security throughout West Africa. In general three of the key issues to be addressed are food security, population trends and environmental degradation. One of the main conclusions to be drawn from all of the speakers was the inter-related nature of these broad topics. All three feed into and influence one another, and it is essential to approach the challenges to sustainable development in West Africa in an integrated manner.

16 June 1999

Building Partnerships to Achieve Food Security: An NGO Consultation

This one day conference was co-sponsored by the Environmental Change and Security Project and ACDI/VOCA to engage broad nongovernmental organization (NGO) leadership in the 1999 World Food Summit continuation process. It also served as a follow-up to the launching of the *U.S. Action Plan for Food Security* that ECSP hosted on 26 March 1999. The participants focused on a review of the U.S. Action Plan and on ways to mobilize broader support for food security. This meeting represented the nongovernmental component of the food security debate, and allowed for deeper interaction between those within the Executive who helped to formulate the Action Plan and those within the private sector who will assist in the implementation phase. Below, please find an agenda of topics and speakers.

Agenda

Welcome
- *Robert Litwak, Director, Division of International Studies, Woodrow Wilson Center*
- *Mike Deegan, President, ACDI/VOCA*

Keynote Speaker:
- *Per Pinstrup-Andersen, Director General, International Food Policy Research Institute*

Panel Discussion I: The U.S. Action Plan Opportunities and Challenges

- *What are its strengths, weaknesses, and omissions?*
- *What does it contribute?*
- *What more is needed?*

- *Christine Vladimiroff, Prioress, Mount St. Benedict Monastery and Co-chair, U.S. Government Food Security Advisory Committee*

- *David Beckmann, President, Bread for the World*

- *Katherine Ozer, Executive Director, National Family Farm Coalition*

Moderator: Mary Ann Keeffe, Assistant Administrator, International Cooperation and Development, U.S. Department of Agriculture/Food Agricultural Service (USDA/FAS)

Panel Discussion II: Community Food Security

The Challenges of Domestic Hunger and Food Insecurity
- *Carol Kramer-LeBlanc, Deputy Executive Director, Center for Nutrition Policy and Promotion, USDA*

The USDA Community Food Security Initiative: What Is It and How Does It Relate to the Action Plan and Community-Based Efforts in the United States?

- *Joel Berg, Coordinator of Community Food Security, USDA*

Community Food Security: A Comprehensive View
- *Kami Pothukuchi, Wayne State University*

Mobilizing Support for Community Food Security
- *Andy Fisher, Community Food Security Coalition*

Moderator: Katherine Ozer

Panel Discussion III: Alternative Routes to Global Food Security

The Challenges of Global Hunger and Food Insecurity
- *Rajul Pandya-Lorch, Head, 2020 Vision, IFPRI*

Sustainable Production and Equitable Access to Re-

sources and Markets
- *Don Crane, Executive Vice President, ACDI/VOCA*

Agricultural Trade, Food Aid, and Food Security
- *Steve Suppan, Director of Research, Institute for Agriculture and Trade Policy*

Women, Gender, and Food Security
- *Hilary Sims Feldstein Training Specialist, International Center for Research on Women*

Moderator: David Beckmann

Breakout Sessions on Next Steps

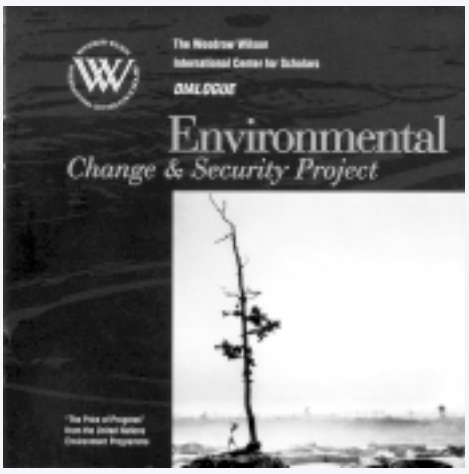
- *The U.S. Action Plan*
- *Community Food Security*
- *Alternative Routes to Global Food Security*

Closing Plenary

- *Rapporteur Reports of Breakout Sessions*
- *Reflections on the Day*
- *Phil Thomas, Assistant Director, International Relations and Trade Issues, General Accounting Office*
- *Closing Comments*

New Compact Disc Compilation from *Dialogue*

A new three compact disc compilation of recent *Dialogue* radio interviews on environmental themes has just been released by the Wilson Center. This set is a product of collaboration between the Wilson Center's Environmental Change and Security Project and *Dialogue*, the broadcast voice of the Wilson Center.



These three CDs features six interviews with scholars and policymakers discussing critical policy challenges such as water scarcity, pesticides, population growth, climate change, and radioactive waste. *Dialogue* host George Liston Seay speaks with:

- Former Senator Paul Simon on water scarcity
- Biographer Linda Lear on ecologist Rachel Carson (Parts I and II)
- Journalist Eugene Linden on causes of future instability
- Scientist Allen Hammond on alternative scenarios for the twenty-first century
- Researcher Geoffrey Dabelko on environment and population challenges

Streaming audio versions of all these programs are available on-line at the Woodrow Wilson Center's website at http://www.wilsoncenter.org/dialogue/index.htm.

To request a copy of the CD, please contact ECSP at 202-691-4130 or by email at ecspwwic@wwic.si.edu.

8 July 1999

United States Southern Command (USSOUTHCOM) Environmental Security Workshop

Colonel Kent Butts, George C. Marshall Chair, Center for Strategic Leadership,
U.S. Army War College
General James Soligan, Director of Strategy, Policy, and Plans;
United States Southern Command, U.S. Air Force
Gary Vest, Principal Assistant Deputy Under Secretary for Environmental Security,
Department of Defense

This one-day conference was co-sponsored by the Environmental Change and Security Project (ECSP), the U.S. Army War College's Center for Strategic Leadership (CSL), the Department of Defense (DoD), and the U.S. Southern Command (USSOUTHCOM). The United States Southern Command is one of nine unified commands located throughout the world. Personnel from the U.S. Air Force, Army, Marine Corps, and Navy are assigned to the command. USSOUTHCOM headquarters are located in Miami, Florida and its area of responsibility includes thirty-two countries and fourteen colonies in Central and South America and the Caribbean, organized into four regional engagement areas. The Commander-in-Chief of the USSOUTHCOM, General Charles E. Wilhelm (U.S.M.C.) considers environmental security issues to be important to USSOUTHCOM's engagement mission and to the stability of the region. To emphasize this, he is creating an Environmental Security Annex to the Theater Engagement Plan (TEP). To assist this process, ECSP was asked to help convene a workshop that would provide CINCSOUTH information on current successful nongovernmental organization and academic environmental programs in USSOUTHCOM's area of responsibility. Representatives from other parts of the Executive branch that are focusing on environmental security issues in the region, such as resource conflicts, natural disasters, energy resources, technological disasters, and population trends also participated in the session.

14September 1999

World Population Beyond Six Billion

John Haaga - Director, MEASURE Communication Project,
Population Reference Bureau
Carl Haub - Conrad Taeuber Chair of Population Information,
Population Reference Bureau

On 12 October, the human population will pass the six billion mark, according to United Nations projections. To mark this milestone, The Environmental Change and Security Project asked two leading demographers to address "World Population Beyond Six Million."

John Haaga outlined trends in fertility, birth rate, death rates and population growth over the last century. From global population of around 1.5 billion at the turn of the last century, we have seen a consistent and rapid growth of total numbers, with the last billion being added within the past twelve years. He was careful to make the distinction between total growth and rates of growth. Globally, rates of growth peaked around the 1970s, but because of population momentum and the number of people in reproductive age groups, total numbers continued to increase. This reduction in rates of growth is one of the often overlooked success stories of the past century. Mr. Haaga cited increasing economic development, greater employment opportunities for and education of women, reduced infant mortality and wider access to modern methods of family planning as the most important contributors to growth rate reductions.

John Haaga

Mr. Haaga also outlined some of the regional differences in growth rates and total growth over the past thirty years, highlighting that the greatest reductions have been in the developed OECD countries. As a corollary to this, the current challenge is within developing countries. Developing country regions are facing demographic change at an unprecedented pace, and are coping with changes in a span of twenty years that occurred in the developed countries over nearly a century. The earth currently supports the largest teenage population ever, a group entering the reproductive cycle. Mr. Haaga concluded that health and planning services will need to expand and adapt to accommodate this next generation.

Carl Haub

Carl Haub looked to the next century and explained the population projections for the next fifty years. He outlined the process of projecting growth with the essential caveats that while we can look at future postulations, it is nearly impossible to accurately predict individual behavior in relation to child bearing. He cited some predictions from previous generations and noted that population growth had actually slowed faster than has been projected. However, unfortunately, much of this trend was due to the onset of the HIV/AIDS pandemic. Mr. Haub outlined several growth rates and what large results even small variations in these would mean to total numbers in fifty years. In the absence of war, famine and abstinence, scenarios either undesirable or unlikely, he pointed to the need to increase both traditional and modern family planning services if the goal is a further reduction in fertility rates.

❑ *To read an excerpt of the text or to order* Population Bulletin *please visit the Population Reference Bureau website at www.prb.org.*

5 October 1999

The GLASS Model: Assessing Environmental Threats to Food and Water Security in Russia

Joseph Alcamo, Director, Center for Environmental Systems Research, University of Kassel, Germany, and Public Policy Scholar, Woodrow Wilson Center

The Global Assessment of Environmental Security (GLASS) model is designed as a tool to screen current and future environmental threats to security and to identify strategies to enhance security, according to Professor Joseph Alcamo, Director of the Center for Environmental Systems Research, University of Kassel. Professor Alcamo was also a Public Policy Scholar at the Wilson Center October 1999 and leads the team developing the GLASS model.

Speaking at a Wilson Center meeting co-sponsored by the Environmental Change and Security Project (ECSP) and the Kennan Institute for Advanced Russian Studies, Alcamo explained the GLASS model and presented preliminary results for Russia and other parts of the world. The the main goal of the model is to link large-scale environmental changes (such as more frequent droughts associated with climate change) with human security. Until now, the model has been used to estimate if water or food crises in different countries will become more or less frequent in the twenty-first century under different scenarios of climate change and economic growth. As an example, Alcamo presented preliminary simulation results of past and future occurrences of water crises in different parts of Russia.

At the core of the model is a proposed relationship between three key concepts—environmental stress, state susceptibility, and crisis. "Environmental stress" is defined as the intensity of an environmental change that involves an undesirable departure from long-term or "normal" conditions, is usually of short duration, is directly or indirectly influenced by society, and is not only the result of natural geologic factors. According to this definition, increased flooding due to climate change would be a type of environmental stress, but damage due to a volcanic eruption would not. Although scientists have yet to agree on the best measure of environmental stress, Alcamo suggested, as examples, that this stress could be proportional to the percentage of area affected by poor crop yield or water shortages.

The second concept is "state susceptibility" which refers to the ability of a state to resist and recover from crises. Although there are various possibilities for quantifying susceptibility using measures such as national political capacity or level of democracy, it is difficult to use these concepts in practice because of the lack of past and future data. There are, however, advantages of using gross domestic product (GDP) per capita as a rough measure of state susceptibility, especially because historical time series and future scenarios exist for these data.

The third key concept is environmentally-related "crisis" defined as "an unstable or crucial time or state of affairs brought about by environmental stress, which requires extraordinary measures to counteract." Alcamo argued that researchers should focus more on the relationship between environmental stress and crisis because the linkage is clearer and more common than the relationship between environmental stress, conflict, and violence. Moreover, the avoidance of crisis is also an important security concern of society, and global databases on the occurrence of these crises are available to researchers. In the discussion it was also pointed out that crisis could lead to either negative impacts on security (conflict and violence) or positive (increased cooperation against a common challenge). Therefore research on the linkage between environmental stress and crisis was useful because it took into account that the result of environmental stress was not always negative.

After estimating environmental stress and susceptibility, the GLASS model is calibrated to international data of crisis events (in the first version of the model these are drought-related water shortages and famines) between 1901 and 1995. Once calibrated, the model is used for scenario analysis of the global potential for environmental crises.

In one example, the GLASS model was used to simulate the past occurrence of water crises in Russia. Alcamo showed that the model "that predicts" the Black Earth region of western Russia had more frequent water crises than other parts of Russia from 1901 to 1995. In another example, the model was used to explore the consequences of changes in climate and national income on food crises in Africa. As an historical baseline, the model estimates that six countries in Africa had a high potential for food crisis during fifty percent or more of the years between 1901 to 1995. If national incomes rise from the year 2000 to the year 2050 (and susceptibility decreases) then the number of countries drops to three. However, if environmental stress increases because of lower precipitation in some parts of Africa (because of climate change), the number of countries with a high potential for food crisis increases again from three to six countries.

During the discussion, Alcamo was particularly interested in hearing comments from potential model users so that he could make the model more useful to them. Discussion centered around the merits of focusing on capacity and vulnerability variables that appear key to avoiding crisis in times of severe environmental change. Several participants were concerned that by not assessing the long-term average quality of soil, air, or water, and, focusing on only quantity and availability, the model ignored the long-term impacts of environmental degradation. While acknowledging the importance of these environmental problems, Alcamo emphasized that the objective of research on environmental change and human security was to focus on *security threats*, not long-term environmental degradation. As an example, he pointed out that although water pollution is an important chronic health and environmental problem, it is normally not considered a *security threat* unless a toxic landfill explodes and contaminates a river.

In conclusion, the GLASS model has a number of applications. By using regional/country spatial data and climate variability data, Alcamo has developed a quantitative model to support policymakers as they develop strategies for mitigating food and water security challenges. Also, the model can identify "trouble spots" where environmental stress can play a role. While there has been considerable research looking at the connection between environmental change and human security on a qualitative scale, this project is one of the few that has tried to quantify that connection. Given that Alcamo's training is in the natural sciences, this discussion represented an example of interdisciplinary dialogue and exchange between natural and social scientists that is needed for designing effective policy responses.

❑ *For copies of papers that present the goals and data from the GLASS model or for more information, please contact Professor Joseph Alcamo at the Center for Environmental Systems Research at: University of Kassel, Kurt-Wolters Strasse 3, D-34109, Kassel, Germany; E-Mail: alcamo@usf.uni-kassel.de; Internet: http://www.usf.uni-kassel.de/english/.*

8 October 1999

Population Dynamics, Migration, and the Future of the Calakmul Biosphere Reserve

JENNY ERICSON, PROGRAM ASSOCIATE, UNIVERSITY OF MICHIGAN FELLOWS PROGRAMS,
FORMER UNIVERSITY OF MICHIGAN POPULATION AND ENVIRONMENT FELLOW

Integrated Conservation and Development Programs (ICDPs) are gaining in popularity through-out developing countries as a way to balance the needs of people with the conservation of natural resources. By employing sustainable management techniques, these programs seek to ensure the availability of natural resources for future generations by placing a value on their conservation. Most of these programs work to ensure that those people who live closest to resources are the ones to benefit from any type of 'set aside' conservation or sustainable exploitation. The basic overriding principle is that by making sustainable use more valuable than unsustainable use, those in closest contact with resources will work to conserve them and thus ensure their future livelihood.

On 8 October, Jenny Ericson of the University of Michigan Population Fellows Program spoke about her experience as a University of Michigan Population and Environment Fellow placed for two years with the World Wildlife Fund (WWF) on an integrated conservation and development project in the Calakmul Biosphere Reserve, located in the southern Yucatan peninsula in Mexico. Ms. Ericson worked with WWF and a Mexican partner organization, Pronatura, to promote placing greater value on the forest and forest products in an effort to reduce deforestation and environmental degradation by relatively new settler populations in the area.


Jenny Ericson

The project had a series of objectives aimed at several different levels of operation. At the macro level, the goal was to establish an understanding of the demographic trends for the region in order to have a better understanding of the human needs in the area and the human influence on the environment. At the community level, the goals were to generate dialogue among the various stakeholders, examine community desires for land use development and empower the local community to take part in decisions that would affect their livelihoods. On an institutional level, the objectives included the establishment of a culturally and politically appropriate participatory land use system and designing a low-cost and effective population monitoring system.

In order to ensure the participation of the local population and record their opinions, Ericson used participatory rural appraisal techniques to allow the predominantly illiterate community to define their own objectives and prioritize their land use needs and desires. There is extensive discussion of the technique and several of the exercises used in the written report of her work. She highlighted that although the process was highly successful in empowering the community with a voice, it was a difficult method with which to extract quantitative data. She also briefly discussed other obstacles along the way such as the conflicting goals of different partners and cooperating agencies.

Ericson concluded by examining some of the accomplishments of the project. These included the provision of a great deal of local training and capacity building, especially in relation to future planning; the development of a series of responses and recommendations used to initiate and broaden dialogue on the links and impacts of land use at all levels; and the development of a clearer understanding of the base environmental problem, its root causes and potential development strategies. On a more concrete level, as a direct result of the project changes have been initiated in internal land use policy at the local level. On a broader level, WWF Mexico has recently decided to include population as one of its institutional priorities and to implement a three-part reproductive health program

in the area.

❑ *Copies of the complete report "Population Dynamics, Migration, and the Future of Calakmul Biosphere Reserve" can be obtained from The American Association for the Advancement of Science, Directorate for International Programs, 1200 New York Avenue, NW, Washington, DC 20005.*

Environment and Security

The *Environment and Security* (E&S) journal is a social scientific journal devoted to the study of environmental forms of insecurity and to the national and international efforts to address these insecurities. The bilingual (French/English) journal tries to build on a new approach to environmental questions and to handle with their social, political, and economic implications by linking the approaches of the natural and social sciences. This year, the journal's editors are releasing two special issues: issue number four explores Canadian environmental foreign policy and issue number five looks at environmental issues in South Asia. Below, please find the table of contents for these two special issues.

No 4. (May-June 2000)
CANADIAN ENVIRONMENTAL FOREIGN POLICY
Peter Stoett, Guest Editor

"Canadian Foreign Policy and Environmental Security: An Introduction"
Peter Stoett

"The Implications of Context, Negotiations, Agreements, and Foreign Environmental Policy Policy"
Samuel Barkin

"Resource Security and the Canada-U.S. Pacific Salmon Dispute"
Christopher Gore

"The Canada-Spain Fishing Dispute: Lessons for Cooperation in Marine Management Between NAFTA and the E.U. "
Peter J. Ricketts

"Human (In)security and Canadian Climate Change Policy"
Heather S. Smith

"Security and the Environment in the Post-Cold War in the Arctic"
Rob Huebert

"Cold War, Frozen Wastes: Cleaning up the Dew Line"
Heather Myers, Don Mutton

No 5 (July-August, 2000)
ENVIRONMENTAL SECURITY IN SOUTH ASIA
R.B. Jain, Guest Editor

"Introduction: Concems for Envrionmental Security in South Asia"
R. B. Jain

"Environmental Security: Challenges before the South Asian Nations"
0. P. Dwivedi

"Reconstructive Postmodemism and Environmental Security in South Asia"
Amita Singh

"Emerging Concem for Environmental Security in International Relations: The Case of South Asia"
M. Shamsul Haque

"Water, Conflict, and Security in South Asia"
Renu Khator

"Resource Management and Environmental Security: the Case of the Chittagong Itll Tracts in Bangladesh"
Mizan R. Khan

"'Wake-Up Call' for India's Environmental Security or Face Collective Suicide"
K D. Gangrade

"Regional Cooperation in Environmental Security: A Study of Prospects in South Asia"
R. B. Jain

For more information, please contact: International Institute for Environmental Strategies and Security (IIESS), C.P. 9621 Sainte-Foy (QC), Canada G1V 4C2; Email: iissen@mediom.qc.ca.

27 October 1999

USAID-WHO Collaboration for Health in the Millennium

J. Brady Anderson, Administrator, U.S. Agency for International Development
Harriet C. Babbitt, Deputy Director, U.S. Agency for International Development
Gro Harlem Brundtland, Director-General, World Health Organization
Duff Gillespie, Deputy Assistant Administrator, U.S. Agency for International Development
Lee H. Hamilton, Director, Woodrow Wilson Center
Christopher Murray, Associate Professor,Harvard Center for Population and Development Studies

In the climate of shrinking foreign assistance and support for international programs, cooperation between the U.S. Agency for International Development (USAID) and its United Nations (U.N.) counterpart, the World Health Organization (WHO), is critically necessary on the crucial health challenges, according to officials from both organizations. Representatives of USAID and WHO gathered at a one-day consultation hosted by the Woodrow Wilson International Center for Scholars on 27 October 1999 to discuss such collaboration.

USAID Administrator Brady Anderson highlighted the need for cooperation between national foreign assistance agencies and the organizations of the United Nations. He utilized examples from his development experience in Africa, particularly Tanzania, to outline the progress that has been made against health challenges in the developing world. Some key organizational issues that Anderson is addressing in his tenure are solidarity in financing with explicit priorities outlined and defining a new role for the state to play in alleviating health crises. A critical social factor in fighting health problems will be to reduce poverty.


J. Brady Anderson

Gro Harlem Brundtland, Director-General of the WHO, outlined her ongoing efforts to reorganize the structure of the WHO in order to meet the future challenges in global health, including such concerns as HIV/AIDS, tuberculosis, immunizations, malaria, river blindness, and tobacco. Efforts are aimed at centralizing the institution into a smaller number of units, involving new collaborators including the private sector, multilateral banks, and national agencies in U.N. global health efforts, and heightening accountability.

Chris Murray of WHO listed four goals for the new WHO: improving health, reducing inequalities in access and distribution of health services, increasing responsiveness to individuals, and protecting families from income loss due to disease. All of these objectives must be met with greater efficiency and no new financial or human resources. Against a backdrop of tremendous progress reflected by greater life expectancy rates around the world, Murray called attention to declining life expectancy rates in Eastern Europe and the former Soviet Union. He also suggested that increased attention would have to be paid to non-communicable diseases as the relatively youthful populations of the developing world ages over the next twenty to thirty years.


Gro Harlem Brundtland

This meeting of USAID and WHO officials was the first of its kind, according to the leaders of both institutions. Brundtland proposed extensive consultations to coordinate actions in the area of health policy. After the initial presentations by the USAID and WHO leadership, staff from each organization met in smaller groups to exchange research and explore means for greater cooperation. Group sessions explored the issues of organization mandates, resources, structure, and interface as well as improving partnerships at the country level, technical challenges, and priorities for collaboration in the coming millennium.

28 October 1999

The Future of Environmental Security in European Institutions

Alexander Carius, Director, Ecologic - Centre for International and European Environmental Research
Kurt Lietzmann, Head of Division, Nature Conservation and Nuclear Safety, Federal Ministry for the Environment

Addressing environmental degradation issues worldwide requires a better institutional understanding of linkages between environment and security, according to Alexander Carius and Kurt Lietzmann speaking at an ECSP meeting on 28 October 1999. This meeting was co-sponsored by the Heinrich Böll Foundation.

Lietzmann co-chaired the recently released the NATO Committee on the Challenges for Modern Society (CCMS) pilot study on "Environment and Security in an International Context" of which there are excerpts in the special reports section in Issue 5 of the *Environmental Change and Security Project Report*. Carius served as one of the pilot study consultants. At this meeting, they discussed the broad set of institutional approaches and frameworks for addressing environmental change and security issues. They also drew on the findings of their newly published volume, *Environmental Change and Security: A European Perspective*, to outline the strategies behind different institutional approaches recently explored by the European Union (EU), the Organization for Security and Cooperation in Europe, the Organization for Economic and Cooperative Development, the United Nations Development Programme, the United Nations Environment Programme (UNEP), NATO, and the IUCN-World Conservation Union.


Kurt Lietzmann

According to Carius, efforts to institutionalize environment and security concerns in European institutions remain in their infancy, in particular, efforts to address environment and conflict linkages. The concepts and linkages are imprecise because the research ranges from conflict management to resources. Also, Carius stressed the need to broaden the concept of security to incorporate issues such as human security. Many units within European institutions (economic and aid units especially) question the "fit" of the environment and security framework for their issues. Yet, sections like the Directorate General XI-Environment of the EU and the European Parliament are increasingly setting out guidelines for action. However, global environmental institutions remain underfunded, making the creation of new institutions questionable.

Lietzmann traced the development of the environmental security ideas within the German Federal Ministry of the Environment. Starting in 1995, participation in the NATO/CCMS was adopted as a means to strengthen environmental policy. The environmental security perspective was examined and developed to make new allies at a time when international environmental negotiations were bogged down. Simultaneously, the German government convened German researchers to understand better the state of the environment in Germany. The product of that effort was the book being released at this meeting.

Efforts of UNEP and other intergovernmental organizations to institutionalize environmental security in the U.N. system have recently been blocked by G-77 [Group of Seventy-Seven] objections. Developing countries oppose expanding the mandate of U.N. organizations to intervene in advance of perceived environmental conflicts. An additional problem is that even if an organization sees the benefit of institutionalizing environmental security concerns, the complexity of the issue is not easily translated into policy. Thus, the linkages are there but the expectations of policymakers in these different international/regional organizations to use these concepts in designing policy are not.

This meeting was an opportunity for American policymakers, academics, and nongovernmental organization

representatives to hear the German and European perspective on environment and security linkages from a German academic and a German policymaker. Both speakers presented their observations on the current debate on environmental security both in European and U.S. circles as well as more globally. Additionally, both reviewed some of the different approaches of the larger groups examining these issues. The dialogue that followed between the speakers and the participants focused on the need to include broader sections of civil society and G-77 perspectives in the environment and security discussions. The participants also stressed the need to understand better the linkages between these two issues in order to more effectively address environmental degradation.

China Environment Series

The Working Group on Environment in U.S.-China Relations, a project within the Woodrow Wilson Center's Environmental Change and Security Project, has published its third issue of the *China Environment Series* (CES). A tool for researchers, policymakers, and educators, CES examines environmental challenges facing China and explores how U.S. foreign policy and assistance might be more effectively crafted to produce more environmentally sound development and better relations with the People's Republic of China.

"The linkage of global and local environmental issues has been highly under-emphasized in the environmental dialogue with China. Ultimately, a reconciliation of global and Chinese domestic environmental priorities may be more feasible than most realize. Indeed, if industrialized countries like the United States better acknowledge the unfamiliar conditions and needs of the developing world, and if nations like China respond carefully but openly, there may be opportunity for a well-designed, equitable greenhouse strategy," writes Chris Nielsen. Nielsen is the executive director of the Harvard University Committee on Environment China Project, in his article "Perspectives on Global and Chinese Environment: Overview of the Harvard University Committee on Environment China."

In the spirit of exploring local environmental issues with regional and global linkages, the other four articles in the *China Environment Series* highlight changes and challenges in the Chinese transportation sector. Following is a list of featured articles in Issue 3 of the *CES*.

"Transportation Infrastructure and Land Use in China"
Robert E. Paaswell

"A New Era for Public Transport Development in China"
D. Tilly Chang

"Transport and the Environment in China"
Michael P. Walsh

"Present and Future Developments of Pollution from Urban Transport in China"
He Kebin and Chang Cheng

The first two issues of the *China Environment Series* featured an inventory of U.S. government and NGO environmental projects and activities taking place in China. In this third issue coverage has been broadened to include current and recently completed environmental projects in China undertaken by other countries as well. The inventory also includes a sample of environmental activities funded by multilateral organizations.

To obtain a copy of the *Series*, please contact the Jennifer Turner at 202-691-4233 or by email at turnerj@wwic.si.edu. You may also download a copy from the ECSP web site at http://ecsp.si.edu.

5 November 1999

Forest Futures: Population, Consumption, and Wood Resources

Robert Engelman, Vice President for Research, Population Action International
Tom Gardner-Outlaw, Research Associate, Population Action International
Nigel Sizer, Director of Forest Policy, World Resources Institute

The meeting highlighted the recently released publication by PAI entitled *Forest Futures: Population, Consumption, and Wood Resources.*

As a research and advocacy organization, Population Action International investigates the relationship between population growth and the availability natural resources and uses that research to explore and promote positive policy options to address the challenges of rapid population growth. Robert Engelman briefly touched on current and positive downward trends in population growth rates, but pointed out that continued overall growth in numbers and shifting consumption patterns mean that there will be increased pressure on natural resources into the foreseeable future. Forests have traditionally provided one of the most easily renewable resources important to human populations as fuel, raw material and in more recent history, as an essential element of communication and education through the use of paper. However, evidence suggests that as human populations have grown, forest cover has been more heavily exploited and the total global forested area has been reduced.


Robert Engleman

One statistic that graphically bears this tendency out is the ratio of forested land to human beings. As global population has grown, this ratio has dropped steadily. The amount of forested cover available to each person has declined globally by fifty percent since 1960. This ratio, currently at 0.6 per capita, is expected to continue to decline as total population continues to grow. Engelman defined the critical forest ratio as .1 hectare per person. Below this level, forest resources would be too scarce to successfully sustain global populations. He highlighted that one of the most critical variables in this ratio is the consumption pattern of current and future populations, particularly the consumption of tropical forest products.

Tom Gardner-Outlaw expanded on Engelman's general comments and supported them with particular findings from the recently released PAI publication entitled Forest Futures: Population, Consumption, and Wood Resources. Of the total current global distribution of forests, sixty percent are in developing countries and are primarily tropical. The remaining forty percent occurring in developed countries are temperate forests. When examined more closely, low forest areas closely correlate with areas of high population growth. For example, Asia has sixty percent of the global population, and only fifteen percent of global forest resources.


Nigel Sizer

The trends in forest cover have been very different in developing versus developed regions. In the period from 1990-1995, total forest area has increased in developed countries by 8.8 million hectares, while in developing countries it has fallen by 65.1 million hectares. Gardner-Outlaw pointed out that this high rate of decline in developing countries reflects a similar pattern in Europe when those countries were in a similar stage of economic development.

The report contains an extensive section on understanding forest loss and an examination of the factors behind loss. Gardner-Outlaw broke these causes into two categories: underlying and direct. Under the heading of underlying causes he listed population growth, economic growth, poverty, market failures and policy failures. Within direct

causes he listed agricultural clearing, industrial logging, infrastructure and industrial development and clearing for fuelwood and charcoal. Population and population growth play a role in all of these individual causes, but also in the relationship between these causes. In recent years, per capita consumption in the global wood trade has been relatively stable, but because of the overall growth of population, total global consumption levels have continued to rise. In addition, because many people in developing countries rely directly on forest products and cleared forest lands to maintain their livelihoods, consumption of these resources in developing regions has a more direct relationship to population growth. In contrast, trends in consumption of forest products in developed countries have been much more dependent on consumer preferences and less directly on population growth.

Thomas Gardner-Outlaw

According to Gardner-Outlaw, these trends have implications for the consumption of global forest resources and for the livelihoods of the various groupings of people reliant on these resources. Significantly, the increasing scarcity of forest resources would have a direct and adverse effect on the lives of women and children. Because women bear the primary responsibility for gathering fuel wood and carry the heavy loads to attend to the needs of the household, a reduction in forest resources could well mean a greater burden on the lives of women and girls. Conversely, improving the well-being and socioeconomic status of women could also lead to more sustainable use of forest and forest products.

A second important implication cited in the report is the future demand for paper as the main medium of communication and education around the world. Gardner-Outlaw pointed out that eight out of ten human beings have yet to reach the level of paper use considered necessary to achieve the basic needs of literacy and communication. If the resources to meet this gap are to be found, vast increases in paper availability will be necessary while at the same time, the excessive use of paper products in countries like the United States must be addressed.

Nigel Sizer, providing critical comments on the presentations and Forest, picked up on the issue of consumption. He highlighted consumption as an essential element in the forest debate, particularly when examining consumption rates in different regions. In the developed OECD countries, each person consumes an average of 160 kilograms of paper a year. In contrast, a person in a developing country only consumes an average of 17 kilograms in a year.

Sizer briefly outlined some of the current and proposed timber and wood product regulations, particularly in relation to upcoming and ongoing World Trade Organization negotiations. He highlighted the fact that most of these discussions deal with trade issues, but not with the issue of the growth of demand. The rapidly increasing demand for paper products has a knock on effect for water resources and pollution related climate change. He concluded that work must focus on reducing unsustainable demand for forest products through campaigns aimed at reducing consumption, by increasing recycling and by changing the methods of production to reduce the overall negative impact on the environment.

❑ *For a copy of the report, please contact Population Action International at: (Tel) 202-557-3400 or http://www.populationaction.org.*

22 November 1999

Trade and the Environment: Finding Common Ground

The Honorable William M. Daley, U.S. Secretary of Commerce
Ken Berlin, Attorney, Skadden, Arps, Slate, Meagher, & Flom LLP
Eric Biel, Office of the Secretary, Department of Commerce
David Festa, Deputy Director of Policy, Department of Commerce
Douglas "Jake" Caldwell, Program Director for Trade and the Environment, National Wildlife Federation
Gary Horlick, Partner, O'Melveny and Myers
David K. Schorr, Director, Sustainable Commerce Program, World Wildlife Fund

At a Director's Forum held at the Woodrow Wilson Center on 22 November, Secretary of Commerce William Daley said that while most Americans want open borders and understand the connection between free trade and jobs, the connection between free trade and the environment is "hardest to sell" and was a major bone of contention at the meeting of the World Trade Organization (WTO) in Seattle last December.

Responding to questions on what the U.S. could realistically hope to achieve at next week's WTO gathering, Daley said that if there is little consensus in this country on ensuring that trade does not lower environmental standards, there is "even less outside." He had just returned from an eight-month tour of other countries, and while he found "great concern" about environmental standards, there was little agreement on how that concern could be interpreted concretely by WTO ministers.


William M. Daley

According to Daley, officials in Washington have been taking an unprecedented degree of initiative in ensuring that future trade agreements take into account environmental concerns. His own Department of Commerce was a natural leader in this regard. The largest agency at Commerce is the National Oceanic and Atmosphere Administration (NOAA), which manages fisheries, endangered species, and coastal eco-systems. "So, I know the pressures that growth can put on the environment, and the need to protect places like our National Marine Sanctuaries. But I also know the needs of the business community." The recent agreement with forty-two nations to rebuild Atlantic tuna and swordfish populations was a good example of the close cooperation between NOAA and the other arm of the Commerce Department, the International Trade Administration, Daley said.

Daley also mentioned President Clinton's recent executive order requiring environmental impact reviews of every major new trade agreement, which came after months of dialogue with nongovernmental organizations (NGOs) such as the World Wildlife Fund.

The Ostriches vs. the Brickthrowers

In a roundtable discussion following the Commerce Secretary's presentation, David Schorr from the World Wildlife Fund said the very fact that Daley recognizes that there is no consensus outside of Washington is important. As the pre-Seattle news reported, the WTO meeting turned into a battleground between business and environmental groups, with the latter insisting that corporate profits not take precedence over the public's welfare. "Will the ostriches or the brickthrowers win?" chimed in Jay Caldwell, a panelist from the National Wildlife Federation. "I hope neither!"

Analyzing this lack of consensus, the panelists concurred that the heart of the matter consisted of the controversy over who has jurisprudence in cases affecting the environment. As lawyer Ken Berlin put it, when is it appropriate

to seek an international solution to problems affecting the global commons versus allowing individual countries to make their own rules? For instance, the United States has a law to protect sea turtles (an endangered species) from death through shrimp trawling, but this is being challenged by other countries in the WTO, on the grounds that the United States has no right to decide on this issue for the rest of the world.

The NGO community is also suspicious about whether the WTO is truly neutral. The "win-win" opportunities for trade and the environment propagated by the Clinton government are misleading, said Schorr, because "win-win" implies that current WTO rules are consistent with environmentally sustainable trade. The WTO, he went on, requires environmental rules to be perfect from a trade perspective, and this "trade purity" is unacceptable to most in the environmental field.

Providing the trade lawyer's perspective, Gary Horlick said that developing countries are cynical about the United States leading the developed world in imposing environmental standards—as long as the United States itself is a bigger polluter. In the view of the developing world, discriminatory regulations prevent them from fully employing their workers and enjoying the benefits of trade.

The panelists were at least encouraged that, thanks to Washington's recent initiative, the issue of trade is now inextricably linked to the environment. The win-win agenda "opens channels for dialogue that didn't exist before," said Schorr. Eric Biel from the Commerce Department thought that a WTO working group on trade and labor (which is another, less emotive way of categorizing environmental and social issues, he said) would provide a valuable forum beyond Seattle. And Caldwell said that he was hopeful that if the developed world listens more carefully to developing countries, then benefits such as market access and technology transfer could be offered in exchange for the raising of their environmental standards.

Environmental Financing in China

28 January 2000 and 9 February 2000

In the People's Republic of China, city and county governments are responsible for over fifty percent of total financing of environmental projects. The magnitude of need in China for innovative and inexpensive financing mechanisms to fund environmental protection and energy efficiency projects far outstrips the current capacity of both the central and local governments in China. In light of this challenge facing China, ECSP's Working Group on Environment in U.S. China Relations began a series of meetings to examine bilateral, multilateral, and private projects in China to promote the financing of environmental protection and energy efficiency projects. The January meeting discussed how past finance programs implemented by the U.S. Environmental Protection Agency (EPA) in the United States could hold lessons in promoting the financing of local-level environmental infrastructure projects in China. The February meeting brought together representatives from the International Finance Corporation and the Global Environment Facility to outline their current and planned energy finance activities in the People's Republic of China. Both meetings were funded by the National Oceanic and Atmospheric Administration and the W. Alton Jones Foundation. For more information about the Working Group on Environment in U.S. China Relations, visit http://ecsp.si.edu/china.

11 January 2000

Population Growth, Environmental Degradation, and State-Sponsored Violence: The Case of Kenya, 1991-93

Colin H. Kahl, Research Associate, Columbia's Center for International Earth Science Information Network CIESIN
Kent H. Butts, George C. Marshall Chair, Center for Strategic Leadership, U.S. Army War College

Demographic and environmental stress can be causes of civil strife when social schisms caused by natural resource scarcities and related social grievances create incentives and opportunities for state elites to engage in violence, according to Colin Kahl, speaking at a recent meeting co-sponsored by ECSP and the Africa Project of the Wilson Center. Kahl, a research associate at Columbia's Center for International Earth Science Information Network (CIESIN), addressed a group of practitioners, policymakers, and NGO representatives on the interrelationships among the three issues of population growth, environmental degradation, and violent conflict. Kent Butts of the U.S. Army War College provided critical comments that centered on the applicability of Kahl's research in formulating policy, including the need to adjust the hypothesis to account for different political, social, and historical factors in each case study.


Colin H. Kahl

Kahl argued that many scholars and practitioners have largely ignored the role of state exploitation and violence when examining the intersection between the issues of population, natural resource scarcity, and violent conflict. As such, Kahl has developed a state exploitation hypothesis that "generates several first- and second-tier effects" that could lead to conflict when combined with particular political institutions and forms of social organizations. The three important first-tier effects are renewable resource scarcity, economic marginalization, and demographic shifts. The two key second-tier effects are increased social grievances and state weakness. State weakness is the concept that factors like environmental degradation, resource scarcity, and population growth will lead to internal strife only if the strife will create "incentives and opportunities" for both individuals and groups to engage in violent behavior.

In developing this hypothesis, Kahl also argued that it is crucial to have explicit definitions of what environmental and demographic stress, civil strife, and the state entail. For Kahl, environmental and demographic stress is "a composite variable encompassing (1) population growth; and (2) the degradation, depletion, and/or mal-distribution of renewable resources." These renewable resources include for example, arable land, fresh water, forests, and fisheries. "Large-scale, sustained, and organized violent conflict within a political entity" which can include campaigns of terrorism, rebellion, insurgency, civil war, and revolution but not crime or riots, constitute civil strife according to Kahl. The state, meanwhile, is composed of "a set of governing institutions and organizations led and coordinated by individuals occupying offices that authorize them to make and implement binding rules for all people within a territorially demarcated area."

There are two intervening variables that must be considered in assessing whether state exploitation dynamics are likely to lead to civil strife. The two variables are institutional inclusivity and groupness. The inclusivity of state institutions refers to the degree to which key social groups are institutionally empowered to participate in, and influence, decision-making by state elites. In an exclusive state, on the other hand, decisions are made by a narrow group of state elites, allowing them and their allies "to exploit resource scarcities to manipulate social schisms to

advance their narrow self-interests, because the social costs of such policies are spread out across society while the benefits are accrued by the narrow clique at the top."

Groupness, the second variable, refers to the degree to which "clusters of individuals depend on distinct identity-groups (whether they be ethno-cultural, kin-, tribe-, religious-, or class-based) for physical, economic, and psychic security, as opposed to a number of overlapping and cross-cutting identity-groups." Thus, the greater degree of groupness in a society, the more likely the tendency will be toward organized violence, while a low degree of groupness makes conflict less likely.

Kent H. Butts

In looking at the role that state violence could play in countries plagued by severe population and environmental pressures, Kahl used the series of events that unfolded in Kenya, leading to violent conflict from 1991 to 1993 as a case study. Conflict became more likely according to Kahl's hypothesis, since Kenya was an exclusionary state with a high degree of uneven groupness. These two intervening variables created "incentives and opportunities" for state elites to exploit the natural resource scarcities in Kenya, leading to civil strife.

Kahl discussed the historical, political, and social factors of Kenya that he argues led to conflict when combined with the intervening and environmental and demographic variables discussed earlier. He provided an overview of the impact of the British colonial structure, the political division of the ethnic groups into two main factions, and the highly developed nationalistic sentiments among the ethnic groups.

Next, Kahl looked at the rapid and uneven population explosion in Kenya and the resulting land scarcity, which created sources of inter-ethnic and political strife. Adding to all this pressure, Kahl argues that the state exploited this natural resource scarcity, in an environment of exclusive institutions and uneven groupness, contributing to an outbreak of violence.

Butts' comments focused on the need for similar research exploring the links between population growth, environmental scarcity, and violent conflict. Both researchers and policymakers must work together to identify the drivers that will increase stability and provide scarcity solutions for the Third World, such as technology and population issues as they relate to land, including accessibility and availability for all parties. He also stressed the need for the developed nation to work with the governments of the developing world to find solutions to that will enhance local, regional, and global security by addressing natural resource scarcity and population issues.

This was an opportunity for practitioners and experts in the fields of population, environment, security, and the region of Africa to hear a political scientist's views on the role that the different issues play. The discussion focused on the need to incorporate more political, social, and economic issues into the model that Kahl developed as well as the ways that this research may be utilized in U.S. foreign policy. Several participants stressed that studies such as Kahl's can provide the tools to evaluate different situations around the world and formulate short-, mid-, and long-term policies to diffuse existing and deter potential conflicts. Building upon the work of other scholars such as Jack Goldstone and Thomas F. Homer-Dixon, Kahl emphasized that in his research demographic and environmental stresses are neither necessary nor wholly sufficient causes of violent conflict, acknowledging the participant's criticisms that other variables must be included when evaluating a crisis.

❑ *For more information, please see Kahl's article similarly entitled "Population Growth, Environmental Degradation, and State-Sponsored Violence: The Case of Kenya, 1991-93."* International Security *23:2 (Fall 1998).*

17 February 2000

Water and Population Dynamics: Case Studies and Policy Implications

Alexander de Sherbinin, Research Associate, Columbia's Center for International Earth Science Information Network (CIESIN)
Victoria Dompka Markham, Executive Director, Center for Environment and Population (CEP)

Governments must work to improve institutions at the local, national, and international levels to better address the social consequences of water scarcity and water pollution issues according to Victoria Markham and Alex de Sherbinin. The two authors presented findings from their edited volume of case studies, *Population and Water Dynamics*, at a recent discussion meeting sponsored by the Environmental Change and Security Project.

Victoria Markham presented an overview of the book's case studies and how the project attempted to make the lessons learned from the case studies applicable in a broad sense from both a management approach and a community approach. She stressed that global water consumption has increased six-fold in the last half-century. She identified both the direct and indirect impacts of the human population on the global water supply: the supply of freshwater per person is declining as population increases; dams and other large development projects are creating pervasive threats to freshwater ecosystems, as well as leading to population displacement; and agricultural and industrial runoff are major sources of water pollution. More indirectly, land use changes such as increased agricultural clearing, construction, and timber cultivation are all leading to greater deforestation and in turn, more runoff. Growing urbanization, particularly in developing countries, is increasing the competition for a limited supply of water. Climate change is disrupting the hydrological cycle creating more floods, droughts, and other natural disasters.


Victoria Dompka Markham

Markham also discussed the issue of finding a balance between water and population. Although traditional approaches have focused on increasing supply, she also examined the idea of demand management. Markham offered three methods through which policymakers can curb demand to more reasonable levels given increasing populations. One is to encourage drip irrigation, a more efficient technology that uses less water than traditional agricultural irrigation. Second, she discussed the concept of appropriate pricing at all levels of society. Pricing needs to be changed not just for the poor but also for wealthy urban populations who often pay far under what it actually costs to get water to them as a result of government subsidies. Finally, water management policies must be developed that address ecosystem and river basin management as well as the needs of local communities to find a balance between the actual water supply and human activities.

Next, Alex de Sherbinin reviewed the unique circumstances in five of the nine case studies and offered specific lessons learned and policy recommendations to address the problems. This case-study approach to water supplies was unique in that it looked at defining different approaches from the global management level to the more local community approaches. Additionally, for each case study selected, both population specialists and natural scientists participated to provide a balance between the ecological and demographic areas.

The case studies selected were divided into three research areas: examining aquatic ecosystems and the challenges of conservation, international river basins, and local participation in water management. The three case studies looking at aquatic ecosystems were in Guatemala, Jordan, and Zambia. For the presentation, de Sherbinin highlighted the critical issues at stake in Guatemala and Jordan. In Guatemala, health issues and subsistence rain-

fed agriculture were the primary issues for the local indigenous population while in Jordan, the focus was on restoring the wetlands to their original state through cleaning and better environmental management.

The authors chose three international river basins to highlight the conflicts between rising demands and a finite water supply and looked at Bangladesh, Mali, and Southern Africa. In Bangladesh, for example, de Sherbinin pointed out that in the south, the country suffered from floods as a result of the monsoon cycle but that in the north, inequitable distribution of water leads to severe water shortages and even droughts. The issue, then, is timing, not just the volume of water available.

The last three case studies, focusing on India, Morocco, and Pakistan, addressed the issue of local participation in water management, or encouraging local communities to take the lead on equitable and sustainable use of water. Examples from the presentation focused on the issues in India and Pakistan. In the case of India, water is declining leading to out-migration of about eight percent of the population to Bangalore, the Silicon Valley of India. Pakistan, on the other hand, demonstrates the issue of disparity in access to water in an agriculturally intensive zone, where the local population successfully argued that access to water is a fundamental human right. What all of these case studies showed, is that water and population linkages are numerous and have different implications. Water and population linkages included:

- recognizing that ecosystem conservation can also meet human needs (e.g., flood control or fisheries);
- recognizing the impact of urbanization;
- understanding that disparities in water use are often due to power relations and market forces (i.e. upstream nations versus downstream nations);
- scarcity and inequity more often lead to out migration rather than conflict;
- access to water is a human rights issue; and
- that community involvement and education are needed.

What do all of these points mean for policymakers? One, policymakers must improve institutions at all levels, particularly international levels, according to de Sherbinin. Taking a page from Aaron Wolf, a noted water expert at Oregon State University, the authors of each case study argued that the focus should be on the economic benefits of water not the hydrological needs when making bilateral or multilateral agreements to avoid future conflicts. Additionally, policymakers must find a balance between appropriately pricing water while protecting subsistence users. Thirdly, technology must be a blend of traditional and environmentally appropriate methods including technical training and assistance and communication among all stakeholders. Policymakers must implement demand management and small-scale engineering solutions to meet future needs while also studying the impact of urbanization on demand patterns. Finally, equitable solutions to groundwater sharing are imperative to ensure access for all people.

The discussion that followed centered on demand management techniques and improving technology to minimize waste water and to provide an adequate supply to everyone. On the demand side, participants addressed how to define appropriate water pricing as well as the value of focusing on economic benefits over water since it addresses underlying needs rather than promoting positions. As to technology, participants discussed the areas of technology that need to be promoted more, particularly industrial processes that can minimize the use of water while simultaneously reducing pollution.

❑ *To download a copy of* Water and Population Dynamics, *please visit the American Association for the Advancement of Science website at http://www.aaas.org/international/psd/waterpop/contents.htm. To read a review of the volume, please see Issue 5 (Summer 1999) of the* ECSP Report *at http://ecsp.si.edu/pdf/Report5-Sect4.pdf.*

29 February 2000

Oiling the Friction: Environmental Conflict Management in the Niger Delta, Nigeria

Okechukwu Ibeanu, Department of Political Science, University of Nigeria

The Niger Delta, once considered "the White Man's Graveyard," is viewed today as an important biological and economic source of wealth for its richness in biodiversity and for its immense oil reserves. However, according to Okechukwu Ibeanu, the extraction and production of oil by large oil companies in cooperation with the Nigerian federal government, has caused environmental damage in this extremely sensitive ecosystem. The government-petrobusiness alliance has exacerbated tensions between various local ethnic communities in the Niger Delta. Ibeanu presented his research findings on conflict in this oil rich but environmentally fragile region of Nigeria at a meeting co-hosted by the Environmental Change and Security Project and the Africa Project at the Woodrow Wilson Center.

Since the 1950s, when Nigeria began exporting large quantities of oil, the oil-rich southern region of the Niger Delta, known as the "oil belt," has been a massive source of revenue for the Nigerian federal government. Nigeria is the fifth largest producer within OPEC (Organization of the Petroleum Exporting Countries), and currently exports about one million barrels of oil per day with Shell Nigeria—the Shell Petroleum Developing Company, a subsidiary of Royal Dutch/Shell, producing about fifty percent of total oil exports.

Okechukwu Ibeanu

Oil and gas pipelines crisscross the region that has experienced many large spills over the last half century. One recent pipeline break resulted in as much as 13 million barrels spilling over an extremely confined space. These oil spills destroy the freshwater ecosystems, foul farmland, kill animals and endanger human life. In addition, canals built to support the pipelines impact the hydrology of the Niger Delta, creating a scarcity of water as well as acting as conduits to pass pollutants back into the ecosystem.

Environmental awareness among Nigerians is widespread and a number of local and international environmental nongovernmental organizational (NGOs) are trying to highlight the precarious environmental situation in the Niger Delta. Yet, Ibeanu stressed that no systematic study has been done on the environmental impact of oil production in the Niger Delta. The Nigerian environmental protection agency remains in its infancy (only ten years old), has limited financial and technical capacity, and is susceptible to corruption. In essence, the agency acts as a rubber stamp for lower standards by endorsing the oil companies' own standards. While oil exports constitute only thirteen percent of Nigeria's gross domestic product, they make up about eighty percent of government revenues, causing the government characterize continued production of oil as an essential Nigerian security interest. In contrast, oil is not central to the survival of the majority of people in the oil-bearing communities of the Niger Delta. Most rely predominantly upon agricultural and pastoral economies. These divergent dependencies have created what Ibeanu terms a "paradox of securities" in that the federal government's pursuit of oil-based "national security" has come into direct conflict with providing communal security for its citizens. The state and its oil company partners and the local communities of the Niger Delta hold very different perceptions of what constitutes security.

In order to ensure the viability of the oil production, the state has relied on the military to secure a stable environment for the oil companies, which together with state officials, constitute the elite of Nigeria. This alliance

was firmly cemented during the long military rule of Nigeria and continues today, as evidenced by the high level of corruption within the federal government. Thus, according to Ibeanu, the Nigerian government, in collusion with petrobusiness, has relied on conscious, systematic, and organized state violence against groups in conflict with the government or petrobusiness. This conflict often emerges when local communities assert their claimed rights to greater shares of the oil profits. But perhaps more importantly, this conflict arises when communities move to protect the local environment upon which they depend for their, livelihoods. In many cases, communities have been willing to resort to violence to end crude oil production if they perceive their human or communal security to be threatened.

The changing nature of ethnicity in Nigeria is another element that is creating instability and contributing to more conflict, says Ibeanu. With the introduction of oil money, many new ethnic groups are laying claim to the oil-producing land and resulting profits. This is not to say necessarily that "new" ethnic groups are forming, but rather that definitions of who constitutes particular ethnic groups are changing, primarily in response to the degradation of the environment combined with the flow of oil money straight into a corrupt federal government coffers. These ethnic groups are distressed that the oil companies misuse security forces to protect production of oil in the face of native claims to the land. There is a lack of accountability and transparency since oil revenues, which supposedly are part of the state income, are actually siphoned off by state officials and oil leaders.

In response to state violence, ethnic groups have mobilized to present their grievances. Ibeanu, however, was quick to point out that some ethnic group elites manipulate the environmental question to their own benefit, further degrading the legitimate claims of those communities truly in need. The paucity of infrastructure and the widespread deprivation in the Niger Delta present a stark contrast to the widespread financial value of the extracted resources, and explains the local demands for more resources, including schools, roads, and hospitals. The percentage of monetary resources derived from oil production that filter back to the communities has dropped from about fifty percent following independence to about thirteen percent in 1999. Communities are simply not seeing the benefit from the oil extracted from their territory. In sum, the tension in the Niger Delta is the result of competing demands of better living conditions for communities and elite self-interest. These competing demands are then fueled at an additional level by conflict between ethnic groups such as the Ogoni and the Ijaw.

The federal government, with the financial support of the oil companies, has responded in two ways. Historically, the military government responded with force as major tool of oppression (with the oil companies themselves directly calling in the military on occasion). With the recently elected civilian government, a new strategy of appropriate compensation has been introduced through the Niger Delta Development Cooperation bill. This program aims to send resources back to local communities in the Niger Delta. However, problems have emerged with this approach with struggles over which ethnic groups are located in the Niger Delta. Will resources be given to traditional ethnic groups living in the wider Niger Delta as defined by the ecosystem? Or will payments go only to the smaller oil-producing area within a subset of the Niger Delta. Hence, tensions have only increased between ethnic groups, a situation the oil companies have been quick to exploit. Moreover, a final level of conflict occurs over the source of funding for the new initiative. The government claims that the funds for this development initiative should come from oil revenues that currently go to the local communities. However, the communities insist that there is not enough money derived from oil revenues that goes towards community development and insist that the initiative should be funded by new government money.

Why does this conflict persist and what can be done about it? Ibeanu stressed that there is a continued misunderstanding of the problem on the part of the federal government, the oil companies, and the international community. He asserted that they are insistent that more money will resolve the issue. However, this money is being misappropriated. Instead of pouring in more money, Ibeanu recommended some fundamental policy changes to overcome the conflict: increasing local participation, encouraging further decentralization and democratization, re-addressing the issue of Nigerian federalism, and changing the mindsets of both local communities and federal government elites.

Despite past grievances, local communities need to begin moving away from viewing the government as the enemy and should seek to cooperate with the government in order to ensure change. On the other hand, the oil companies must be re-oriented in their focus. Currently, they concentrate too much on improving their image through public relations. Instead, Ibeanu suggests that the oil companies should view their activities in the long term. Transparency and openness of their activities will help to alleviate tension, especially if combined with infrastructure investment rather than

payment of compensation, which feeds corruption. Finally, oil companies must adhere to international environmental standards to show their commitment to protecting nature.

❑ *Okechukwu Ibeanu also spoke on this same topic at a Wilson Center public meeting, entitled "Petrobusiness, Politics, and Environmental Conflict in the Niger Delta," on 2 March 2000. Page 19 of this* Report *also features an article on the Niger Delta conflict by Ibeanu.*]

United States Initiatives in Energy and Environment in China

10 February 2000

The Honorable Leon Fuerth, Assistant to the Vice President for National Security Affairs
D. Howard Pierce, President, ABB, Inc.
Douglas Ogden, Vice President, The Energy Foundation

As China's economic growth continues, the country will be facing the need to greatly expand its energy infrastructure, attract foreign investment, and create policies to encourage renewable energy development. ECSP's Working Group on Environment in U.S.-China Relations and the National Committee on U.S.-China Relations co-sponsored a conference that brought together representatives from government agencies, corporations, and foundations to discuss challenges and opportunities for bilateral cooperation in promoting clean and efficient energy use in China.

The three keynote speakers were Leon Fuerth, Assistant to the Vice President for National Security Affairs; D. Howard Pierce, President, ABB, Inc.; and Doug Ogden, Vice President of the Energy Foundation. Leon Fuerth discussed how despite the tensions between the United States and China over the past few years, bilateral governmental cooperation on environmental and energy issues has continued to improve between the two countries. One notable new U.S. energy project in China is the Export-Import Bank Clean Energy Program Project, which will help to fund a Wind Energy Project in northern China. Howard Pierce highlighted how future trends in the Chinese energy sector combined with China's entry into the World Trade Organization will open up foreign oil and gas opportunities in the future. Doug Ogden outlined how The Energy Foundation's China Sustainable Energy Program is promoting energy efficiency and renewable energy policy development in China's industrial, buildings, electric utility, renewable energy, and transportation sectors.

Other speakers featured at this meeting were Marianne Bailey, Asia Program Manager, Environmental Protection Agency; John Boright, Executive Director, Office of International Affairs, National Academy of Sciences; William Chandler, Senior Staff Scientist, Battelle; Jan H. Kalicki, Counselor to the U.S. Department of Commerce; Ernest Moniz, Under Secretary of Energy, Department of Energy; and Ann Weeks, Associate Business Services, U.S.-China Business Council. This meeting was funded by the National Oceanic and Atmospheric Administration and the co-sponsoring organization, the National Committee on U.S.-China Relations.

13 March 2000

The Promises and Pitfalls of Environmental Peacemaking in the Aral Sea

Erika Weinthal, Lecturer, Department of Political Science, Tel Aviv University

The Aral Sea, once the fourth largest lake in the world, fell victim to Soviet-era irrigation schemes to grow cotton in Central Asia. By 1991, the surface area of the sea had been reduced by half and the volume by two-thirds; salinity levels had tripled from ten to thirty grams per liter, according to Erika Weinthal, who spoke at a public meeting of the Environmental Change and Security Project at the Woodrow Wilson Center on 13 March.

If the centralized Soviet system caused the problem, the break-up of the Soviet Union has greatly complicated the solution by creating new sovereign nation states competing for limited water resources. The new states of Central Asia, according to Weinthal, are anxious to demonstrate their sovereignty by controlling their natural resources, including water, and are not inclined to cooperate. This recalcitrance is exacerbated by the physical structure of the body of water, where post-independence borders mean that there are unequal gains to be had from cooperation, particularly between upstream and downstream users. Historical ethnic rivalries further complicate the issue and now, with the newly independent states, threaten to turn into interstate conflicts. Environmental protest, once encouraged as a way to challenge control from Moscow, is no longer tolerated in the new states.

Erika Weinthal

In an attempt to prevent interstate conflict, the international community has stepped in to help manage the situation with financial resources and management strategies. Weinthal highlighted several of these initiatives including the World Bank Aral Basin Sea Program, and the U.S. Agency for International Development-led attempts at management. She asserted that one potential explanation for the failure of both of these processes was the failure to penetrate the local level. In recent years, non-governmental organizations (NGOs) have stepped in to fill the local level role.

If cooperation around the Aral Sea is to succeed, Weinthal pointed to some necessary precursors. The first observation is that international activity in the region would be better served through donor cooperation. Second, the challenge of agricultural reform remains. The Soviet system of monoculture contributed heavily to the environmental problems in the area, and until there is a shift to less water intensive crops, there will be little reduction of the adverse effect of agriculture on the environment. Finally, direct funds should be channeled to programs aimed at strengthening civil society, and work to include communities and local NGOs in the decision-making process.

14 March 2000

Environmental Cooperation for Regional Peace and Security in Southern Africa

Larry A. Swatuk, Department of Political Studies, University of Botswana

A geographical and historical overview of southern Africa is a necessary starting point for discussing water issues in the region. Swatuk pointed out that the pre-colonial settlement structure of the region was focused along rivers, that regional patterns of trade followed the course of these rivers and generally remained within the geographically defined "basin structure." This structure was disrupted with the colonial era. State boundaries were overlaid on these natural structures to create political zones of exclusivity based on mineral and physical resource wealth. Infrastructure development and settlement patters were then re-focused to support extraction and exploitation. The colonial state attitude toward the environment was based on the attitude that resources determine borders, so that the more valuable the resource, the stronger the state. This attitude continued with many post-colonial governments. Each historical era has thus moved further away from the early settlement patters around water resources, and each era has posed new challenges to the human populations and state structures within the region.

History has thus created certain realities within the southern African region. Centers of population have been focused on areas of mineral extraction and are often located in areas that have insufficient natural resources to support these populations. This mismatch and shortfall is particularly apparent when one examines settlement patterns in relation to water availability. Population bases, in many cases, are far away from water sources, creating in some instances the need to literally make water run uphill. Historically South Africa has been the dominant state in the region, and that dominance continues today with South Africa accounting for ninety-three percent of the regional GDP. There is a high level of inequality within the region and within the individual states in the region. Some states are more urbanized, some states have a more developed civil society, and many states still rely on the production of primary products to fuel their economy. All of these realities must be understood in order to explore the strengths and weaknesses of the various proposals for environmental cooperation and the potential effect of that cooperation on regional peace and security.

Having set the historical, geographical, and political stage, Swatuk then briefly examined two examples of regional cooperation around the essential resource of water. In the cases of both the Okavango and the Zambezi basins, cooperation has emerged in a fairly ad-hoc manner, driven by the response to a crisis rather than by an overarching desire to cooperate. In both cases, the water resource is shared across several countries. Swatuk outlined some of the institutional bodies that have evolved around these basins, but pointed out that none of them has been particularly strong in developing, agreeing, and implementing legal or institutional management structures. He also pointed out that the growing importance of tourism has brought additional non-state actors into the forum including non-governmental organizations (NGOs). In the case of the Okavango, these NGOs are proving the most vociferous campaigners for cooperation and are driving the decision-making structure because of their relative international strength in comparison with the states themselves. Thus, in that situation, there is an essentially "accidental" conservation based on the ability to generate income and development from the tourist industry.

Swatuk concluded by stating that the increased activity of the traditionally weaker states in international discussions around the environment, and specifically water was one way in which they were building statehood. He tabled the idea that perhaps this type of internationally-driven resource cooperation could form the basis and framework for wider, more formal efforts to integrate environmental cooperation into the region as part of a larger effort to build peace and security.

19 March 2000

ISA Workshop on Environment and Conflict Research

THOMAS F. HOMER-DIXON, DIRECTOR, PEACE AND CONFLICT STUDIES PROGRAM,
UNIVERSITY OF TORONTO
MARC LEVY, VICE PRESIDENT, CIESIN
DAVID DESSLER, PROFESSOR OF POLITICAL SCIENCE, COLLEGE OF WILLIAM AND MARY
RICHARD MATTHEW, PROFESSOR, SCHOOL OF ECOLOGY,
UNIVERSITY OF CALIFORNIA, IRVINE
GEOFFREY DABELKO, DIRECTOR, ENVIRONMENTAL CHANGE AND SECURITY PROJECT


Thomas F. Homer-Dixon

Funded by a grant from the International Studies Association (ISA), this one-day meeting was an opportunity to bring together notable scholars studying the links between environment, population, and conflict in a meeting directly following the annual ISA convention, held in Los Angeles this year. Co-sponsored by ECSP and the University of California, Irvine Global Environmental Change and Human Security Project, it was held at the University of California, Irvine, Beckman Center.

Participants included many of the leading researchers discussing findings, methodology, and future research trends of the field. Thomas Homer-Dixon presented the findings, thus far, in the emerging field, while Marc Levy discussed the successes and challenges of the current methodology. Finally, David Dessler offered some avenues for further research, including adopting new methodologies to counter some of the current difficulties in research and data collection.


David Dessler

In a continuing effort to broaden ECSP's activities and audience, this was a unique opportunity to gather notable scholars in one room for a full-day session on the direction that environment and conflict research is taking. Geoffrey Dabelko and Richard Matthew have co-authored a rapporteur's report on the findings of this workshop.

For more about the ISA and its activities in the Environmental Studies Section, please visit its website at: http://www.isanet.org/.

❑ *Please see page 99 in the Commentary section of this* Report *for the rapporteur's report.*

22 March 2000

Land, Water, People, and Conflict

Jessica Tuchman Mathews, President, Carnegie Endowment International Peace
Robert Engelman, Vice President for Research, Population Action International
Geoffrey D. Dabelko, Director, Environmental Change and Security Project,
Woodrow Wilson Center

Political scientist Samuel Huntington famously prophesied a clash of civilizations in the wake of the Cold War. But for a group of environmental thinkers, the ending of the Cold War opened up the possibility of battles far more primordial than those fought along ethnic lines—namely, disputes over land, water, and other scarce resources.

These environmental researchers would prefer less money be spent on tanks and automatic weapons and more on solutions to the problems of population growth, environmental degradation, and inequitable distribution of wealth that, they say, are provoking political strife around the world.

The documentary film "Land, Water, People, and Conflict" explores the plausibility of associating a nation's security with a healthy environment. Screened at the Wilson Center on behalf of the Environmental Film Festival, the film is part of the *America's Defense Monitor* series critiquing the American military's relationship with the environment. Like the rest of the series, the film combines testimony from experts with opinions from regular people to make a compelling case for redefining traditional notions of security and defense spending.

For Jessica Tuchman Mathews, an expert who appears in the film, this new understanding of national security is the product of a gradual evolution over the past twenty years. At the panel discussion following the Wilson Center screening, Mathews explained that in the 1980s, but especially the 1990s, it became the trend within academic and policy circles to identify environmental degradation, population growth, and shortages of vital resources as threats to world peace.

Environmental problems contributed to the making of four of the six conflicts in which the United States became involved in the 1990s, Mathews said—namely, Haiti, Somalia, Rwanda, and the Middle East. (Conflicts in Bosnia and North Korea, she said, are not widely seen as outgrowths of environmental or demographic crises.)

Of these, Haiti is the most widely cited example of an environmentally induced political crisis. As the Wilson Center's Geoffrey Dabelko explained in article for the Autumn 1999 *Wilson Quarterly*, one cannot fully understand the 1994 coup in Haiti without taking into account its massive environmental problems. Decades of rapid population growth pushed Haiti's poor farmers into marginal lands, stripping the country of its forests and topsoil. They migrated by the thousands to the cities, where overcrowding and poverty provoked protests and riots. The instability weakened President Aristide's government and encouraged the 1991 military coup against him. It is unlikely that the coup would have occurred had the rural farmers been able to earn a living off the land, Dabelko argued.

Another environmentalist featured in the film, Michael Renner of the Worldwatch Institute, has written a book exploring the nexus between security and the environment. Renner believes that the greatest threats to security today come from within nations, not from invading armies, and points out that environmental crises often underpin, or else exacerbate, a nation's ethnic conflicts. During the panel discussion, Mathews picked up on Renner's concern about the rise of intrastate conflict, arguing that conflicts within nations are often made more acute by resource shortages or a burgeoning population. Environmental problems "further polarize societies that were already divided," she said.

Because environmental issues are seen as falling under a nation's "internal affairs," the international community typically does not pay attention until too late—i.e., when the strains produced by environmental problems lead to

outbreaks of violence. It is therefore rare for an environmental problem to be addressed at the prevention stage.

Mathews stressed, however, that "the connection between environmental degradation and population growth, and conflict is not at all inevitable." She noted that policymakers have an array of options at their disposal should they decide to give priority to ensuring that an environmental crisis does not become a crisis at a political or humanitarian level. Along with panelist Robert Engelman, Mathews recommended that countries:

- Calculate their Gross Domestic Product (GDP) to reflect more accurately the value of natural resources as well as real risks. An environmentally accurate GDP would "eliminate a lot of bad policy decisions," Mathews said. It would also be helpful to incorporate the many bilateral and multilateral environmental treaties into international law.

- Embrace "environmentally rational pricing," where the price of a resource reflects its true value.

- Tax products to compensate for the environmental damage they cause.

In closing, the panel said that the link between the environment and security is still viewed with skepticism, and military programs continue to receive a higher priority for funding. But panelists sensed that the tide was turning, and were hopeful that with growing recognition of the environment-peace link, it will be possible to avoid many conflicts. If countries use diplomacy rather than guns, said Engelman, these conflicts present a "tremendous opportunity for cooperation and compromise." And although organizations like the United Nations could play a role, Engelman, along with the rest of the panelists, said he puts most of his faith in the power of non-governmental organizations and the news media to raise public awareness of the need for preventive diplomacy. "Sociocultural change is absolutely essential" to the prevention of environmentally induced crises, Engelman stressed.

❑ *This summary written by Justine A. Kwiatkowski, Assistant Editor,* Wilson Quarterly. *For more information on the Environmental Film Festival, please visit their web site at: http://www.capaccess.org/ane/eff/. To order a copy of the video, "Land, Water, People, and Conflict," please contact the Center for Defense Information at 1779 Massachusetts Avenue, N.W., Washington D.C. 20036, Phone: 202-332-0600; Fax: 202-462-4559; or visit their website at http://www.cdi.org/adm/m&e.html. Please visit the Wilson Center web site (wwics.si.edu) for a copy of Geoffrey Dabelko's "The Environment Factor" in the* Wilson Quarterly *(Autumn 1999).*

ECSP on the Internet

http://ecsp.si.edu

- Download the *ECSP Report, China Environment Series, Climate Action in the United States and China, and PECS News.*
- Access bibliographic guides to relevant ECSP and China Environment literature.
- Browse through an inventory of work being performed on the environment in China.
- Search through summaries of ECSP and Working Group on Environment in U.S.-China Relations meetings.

28 March 2000

Integrating Population and Environment: Current Practices, Future Potential

Connie Campbell, Community Conservation Program Manager in Conservation Science, The Nature Conservancy
James Nations, Vice President Mexico and Central America, Conservation International
Anthony Anderson, Director, People and Conservation, World Wildlife Fund
Roger-Mark De Souza, Population and Environment Coordinator, Population Reference Bureau

WWF is committed to addressing and mitigating current consumption and population trends, according Anthony Anderson of the World Wildlife Fund (WWF) quoting a key provision of the WWF's Statement on Population and Consumption. Conservation and traditional environmental nongovernmental organizations (NGOs) like the WWF have, over the past decade, begun to incorporate population issues into their overall missions. These groups have recognized that without addressing these critical issues, they will be unable to meet their conservation goals. Likewise, population NGOs have also identified the importance of the links between environment and population, and are incorporating a conservation perspective into their work. In a meeting designed to survey current activities and future potential for integration, Anderson, Connie Campbell, and James Nations each presented the challenges and opportunities of incorporating population into their conservation-focused organizations while Roger-Mark De Souza presented ways to bring the environment into the work of the Population Reference Bureau.


Anthony Anderson

Integrating Population into Conservation Efforts

Drawing on her work on the Parks in Peril program of The Nature Conservancy (TNC), Connie Campbell presented six tasks that she sees as key to successfully integrating population into the work of TNC. One major challenge is identifying and hiring a staff who can work to integrate the two issues. A second challenge is how to institutionalize population within TNC. Within this challenge, there was the organization's institutional mandate to focus on communities, which gave them tacit approval to look at population. The third challenge relates to the conservation process. The four steps to this conservation process are: (1) eco-regional planning – the process of mapping the ecosystem including the impact of mobility and growth of human population; (2) site conservation planning; (3) conservation actions; and (4) measuring the success of conservation actions— including assessing the link of population and linking TNC's own efforts with those of local and regional NGOs. The fourth challenge that TNC faces is generating the resources and partnering with local NGOs to facilitate participatory research. Fifth, training or "updating" of senior management and partners will need to be done to ensure senior-level buy-in of including population matters. The final challenge, according to Campbell, is attracting and maintaining donor interest in these linkages.


Connie Campbell

James Nations of Conservation International (CI) discussed the transition that CI made from solely focusing on creating and protecting parks and natural areas to incorporating the role that population growth plays in conservation. The impetus for change came from losing the battle to conserve nature because population growth was most

rapid in the peak biodiversity hotspots. Some examples include the tremendous population growth in the tropical rainforest areas of Central and Latin America as well as in Central Africa. Three factors at CI allowed this shift from an exclusive conservation focus to including the examination of the linkages between the environment and population. First, the composition of CI's Board of Trustees changed, with new members more open to innovative methods, such as incorporating population into programs, as a way of increasing the effectiveness and capacity of conservation programs. Second, the director of the Board, Liz McCormack, saw the need to address population and advance the goals of the International Conference on Population and Development held in Cairo in 1994. Third, key staff members of CI also saw the link between natural resource conservation and population activities, and pressed for a change in organizational goals.

Roger-Mark De Souza

There remain, however, major challenges to integrating a population action program into a field conservation program, according to Nations. Large reproductive programs tend to focus on urban areas whereas conservation programs tend to be located in rural areas. Therefore, a primary challenge will be in how to introduce population initiatives into the sensitive biodiversity hotspot areas. Only through partnerships and the sharing of knowledge with other local and regional NGOs, will these efforts be successful.

New opportunities have arisen from this attempt to address the linkages, said Anderson. Population and environment, which have traditionally been viewed as respective edge or sideline issues, are now at the center of many debates with more attention paid to their mutual impacts. Although there is still a North-South divide on these issues, the gap has diminished more recently. There has been substantial success in promoting human development, leading to further declines in fertility. New coalitions have been formed. Finally, conservation efforts now work at the landscape level as opposed to smaller fragments, thanks in part to the integration of population since human population studies are usually studied at the larger level.

James Nations

To take advantage of these new opportunities, Anderson recommended a three-pronged approach to creating a population agenda. First, he suggested that NGOs must develop a population statement such as WWF has done with their statement of principles, and carry this out with policy briefs. Second, analyses must be conducted that look at key population trends in high biodiversity areas. Third, WWF and other organizations must secure financial and technical support and prioritize along geographic and thematic lines to ensure that the most vulnerable areas receive attention.

Incorporating the Environment into a Population Organization

Finally, Roger-Mark De Souza presented the challenges the Population Reference Bureau has faced in integrating the environment into its activities. PRB has addressed recently what he termed the three P's: problems, present situation, and potential. In other words, where is PRB coming from? Where is PRB now? And, where could PRB go from here? The challenges that PRB faces are a limited theoretical framework for having a direction of causality, the lack of a policy framework for addressing the linkages, the need to develop and compare data, and finally that much of the work on the two issues has been done in isolation.

Three opportunities have emerged from these challenges. First, the environment contributes to the continuing policy debate about the need for population assistance. Second, there are benefits for both the environment and population work through this integrated research. Third, new technologies such as geographic information systems have increased the capacity to study the two issues together. These opportunities in turn created three potential avenues for further activity. These are the potential for more interdisciplinary, collaborative research, better information sharing, and improved communication.

So, where do NGOs go from here? According to De Souza, collaboration must be furthered to approaches that yield better self-evaluation. For example, how do field-based organizations evaluate their population-environment approaches? They must collaborate with policy-based organizations in order for both groups to see the results of their work. Collaboration can also lead to better information linkages and better communication of results into policy and programs.

6 April 2000

U.S. Central Command Workshop on Environmental Security

General Anthony Zinni (USMC), Commander in Chief, U.S. Central Command
Sherri W. Goodman, Deputy Under Secretary of Defense for Environmental Security, Department of Defense
Alan Hecht, Principal Deputy Assistant Administrator, Environmental Protection Agency
Brigadier General Stephen Johnson (USMC), Deputy Director of Plans and Policy, U.S. Central Command
Terry Flannery, Director, DCI Environmental Center, Central Intelligence Agency
Roy Williams, Director, Office of Foreign and Disaster Assistance, U.S. Agency for International Development
Stephen Lintner, Senior Advisor, The World Bank
Charles Lawson, Bureau of Near East Affairs, Department of State
Douglas McNeal, Regional Environmental Officer, Environmental Hub, Ethiopia, Department of State
Kate Watters, Director of Programs, Institute for Social Action and Renewal (ISAR)
Richard Knapp, Research Scientist, Lawrence Livermore Laboratories, Department of Energy
Geoffrey D. Dabelko, Director, Environmental Change and Security Project, Woodrow Wilson Center
Kent Hughes Butts, Center for Strategic Leadership, U.S. Army War College

How can environmental issues exacerbate regional conflicts and how can environmental issues be used as a tool of U.S. diplomacy and as confidence building measures among regional actors? These questions framed the discussions for a joint Woodrow Wilson Center and U.S. Army War College workshop designed to provide CENTCOM (U.S. Central Command) with information and ideas for integrating environmental considerations into an overall engagement strategy. CENTCOM is the unified military command responsible for U.S. national security interests in the twenty-five nations that stretch from the Horn of Africa, to the Middle East and Central Asia.

Sherri Goodman, Deputy Under Secretary of Defense for Environmental Security, remarked how environmental security "has become an issue of importance to the Department of Defense because we now recognize that it supports the three elements of the national military strategy: shape, prepare, and respond." The national military strategy stresses the importance of "shaping" the international environment to promote U.S. national interests and to prevent conflict. Ms. Goodman underscored how defense environmental cooperation "is a useful, non-threatening tool for initiating early military to military contacts, for engaging militaries in preparation for more complex, cooperative efforts and partnership, and for overall promotion of regional and hemispheric stability."

According to Goodman, the U.S. military has demonstrated that it is indeed possible to meet requirements and objectives set out by the Department of Defense and still be "environmentally friendly." Domestically, the U.S. military is involved in several activities reflecting its environmental awareness and education. This knowledge, Goodman stressed, is now being shared with foreign militaries at a negligible cost, and with encouraging results. The U.S. military's environmental training and education can serve as a model for the armed forces of other nations facing similar challenges. Environmental degradation and its potential threats, such as water scarcity, are a common denominator among the countries under the purview of CENTCOM, and it is vital for the United States to cooperate with these nations on environmental issues.

General Anthony Zinni (USMC), Commander in Chief of CENTCOM, discussed the role of CENTCOM, which includes: ensuring uninterrupted energy flow from the Middle East; access to the region, which has economic potential beyond its oil reserves; freedom of navigation; and maintaining regional stability. The latter is the most important role the United States is playing in the area. Environmental threats, either man-made or natural, are growing in the areas under the purview of CENTCOM, and have the potential to threaten regional stability.

General Anthony Zinni

It is not oil that will be the liquid that causes conflict in the near future, but rather water. Looking at the Horn of Africa, the importance of the Nile on the region, as well as the droughts in Ethiopia, Somalia, Kenya, and Djibouti, it is easy to comprehend better the kinds of environmental problems facing this region. In addition, the Arabian Peninsula and Jordan are also experiencing difficulties in accessing water. It is estimated that the aquifer in the capital of Yemen, Saan'a, will run out of water by 2005, and Central Asia and Southwest Asia are also facing water problems.

The water issue, could lead to conflict and possibly involve the United States in the process. Interdependence among the countries in the region, such as Turkey's control over the water for Syria or Kyrgyzstan's control over the water needed by Kazakhstan are potential sources of conflict not to be underestimated. Ineffective water management from lack of experience as well as a lack of modern technology only exacerbate an already acute problem. Cultural barriers are also difficult to overcome as water, in the words of an old Islamic proverb, is not be sold or controlled, nor intended to be conserved, and thus, should be available to everybody to use and consume. Water diversion for irrigation purposes and upstream consumption also intensify the problem as they lessen the downstream flow of water. Water pollution is affecting the region as well. In Somalia, for instance, slaughterhouses located right on the water have so severely compromised water quality that not even reverse osmosis purification would be able to make the water potable and safe to use. Additionally, a lack of technological capability as well as prohibitive costs are hampering the development of techniques such as desalinization.

Water is not the only environmental problem affecting these regions. Depletion of resources and loss of biodiversity can cause soil degradation. This, in turn, can lead to migration to the cities, which suffer from urban explosion and become hotbeds for extremism. Population growth in Africa and in the Arabian Peninsula is also a great concern, as these regions may not be able to sustain such a high demographic density. Encroachment of territory is a severe problem affecting both the Horn of Africa and the Arabian Peninsula where fisheries are being depleted. These states are unable to protect their own territorial waters, which are being raided by foreign fishing boats.

Awareness is still a major problem in these areas of the world. There is a growing appreciation for environmental issues, and the U.S. military is trying to help promote awareness and emphasize the military's commitment to the environment. Zinni cited the cooperation with the Seychelles and their local coast guard, as well as CENTCOM efforts to help Kuwait establish a local environmental protection agency. The military can do a lot to monitor, watch, and observe environmental trends and problems, as well as cooperate with allies in the region.

General Stephen Johnson (USMC), Director of Plans and Policy at CENTCOM, outlined CENTCOM engagement goals and how they relate to environmental security. CENTCOM is a novice when it comes to environmental security and how the concept fits in with its mission. The following have been identified as potentially destabilizing environmental factors:

- Water access, quality, and control
- Transboundary resource competition
- Migration, refugees, and land use
- Public health/HIV/famine
- Industrial Pollution
- Environmental degradation/desertification
- Eco-Terrorism/war

Population growth, which is a serious concern of CENTCOM, will place enormous demands on resources, and increase the likelihood of disease, migration, and border conflict. Environmental degradation, especially in Central Asia, is of concern, as its impact is not yet fully known.

Like Goodman and Zinni, General Johnson stressed how environmental security has helped foster a productive, multilateral dialogue with key leaders in the area and has fostered cooperation. Environmental security transcends some of the regional tensions, and it benefits many nations. The concept of environmental security is appropriate for us in the military to use as it is reasonably low in cost, and gives the military the chance to

interact and learn from environmental experts and NGO representative. Environmental security is an engagement tool, one which has a win-win outcome.

CENTCOM has been involved in several environmental activities such as port and environmental security assessments in the United Arab Emirates, Jordan, and Seychelles, and more are planned in Kenya and Yemen. Humanitarian relief operations were carried out in Somalia and Kenya, as well as construction events such as a wash rack in Qatar and a water recycling system. A Fisheries Enforcement Mobile Training Team was deployed to Kenya in 1999. Education and training is also provided to representatives of foreign militaries, who come to observe how the U.S. military addresses environmental issues. However, although the scope for activity is larger, CENTCOM has no budget directly allocated to environmental security, and there are limitations to what the U.S. military can do.

The presentations and discussion of the conference all centered on non-traditional security threats, such as droughts, famine, and diseases. They presented the arduous challenges both the military and the civilian worlds must contend with in the future. Most problematic is the funding issue. Although much has been done as evidenced by the examples above, the limitations will continue without more money to increase activity in the region under the purview of CENTCOM. Concluding the meeting, the interagency and donor community representatives agreed that it was essential to work together and saw great promise in combining their efforts to address the issues of the region.

Environmental Nongovernmental Organizations in the PRC and Taiwan

31 May 2000

Chen Man-Li, Secretary General, Homemakers' Union and Foundation
Lu Hongyan, Environmental Volunteer Association of Sichuan University
Shi Lihong, Green Plateau Institute for Ecological Conservation and Development

The Homemakers' Union has been a major force in expanding environmental education, awareness, and citizen activism in Taiwan, according to Chen Man-Li, speaking at a meeting featuring three participants from the Elisabeth Luce Moore Leadership Program for Chinese Women 2000. Each participant gave a presentation on her work in environmental nongovernmental organizations at this 31 May 2000 meeting of the Working Group on Environment in U.S.-China Relations. Two of the women founded small environmental organizations in southwestern China. In 1995, Lu Hongyan established the Environmental Volunteer Association of Sichuan University, which aims to enhance environmental awareness and engender responsible action within the university community. In 1999, Shi Lihong founded the Green Plateau Institute for Ecological Conservation and Development. The mission of this new organization is to preserve endangered species and old-growth forests in the northwest Yunnan Province. Green Plateau also explores community-based integrated conservation and development approaches. In 1998, Chen Man-Li helped found the Homemakers' Union and Foundation-one of the oldest non-profit organizations in Taiwan. While the formation and range of permitted activities of environmental organizations has been much greater in Taiwan than in Mainland China, on both sides of the Taiwan Straits, environmental groups appear to face similar challenges in raising funds and motivating participation of local citizens in their environmental activities. This meeting was funded by the National Oceanic and Atmospheric Administration.

Shi Lihong

Chen Man-Li

13 April 2000

"Environmental Degradation and Migration" and "Sustainable Development: A Southern Perspective," a two-part meeting in the *AVISO* Policy Briefing Series

Steve Lonergan, Director, Global Environmental Change and Human Security (GECHS) Project, University of Victoria
Youba Sokona, ENDA Tiers Monde, Dakar, Senegal

Large development projects, such as the Three Gorges Dam, are a major cause of large human migration movements and will continue to be, according to Steve Lonergan, director of the GECHS project, speaking at a recent Environmental Change and Security Project (ECSP) meeting. Steve Lonergan discussed the links between human migration and the environment in presenting an overview of Issue 2 of *AVISO* entitled, "Degradation and Population Displacement." In addressing migration, Lonergan specifically looked at population displacement where environmental degradation might be a contributing factor as well as social, political, or economic factors. Some researchers have called these environmentally-displaced persons "environmental refugees," a term coined in 1985 by United Nations representative, El-Hinnawi to indicate:

> Those people who have been forced to leave their traditional habitat, temporarily or permanently, because of a marked environmental disruption (natural and/or triggered by people) that jeopardized their existence and/or seriously affected the quality of their life.

Given the controversy, however, in the migration studies community over using the legal term "refugee," Lonergan preferred to use the term "population displacement" to indicate a movement of people, usually not of their own volition.

Population displacements can be caused by several factors, although the primary factors, according to the United Nations High Commissioner for Refugees (UNHCR), are political instability, economic tensions, ethnic conflicts, and environmental deterioration. Examples of environmental deterioration include annual flooding in Bangladesh from monsoons, regularly displacing thousands of people, and the more recent issue of deforestation in Thailand, which has forced many Thais to abandon their homes. The problem, though, with viewing environmental factors as causes of displacement is that there is plenty of anecdotal evidence but not enough empirical data on the relationship, as there is with the other three primary causes of displacement.


Youba Sokona

Having detailed the basics about migration, Lonergan highlighted four key points about the links between migration and environmental deterioration. Despite generalizations about the relationship between the two issues, the field of migration research is complex because of the many separate political, social, economic, institutional, and environmental issues associated with the movement of people. One also needs to distinguish between voluntary and involuntary movements of people. The plethora of push-pull theories and dearth of structural theories of migration are an indication that generalizations often mask this complexity of migration decision-making. Second, the specific contributions of the environment to migratory patterns are hard to pinpoint, especially when those movements may be characterized as "voluntary" in nature. Movements can often be the result of a combination of factors. Third, there is an implicit assumption that migration provides immediate relief from environmental pressures when in fact it often only serves to increase pressures. A good example of this increase is when cholera epidemics or other infectious diseases break out in refugee camps. Finally,

there is a lack of good empirical data on the precise future intentions of the displaced individuals for the future.

After explicating these four key points, Lonergan offered several recommendations for policy. First, he stressed the need to develop a system to anticipate large movements of people and identify those populations that are "most vulnerable." In addition, it is essential to identify adaptation mechanisms, and how these mechanisms may be reinforced in particularly vulnerable communities. Third, more case studies of how environmental degradation affects migration should be funded. Fourth, practitioners should develop better communication and working relationships between the different human rights, population, environmental, and migration organizations. Care should be taken to involve migrants and refugees directly in the development of relief programs. Additionally, both policymakers and researchers must recognize the cumulative causality of environmental degradation and assist the regions receiving migrants and refugees to reduce the environmental impacts of large movements of people. Finally, Lonergan recommended providing assistance to those countries and regions that are most vulnerable to environmental change and identify them as human priority areas.

Following his presentation, the floor was opened to discussion. Participants focused on the need diminish the ambiguity that surrounds the terminology of the field and the need for better indicators to predict and prevent potential mass migrations. For example, in Issue 6 of *AVISO*, the authors define a human security index for measuring progress and decline of regions to show vulnerability to social, political, economic, and environmental tensions. While other early warning systems have been developed, they need to be refined to ensure better early preventive actions.

Next, Youba Sokona, one of five authors of Issue 5 of *AVISO*, entitled "A Southern Dialogue: Articulating Visions of Sustainable Development," argued that a global dialogue is needed on the links between environment and development. However, prior to such a global dialogue, a "Southern Dialogue" should be held in which the Southern states would offer their own visions of sustainable development. Developing countries have a wide variety of differences just like developed nations in their social, cultural, economic, political, and environmental factors, which will have an impact on their priorities, a fact that must be recognized by the North, according to Sokona.

Some of the most important lessons that the South has learned have been the need to articulate who is at risk, what role climate change will play in exacerbating that risk, what levels of coping mechanisms exist, and finally, what are the most effective coping strategies for developing nations to better respond to environmental crises. Sokona provided examples where these lessons are being applied now including the desiccation of the Sahel and the floods in Mozambique. The former offers lessons on how to prevent current widespread famine while the latter shows the challenges to development in many developing nations. In both of these recent events, the nations have shown that there are a wide variety of coping strategies including bartering, migration, social welfare, formal insurance, and education.

A long-term, critical challenge for developing nations that has already had severe impacts in some areas is climate change. Sokona discussed the many varied ways in which climate change can impact the development of nations. He also offered some ways in which the South is trying to combat climate change. Some of the coping strategies that can be used in climate change, but also in other areas of environmental degradation, include increasing and spreading information, building capacity both within nations and across regions, reconstruction projects, risk reduction strategies, and spreading the risk so as to minimize its impact.

Following his presentation, participants queried Sokona on how to measure the impacts and develop meaningful indicators for sustainable development in the South. This need to articulate meaningful indicators points out a key problem between the North and South. The developing countries have very different perceptions and aspirations of what signifies meaningful indicators, a difference that must be overcome within the South and between the North and South. Both presentations highlighted serious deficiencies in both research and in practice of addressing the problems of environmentally-induced migration and promoting sustainable development in the developing nations that is satisfactory to the nations involved.

❑ AVISO *is a policy-briefing series co-sponsored by ECSP through a funding arrangement with the U.S. Agency for International Development (USAID) and the GECHS program through a funding arrangement with the Canadian International Development Agency (CIDA). This briefing was the second* AVISO *policy briefing meeting hosted by ECSP since the inception of the partnership between the two institutions and their funding organizations. This meeting was a two-part* AVISO *policy briefing session featuring presentations by Steve Lonergan and Youba Sokona. For a summary of the first meeting, held 4 June 1999, please go to: http://ecsp.si.edu/water-food-security. To download copies of the first six* AVISO *briefings, please go to the GECHS web site at: www.gechs.org.*

18 April 2000

The Global Infectious Disease Threat and Its Implications for the United States

George Fidas, Deputy National Intelligence Officer for Economics, and Global Issues, National Intelligence Council
Lt. Col. Donald L. Noah, Armed Forces Medical Intelligence Center

New and reemerging infectious diseases will pose a rising global health threat and will complicate U.S. and global security over the next twenty years, according to George Fidas and Donald Noah, speaking at a recent meeting hosted by ECSP. The two speakers presented the findings of a recently released National Intelligence Estimate on "The Global Infectious Disease Threat and Its Implications for the United States" to a group of Washington policymakers and NGO representatives. Fidas detailed the findings while Noah, fielded epidemiological questions on the report.

In 1996, the U.S. intelligence community was tasked with exploring the issue of infectious diseases and its impact on U.S. national security. The Department of State and National Security Council commissioned the National Intelligence Estimate, following more than a decade of indications that infectious diseases were beginning to pose a global threat. This concern came, despite earlier eradication of some infectious diseases (such as polio) in many parts of the world. Many branches of the U.S. government as well as non-profit organizations had begun to study the threat that infectious diseases pose, leading in part to their inclusion in the Department of State's National Security Strategy of 1996.


George Fidas

This NIC report was released at a time of particularly high policy attention. Vice President Al Gore addressed the U.N. Security Council on AIDS and nongovernmental organizations released similar publications about the impact increasing incidences of infectious diseases are having on global security. More recently, at the World Bank meetings held in Washington, DC in April 2000, World Bank President, James Wolfensohn stressed the need to provide unlimited sums of money to poor countries to combat AIDS and other pandemics.

New and Reemerging Infectious Diseases

Globally, infectious diseases remain a leading cause of death, but are particularly pernicious in developing nations. Worldwide, of fifty-four million deaths, approximately one-third to one-half of them result from infectious agents, with most deaths occurring in developing nations and affecting children under the age of five. Some infectious diseases, however, have reemerged or spread more widely since 1973, including tuberculosis, malaria, and cholera. Many of these reemerging diseases are far more virulent than their predecessors and are often drug resistant.

Combined with these reemerging diseases, several new infectious disease agents have been identified since 1973, including HIV/AIDS, Ebola, and hepatitis C. These new infections have no known cure and replicate quite quickly. The seven most deadly disease agents are HIV/AIDS, tuberculosis, malaria, hepatitis B and C, lower respiratory infections, and diarrheal diseases, with HIV/AIDS and tuberculosis liable to cause the majority of deaths from infectious diseases in developing nations by the year 2020. HIV/AIDS in Africa is already taking a huge toll and the spread of this plague is only projected to increase over the next twenty years. Life expectancy in parts of sub-Saharan Africa, for example, has already decreased on average by ten to twenty yeas as a direct result of the AIDS epidemic.

Impact on the United States

Because microbes know no boundaries, public health threats from what were previously thought to be eradi-

cated diseases, and newly emerging diseases are a global threat and complicate global security as they sometimes exacerbate social, political, and economic tensions. The NIC report identified several major contributing factors to the spread of infectious disease that are global in nature. Each factor has been associated with certain infectious diseases. For example, human demographics and behavior can lead to the spread of dengue fever, sexually transmitted diseases, and giardiasis. Innovations in technology and industry can cause toxic shock syndrome and hemorrhagic colitis. Other factors, which can increase incidences of disease, include economic development and land use, international travel and commerce, microbial adaptation and change, breakdown of public health measures, and climate change.

What do these trends mean for the United States specifically? Despite a lower total of deaths from infectious disease agents than in the developing world, Americans are becoming more susceptible to infectious diseases through increased travel, the deployment of armed forces overseas, changes in human behavior and diet, changes in land-use patterns, and increases in international trade. Infectious-disease related deaths per annum have almost doubled over the last twenty years after the lowest recorded deaths in 1980. Tuberculosis for example, exacerbated by multi-drug resistant strains, and an increase in HIV/AIDS infections, has made a comeback. The next serious threat to the United States may come from an unknown or new disease, such as AIDS that emerged in the early 1980s.

Three Scenarios

Fidas also discussed three alternative scenarios developed in the report on the infectious disease threat over the next twenty years. The first scenario, and least likely, according to the NIC, is what is termed "Steady Progress," whereby there is a global "health transition." In other words, given the aging global population, declining fertility rates, socioeconomic advances, and improvement in health care and medical breakthroughs, noninfectious chronic diseases, such as diabetes and cancer would predominate. It is the least likely scenario, however, because there are pernicious challenges both demographically and socio-economically.

A second, and perhaps more likely scenario is one in which progress is stymied, where no progress is made in countering deadly infectious diseases such as the Ebola virus and HIV/AIDS. Microbial resistance to drugs will rise spreading infectious disease agents among large populations such as in China and India. But, unlike the first scenario, this "Progress Stymied" scenario is overly pessimistic about political and socioeconomic opportunities.

Finally, Fidas discussed the third and most likely scenario of the report, "Deterioration, Then Limited Improvement," in which there is a worsening of the disease threat and a deterioration in health services, but will in part be overcome by improvements both in the health field and in the socioeconomic circumstances of countries. Better preventive tactics and new pharmaceutical drugs will help to counter the spread of disease in developing countries with conducive environments such as increasing urbanization and continued levels of inequity and poverty. Fidas stated that this was most likely given the demographic predictions and the social, economic, and political factors.

In sum, although the "infectious disease burden will add to the political instability and slow democratic development in sub-Saharan Africa, parts of Asia, and the former Soviet Union, while also increasing political tension in and among some developed countries," according to Fidas, yet, there is hope. What happens in the future, will depend on improvements, preventive behavior, and what the world does to address socioeconomic and demographic factors today.

Discussion

Participants questioned the motives of Thebo Mbeki's recent statement that HIV does not cause AIDS. They speculated that his political denial is in part based on cultural treatment of diseases, and South Africa's fear of the economic consequences of negative press (i.e. declines in tourism revenues). Discussion also centered on globalization of diseases and what to do. Participants discussed five actions to ameliorate the impact of infectious diseases: (1) more funds must be spent on infectious disease research, particularly on prevention; (2) countries must educate the public on health, especially AIDS; (3) decision-makers must prioritize spending, which will require recognizing health as a security issue that can eventually affect civil society and democracy in countries; (4) cures must be found to these diseases; and (5) countries must work to improve access to health care and drugs.

❑ *This National Intelligence Estimate was the third report released by the National Intelligence Council that ECSP has highlighted at Center meetings. Others included one on "The Environmental Outlook in Russia" and another on "The Environmental Outlook in Central and Eastern Europe." Please see page 33 in the Special Reports section of this* ECSP Report, *for excerpts from this National Intelligence Estimate.*

20 April 2000

One Planet, Two Hemispheres: Green Politics from an Indian Perspective

Anju Sharma, Centre for Science and Environment, New Delhi, India

As the recent protests in Seattle and Washington attest, the problems associated with international institutions are now at the forefront of public consciousness. The International Monetary Fund (IMF), the World Trade Organization (WTO), and the World Bank have all come under heated criticism for flaws ranging from a lack of transparency to indifference to the need for environmental protection.

The latter concern was the topic of an ECSP public seminar featuring Anju Sharma, who gave a presentation on a book she co-edited with Anil Agarwal and Sunita Narain on environmental negotiations from the perspective of countries in the Southern Hemisphere. *Entitled Green Politics: Global Environmental Negotiations*, the book aims to increase the clout of developing countries in international environmental negotiations and to make the outcome of those negotiations fair to participants from both hemispheres.

Anju Sharma

Following her presentation, Justine Kwiatkowski of the *Wilson Quarterly* interviewed Sharma. She asked her to elaborate on how perspectives differ between Northern and Southern Hemispheres and on what would therefore be an equitable system of global environmental governance. Following is a transcript of the interview.

KWIATKOWSKI: Do you feel that the American youth protesting the World Bank and the IMF in Seattle and Washington in the past few months aided the environmental agenda of Southern nations? Or did they misrepresent the Southern views and goals?

SHARMA: The protestors meant well, though, I sense they are not entirely sure about what they want.

Actually, I am not so sure how much the protests in Seattle and Washington were linked. In Seattle, the protesters were concerned with issues such as Tibet and saving turtles. These are worthy goals, but they're what I call "sovereign issues," and the actions the protesters were advocating would infringe on the rights and sovereignty of other nations. The protesters were asking industrialized countries to put pressure on India and other Southern Hemisphere nations to deal with such sovereign issues, which is unfair. Protesters and the general public have to realize one fundamental thing: any loss of sovereignty has to be across the board. That some countries preserve their sovereignty while forcing others to cede theirs is unfair.

However, as a civil society movement, the protests in both cities were impressive. I perceive a general lack of activism in civil society in both Northern and Southern hemispheres, so in that way, the U.S.-based protests were heartening.

KWIATKOWSKI: What inspired you and your colleagues at the Centre for Science and Environment to collaborate on a book about green politics? What does *Green Politics: Global Environmental Negotiations* add to the debate?

SHARMA: We were inspired to put together *Green Politics* when we realized that few Southern countries had an overview of what goes on in global environmental negotiations—which is basically to promote the economic agenda of rich countries. Poor countries do not know what is going on in these negotiations, yet their environmental and economic future depends on the outcome. They have to realize how important these negotiations are, and hopefully

this book will aid in cultivating that understanding.

We would also like to start a dialogue so that people everywhere perceive the importance of democracy in a global context—especially countries in the Northern Hemisphere, which often overlook the need for equality and justice in their environmental negotiations.

KWIATKOWSKI: The thesis of *Green Politics* is that environmental negotiations have been transformed into mere "business transactions." Could you tell us what you mean by that?

SHARMA: Environmental negotiations become "business transactions" when the interests of the business world overtake a country's agenda. At major environmental conferences, developed countries tend to take positions that the industries in their countries want them to take. For example, at the Climate Change Convention, the United States took the position that their automobile and oil industries had instructed them to take. American car and oil businesses feared that their counterparts in developing countries would gain a competitive edge if the United States agreed to global environmental commitments, and so these native U.S. industries attempted to co-opt the process.

Clinton and Gore made it easy for American business to take over in that they did not talk to the Congress first to get a unified opinion—they just rushed off to the climate change meeting without a coherent opinion. That vacuum allowed the industries' perspective to dominate. And this conference is only one example of the North's failure to withstand business pressure. There are many others.

KWIATKOWSKI: One of the major obstacles to environmental management is the tension between economic development and environmental protection. You and the Centre have stated that the two goals can be accomplished simultaneously. Could you provide an example of how this tension has manifested itself in India—a beneficiary of World Bank money—and whether and how the tension was resolved?

SHARMA: The management of national parks is a good example of how this tension has manifested itself in India. India has adopted a Western concept of national parks—essentially declaring certain areas inaccessible to human beings. But that is not practical for our country with a large and expanding population, not to mention a tradition of a symbiotic relationship between the people and the land. This Western method has isolated Indian communities from wildlife management, in many ways stunting their understanding of the importance of preserving the environment— and thereby working against the very goals the policy set out to achieve.

Contrary to this Western conception, it is possible for human communities and wildlife to live together, but this only happens if the community is given responsibility for the resources of its land. If they have a vested interest in preserving the land and understand that it is their future, they will protect it. National parks in India remain as they are, however—scordoned off from the community. But there are a few examples of indigenous groups in India that have integrated with the forest again.

KWIATKOWSKI: Some people believe that environmental issues should be incorporated into existent organizations such as the WTO, while others advocate the creation of a separate global organization focused solely on environmental issues. What do you think is the best global governance framework for environmental protection, and how can it realistically be achieved?

SHARMA: The Centre for Science and the Environment where I work in New Dehli advocates a separate organization, one that acts as a counterweight to the WTO and addresses both environmental and development issues. Or, alternately, the U.N. could get its act together and become a more democratic and streamlined organization. As to whether it is possible or not, I am not sure. People have spoken about a separate organization, but if the current political nexus continues, it will not happen. It is in the current interests of the United States to keep the WTO dominant, and the United States determines most of what happens in the global environmental realm.

9-11 May 2000

Migration, Environmental Change and Security: A Great Lakes Simulation

COLLINS CENTER, U.S. ARMY WAR COLLEGE, CARLISLE, PA

Co-sponsored by
Woodrow Wilson Center's Environmental Change and Security Project (ECSP)
University of Michigan Population Fellows Programs
U.S. Army War College Center for Strategic Leadership

Through a series of role playing exercises, this three-day simulation enabled a mix of inter-agency policymakers from the U.S. government, representatives from intergovernmental agencies, international nongovernmental organizations (NGOs), funding organizations, and leading academics to explore the policy aspects of providing humanitarian and security support to migrating populations, moving due to a combination of factors including environmental degradation and drought. The simulation was set in the Great Lakes Region of Africa, an area characterized by high levels of population growth, a high dependence on subsistence agriculture within a fragile natural environment, and a high historical incidence of human insecurity and resultant population movement. In cooperation with the Center for Strategic Leadership, ECSP used the gaming techniques and facilities at the U.S. Army War College to create a simulated crisis in which "players" divided into negotiating teams to explore how various actors, ranging from state and military to international humanitarian organizations to the United Nations, cope and behave in a migratory situation with root causes in both human management techniques and natural environmental conditions. Before initiating the scenario, the speakers made presentations on current conditions in the Great Lakes region; on NGO-military cooperation in complex humanitarian disasters; on national and international institutions for addressing migration flows; and the state of scholarly work in the subfield of environmental change, migration, and security.

Burundi negotiates with the U.N. team.

Initial observations and conclusions from the exercise include the following points:

U.S. team deliberations.

- Too little policy and scholarly attention is paid to populations that endure severe environmental and economic stress but chose not to move.

- Even with strong incentives for adopting medium and long-range policy approaches to address underlying causes of migration, short-term humanitarian and security concerns dominate the agendas of even actors (such as NGOs) most likely to operate beyond a focus on security.

- Mechanisms for government to NGO and military to non-military communication and cooperation remain underdeveloped, thereby undercutting the effectiveness of response.

- The importance of the given local context and history cannot be underestimated in designing external interventions. Foreign assistance can be resisted in the face of severe stress for historical and local reasons that remain difficult for outside aid providers to appreciate. Knowledge is, therefore, critical to the success of designing

effective assistance and avoiding the temptation to apply a generic model to supposedly similar situations.

The simulation forum provided the opportunity for a variety of experts to step out of their normal roles, and away from the immediate work pressures of their office environment, to examine a problem from a new viewpoint, providing them with additional insight into other actors motivations and policy positions. For the majority of the participants, this was the first time they had taken part in such an exercise, and provided them with an open forum to think "outside the box" on a complex environmental, humanitarian, and security issue. This was the first of a planned annual collaboration between ECSP and the Center for Strategic Leadership.

Following is an agenda of the three-day simulation meeting at the U.S. Army War College:

9 May 2000

Plenary Session I:
Brief introductory presentations:
- Kent H. Butts, Center for Strategic Leadership, U.S. Army War College
- Geoffrey D. Dabelko, Environmental Change and Security Project, Woodrow Wilson Center
- Joanne Grossi, Office of Population, U.S. Agency for International Development
- Frank Zinn, University of Michigan Population Fellows Programs
- Scott Lloyd, International Security Affairs, Department of Defense
- Paula Lynch, Bureau for Population, Refugees, and Migration, Department of State

Presentations:
- Ambassador Grant Smith, Peacekeeping Institute
- Matthew Connelly, University of Michigan

Scenario Overview:
- Roy Alacala, MPRI, Inc.

Dinner Keynote Address
- Ambassador Richard Bogosian, Special Assistant to the Greater Horn of Africa Initiative, Department of State

10 May 2000

Final instructions for the scenario

Development of Initial Team Negotiating Positions
- Team Negotiations

Modify Negotiating Positions
- Team Negotiations

Prepare and Present Team Briefings to Plenary

Phase II Briefing

Development of Team Positions
- Begin Negotiations

End of Day
- Team Leaders and rapporteurs met informally to prepare team briefings

Dinner reception

11 May 2000

Plenary Session II:
Team Briefing Reports

Lessons Learned and Conclusions

❑ *A rapporteur's report of the simulation will be featured in the next issue of the* ECSP Report.

30 May 2000

Nature's Place: Human Population and the Future of Biological Diversity

Robert Engelman, Vice President for Research, Population Action International (PAI)
Richard Cincotta, Senior Research Associate, PAI
Cynthia Gill, Acting Biodiversity Team Leader, Global Bureau Center for Environment, U.S. Agency for International Development (USAID)
Kimberly Sais, Environment Program Financial Analyst, Global Bureau Center for Environment, USAID

What are the direct causes of biodiversity loss on Earth? According to Richard Cincotta, Senior Research Associate at PAI, the five main direct causes of biodiversity loss are habitat loss and fragmentation, biological invasion, pollution, over-harvesting, and human-induced climate change. Cincotta and Robert Engelman presented the findings of their recent PAI report, *Nature's Place: Human Population and the Future of Biological Diversity* at a recent ECSP meeting. Cynthia Gill and Kimberly Sais of the U.S. Agency for International Development provided comments on the report's policy relevance.

While biodiversity's importance has been recognized for some time, too little work has been done on what a loss of biodiversity will mean for the future. Similarly, what are the exact impacts human population growth and density having on ecologically-sensitive areas? The authors set out to more comprehensively document the direct and underlying causes of biodiversity loss, and specifically, in the twenty-five "hotspots" identified by Conservation International. "Hotspots" are defined by ecologists Norman Myers and Russell Mittermeier as the most threatened species-rich regions on Earth. More than 1.1 billion people currently live in these critical regions with the populations expected to triple in the next twenty years. These areas are especially important because although they cover only roughly twelve percent of the Earth's land surface, they are home to more than twenty percent of the world's human population.

Cynthia Gill and Kimberly Sais

Using geographic information systems (GIS) data from the World Conservation Monitoring Centre and Conservation International (CI), Engelman and Cincotta studied the linked between biodiversity with human population by overlaying satellite imagery. The two main data sources were global population data layers and the boundaries of species-rich threatened areas (primarily from CI).

Cincotta presented the findings of the report, including some basic facts about biodiversity. A simple definition of biodiversity that the authors used in the report was, "the sum total of life's physical expression and genetic potential, embodied in the array of organisms now alive." Biodiversity serves many purposes including providing marketable products (e.g., pharmaceutical drugs, fish stocks), fundamental services (e.g., soil nutrient cycle, pollination); and cultural, aesthetic, and scientific contributions to society. Biologist Thomas Lovejoy has compared Earth's biodiversity to a "library" wherein there lies a wealth of data.

In addition to presenting the five direct causes listed above that cause biodiversity loss, Cincotta also listed the four main underlying causes. These underlying causes include population change, poverty and equity issues, policy failures, and market failures. The role of population growth is particularly problematic as it increases the scale of demand, leads to human-dominated ecosystems, and creates habitat islands. For example, Lake Victoria in sub-Saharan Africa is a species-rich area that has become a habitat island, surrounded by areas of high population density.

What does this population growth mean for policymakers? Three policy challenges result from population growth and density. One, it increases the risks of native species survival, since humans bring in non-native species

such as grasses and trees when they change an ecosystem. Two, conservation becomes more difficult and expensive as the number of people in an area increases. For example, nine out of ten threatened species on the U.S. Department of Interior's list, are located in the three identified U.S. hotspots. Third, population growth creates the need for more efficient, more responsive, and greater numbers of institutions (e.g., regulations, policies, programs, and markets). However, an issue that conservationists face in a densely populated area is the issue of property value versus biodiversity. Property values tend to increase as local population grows, making it difficult to purchase adequate land to protect species. California is well-known example in the United States.

Richard Cincotta (l). and Robert Engleman (r)

Sais and Gill both commented that reports like *Nature's Place* are extremely useful for policymakers because they elevate the need to conserve threatened biotas while also addressing human population growth and density issues, thereby helping institutions such as USAID to achieve goals of sustainable development. The biggest change in USAID has been the unit of analysis, with a focus on eco-regional conservation, as can be seen in the case study of Madagascar. Gill also outlined the Global Conservation Program, which is working at different scales, experimenting to find the best approach to conservation. One of the main goals of this USAID partnership program is make sure that they broaden the message by targeting all the stakeholders and using participatory methods to ensure sustainable development practices.

Following the presentations, the discussion focused on the need to increase awareness of these NGO publications to congressional staff. While some efforts has already been made among congressional staff, more concerted targeting of the decision-makers will have an impact on conservation in the densely populated regions. Additionally, participants stressed the benefits of increasing private sector investment into biodiversity conservation, to create wider buy-in to the concepts presented in *Nature's Place*. ■

Population and Environment Linkages Service

New Web Site from the National Council for Science and the Environment

The Population and Environment Linkages Service brings comprehensive and reliable information to researchers, students, policymakers, government officials and others around the world who are working on, or concerned about, the linkage between population growth and the environment. It is in response to calls for such a service in the 1994 International Conference on Population and Development (Cairo Conference) Programme of Action. This project's innovative and rational approach to information, as well as the involvement of stakeholders in the process, seeks to facilitate greater access to material on population-environment relationships and promote more coordinated exchanges among researchers and others.

This service includes links to books, reports, journal articles, newspaper articles, news analysis, maps, conference papers, data sets, slide shows, organizations, regional overviews, laws, bills, and court decisions, from around the world. Different topics can be explored on this website including such issues as biodiversity, climate, conflict, demographics, development, fisheries, food, forests, freshwater, health, migration, policies, urbanization, and women.

For more information or to add a link to this site, please contact, Dr. Peter Saundry, Executive Director of the National Council for Science and the Environment at 1725 K Street, NW, Suite 212, Washington, DC 20006-1401. Phone: 202-530-5810; Fax: (202) 628-4311; and E-Mail: cnie@cnie.org.

UPDATE

This Update section is designed to highlight the environment, population, and security activities of academic programs, foundations, nongovernmental organizations, government offices, and intergovernmental organizations. Please refer to the websites listed within these descriptions for updates on current activities and contact information. If your organization is not listed or if you have an organization to recommend, please contact the project at ecspwwic@wwic.si.edu. The editors wish to thank all organizations that responded to requests for information.

ACADEMIC PROGRAMS

CAROLINA POPULATION CENTER

The Carolina Population Center was established at the University of North Carolina at Chapel Hill (UNC-CH) in 1966 to coordinate university-wide programs in population. Forty-eight scholars are currently holding faculty appointments in fifteen UNC-CH departments. The Carolina Population Center provides a multidisciplinary community to carry out population research and train students. The Center's research projects are the Cebu Longitudinal Health and Nutrition Survey, China Health and Nutrition Survey, the EVALUATION Project, Lead and Pregnancy Study, the MEASURE Evaluation Project, Nang Rong Projects, the National Longitudinal Study of Adolescent Health, and Russia Longitudinal Monitoring Survey. For more information, contact: Carolina Population Center, 123 W. Franklin St., University Square, The University of North Carolina at Chapel Hill, Chapel Hill, NC 27516-3997. Tel: 919-966-2157; Fax: 919-966-6638; E-Mail: cpcnews@unc.edu; Internet: http://www.cpc.unc.edu/.

CENTER FOR ENVIRONMENTAL SYSTEMS RESEARCH

The goals of the Center for Environmental Systems Research are: to increase understanding about the functioning of environmental systems and the causes of environmental problems, and to identify "sustainable" pathways into the future, i.e. pathways that allow development of society in harmony with nature. The uniqueness of the Center, created in 1995, lies in its systems approach—the use of methods and instruments of systems thinking such as systems analysis and computer simulation; and in its interdisciplinary approach, in this case meant to be the cou-

pling of social sciences with natural sciences. To accomplish the Center's goals, research activity is carried out in three research groups and one working group: the Research Group on Ecosystems Modeling, the Research Group on Society-Environment Interactions, the Research Group on Global and Regional Dynamics, and the Eco-Balance Group. The Center strongly emphasizes collaboration with other institutions both inside and outside Germany. As a young Center, many new projects and themes are under development, which will give greater emphasis to the social and economic aspects of environmental systems, and to topics of global environmental change. Cross-cutting themes under development include: the World Water Program, Society-Environment Interactions, and Global Environmental Security. The Center will also intensify its link between science and policy by using its research findings to help develop national and international environmental policy. For more information, contact: Dr. J. Alcamo, Director, or Dr. K.H. Simon, Deputy Director, The Center for Environmental Systems Research, University of Kassel, Kurt-Wolters-Strasse 3, 34109 Kassel, Germany. E-Mail: alcamo@usf.uni-kassel.de or simon@usf.uni-kassel.de.

National Council for Science and the Environment

The National Council for Science and the Environment (NCSE) has a mission to improve the scientific basis for making decisions on environmental issues through the successful operation of a National Institute for the Environment (NIE). The work of the NCSE is funded by private and corporate foundations, universities, members of the NCSE Associates Program, and individuals. The effort to create the NIE began in 1989 with a meeting of fifty scientists, environmentalists, and policy experts, led by Dr. Stephen Hubbell of Princeton University and Dr. Henry Howe of the University of Illinois, Chicago. NCSE is demonstrating the information dissemination function of the NIE by providing free, educational, nonadvocacy resources through a prototype National Library for the Environment, accessible online at no charge. The Library includes: information services, (daily news, congressional reports and briefing books, laws and treaties, educational resources, jobs and careers, meetings, journals, virtual topic libraries, reference materials, etc.) and addresses topics such as agriculture and grazing, air, biodiversity and ecology, energy, forestry, global climate change, mining, ocean and coastal resources, population, public lands, stratospheric ozone, waste management, water quality, wetlands, and others. NCSE is also exploring the development of online Country Briefing Books. For information, contact: National Council for Science and the Environment, 1725 K St. NW, Ste. 212, Washington, DC 20006-1401. Tel: 202-530-5810; Fax: 202-628-4311; E-Mail: cnie@cnie.org; Internet: http://www.cnie.org/.

Cornell Program on Environment and Community

The Cornell Program on Environment and Community (CPEC), housed in the Cornell's Center for the Environment, seeks to foster more effective management of environmental, community, and public policy conflicts. To meet this goal, the program aims to build community, institutional, and individual capacities for collaborative decision-making over a broad range of issues. The approach includes: 1) integrating research and practice in selected field-based collaborative decision-making initiatives; 2) developing networks and working partnerships among stakeholder groups; and, 3) creating multiple learning opportunities through seminars, field studies, program cross visits, applied research, peer exchange, and capacity-building workshops. In the United States, programs have focused on developing a number of regionally- and nationally-based research and networking projects on public issues education, coalition-building, public involvement in national forest planning, and community-based ecosystems management. In Central America, the program has continued to help build the capacity of local and regional practitioner networks through training workshops, cross-visits, and case study research and documentation. Work in Southeast Asia has emphasized the development of networks of environmental mediation practitioners, with primary focus in Indonesia. Additional program activities include emerging work in the Philippines and southern China. For information, please contact: CPEC, 112 Rice Hall, Cornell University, Ithaca, NY 14843. Tel: 607-255-4523; Fax: 607-255-8207; E-Mail: busters@cornell.edu; Internet: http://www.cfe.cornell.edu/CPEC/.

Environmental Policy and Society

Environmental Policy and Society (EPOS) is a research network, which began its activities in 1991. The focus lies on environmental security in community perspectives and on societal impacts of environmental policy change. The ambition is to begin with a community perspective as a means to seek the more general principles, forming a political dimension of environmental change. This approach means, by definition, an interdisciplinary mode of

operation; problems addressed are essentially social, but aspects other than those of social science are also required. Accordingly, the importance of EPOS studies lies not in the ecological or environmental competence but in the social scientific contextualization of central, current environmental questions. This overall approach is emphasized in several studies and the aim is to combine the findings of the different projects included in the network. The network involves partners both in Sweden and in eastern Africa and is operated with a small secretariat at Linkoping University in Sweden. Anders Hjort of Ornäs is the program director. For information, contact: EPOS, Tema Institute, Linkoping University, 581 83 Linkoping, Sweden. Tel: 46-13-28-25-10; Fax: 46-13-28-44-15; E-Mail: tiigr@tema.liu.se; Internet: http://www.tema.liu.se/epos.

The George Washington University, Space Policy Institute

The Space Policy Institute was established in 1987 as an element of the Center for International Science and Technology Policy of George Washington University's Elliott School of International Affairs. The Institute focuses its activities on examining policy issues related to the space efforts of the United States and cooperative and competitive interactions in space between the United States and other countries. Using a combination of staff analysis, commissioned papers, groups of experts, research interviews, seminars focused on space and security issues, and a major conference to review the project's recommendations, this project focuses on the following primary issues: 1) understanding the key trends in dual-purpose space technologies; 2) regional security implications of the proliferation of space technology; 3) implications for U.S. military force planning and operations; and 4) recommendations for effective policy responses. For further information, contact: Ray A. Williamson or John C. Baker, Space Policy Institute, 2013 G St. NW, Stuart 201, The George Washington University, Washington, DC 20052. Tel: 202-994-7292; Fax: 202-994-1639; E-Mail: rayw@gwu.edu or jcbaker6@gwu.edu.

The Global Environmental Change and Human Security Project (GECHS)

In May 1996, the Scientific Committee of the International Human Dimensions of Global Change Programme (IHDP) formally adopted the Global Environmental Change and Human Security (GECHS) initiative developed by the Canadian Global Change Programme and the Netherlands Human Dimensions Programme as a core project of the IHDP. At present, there are three other major projects in the IHDP: Land Use and Cover Change (LUCC), which is a joint initiative with the International Geosphere-Biosphere Program (IGBP); Institutional Dimensions of Global Environmental Change (IDGC); and Industrial Transformation (IT). GECHS is coordinated by the Canadian Global Change Programme and the Netherlands HDP Committee, in conjunction with the IHDP. The scientific planning committee is under the directorship of Steve Lonergan (Canada), Mike Brklacich (Canada), Nils Petter Gleditsch (Norway), Sunita Narain (India), Marvin Soroos (USA), Chris Cocklin (Australia), Edgar Guttierez-Espeleta (Costa Rica), Ans Kolk (Netherlands), and Richard Matthew (USA). The objectives of the project are three-fold: to promote research activities in the area of global environmental change and human security (which recognizes the essential integrative nature of the relationship among individual, community, and national vulnerability to environmental change); to encourage the collaboration of scholars internationally; and to facilitate improved communication and cooperation between the policy community/user groups and the research community. For information, contact: Steve Lonergan, GECHS International Project Office, University of Victoria, P.O. Box 1700, Victoria, B.C., Canada V8W 2Y2. Tel: 250-472-4337; Fax: 250-472-4830; E-Mail: info@gechs.org; Internet: http://www.gechs.org.

Hampshire College, Population and Development Program

The Population and Development Program at Hampshire College combines teaching, research, activism, and advocacy in the fields of international women's health, reproductive rights, and population and environment. It monitors changing trends in population policies and critiques conventional neo-Malthusian analyses of population and the environment from a pro-choice, feminist perspective. Current projects include research on the development of environmental conflict models. The Program also serves as the institutional base for the Committee on Women, Population and the Environment (CWPE), a multiracial network of feminist scholars and activists. CWPE has played an active role in challenging anti-immigrant initiatives in the U.S. environmental movement and has recently published an anthology, Dangerous Intersections: Feminist Perspectives on Population, Environment and Development with South End Press in Boston. For information, contact: Population and Development Program/

SS, Hampshire College, Amherst, MA 01002. Tel: 413-559-5506; Fax: 413-559-5620; E-Mail: cwpe@hampshire.edu.

Harrison Program on the Future Global Agenda, University of Maryland

Global environmental change, demographic trends, and the diffusion of technological innovations are rapidly reshaping the international system. Disregarding national borders, these forces are transforming international relations, deepening interdependence, and forging a global system from a world of sovereign states. Creating a more sustainable planet for the next century will require dealing with a wide range of policy issues raised by this rapid acceleration of events. The Harrison Program on the Future Global Agenda engages in futures-oriented teaching and research that will contribute to humanity's ability to anticipate and deal effectively with these important currents of change. The Program makes an effort to understand the nature and interaction of environmental, technological, social, and political systems, and to suggest potential means of breaking out of destructive patterns of behavior. To this end, faculty develop new and innovative educational materials, conduct scholarly research, and organize conferences and workshops that bring together scientists, social theorists, advocates, and policy makers to examine key components of the future global agenda. For more information, contact: Harrison Program on the Future Global Agenda, Department of Government and Politics, Tydings Hall, Suite 3114, University of Maryland College Park, College Park, MD 20742. Tel: 301-405-7490; Fax: 301-314-9690; E-Mail: harrison@bss2.umd.edu; Internet: http://www.bsos.umd.edu/harrison/.

Harvard Center for Population and Development Studies

The Harvard Center for Population and Development Studies is a university-wide research center, founded in 1964 as part of the Harvard School of Public Health. The Center's primary aim is to advance understanding of world population and development issues-especially those related to health, natural resources and the environment, human security, and socioeconomic development. The Center's work is characterized by a multidisciplinary approach, a commitment to integrate gender and ethical perspectives in its research, and a strong policy orientation. The Center attempts to advance knowledge through collaborative research, publications, seminars and a working paper series. In addition to advancing knowledge, the Center seeks to foster capacity-building and promote international collaboration to improve health and well-being around the world. About thirty-five full-time residents-including faculty, research fellows and graduate students-pursue work mainly through multidisciplinary working groups. Other participants are drawn from Harvard faculties and Boston-area universities. The Center also regularly invites visiting scholars from around the world. The Center's current research programs focus on gender and population policies, demographic transitions, burden of disease, health equity, human development and human security. The human security program explores concepts of security through research on ethics and international policy, human survival crises during complex humanitarian emergencies, environmental security and new diseases, and population and security. For more information, please contact: Winifred M. Fitzgerald, Executive Director, Harvard Center for Population and Development Studies, 9 Bow Street, Cambridge, MA 02138. Tel: 617-495-3002; Fax: 617-495-5418; E-Mail: wmfitz@hsph.harvard.edu; Internet: http://www.hsph.harvard.edu/hcpds.

The Institute for Foreign Policy Analysis, Inc.

The Institute for Foreign Policy Analysis (IFPA) is a non-profit policy research organization affiliated with the Fletcher School of Law and Diplomacy at Tufts University. Founded in 1976, the Institute has performed a wide range of studies of a variety of foreign policy and security affairs issues, as well as the sources, scope and impact of ethnic conflict in the post-Soviet security environment. The Institute also has a long-standing interest in issues of resource scarcity; the security implications of energy extraction, transit, and processing; and the linkages between economic development, environmental degradation, and political stability. IFPA is well-known internationally for its ability to organize a wide range of fora that bring together key decision-makers and experts from the international community. These meetings have included senior-level, formal gatherings involving the participation of heads of state and government, leaders of key multinational organizations, and senior parliamentarians; expert-level workshops and round tables; and seminar series on Capitol Hill and elsewhere. With offices in Washington, D.C. and Cambridge, M.A., IFPA has extensive resources upon which to draw in both the worlds of policy and academe. For information, contact: Robert L. Pfaltzgraff, Jr., President, Institute for Foreign Policy Analysis, Inc., 675 Massachusetts Ave., Cambridge, MA 02139. Tel: 617-492-2116; Fax: 617-492-8242; E-Mail: mail@ifpa.org; Internet:

http://www.ifpa.org/text_pages/home_.htm.

MIT Project on Environmental Politics and Policy

The Project on Environmental Politics and Policy sees policy making first and foremost as a political process-the collision of political, economic, social, and philosophical interests-and only secondarily as an exercise in technical problem solving. Addressing environmental problems as though they were fundamentally engineering problem sets most often produces solutions that are politically infeasible, regardless of the technical merits. Accordingly, the Project's goal is to advance an understanding of environmental policymaking as a political process and thereby improve the chances of designing responsive and effective technical policies that can be more readily adopted and implemented. The Project has a broad research agenda. A major line of research examines the ongoing struggle between environmental and economic interests to influence national, state, and local policies. A second line of research investigates the continuing failure of federal agencies to bring ecologically sound management practices to public lands and natural resources held in common. A third line of research explores how local governments and the public absorb and respond to the complex scientific-technical content of local environmental problems and, in turn, how their responses affect technical options for environmental policy. For more information, contact: MIT Project on Environmental Politics and Policy, Massachusetts Institute of Technology, Bldg. E53-402, Cambridge, MA 02139. Tel: 617-253-8078; Fax: 617-258-6164; E-Mail: smmeyer@mit.edu; Internet: http://web.mit.edu/polisci.mpepp.

Monitoring Newly Independent States Environmental Developments Project (MNISED)

Currently the primary project activity involves collecting information on environmental and health problems associated with nuclear weapons, missiles, and the civilian nuclear industry in the former Soviet Union. This open media collection supports faculty and student research and academic needs at the Monterey Institute. The project is a part of the Center for Russian and Eurasian Studies Library, which facilitates information collection and dissemination for a variety of Institute programs and projects, including the Newly Independent States Nonproliferation Project (NISNP). As an integral unit of the Center for Nonproliferation Studies at the Monterey Institute, NISNP incorporates this information into its Nuclear Profiles Database. The database contains the most comprehensive open-source collection of information on nuclear proliferation in the former Soviet Union. Related environmental topics in the database include radioactive waste storage, submarine dismantling, and spent fuel reprocessing. In 1995, MNISED discontinued publication of its semiannual journal NIS Environmental Watch. Back issues 1-7 are available upon request. For information, contact: Elena K. Sokova, Center for Russian and Eurasian Studies, Monterey Institute of International Studies, 425 Van Buren St., Monterey, CA 93940. Tel: 831-647-3582; Fax: 831-647-6672; E-Mail: esokova@miis.edu; Internet: http://cns.miis.edu/cres.htm.

Population Information Program

The Population Information Program (PIP) supplies health and family planning professionals and policy makers with authoritative, accurate, and up-to-date information in its journal Population Reports, the bibliographic database POPLINE, and the Media/Materials Clearinghouse (M/MC). PIP is supported by the U.S. Agency for International Development (USAID). One of the Program's recent publications is "Solutions for a Water-Short World," part of the Population Reports series. For information, contact: Population Information Program, 111 Market Place, Suite 310, Baltimore, MD 21202. Tel: 410-659-6300; Fax: 410-659-6266; E-Mail: popline@jhuccp.org; Internet: http://www.jhuccp.org.

Princeton University, Globalization and Fragmentation Project

There are two broad trends that challenge the contemporary nation-state order: accelerating globalization in financial, currency, and product markets, accompanied by a trend toward the homogenization of consumer cultures and political values on the one hand; and on the other, fragmentation of existing states into ethnic or sectarian sub-units. Directly affecting both trends are the complex processes of international, national, and regional environmental degradation with repercussions that range from the search for international regimes to local revolts among directly-affected populations. While old issues of states and their security will certainly not vanish, basic redefinitions of what constitutes "vital interests" of given states, and thus of their security, are underway. This project sponsored one interdisciplinary graduate seminar each year from 1995 to 1998 at Princeton University. A second phase (1998-

2001) of the same project focuses on three reactions to globalization: collective efforts to restore peace following civil wars; federal systems as responses to territorially-based conflicts; and nation-state specialization in a global division of labor. For more information, contact: Center of International Studies, Bendheim Hall, Princeton University, Princeton, NJ 08544. Tel: 609-258-4851; Fax: 609-258-3988; Internet: http://www.wws.princeton.edu/~cis/.

Stanford University Center for Environmental Science and Policy, Institute for International Studies

The Institute for International Studies (IIS) at Stanford University has established an integrated teaching and research program in environmental studies to aid in the discovery and dissemination of knowledge related to global issues such as population growth, human health and nutrition, climate change, toxic wastes, and loss of biodiversity. IIS has established five main research areas that combine both science and policy-related studies: global change; ecology, agriculture, biodiversity, and regulation; health, population, and resources; technological approaches to biodiversity assessment; and market-based approaches to environmental preservation. These issues are currently the focus of the Environmental Policy Seminar, a weekly series that is conducted by IIS for faculty members and their graduate students throughout the University. The seminars are project-focused, and are tied to ongoing research by faculty and graduate students throughout the University and to other academic, governmental, or industrial institutions sharing an interest in solving or implementing solutions to the problems presented. For information, contact: Donald Kennedy or Walter A. Falcon, Co-Directors, Center for Environmental Science and Policy, Encina Hall, Room 200, Stanford, CA 94305-6055. Tel: 415-725-9888; Fax: 415-725-2592; E-Mail: hfexn@forsythe.stanford.edu.

University of Michigan Population Fellows Programs

The University of Michigan Population Fellows Programs was first established in 1984 and is funded through the U.S. Agency for International Development (USAID). The Programs place Fellows with a wide variety of organizations that address family planning and reproductive health issues in developing countries. The Programs provide a modest professional stipend to the Fellows and aims to both enhance the Fellows' skills, as well as to build capacity within host organizations for development of effective and sustainable family planning and reproductive health interventions. Since the Programs' inception, there have been more than 200 professionals placed in the field and an expansion of the Programs' original focus to include several new initiatives, including the Population-Environment Fellows Program (PEFP), the Population, Environmental Change, and Security (PECS) Initiative, and the Minority-Serving Institutions Initiative (MSI). The Environmental Change and Security Project is a key element of the PECS Initiative. Fellows work in a wide variety of settings and perform a wide range of roles for their host organizations. All Fellows, however, gain the opportunity to develop a network of professional contacts and the chance to master new skills in the field of international development assistance. They also gain the opportunity to support meaningful projects around the world. Fellows generally come into the Programs with a Master's degree in a related field and less than five years of professional experience. They leave the Fellows Programs in a position to pursue mid-level career placements in the field of international population/family planning assistance or population-environment. For more information, contact: Mita Sengupta Gibson, Manager, Population-Environment Fellows Program, Center for Population Planning, University of Michigan, Room M4531, School of Public Health II, 1420 Washington Heights, Ann Arbor, MI 48109-2029. Tel: 734-936-1627; Fax: 734-647-4947; E-Mail: pop.fellows@umich.edu or popenv@sph.umich.edu.

University of Toronto, Project on Environmental Scarcities, State Capacity, and Civil Violence

The Project on Environmental Scarcities, State Capacity, and Civil Violence at the University of Toronto has investigated the impacts of water, forests, and cropland resource scarcities on governmental capabilities in the developing countries of China, India, and Indonesia. The project asks if capacity declines, is there an increased likelihood of widespread civil violence such as riots, ethnic clashes, insurgency, and revolution? The project has targeted its finding for the public and policymakers in Canada, the United States, China, India, and Indonesia. Funding has been provided by The Rockefeller Foundation and The Pew Charitable Trusts. Recent publications to emerge from the project include Ecoviolence: Links Among Environment, Population, and Security, edited by Thomas F. Homer-Dixon and Jessica Blitt, and a new second edition of Environment, Scarcity, and Violence by Homer-Dixon. For information on the project, contact: Thomas Homer-Dixon, Principal Investigator, Peace and Conflict Studies Program, University College, 15 King's College Circle, University of Toronto, Toronto, Canada M5S 1A1. Tel: 416-

978-8148; Fax: 416-978-8416; E-Mail: pcs.programme@utoronto.ca; Internet: http:/www.library.utoronto.ca/www/pcs/state.htm.

Yale Center for Environmental Law and Policy

The Yale Center for Environmental Law and Policy was established in 1994 by the Yale Law School and the Yale School of Forestry and Environmental Studies (YSFES). The Center draws on resources throughout Yale University to develop and advance environmental policy locally, regionally, nationally, and globally. For information, contact: Yale Center for Environmental Law and Policy, Sage Hall, 205 Prospect Street, New Haven, CT 06511. Tel: 203-432-6065; Fax: 203-432-5596; E-mail: epcenter@minerva.cis.yale.edu; Internet: http://pantheon.yale.edu/~epcenter.

Foundations

Canadian Foundation for the Americas

Founded in 1990, the Canadian Foundation for the Americas (FOCAL) aims to develop greater understanding of important hemispheric issues and help to build a stronger community of the Americas. As a policy center, FOCAL fosters informed and timely debate and dialogue among decision-makers and opinion leaders in Canada and throughout the Western Hemisphere. FOCAL studies a range of issues in four policy areas: Inter-American Relations, Governance and Human Security, Social Policies, and Economic Integration. In 1999, FOCAL may deal with topics such as drug trafficking and human security in the Americas, the negotiations of the Free Trade Areas of the Americas, improved health strategies, and Canada's relations with the countries in the Americas. Topics examined by FOCAL on an ongoing basis include the environment and sustainable development. FOCAL is an independent, not-for-profit charitable organization that is guided by a Board of Directors. It receives funding from the Department of Foreign Affairs and International Trade, the Canadian International Development Agency, and other public and private sector organizations, as well as inter-American institutions. For information, contact: Canadian Foundation for the Americas, 1 Nicholas St., Ste. 720, Ottawa, Ontario K1N 7B7, Canada. Tel: 613-562-0005; Fax: 613-562-2525; Internet: http://www.focal.ca.

Compton Foundation, Inc.

The Compton Foundation was founded to address community, national, and international concerns in the fields of peace and world order, population, and the environment. In a world in which most problems have become increasingly interrelated and universal in dimension, and where survival of human life under conditions worth living is in jeopardy, the Foundation is concerned first and foremost with the prevention of war, and the amelioration of world conditions that tend to cause conflict. Primary among these conditions are the increasing pressures and destabilizing effects of excessive population growth, the alarming depletion of the earth's natural resources, the steady deterioration of the world's environment, and the tenuous status of human rights. To address these problems, the Compton Foundation focuses most of its grant-making in the areas of peace and world order, population, and the environment, with special emphasis on projects that explore the interconnections between these three categories. The Foundation believes that prevention is a more effective strategy than remediation, that research and activism should inform each other, and that both perspectives are needed for productive public debate. For more information, contact: Compton Foundation, Inc., 545 Middlefield Road, Suite 178, Menlo Park, CA 94025. Tel: 650-328-0101. Fax: 650-328-0171 E-Mail: comptonfdn@igc.org.

The David and Lucile Packard Foundation

The David and Lucile Packard Foundation is a private family foundation created in 1964 by David Packard (1912-1996), co-founder of the Hewlett-Packard Company, and Lucile Salter Packard (1914-1987). The Foundation provides grants to nonprofit organizations in the following broad program areas: science, children, population, conservation, arts, community, and special areas that include organizational effectiveness and philanthropy. The Foundation provides national and international grants, and also has a special focus on the Northern California counties of San Mateo, Santa Clara, Santa Cruz, and Monterey. The Foundation's assets were $9 billion at the end of 1997 and grant awards were more than $200 million. The Foundation is directed by an eight-member Board of Trustees which includes the four children of the founders. A staff of 115 employees conducts the day-to-day opera-

tions of the Foundation. For information, contact: The David and Lucile Packard Foundation, 300 Second Street, Suite 200, Los Altos, California 94022. Tel: 650-948-7658; Fax: 650-948-5793; Internet: http://www.packfound.org.

Ford Foundation

The Ford Foundation is a resource for innovative people and institutions worldwide. Its goals are: to strengthen democratic values, reduce poverty and injustice, promote international cooperation, and advance human achievement. A fundamental challenge facing every society is to create political, economic, and social systems that promote peace, human welfare, and the sustainability of the environment on which life depends. The Foundation believes that the best way to meet this challenge is to encourage initiatives by those living and working closest to where problems are located; to promote collaboration among the nonprofit, government, and business sectors; and to assure participation by men and women from diverse communities and at all levels of society. It works mainly by making grants or loans that build knowledge and strengthen organizations and networks. Since its financial resources are modest in comparison to societal needs, it focuses on a limited number of problem areas and program strategies within our broad goals. Founded in 1936, the Foundation operated as a local philanthropy in the state of Michigan until 1950, when it expanded to become a national and international foundation. Since inception, it has been an independent, nonprofit, nongovernmental organization. It has provided over $8 billion in grants and loans. For information, contact: The Ford Foundation, 320 East 43rd St., New York, NY 10017. Tel: 212-573-5000; Fax: 212-351-3677; Internet: http://www.fordfound.org/website/website.html.

The Heinrich Böll Foundation

With headquarters in Berlin, Germany, the Heinrich Böll Foundation is a political foundation for the promotion of democratic ideas, civil society, and international understanding. It is associated with the political party Alliance 90/The Greens, and its work is oriented towards ecology, democracy, solidarity, and non-violence. At present, one of the key themes of the Foundation's international work is "Ecology and Sustainable Development." The foundation's projects, in cooperation with partner organizations, include exchanges, educational programs, and study tours. The Foundation maintains offices in eleven countries outside of Germany. For more information, contact: Sascha Muller-Kraenner, Heinrich Böll Foundation, Washington Office, Chelsea Gardens, 1638 R St. NW, Ste. 120, Washington, DC 20009. Tel: 202-462-7512; Fax: 202-462-5230; E-Mail: washington@boell.de, Internet: http://www.ased.org/index.htm.

The John D. and Catherine T. MacArthur Foundation, Program on Global Security and Sustainability

The objective of the Program on Global Security and Sustainability of the MacArthur Foundation is to promote peace within and among countries, healthy ecosystems worldwide, and responsible reproductive choices. The Foundation encourages work that recognizes the interactions among peace, sustainable development, reproductive health, and the protection of human rights. It supports innovative research and training, the development of new institutions for cooperative action, and new strategies for engaging U.S. audiences in efforts to advance global security and sustainability. The Foundation recognizes the importance of three specific global issues: arms reduction and security policy; ecosystems conservation; and population. These are three core areas of the Program. In addition, support is provided in three key aspects of the global context: the state of understanding of the concepts of security and sustainability; the need for new partnerships and institutions to address global problems; and the education of the public about the United States' interests and responsibilities regarding global issues. For information, contact: The John D. and Catherine T. MacArthur Foundation, 140 South Dearborn St., Chicago, IL 60603. Tel: 312-726-5922; E-Mail: 4answers@macfdn.org; Internet: http://www.macfdn.org.

Ploughshares Fund

Founded at a time when global nuclear conflict seemed a real and immediate possibility, the Ploughshares Fund was designed to provide financial support to the best efforts we could identify among the many people and organizations working to eliminate the threat of nuclear war. Since that time, Ploughshares has responded to new challenges-the burgeoning trade in conventional weapons, the explosion of regional conflict in the aftermath of the Cold War, and the growing danger of nuclear weapons proliferation following the breakup of the Soviet Union. With gifts from just over 5,000 individuals and a few foundations, Ploughshares has made over 1,400 grants totaling more than $18 million since its inception in 1981. The Ploughshares Fund supports national and grassroots organizations that over

the years have forced the closure of nuclear weapons production lines around the country, charging safety and environmental abuses at those facilities. With direct support and technical assistance, Ploughshares enables citizens to monitor and expose Department of Energy's (DOE) continued efforts to design, test, and produce nuclear weapons at the expense of environmental cleanup. A coalition of these groups is now suing the DOE to halt construction of new stockpile stewardship facilities, claiming that it has failed to comply with the National Environmental Policy Act. Ploughshares also supports the development of an indigenous network of citizens' groups in the former Soviet Union who are facing equal or greater environmental challenges caused by the production of nuclear weapons in their countries. For information, contact: Ploughshares Fund, Fort Mason Center, Bldg. B, Suite 330, San Francisco, CA 94123. Tel: 415-775-2244; Fax: 415-775-4529; E-Mail: ploughshares@igc.org; Internet: http://www.ploughshares.org/.

The Rockefeller Brothers Fund, "One World: Sustainable Resource Use" and "Global Security Program"

The goal of the Fund's sustainable resource use program is to "foster environmental stewardship which is ecologically-based, economically sound, culturally appropriate, and sensitive to questions of intergenerational equity." The Global Security Program comprises grant-making in the pursuit of "a more just, sustainable, and peaceful world by improving the cooperative management of transnational threats and challenges," working with public and private actors in North America, East Asia, Central and Eastern Europe, and southern Africa. The program focuses on constituency building, transparency and inclusive participation, the challenges of economic integration, and emerging transnational concerns. For information, contact: The Rockefeller Brothers Fund, Inc., 1290 Avenue of the Americas, New York, NY 10104-0233. Tel: 212-373-4200; Fax: 212-315-0996; E-Mail: rbf@mcimail.com; Internet: http://www.rbf.org/.

Rockefeller Foundation, Global Environment Division

The Global Environment Division's goals are to build international leadership capable of initiating and carrying out innovative approaches to sustainable development, and to facilitate the transition to a new energy paradigm based on sustainability, renewable resources, efficient use, economic viability, and equity in access. The Global Environment division seeks to catalyze the transition to a new energy paradigm in both developed and developing countries by reducing dependence on fossil fuel, and replacing it with renewable-energy sources and increased energy efficiency. In the United States the Global Environment division supports the Energy Foundation's efforts to promote policies, practices, and technologies that help utilities to generate, and end-users to employ energy at the least financial and environmental cost. The Foundation conceived the Global Energy Initiative, which seeks to demonstrate to high-level, national decision-makers in developing countries the viability of renewable-energy sources by emphasizing their equity and quality-of-life benefits. This Initiative aims to facilitate dialogue among political, business, and community leaders to catalyze selective projects designed to demonstrate an improved quality of life for the rural and urban poor, and simultaneously reduce the threats of pollution and global climate change. *High Stakes: The United States, Global Population and Our Common Future* is a book recently published by the Foundation. For information, contact: Rockefeller Foundation, Global Environment Division, 420 Fifth Ave., New York, NY 10018. Tel: 212-852-8365; Internet: http://www.rockfound.org.

Soros Open Society Institute

The Open Society Institute (OSI) is a private operating and grant-making foundation that seeks to promote the development and maintenance of open societies around the world by supporting a range of programs in the areas of educational, social, and legal reform, and by encouraging alternative approaches to complex and often controversial issues. Established in 1993 and based in New York City, the Open Society Institute is part of the Soros Foundations network, an informal network of organizations created by George Soros that operate in over thirty countries around the world, principally in Central and Eastern Europe and the former Soviet Union but also in Guatemala, Haiti, Mongolia, Southern Africa, and the United States. Together with its Hungary-based affiliate, the Open Society Institute-Budapest, OSI assists these organizations by providing administrative, financial, and technical support, and by establishing "network programs" that address certain issues on a regional or network-wide basis. The OSI programs fall into three categories: network programs; international initiatives; and programs that focus on the United States. For more information contact: Office of Communications at the Open Society Institute-New York, 400 West 59th Street, New York, NY 10019. Tel: 212 548-0668; Internet: http://www.soros.org.

Summit Foundation

The Summit Foundation is dedicated to improving the quality of life for residents and guests of Summit County. Summit County, Colorado is a vacation paradise for millions of visitors each year. But to over 18,000 people it is also their home-a special community enriched by the work of the Summit Foundation. Established in 1984 as the Breckenridge Development Foundation by the Breckenridge Ski Area, the Summit Foundation added support from Copper Mountain, Keystone, and Arapahoe Basin Ski Resorts and assumed its current name in 1991. A public foundation which funds other Summit County nonprofit agencies providing programs and services in art and culture, health and human service, education, environment, and sports, the Summit Foundation allocates funds twice per year from submitted applications. In 1994, the Foundation achieved an important milestone, surpassing $1 million in grants; all monies raised remain in Summit County. The Summit Foundation was not started as an endowed foundation, and therefore, raises revenue through unrestricted individual and business donations and several fundraising events. For information, contact: The Summit Foundation, Breckenridge, Colorado 80424. Tel: 970-453-5970; E-Mail: sumfound@colorado.net; Internet: http://www.summitfoundation.org/home.html.

W. Alton Jones Foundation, Sustainable World and Secure World Programs

The W. Alton Jones Foundation seeks to build a sustainable world by developing new ways for humanity to interact responsibly with the planet's ecological systems as well as a secure world by eliminating the possibility of nuclear war and providing alternative methods of resolving conflicts and promoting security. The Sustainable World Program supports efforts that will ensure that human activities do not undermine the quality of life of future generations and do not erode the Earth's capacity to support living organisms. The Foundation addresses this challenge with a tight focus on issues whose resolution will determine how habitable the planet remains over the next century and beyond: maintaining biological diversity; ensuring that human economic activity is based on sound ecological principles; solving humanity's energy needs in environmentally sustainable ways; and avoiding patterns of contamination that erode the planet's capacity to support life. The Secure World Program seeks to build a secure world free from the nuclear threat. The Foundation addresses this challenge by: promoting common security and strategies related to how nations can structure their relationships without resorting to nuclear weapons; devising and promoting policy options to control and eventually eliminate existing nuclear arsenals and fissile materials; stemming proliferation of nuclear weapons and related materials; addressing threats to global sustainability by preventing the massive release of radioactive material; and assessing and publicizing the full costs of a nuclear-weapon state. For information, contact: W. Alton Jones Foundation, 232 East High St., Charlottesville, VA 22902-5178. Tel: 804-295-2134; Fax: 804-295-1648; E-Mail: earth@wajones.org; Internet: http://www.wajones.org/wajones.

Nongovernmental Organizations

The Aspen Institute

The Aspen Institute is an international nonprofit educational institution dedicated to enhancing the quality of leadership and policymaking through informed dialogue. The Institute's International Peace and Security Program is composed of a series of high-level international conferences designed to suggest practical strategies to promote peace, greater economic equity, and security in the face of the principal threats and sources of tension characterizing the first decades after the end of the Cold War. Participants are influential leaders of diverse backgrounds and perspectives from all global regions. Topics have included the new dimensions of national security, the role of intervention in managing conflict, conflict prevention, international poverty, and promoting peace in the Balkans. Post-conference publications are useful for policymakers, public education, and academic material. The Institute's program on Energy, the Environment, and the Economy seeks to build consensus in the areas of energy and environmental policies by convening private and public sector leaders in a nonadversarial setting. Recent or current activities include a Series on the Environment in the Twenty-first Century, an annual Energy Policy Forum, a Mexico-U.S. Border Environmental Dialogue, a series on integrating environmental and financial performance, a series on non-proliferation and environmental aspects of nuclear waste policies, and an annual Pacific Rim energy workshop. For information, contact: Nancy Bearg Dyke (International Peace and Security Program) or Anne Car-

penter (Program on Energy, the Environment, and the Economy), The Aspen Institute, 1 DuPont Circle, Washington, DC 20036. Tel: 202-736-5800; Fax: 202-467-0790; E-Mail: acarpenter@aspeninst.org; Internet: http://www.aspeninst.org.

Carnegie Endowment for International Peace, International Migration Policy Program

The Program is a leading source of expert analysis and policy ideas on migrant and refugee issues. It focuses on bridging the worlds of research and policy, bringing an independent voice to migrant and refugee policy debates, and enhancing public understanding of these and related issues. Its activities extend to Russia and other post-Soviet states, as well as numerous other governments, leading independent institutions, the UN, and other international agencies. For information, contact: Demetrios Papademetriou and Kathleen Newland, International Migration Policy Program, Carnegie Endowment for International Peace, 1779 Massachusetts Ave. NW, Washington, DC 20036. Tel: 202-939-2276; Fax: 202-332-0945; Internet: http://ceip.org.

Carnegie Endowment for International Peace, Managing Global Issues Project

The Project identifies lessons drawn from attempts in the international community to manage a wide range of global issues (including environment, weapons proliferation, organized crime, terrorism, trade, the Internet, and other issues). It examines how innovative mechanisms and techniques used in one arena (such as the NGO-government partnership in drafting and negotiating a land mine accord) can offer positive or negative lessons for the management of other transnational issues (such as negotiating agreements on climate change or global crime). By bringing together experts from a variety of different disciplines and professions, the project aims to strengthen practice and enrich the growing theoretical literature on international organizations and global governance with the insights of actual experience. For more information, contact: P.J. Simmons, Director, Managing Global Issues Project, 1779 Massachusetts Ave. NW, Washington, DC 20036. Tel: 202-939-2259; Fax: 202-483-4462; E-mail: pjsimmons@ceip.org; Internet: http://www.ceip.org.

Center for Bioregional Conflict Resolution

The Center for Bioregional Conflict Resolution was established in 1995 to study the complex relationship among human communities, public regulatory institutions, and the natural environment while addressing a growing number of intense conflicts between human communities and scarce resources. The Center works with parties to large scale environmental conflicts that are regional and transboundary in nature to increase awareness, collaboration, and coordination. The four primary goals of the Center are to study and enhance the conservation, preservation, and restoration of key bioregional resources, to foster the development of cooperative processes to sustain human communities and complex ecosystems, to aid in the development of bioregional public policies, and to act as an information clearinghouse. The Center is currently developing the following research programs: Improving the Understanding of the Relationship between Ecosystem Planning and Management, Human Communities, and Public Institutions; Strengthening the Theory and Practice of Environmental Conflict Resolution; Leadership Training to Improve the Quality of Environmental Decision Making; and Developing Effective Strategies for Integrating Cultural Preservation with Environmental Protection. The Center's co-directors recently published a book, Bioregionalism (Routledge Press, 1997) that examines the history and confluence between bioregional science and conflict resolution. For information, contact: Center for Bioregional Conflict Resolution, 340 Soquel Avenue, Suite 104, Santa Cruz, CA 95062. Tel: 408-457-1397; Fax: 408-457-8610; E-mail: concur@concurinc.com; Internet: http://www.concurinc.com/CONCUR07.html.

Center for Defense Information

The Center for Defense Information (CDI) is a non-profit, non-government organization which believes that strong social, economic, political, and military components and a healthy environment contribute equally to the nation's security. CDI opposes excessive expenditures for weapons and policies that increase the danger of war. CDI also produces a weekly television show, America's Defense Monitor. One of CDI's accomplishments is a documentary titled, "Water, Land, People, and Conflict," which addresses complex national security issues related to the environment such as population growth, water scarcity, pollution, and economic stability. For local broadcast times and access to extensive resources on military and security issues, contact CDI's Internet site: http://www.cdi.org. For more information, contact: Center for Defense Information, 1799 Massachusetts Ave. NW, Ste. 615, Washing-

ton, DC 20036. Tel: 202-332-0600; Fax: 202-462-4559; E-Mail: info@cdi.org.

The Center for Economic Conversion

Founded in 1975, the Center for Economic Conversion (CEC) is a non-profit organization dedicated to creating positive alternatives to dependence on excessive military spending. One of the CEC's top priorities is "green conversion," the transfer of military assets (money, talent, technology, facilities and equipment) to activities that enhance the natural environment and foster sustainable economic development. This work includes: studies of green conversion efforts already underway in industry, national laboratories, and military bases; a pilot project in green military base conversion; the promotion of public policies that encourage green conversion; and various educational activities that build support for green conversion. For information, contact: Joan Holtzman, Center for Economic Conversion, 222 View St., Mountain View, CA 94041. Tel: 650-968-8798; Fax: 650-968-1126; E-mail: cec@igc.apc.org; Internet: http://www.conversion.org.

Center for International Studies

The Center for International Studies (CIS) is a private, independent, non-profit, Baku-based research and public organization, which was founded in May 1998. The CIS Center focuses on the most challenging issues of international and regional security, oil pipeline politics, energy, environment, conflict resolution, peace, and new geopolitics of great powers within the Caucasus and in the former Soviet Union. The CIS Research Groups work independently on research projects and analyze contemporary geopolitical and international security issues as well as energy and environmental problems from an Azeri perspective in order to give the public a better profile of the ongoing complex processes and the general situation in the region. For information, contact: Tarlan Jarulla-zadeh, US Representative Officer, Center for International Studies, 50 Rockefeller Plaza, Ste. 1007, New York, NY 10020. Tel: 212-332-4840; Fax: 212-332-4847; E-Mail: Tzade@aol.com.

Center for Public Environmental Oversight

The Center for Public Environmental Oversight (CPEO) is an organization that promotes and facilitates public participation in the oversight of environmental activities, including but not limited to the remediation of U.S. federal facilities, private "Superfund" sites, and Brownfields. It was formed in 1992 as CAREER/PRO (the California Economic Recovery and Environmental Restoration Project) by the San Francisco Urban Institute, in response to the large number of military base closures in the San Francisco Bay Area. CPEO has its roots in community activism, and it provides support for public advocacy, but it is not a political organization. Its work is based upon six principles: Empowerment, Justice, Education, Communications, Partnership, and Credibility. CPEO publishes two newsletters, "Citizens' Report on the Military and the Environment" and "Citizens' Report on Brownfields." For more information, contact: SFSU Center for Public Environmental Oversight, 425 Market St., 2nd Floor, San Francisco, CA 94105. Tel: 415-904-7751; Fax: 415-904-7765; E-mail: cpeo@cpeo.org; Internet: http://www.cpeo.org.

The Center for Security Policy

The Center for Security Policy exists as a non-profit, non-partisan organization to stimulate and inform the national and international debates about all aspects of security policy, including their strategic and environmental implications, particularly as they relate to the all-encompassing question of energy. The Center is committed to preserving the credibility of U.S. antiproliferation efforts, and the message to allies and potential adversaries that the U.S. is serious about ensuring the safe and benign global development of nuclear energy. The Center has extensively studied the Chemical Weapons Convention, the Cienfuegos nuclear power project in Cuba, and expressed concern over the Department of Energy's Environmental Management program for cleaning up the nuclear legacy of the Cold War. In addition, the Center calls for increased attention to the strategic importance of the vast oil reserves of the Caspian Basin, and to the deterioration of the sensitive ecosystems and waterways of the region (for example Turkey's imperiled Bosphorus Straits). The Center makes a unique contribution to the debate about these and other aspects of security and environmental policies, through its rapid preparation and dissemination of analyses and policy recommendations via computerized fax, published articles and electronic media. For information, contact: The Center for Security Policy, 1250 24th St. NW, Ste. 350, Washington, DC 20037. Tel: 202-466-0515; Fax: 202-466-0518; Internet: http://www.security-policy.org.

The Centre for the Development of Human Resources

The Centre for the Development of Human Resources at the Centre of Investigation and National Security of Mexico is conducting prospective studies on several issues related to national security, such as environmental security, food security, organized crime, drug trafficking, water availability, energy, poverty, low intensity conflict, and other social, economic, and political threats to national stability. These studies are designed to provide data information for building early warning systems and monitoring risk indicators. The first stage will conclude by December 1999, and the second one a year later. For information, contact: Jose Luis Calderón, Director, Centre for the Development of Human Resources, or Ricardo Márquez, Head of the Strategic Studies Program, Camino Real de Contreras No. 35, Col. La Concepción, Delegación Magdalena Contreras, Mexico, D.F., D.P. 10840. Tel: 6-24-37-00, ext. 2676 (Jose Luis Calderón) or ext. 2078 (Ricardo Márquez).

Climate Institute

The Climate Institute (CI) is an international organization devoted to helping maintain the balance between climate and life on Earth. In all its efforts, including the Climate Alert newsletter, the Institute strives to be a source of objective information and a facilitator of dialogue among scientists, policy makers, business executives, and citizens. Currently, the Institute's main focus is energy efficiency and renewable energy. CI's Green Energy Investment project works to mobilize investors to finance and accelerate the development of renewable and "greenhouse-benign" energy technologies. The Small Island States Greening Initiative assists the island states in adapting to climate change and transforming their energy systems to renewables. Through the United Nations Greening Initiative, the Institute assisted the North American Regional office of UNEP in energy upgrades and is now working toward making UN Headquarters a showcase for green technologies. For information, contact: Christopher Dabi, the Climate Institute, 333 1/2 Pennsylvania Ave. SE, Washington, DC 20003. Tel: 202-547-0104; Fax: 202-547-0111; E-Mail: cdabi@climate.org; Internet: http://www.climate.org.

The Club of Rome

Members of the Club of Rome are convinced that the future of humankind is not determined once and for all, and that it is possible to avoid present and foreseeable catastrophes when they are the result of human selfishness or of mistakes made in managing world affairs. In 1972 the Club published Limits to Growth, a companion book to their World3 computer model indicating trends for growth on this planet. The model considered the effects on growth of population, agricultural production, consumption of non-renewable natural resources, industrial production, and pollution. Limits to Growth was followed in the early 1990s by Beyond the Limits: Confronting Global Collapse, Envisioning a Sustainable Future. Beyond the Limits encouraged a comprehensive revision of policies and practices that perpetuate growth in material consumption and in population and a drastic increase in the efficiency with which materials and energy are used. The modeling work for these projects spread to the International Institute of Applied Systems Analysis in Vienna, where it inspired many more projects and conferences. Both the books and the computer model, and many successive ones, have become teaching tools and have been instituted in training games. For information, contact: Bertrand Schneider, Secretary General, The Club of Rome, 34 avenue d'Eylau, 75116 Paris, France. Tel: 33-1-47-04-45-25; Fax: 33-1-47-04-45-23; E-Mail: cor.bs@dialup.francenet.fr; Internet: http://www.clubofrome.org/cor.htm.

Committee on Population

The Committee on Population was established in 1983 to bring the knowledge and methods of the population sciences to bear on major issues of science and public policy. The Committee's work includes both basic studies of fertility, health and mortality, and migration, and applied studies aimed at improving programs for the public health and welfare in the United States and developing countries. The Committee also fosters communication among researchers in different disciplines and countries and policy-makers in government and international agencies. Recent consensus reports of the Committee include Demographic & Economic Impacts of Immigration, Global Population Projections, Cross-National Research on Aging, Urbanization in the Developing World, Reproductive Health in Developing Countries, and Research and Data Priorities for Arresting AIDS in Sub-Saharan Africa. For information, contact: National Research Council, Committee on Population, 2101 Constitution Ave. NW, HA-172, Washington, DC 20418. Tel: 202-334-3167; Fax: 202-334-3768; E-mail: cpop@nas.edu; Internet: http://www2.nas.edu/cpop.

Consortium for International Earth Science Information Network (CIESIN)

CIESIN was established in 1989 as a non-profit, non-governmental organization to provide information that would help scientists, decision-makers, and the public better understand their changing world. CIESIN specializes in global and regional network development, science data management, decision support, and training, education, and technical consultation services. CIESIN is the World Data Center A (WDC-A) for Human Interactions in the Environment. One program CIESIN implemented is the US Global Change Research Information Office (GCRIO). This office provides access to data and information on global change research, adaptation/mitigation strategies and technologies, and global change related educational resources on behalf of the US Global Change Research Program (USGCRP) and its participating Federal Agencies and Organizations. CIESIN is located on Columbia University's Lamont-Doherty Earth Observatory campus in Palisades, New York. For more information contact CIESIN at: PO Box 1000, 61 Route 9W, Palisades, NY 10964. Tel: (914) 365-8920; E-Mail: ciesin.info@ciesin.org

Ecologic-Centre for International and European Environmental Research

Ecologic was established in 1995 as a not-for-profit institution for applied research and policy consulting. Ecologic is part of the network of Institutes for European Environmental Policy with offices in Arnhem, London, Madrid, Paris, and Brussels, as well as a wider network of associated researchers. The mission of this network is to analyze and advance environmental policy in Europe. The main themes of Ecologic's work are: strategic dimensions of environmental policy, European environmental policy, multilateral environmental agreements, trade and environment, environment and development, environment and security policy, environmental policy instruments, green finance, regulation, and enforcement, as well as various issues of air pollution control, waste management, and water management and policy. Ecologic works for diverse sponsors and clients including: the German Federal Parliament, the French Ministry of Environment, the German Foundation for International Development, and Directorate-General XII (Research) of the European Commission and the Organization for Economic Cooperation and Development. In addition, research is carried out for or in cooperation with industry, trade unions, and environmental or conservationist NGOs. Some completed and ongoing projects include "Impact of EU Enlargement on European Environmental Policy," "Water Rights," and "International Workshop on Environment and Security." For information, contact: Ecologic, Friedrichstrasse 165, 10117 Berlin, Germany. Tel: 49-30-2265-1135; Fax: 49-30-2265-1136; E-Mail: office@ecologic.de; Internet: http://www.envirocom.com/ieep/.

ECOMAN

ECOMAN, the successor to the Environment and Conflicts Project (ENCOP) is jointly run by the Center for Security Studies and Conflict Research at the Swiss Federal Institute of Technology, Zurich, and the Swiss Peace Foundation, Bern. ECOMAN aims at elaborating theoretical approaches and practical options in view of socio-ecologically and politically sustainable and demographically adapted development. For this purpose it analyzes both everyday people's strategies and competition over scarce resources as well as innovative capacities to cope with the degradation of renewable resources in geographically distinct societal and cultural environments. Since the normative horizon "sustainable development" encompasses almost countless elements, the ECOMAN focuses on three interrelated problem areas. It looks to the political capacities of actor groups at a local and regional (sub-national and transboundary) level in order to regulate environmental and resource conflicts (water, land, forest). Second, it examines the socio-economic capacities of actors at the levels mentioned above as well as the structural or institutional constraints concerning innovative adaptations. Finally, ECOMAN looks at the relevance of life cycle and gender perspectives in the framework of local strategies of survival, reproductive choice, and sustainable management of renewable resources. For more information contact: the Project management at the Center for Security Policy and Conflict Research, ETH-Zentrum SEI, 8092 Zurich, Switzerland. Tel: 41-1-632-4025; E-Mail: encop@sipo.reok.ethz.ch. Swiss Peace Foundation, Wasserwerkgasse 7, P.O. Box 3011, Bern, Switzerland. Tel: 41-31-311-5582; E-Mail: chfried@dial.eunet.ch. Internet: http://www.fsk.ethz.ch/encop/. [Editor's note: See ECSP Report Issue 4 for an article by ENCOP co-director, Günther Baechler. He is also the author of a new volume on environment and conflict published by Kluwer Press.]

Environmental and Energy Study Institute

The Environmental and Energy Study Institute (EESI) is a nonprofit organization dedicated to promoting environ-

mentally sustainable societies. EESI believes meeting this goal requires transitions to social and economic patterns that sustain people, the environment and the natural resources upon which present and future generations depend. EESI produces credible, timely information and innovative public policy initiatives that lead to these transitions. These products are developed and promoted through action-oriented briefings, workshops, analysis, publications, task forces, and working groups. For more information contact: Ken Murphy, Director, 122 C Street, NW, Suite 700, Washington, DC 20001. Tel: 202- 628-1400; E-Mail: eesi@eesi.org.

Evidence Based Research, Inc.

Evidence Based Research (EBR) is a for-profit research and analysis firm specializing in applied social science to support decision-makers in government and private industry. EBR has expertise in several program areas, including environmental security, command and control, indicators and warning, and instability analysis. EBR has extensive experience in the analysis of the impact of environmental change on the security and stability of states. EBR has provided research and technical support to the Department of Defense and its chairmanship of the NATO CCMS Pilot Study "Environment and Security in an International Context." EBR has also supported the development of regional strategies for the U.S. Southern and European Commands and in the Asia Pacific region. EBR is also engaged in research on how environmental factors may impact political, social, and economic futures. For further information, contact: Evidence Based Research, Inc., 1595 Spring Hill Rd., Ste. 250, Vienna, VA 22182-2228. Tel: 703-893-6800; Fax: 703-821-7742; E-Mail: EBRInc@EBRInc.Com; Internet: http://www.ebrinc.com.

Federation of American Scientists

The Federation of American Scientists (FAS) has several projects which address environment and security linkages. The "FAS Project on Agricultural Research," which replaced the Long Term Global Food Project, aims to ward off complacency in agricultural planning and to promote the responsible use of agricultural research to ensure food availability, social equity and preservation of the environment. The project's newsletter, "Global Issues in Agricultural Research," is available on the FAS web site as well as in print edition. FAS also sponsors a project to promote the establishment of a global program for monitoring emerging diseases (ProMED), begun in 1992. ProMED Mail is a new electronic information network to link scientists, doctors, journalists, and lay people to share information on emerging diseases and human security. For more information, contact: Barbara Rosenberg, ProMED Mail Steering Committee and FAS Coordinator, Federation of American Scientists, 307 Massachusetts Ave. NE, Washington, DC 20002. Tel: 202-546-3300; E-Mail: bhrosen@purvid.purchase.edu; Internet: http://www.fas.org.

Fridtjof Nansen Institute

Established in 1958, the independent Fridtjof Nansen Institute (FNI) conducts applied social science research on international issues of energy, resource management, and the environment. Placing a particular emphasis on an interdisciplinary approach, FNI strives to meet academic quality standards while producing user-relevant and topical results. Projects of particular relevance for environmental change and security include the International Northern Sea Route Programme and the Green Globe Yearbook. For information, contact: Willy Østreng, Director, the Fridtjof Nansen Institute, Fridtjof Nansens vei 17, Postboks 324, Lysaker, Norway N-1324. Tel: 47-67-53-89-12; Fax: 47-67-12-50-47; E-mail: iliseter@ulrik.uio.no.

Future Harvest

Future Harvest seeks to promote the importance of agriculture and international agricultural research by raising awareness of their wider social benefits, including peace, prosperity, environmental renewal, health, and the alleviation of human suffering. Future Harvest commissions studies on the links between agriculture and critical global issues. Study results are widely disseminated through the media and world influentials who serve as ambassadors. Current work explores the connection between food insecurity and the degradation of natural resources and violent conflict, as well as the consequences of this conflict for migration, international intervention, and global peace and stability. It examines the environmental conditions of key agricultural areas. Future Harvest was created out of concern that in the next century, the world will need to feed an additional ninety million people a year without jeopardizing the earth's land, water, and biodiversity. It is an initiative of the Consultative Group on International Agricultural Research (CGIAR), a network of sixteen international agricultural research centers, that recognizes the

role of science for food, the environment, and the world's poor. For information, contact: Barbara Alison Rose, Director of Operations, Future Harvest, CGIAR Secretariat, World Bank, 1818 H Street, NW, Washington, DC, 20433. Tel: 202-473-4734; Fax: 202-473-8110; Email: futureharvest@cgnet.com.

Global Environment and Energy in the 21st Century (GEE-21)

GEE-21 is a not-for-profit organization, which carries out research and education activities dealing with issues of environment and energy. It is incorporated in Hawaii, with an international Board of Directors. The initial program areas of GEE-21 are global climate change, with the emphasis on strategies for reducing emissions of greenhouse gases from energy systems; water and security in South Asia; and cooperation in the transfer and diffusion of environment-friendly energy technologies. The activities undertaken by GEE-21 are carried out in collaboration with institutions in several countries, such as the Asian Institute of Technology (Thailand), the Fridtjof Nansen Institute (Norway), and the School of Advanced International Studies of the Johns Hopkins University (U.S.). For more information, please contact GEE-21: 1765 Ala Moana Boulevard, #1189, Honolulu, HI 96815-1420. Tel: 808-951-5672; Fax: 803-394-0814; Email: gee.21@worldnet.att.net; Internet: www.gee21.org.

Global Green USA, Legacy Program

The goal of the Legacy Program is to create a legacy of peace by creating a sustainable and secure future. It works toward this goal by facilitating communication and dialogue among stakeholders in the U.S. and abroad to advance the proper, accelerated cleanup of the legacy military toxic contamination. The Legacy Program also supports the safe and sound demilitarization of both conventional and mass destruction weapons, and thereby full implementation of arms control treaties; and promotes the sustainable re-use of affected facilities. Current efforts include a Washington, D.C. office focused on public education and policy advocacy to strengthen military-related pollution clean-up, and CHEMTRUST, a four-year project designed to build public participation in Russian and American decision-making for chemical weapons demilitarization. For more information, contact: GG USA Legacy Program, 1025 Vermont Ave. NW, Ste. 300, Washington, DC 20005-6303. Tel: 202-879-3181; Fax: 202-879-3182; E-mail: gleikam@globalgreen.org; Internet: http://www.globalgreen.org.

Global Survival Network

The Global Survival Network (GSN), formerly the Global Security Network, is a non-profit organization that addresses urgent threats to human and environmental welfare. GSN combines investigations, public media campaigns, direct action programs, and global networking to identify, expose, and address flagrant violations of environmental and human rights. Some of their accomplishments include establishing a successful, world-renowned wildlife recovery program in the Russian Far East, reducing the consumption of endangered species through their international multi-media Asian Conservation Awareness Program (ACAP), and addressing human trafficking and associated human rights abuses. For more information, contact: Global Survival Network, P.O. Box 73214, T Street Station NW, Washington, DC 20009. Tel: 202-387-0028; Fax: 202-387-2590; E-Mail: ingsn@igc.apc.org; Internet: http://www.globalsurvival.net.

Global Water Partnership

The Global Water Partnership (GWP) is an international network comprising a large number of developed and developing country government institutions, agencies of United Nations, development banks, professional associations, research institutions, NGOs, and private sector organizations. GWP initiatives are based on the Dublin-Rio principles articulated in 1992, and are intended to support national, regional, and international cooperation and coordination of activities and to foster investment in water resource activities. These initiatives include supporting integrated water resources management; information-sharing mechanisms; developing innovative solutions to conflicts over water resources; suggesting practical policies based on these solutions; and helping to match needs to available resources. GWP also hosts an independent, on-line interactive venue for knowledge and networking called the Water Forum at http://www.gwpforum.org. The Water Forum serves as a tool for information exchange and exploration among individuals, organizations, the private sector, and academia with interest in fresh water management. For more information, please contact: GWP Secretariat, c/o Sida, S-105 25 Stockholm, Sweden. Tel: 46-8-698 5000; Fax: 46-8-698 5627; E-Mail: gwp@sida.se; Internet: http://www.gwp.sida.se.

Institute for Alternative Futures

The Institute for Alternative Futures (IAF) is a nonprofit futures research think-tank founded by Clement Bezold, James Dator, and Alvin Toffler in 1977. The Foresight Seminars were initiated in 1978 and are the Institute's primary public education program. The Seminars provide Congress, federal agencies, and the public with health futures research and future-oriented public policy analysis. A seminar in February 1999 addressed the threat of infectious diseases and drug-resistant pathogens. The IAF also explores environmental topics. For information, contact: Institute for Alternative Futures, 100 N. Pitt St., Ste. 235, Alexandria, VA 22314-3108. Tel: 703-684-5880; Fax: 703-684-0640; E-Mail: futurist@altfutures.com; Internet: http://www.altfutures.com.

Institute for Sustainable Communities

The Institute for Sustainable Communities (ISC) is an independent, non-profit organization, founded in 1991 by former governor of Vermont Madeleine Kunin. ISC provides training, technical assistance, and financial support to communities. The mission of ISC is to promote environmental protection and economic and social well-being through integrated strategies at the local level. ISC projects emphasize participating actively in civic life, developing stronger democratic institutions, and engaging diverse interests in decision making. ISC is based in Montpelier, Vermont with offices in Russia, Macedonia, and Bulgaria. For information, please check ISC's Web site at http://www.iscvt.org or contact George Hamilton, Executive Director, Institute for Sustainable Communities, 56 College St., Montpelier, VT 05602. Tel: 802-229-2900; Fax: 802-229-2919.

International Center for Research on Women

The International Center for Research on Women (ICRW) is a private, nonprofit organization dedicated to promoting social and economic development with women's full participation. ICRW generates quality, empirical information and technical assistance on women's productive and reproductive roles, their status in the family, their leadership in society, and their management of environmental resources. The Center's publications included "New Directions for the Study of Women and Environmental Degradation" and "Women, Land, and Sustainable Development." ICRW advocates with governments and multilateral agencies, convenes experts in formal and informal forums, and engages in an active publications and information program to advance women's rights and opportunities. ICRW was founded in 1976 and focuses principally on women in developing and transition countries. For information, contact: International Center for Research on Women (ICRW), 1717 Massachusetts Ave. NW, Suite 302, Washington, DC 20036. Tel: 202-797-0007; Fax: 202-797-0020; E-Mail: icrw@igc.apc.org; Internet: http://www.icrw.org.

International Food Policy Research Institute

The International Food Policy Research Institute (IFPRI) was established in 1975 to identify and analyze policies for sustainably meeting the food needs of the poor in developing countries and to disseminate the results of the research to policymakers and others concerned with food and agricultural policy. IFPRI is a member of the Consultative Group on International Agricultural Research (CGIAR), an association of sixteen international research centers, and receives support from a number of governments, multilateral organizations, and foundations. IFPRI supports Future Harvest, a public awareness campaign that builds understanding on the importance of agricultural issues and international agricultural research. For more information, contact: International Food Policy Research Institute, 2033 K St. NW, Washington, DC 20006. Tel: 202-862-5600; Fax: 202-467-4439; E-mail: ifpri@cgiar.org; Internet: http://www.cgiar.org/ifpri/2index.HTM.

International Human Dimensions Programme on Global Environmental Change

IHDP is an international, interdisciplinary, non-governmental social science program dedicated to promoting and coordinating research aimed at describing, analyzing, and understanding the human dimensions of global environmental change. In order to accomplish its goals, IHDP links researchers, policy-makers, and stakeholders; promotes synergies among national and regional research committees and programs; identifies new research priorities; provides a focus and new frameworks for interdisciplinary research; and facilitates the dissemination of research results. This strategy is based on a bottom-up approach, which builds upon existing researchers and research results around the world. Particular emphasis is placed on expanding and strengthening the network of national human dimensions committees and programs and on enhancing the IHDP's capacity to support them. For information, contact:

IHDP, Walter-Flex-Strasse 3, 53113 Bonn, Germany. Tel: 49-228-739050; Fax: 49-228-789054; E-Mail: ihdp@uni-bonn.de; Internet: http://ibm.rhrz.uni-bonn.de/IHDP/.

International Institute for Sustainable Development

The mission of the International Institute for Sustainable Development (IISD) is to champion innovation, enabling societies to live sustainably. The IISD contributes new knowledge and concepts, undertakes policy research and analysis, demonstrates how to measure progress, and identifies and disseminates sustainable development information. Its focus is on such topics and issues as economic instruments and perverse subsidies, trade and investment, climate change and the development of sustainable forms of agriculture and forestry. The theme of environment and security is common across their work. For more information, contact: International Institute for Sustainable Development, 161 Portage Ave. East, 6th Floor, Winnipeg, Manitoba R3B 0Y4, Canada. Tel: 204-958-7700; Fax: 204-958-7710; E-Mail: info@iisd.ca; Internet: IISDnet-http://iisd.ca; http://www.iisd.ca/linkages.

International Institute of Applied System Analysis (IIASA)

IIASA is a non-governmental research organization located in Austria. International teams of experts from various disciplines conduct scientific studies on environmental, economic, technological, and social issues in the context of human dimensions of global change. Since its inception in 1972, IIASA has been the site of successful international scientific collaboration in addressing areas of concern for all advanced societies, such as energy, water, environment, risk, and human settlement. The Institute is sponsored by National Member Organizations in North America, Europe, and Asia. For information, contact: International Institute for Applied Systems Analysis, A-2361 Laxenburg, Austria. Tel: 43-2236-807-0; Fax: 43-2236-71313; E-Mail: info@iiasa.ac.at; Internet: http://www.iiasa.ac.at/.

International Peace Research Institute, Oslo

The International Peace Research Institute in Oslo (PRIO), was founded in 1959. Researchers at PRIO have published significant theoretical contributions on the concept of security while also investigating the specific linkages between environment, poverty, and conflict. Future projects center on connections between the natural environment and conflict and migration. PRIO also makes ongoing contributions as the editorial home to both The Journal of Peace Research and Security Dialogue. For information, contact: Dan Smith, Director, International Peace Research Institute (PRIO), Fuglehauggata 11, 0260 Oslo, Norway. Tel: 47-22-54-77-00; Fax: 47-22-54-77-01; E-mail: info@prio.no; Internet: http://www.prio.no/.

International Policy Council on Agriculture, Food, and Trade

The International Policy Council on Agriculture, Food, and Trade (IPC) is dedicated to developing and advocating policies that support an efficient and open global food and agricultural system that promotes production and distribution of food supplies adequate to meet the needs of the world's population. IPC was founded in 1987 as an independent group of leaders in food and agriculture from twenty developed and developing countries. It conveys its recommendations directly to policymakers, and publishes a variety of papers and studies. For information, contact: International Policy Council on Agriculture, Food, and Trade, 1616 P Street NW, Ste. 100, Washington, DC 20036. Tel: 202-328-5117; Fax: 202-328-5133; E-mail: lacy@rff.org; Internet: http://www.agritrade.org.

IUCN-The World Conservation Union

IUCN is an international conservation organization with a membership of over 900 bodies, including states, government agencies, and non-government organizations across some 140 countries, as well as scientific and technical networks. The mission of IUCN is to influence, encourage, and assist societies to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable. It has been an important actor in promoting effective global governance through contributions to multilateral agreements such as CITES and the Biodiversity Convention, in environmental mediation (e.g. Okavango Delta, Victoria Falls) and at the regional and national levels (e.g. national conservation strategies and transboundary ecosystem management). IUCN with the World Bank, has established the World Commission on Dams whose mandate is to review and make recommendations on the future of large dams, including environment and social dimensions. IUCN has also conducted an important study for the Organization for Economic Cooperation and Development (OECD) on environment and security. In October of 1998, IUCN celebrated its 50th Anniversary in Fontainebleau, France, in

which environment and security was a major theme. More recently, IUCN is in the planning stage of launching an initiative on Environment and Security intended to build on practical lessons learned and issues drawn from its field presence. IUCN's chief scientist is conducting research on the relationship between war and biodiversity with a book expected to be completed in 1999. The Second World Conservation Congress will take place in Jordan in 2000. For information, contact: Scott A. Hajost, Executive Director, IUCN-US, 1630 Connecticut Ave. NW, 3rd Floor, Washington, DC 20009. Tel: 202-387-4826; Fax: 202-387-4823; E-Mail: postmaster@iucnus.org; Internet: http://www.iucn.org/.

The Natural Resources Defense Council

The Natural Resources Defense Council (NRDC) is a U.S. non-profit environmental protection organization with over 400,000 members and a staff of attorneys, scientists, and specialists addressing the full range of pressing environmental problems. The NRDC has had a long and active program related to environment and security. NRDC has engaged in extensive advocacy with the U.S. government and international institutions on climate change and other global common problems and on environmental challenges in developing countries. Since the 1992 Earth Summit, NRDC has worked on the creation and approach of new mechanisms to hold governments accountable to commitments they have made to move toward "sustainable development." NRDC has a new initiative in China on energy efficiency and renewables. NRDC continues to undertake research, analysis, and advocacy related to nuclear weapons production and dismantlement, nuclear materials and proliferation, and nuclear energy. For information, contact: S. Jacob Scherr, Senior Attorney, NRDC, 1200 New York Ave. NW, Washington, DC 20005. Tel: 202-289-6868; Fax: 202-289-1060; Internet: http://www.nrdc.org.

The Nautilus Institute for Security and Sustainable Development

The Nautilus Institute is a policy-oriented research and consulting organization. Nautilus promotes international cooperation for security and ecologically sustainable development. Programs embrace both global and regional issues, with a focus on the Asia-Pacific region. Nautilus has produced a number of policy-oriented studies on these topics which are available on the Internet and in hard copy. Current projects include a U.S.-Japan Policy Study Group focused on transboundary environmental and security issues arising from rapid energy development in Northeast Asia. This group is identifying specific areas for cooperation and collaboration between the United States and Japan to mitigate the negative impacts of the growth in energy use. The Energy Futures project focuses on the economic, environmental, and security implications of future energy resource scenarios for Northeast Asia including coal, nuclear power, natural gas, and increased efficiency and renewable sources. The Institute is taking a close analytical look at the concept of "energy security" in Japan, exploring the decision-making options to increase energy security without presupposed conclusions as to the implications for the use of nuclear technology. The Institute also leads dialogues on environmental security issues in the Korean Peninsula and conducts research on trade and environmental issues in the APEC region. The Northeast Asia Peace and Security Network (NAPSNet) and the Asia-Pacific Environmental Network (APRENet) are two information services the Institute offers to subscribers free of charge via E-mail. For information, contact: The Nautilus Institute, 1831 2nd St., Berkeley, CA 94710. Tel: 510-204-9296; Fax: 510-204-9298; E-mail: info@nautilus.org; Internet: http://www.nautilus.org.

Overseas Development Institute

The Overseas Development Institute (ODI) is one of Britain's leading independent think-tanks on international development and humanitarian issues. Its mission is to inspire and inform policy and practice, which lead to the reduction of poverty, the alleviation of suffering and the achievement of sustainable livelihoods in developing countries. ODI does this by linking together high-quality applied research, practical policy advice, and policy-focused dissemination and debate. They work with partners in the public and private sectors, in both developing and developed countries. ODI's work centers on four research and policy programs: the Humanitarian Policy Group, the International Economic Development Group, the Forest Policy and Environment Group, and the Rural Policy and Environment Group. ODI publishes two journals, the Development Policy Review and Disasters, and manages three international networks linking researchers, policy-makers, and practitioners: the Agricultural Research and Extension Network, the Rural Development Forestry Network, and the Relief and Rehabilitation Network. ODI also manages the ODI Fellowship Scheme, which places up to twenty young economists a year on attachment to the governments of developing countries. As a registered charity, ODI is dependent on outside funds and is

supported by grants and donations from public and private sources. For information, contact: Overseas Development Institute, 111 Wesstminster Bridge Road, London SEI 7JD, United Kingdom. Tel: 44-(0)207-922-0300; Fax: 44-(0)207-922-0399; E-Mail: odi@odi.org.uk; Internet: http://www.oneworld.org/odi/.

The Pacific Institute

The Pacific Institute for Studies in Development, Environment, and Security, directed by Peter H. Gleick, is an independent, non-profit research center created in 1987 to conduct research and policy analysis in the areas of environmental degradation, sustainable development, and international security, with an emphasis on the nexus of these issues. The Institute has three broad goals: 1) to conduct policy-relevant research on the nexus of international security, environmental change and degradation, and economic development; 2) to collaborate on complementary research efforts with other organizations and individuals; and 3) to actively work on developing solutions with policymakers, activists, and members of the general public. The Institute has been a leader in research on how resource issues may fuel instability and conflict, focusing on freshwater resources, climate change, and resource management. Recent projects include: an assessment of the impact of climate change on freshwater ecosystems; analysis of the role of conservation and economic incentives to solve California's water problems, and a critique of efforts to restore the Salton Sea as a viable ecosystem. For more information, contact: The Pacific Institute for Studies in Development, Environment, and Security, 654 13th St., Oakland, CA 94612. Tel: 510-251-1600; Fax: 510-251-2203; E-Mail: wburns@pacinst.org; Internet: http://www.pacinst.org.

Pew Center on Global Climate Change

Joining forces under a new organization, the Pew Center On Global Climate Change, diverse sectors of society are now coming together to steer our nation and the world toward reasonable, responsible, and equitable solutions to our global climate change problems. The Center brings a new cooperative approach and critical scientific, economic, and technological expertise to the global debate on climate change. Established in 1998 by the Pew Charitable Trusts, the Center is directed by Eileen Claussen, former U.S. Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs. Major companies and other organizations are working together through the Center to educate the public on the risks, challenges and solutions to climate change. These efforts at cooperation and education are spearheaded by the Center's Business Environmental Leadership Council. The Pew Center is committed to the development of a wide range of reports and policy analyses that will add new facts and perspectives to the climate change debate in key areas such as economic and environmental impacts, and equity issues. For information, contact: Pew Center on Global Climate Change, 2111 Wilson Blvd., Ste. 350, Arlington, VA 22201. Tel: 703-516-4146; Fax: 703-243-2874; Internet: http://www.pewclimate.org.

Population Action International

Population Action International (PAI) promotes the early stabilization of world population through policies that enable all women and couples to decide for themselves, safely and in good health, whether and when to have children. PAI's Population and Environment Program supports this work through research and publications on the relationship of population dynamics to the sustainability of natural resources critical to human well-being. The program also considers interactions between population dynamics and economic change, public health and security. Most recently, the program has begun an initiative related to community-based population and environment activities, defined as provision of services linking natural resources management and reproductive health at the request of communities. In 1998 PAI published Plan and Conserve: A Source Book on Linking Population and Environmental Services in Communities. Other departments within PAI explore issues related to population policy and funding, provision of reproductive health services, the education of girls, and legislative initiatives related to international population issues. For further information, contact: Robert Engelman, Director, Population and Environment Program, Population Action International, 1300 19th St. NW, Second Floor. 550, Washington, DC 20036. Tel: 202-557-3400; Fax: 202-728-4177; E-mail: re@popact.org; Internet: http://www.populationaction.org.

Population and Habitat Campaign

National Audubon Society has launched a major new initiative to build a public mandate for population and family planning and to connect the issues of population growth with habitat. Through this program, Audubon will draw upon its chapters and other community leadership to educate and mobilize citizens from around the country to

confront population and environment problems and to communicate with policy makers. The National Audubon Society has embarked on a broad-based effort to strengthen U.S. leadership on population, utilizing its expertise in grassroots activism. The Population and Habitat Program focuses on 1) restoration of international population funding and 2) connecting population issues to state and local habitat issues. To these ends, the Population Program has already put three State Coordinators in place in Colorado, Pennsylvania, and New York, with plans for additional Coordinators in California, Florida, Ohio, and Texas. These Coordinators will design a three-year plan identifying local population issues and their impacts on birds, wildlife, and habitat. They will be conducting training for activists and providing chapters and the public with ways to become involved in the Program. The Program produced a publication in 1998 called *Population and Habitat in the New Millennium*, by Ken Strom, that helps activists make the connections among population growth, consumption and environmental issues and includes provocative discussions and possible solutions. For more information, contact: Lise Rousseau, Communications Director, Population & Habitat Program, National Audubon Society, 3109 28th St., Boulder, CO 80301. Tel: 303-442-2600; Fax: 303-442-2199; E-Mail: LRousseau@Audubon.org; Internet: http://www.earthnet.net/~popnet.

Population Council

The Population Council, a nonprofit, nongovernmental research organization established in 1952, seeks to improve the well-being and reproductive health of current and future generations around the world and to help achieve a humane, equitable, and sustainable balance between people and resources. The Council analyzes population issues and trends; conducts research in the social and reproductive sciences; develops new contraceptives; works with public and private agencies to improve the quality and outreach of family planning and reproductive health services; helps governments design and implement effective population policies; communicates the results of research in the population field to diverse audiences; and helps strengthen professional resources in developing countries through collaborative research and programs, technical exchange, awards, and fellowships. Research and programs are carried out by three divisions-the Center for Biomedical Research, the Policy Research Division, and the International Programs Division-and by two Distinguished Colleagues. Council headquarters and the Center for Biomedical Research are located in New York City and the Council also has four regional and fifteen country offices overseas. About 360 women and men from more than sixty countries work for the Council; more than a third hold advanced degrees. Roughly forty percent are based in developing countries. Council staff collaborate with developing-country colleagues to conduct research and programs in some fifty countries in South and East Asia, West Asia and North Africa, sub-Saharan Africa, and Latin America and the Caribbean. The organization's funds come from governments, foundations and other nongovernmental organizations, internal sources, multilateral organizations, corporations, and individuals. The Council's current annual budget is $49 million. For information, contact: Population Council, 1 Dag Hammarskjkold Plaza, New York, NY 10017. Tel: 212-339-0525; Fax: 212-755-6052; E-Mail: pubinfo@popcouncil.org; Internet: www.popcouncil.org.

The Population Institute

The Population Institute is a private, non-profit organization working for a more equitable balance among the world's population, environment, and resources. The Institute was founded in 1969. Since 1980, it has dedicated its efforts exclusively to creating awareness of international population issues among policy makers, the media, and the public. In pursuing its goals, the Institute works in three specific programmatic areas: the development of the largest grassroots network in the international population field; providing the media with timely and accurate information on global population issues; and the tracking of public policy and legislation affecting population. The Institute's Future Leaders Program recruits college students and recent graduates as staff assistants in its community leaders, information and education, and public policy divisions. An International Fellowship in Population Studies was launched in 1989 to provide six-month internships in a developing country's population and family planning program to qualified applicants. The Institute annually presents Global Media Awards for Excellence in Population Reporting to journalists in fifteen media categories, and the Global Statesman Award to world leaders. It is also the official sponsor of World Population Awareness Week (WPAW), a week of awareness-raising activities co-sponsored by organizations worldwide. The Institute publishes the bimonthly newspaper, *POPLINE*, the most widely circulated newspaper devoted exclusively to population issues; the *Towards the 21st Century* series, exploring the interrelationships between population and other major issues; educational materials and books. Regional representatives of the Population Institute are located in Bogota, Columbia; Colombo, Sri Lanka; and Brussels, Belgium.

For more information, contact Werner Fornos, President, or Bettye Ward, Chair, The Population Institute, 107 Second St. NE, Washington, DC 20002. Tel: 202-544-3300; Fax: 202-544-0068; E-mail: web@population institute.org; Internet: www.populationinstitute.org.

Population Matters

In 1996, RAND launched Population Matters, a program for research communication that is using different means, methods, and formats for reaching audiences that influence the making of population policy, in the United States and abroad. With support from a consortium of donors led by the William and Flora Hewlett Foundation and including the Rockefeller Foundation and the United Nations Population Fund, the program is addressing the concern that empirical population research is missing opportunities to inform policymaking and public awareness. RAND's involvement is also intended to fill the need for an objective "information broker" who does not espouse a political or ideological point of view on population issues. The program has two principal goals: 1) to raise awareness of and highlight the importance of population policy issues, and 2) to provide a more scientific basis for public debate over population policy questions. To date, the project has examined 12 topics: the record of family planning programs in developing countries; congressional views of population and family planning issues; Russia's demographic crisis; immigration in California; the national security implications of demographic factors; interrelations between population and the environment; factors that influence abortion rates; economic consequences of demographic change; the health and demographic effects of economic crises; the consequences of population growth in California; American public opinion on population issues; and the value of U.S. support for international demographic research. For more information about the project, contact: Dr. Julie DaVanzo, RAND, 1700 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138. Tel: 310-393-0411 ext. 7516; Fax: 310-260-8035; E-Mail: Julie_DaVanzo@rand.org; Internet: http://www.rand.org/popmatters.

The Population Reference Bureau

The Population Reference Bureau (PRB) provides information to policymakers, educators, the media, opinion leaders and the public around the world about U.S. and international population trends. PRB examines the links among population, environment, and security. PRB has recently conducted three specific projects that deal with these linkages. The first is a cross-national project on population, environment, and consumption in collaboration with research institutes in Mali, Mexico, and Thailand. This project examines the impact of household-level transportation on urban air pollution in the U.S. and in the partner nations. By improving methods of measurement, better understanding people's attitudes, and enhancing policymakers' understanding, this project will expand the framework for studying population, consumption, and the environment. The second project, called The Water and Population Dynamics Initiative, promotes the sustainable use and equitable management of water resources and aquatic ecosystems. In addition, it strengthens population policies and programs, adhering to the ICPD Program of Action. Through this project, the goal of informing water and population policies and practices-and the effectiveness of combined management strategies-will be applied directly in Guatemala, India, Jordan, Morocco, Pakistan, and Zambia over three years. Finally, PRB's U.S. in the World project helps Americans relate population-environment interactions in the U.S. to those in developing nations. The project profiles the demographic, social, economic, and environmental conditions of a US state along side a comparable developing nation. In turn, Americans learn about the connections among population, the environment, and resource use both locally and globally. In addition, members of partner organizations are able to articulate how their welfare is linked to the well-being of people in developing regions. For more information, please contact: Roger-Mark De Souza, Population-Environment Coordinator, 1875 Connecticut Ave. NW, Ste. 520, Washington, DC 20009-5728. Tel: 202-939-5430; Fax: 202-328-3937; E-Mail: rdesouza@prb.org.

Program on International Peace and Security

The Program on International Peace and Security, with funding from the MacArthur Foundation, provides fellowships to help reshape security studies in academia and in such professions as law and journalism to include both a much broader range of substantive research topics and a more diverse set of researchers. The program is based on the view that security concerns-violent conflict and military force-apply to a much wider range of actors and situations than the state-centric mode of traditional security thinking. Every year, the Social Science Research Council has awarded approximately 13 two-year dissertation and postdoctoral fellowships for training and research. For infor-

mation, contact: Social Science Research Council, 810 Seventh Ave., New York, NY 10019. Tel: 212-377-2700; Fax: 212-377-2727; Internet: http://www.wwrc.org/.

Resources Conflict Institute (RECONCILE)

The phenomenal population growth in Kenya since independence, has exerted immense pressure on the natural resource base, leading to an escalation in both the intensity and the scope of natural resource conflicts. In order to address natural resources conflicts it is necessary to recognize and utilize existing capacities within resource dependent communities as well as build new capacities in response to new forms and manifestations of conflict over natural resources. It is this challenge that the Resources Conflict Institute (RECONCILE) seeks to meet. RECONCILE works for the reconciliation of competing resource needs to promote the sustainable management of natural resources and the promotion of sustainable development. In this work, it is guided by a commitment to achieve the following objectives: to understand, articulate and promote the use of traditional natural resource management systems, institutions, concepts, and practices in addressing existing and emerging natural resource conflicts; to use natural resource conflicts as an entry point for understanding and addressing the resource needs, opportunities and constraints of resource dependent communities and for devising and promoting policy options for equitable access to and control of natural resources by these communities; to engage and use the legal system and the legal process in Kenya in addressing conflicts over access to and control of natural resources by resource dependent communities. For more information, contact: The Executive Director, Resources Conflict Institute (RECONCILE), Printing House Road, P.O. Box 7150, Nakuru; Tel: 254-37-44940; Fax: 254-37-212865; E-mail: Reconcile@net2000ke.com.

Resources for the Future

Resources for the Future (RFF) is an independent, nonprofit research organization that aims to help people make better decisions about the environment. RFF is committed to elevating public debate about natural resources and the environment by providing accurate, objective information to policymakers, legislators, public opinion leaders, and environmentalists. RFF has three research divisions: the Center for Risk Management, the Energy and Natural Resources Division, and the Quality of the Environment Division. Currently, RFF has several programs which address environment and security linkages including an ongoing project on Environmental Protection in China and the International Institutional Development and Environmental Assistance Program (IIDEA). IIDEA is aimed at helping countries and institutions become more effective environmental actors by focusing on implementation and management of environmental law and policy. IIDEA's mission is to reduce environmental risk and enhance environmental security by working to bridge the gap between formal commitment and actual practice. For information, contact: Resources for the Future, 1616 P St. NW, Washington, DC 20036. Tel: 202-328-5000; Fax: 202-939-3460; E-mail: bell@rff.org; Internet: http://www.rff.org.

Rocky Mountain Institute

The Rocky Mountain Institute is an independent, nonprofit research and educational foundation which works to foster the efficient and sustainable use of resources as a path to global security. Its research focuses on the interlinked areas of energy, transportation, real-estate development, water and agriculture, community economic development, corporate practices, and security. The Institute endeavors to develop a balanced concept of national and global security that will ensure a better quality of life for future generations. For information, contact: Rocky Mountain Institute, 1739 Snowmass Creek Rd., Snowmass, CO 81654-9199. Tel: 970-927-3851; Fax: 970-927-3420; E-Mail: outreach@rmi.org; Internet: http://www.rmi.org.

The Royal Institute of International Affairs Energy and Environmental Program

The Energy and Environmental Programme (EEP) is one of seven research programs based at the Royal Institute of International Affairs. The EEP aims to conduct authoritative research and to stimulate debate on the political, strategic, and economic aspects of domestic and international energy and environmental policy issues. Meetings, study groups, workshops and conferences bring together program sponsors, industry, government, nongovernmental groups and academics. A wide range of policy-relevant EEP publications go through an extensive process of peer review both at RIIA and externally. For information, contact: Energy and Environmental Programme, Royal Institute of International Affairs, Chatham House, 10 St. James's Square, London SW1Y 4LE, England. Tel:

44-(0)171-957-5711; Fax: 44-(0)171-957-5710; E-mail: eep-admin@riia.org; Internet: http://www.riia.org/eep.html.

Stockholm Environment Institute

The Stockholm Environment Institute (SEI), established in 1989, is an independent, international research institute specializing in sustainable development and environment issues. It works at local, national, regional, and global policy levels. The SEI research program aims to clarify the requirements, strategies, and policies for a transition to sustainability. These goals are linked to the principles advocated in Agenda 21 and the Conventions such as Climate Change, Ozone Layer Protection, and Biological Diversity. SEI examines the policy connections and implications of scientific and technical analysis. This includes management strategies for environment and development issues of regional and global importance. The results of SEI research are made available to a wide range of audiences through publications, electronic communication, software packages, conferences, training workshops, specialist courses, and roundtable policy dialogues. The Institute has its headquarters in Stockholm with a network structure of permanent and associated staff worldwide and centers in Boston (USA), York (U.K.), and Tallinn (Estonia). The collaborative network consists of scientists, research institutes, project advisors, and field staff located in over 20 countries. For more information, contact: Nicholas Sonntag, Executive Director, Stockholm Environment Institute, Lilla Nygatan 1, Box 2142, S-103 14 Stockholm, Sweden. Tel: 46-8-412-1400; Fax: 46-8-723-0348; E-Mail: postmaster@sei.se; Internet: http://www.sei.se.

World Resources Institute

Established in 1982, the mission of the World Resources Institute (WRI) is to move human society to live in ways that protect Earth's environment and its capacity to provide for the needs and aspirations of current and future generations. Because people are inspired by ideas, empowered by knowledge, and moved to change by greater understanding, WRI provides-and helps other institutions provide-objective information and practical proposals for policy and institutional change that will foster environmentally sound, socially equitable development. To further its mission, WRI conducts policy research, publicizes policy options, encourages adoption of innovative approaches, and provides strong technical support to governments, corporations, international institutions, and environmental NGOs. WRI's current areas of work include economics, forests, biodiversity, climate change, energy, sustainable agriculture, resource and environmental information, trade, technology, national strategies for environmental and resource management, business liaison, and human health. For more information contact: World Resources Institute, 10 G Street, NE, Suite 800, Washington, DC 20002. Tel: 202-729-7600; Fax: 202-729-7610; E-Mail: lauralee@wri.org; Internet: http://www.wri.org/wri/.

Worldwatch Institute

Worldwatch is dedicated to fostering the evolution of an environmentally sustainable society through inter-disciplinary non-partisan research on emerging global environmental concerns, including population and security issues. The Institute recently published Worldwatch paper 143, *Beyond Malthus: Sixteen Dimensions of the Population Problem*, by Lester Brown, Gary Gardner, and Brian Halweil, which addresses the effects of population growth on global and regional stability. Worldwatch researcher Michael Renner published in late 1997 Paper 137 on the destructive effects of small arms proliferation entitled *Small Arms, Big Impact: The Next Challenge of Disarmament;* Mr. Renner's 1996 publication *Fighting for Survival: Environmental Decline, Social Conflict, and the New Age of Insecurity* deals with international security and environment/sustainable development. Lester Brown's 1995 book, *Who Will Feed China? Wake-up Call for a Small Planet*, examines the challenges associated with sustainability meeting the needs of a rapidly expanding population. The Institute's annual publications, State of the World and Vital Signs, provide a comprehensive review and analysis of the state of the environment and trends that are shaping its future. The Institute's bimonthly magazine, World Watch, complements these reports with updates and in-depth articles on a host of environmental issues. Other Worldwatch publications discuss redefining security in the context of global environmental and social issues, the impact of population growth on the earth's resources, and other major environmental issues; and Worldwatch will continue these analyses into the future. For information, contact: Worldwatch Institute, 1776 Massachusetts Ave. NW, Washington, DC 20036. Tel: 202-452-1999; Fax 202-296-7365; E-mail: worldwatch@worldwatch.org; Internet: http://www.worldwatch.org.

Governmental Activities

Army Environmental Policy Institute

The U.S. Army Environmental Policy Institute (AEPI) was established in 1989. The AEPI mission is to assist the Army Secretariat in developing proactive policies and strategies to address both current and future Army environmental challenges. Study topics include developing an environmental training strategy for DoD's approach to Native Americans/Alaskan Indian environmental issues; environmental justice; pollution prevention policy in weapon systems acquisition; privatization and competitive outsourcing; revision of the Army's National Environmental Policy Act (NEPA) implementation regulation; environmental legislation monitoring and impact analysis; and environmental issues that are likely challenges or opportunities for the Army in future years. Expert consultant services recently included such areas as public involvement policy, environmental issue management for overseas military operations, and environmental policy for exploded and unexploded ordnance on training ranges. AEPI augments its small, multi-disciplined permanent staff with experts from the private sector, academia, and other Army, DoD, and governmental agencies. The Institute has published more than a twenty policy papers on pertinent environmental issues. Recent titles include "Defining Environmental Security: Implications for the U.S. Army," "Interagency Cooperation on Environmental Security," "Mending the Seams in Force Protection: From the Pentagon to the Foxhole," and "Environmental Methods Review: Retooling Impact Assessment for the New Century." They and the 1999 Corporate Report may be ordered from AEPI. For information, contact: Director, AEPI, 101 Marietta St., Ste. 3120, Atlanta, GA 30303. Tel: 404-524-9364; Fax: 404-524-9368; E-Mail: webmaster@aepi.army.mil; Internet: http://www.aepi.army.mil/.

Director of Central Intelligence/DCI Environmental Center

The DCI Environment Center was established in 1997 as a focal point for the intelligence community on environmental matters. The DCI Environmental Center provides comprehensive information from a number of organizations to policymakers on environmental issues that impact U.S. national security interests. Housed in the Directorate of Intelligence, the Center produces, integrates, and coordinates assessments of the political, economic, and scientific aspects of environmental issues as they pertain to US interests. The DEC also provides data to the environmental community. The Center has three main components: the Environmental Issues Branch, a Civil Applications Branch, and a long-term assessment element. The Environmental Issues Branch was established at the Central Intelligence Agency in the late 1980s in response to policymakers' questions concerning global environmental issues, including treaty negotiations and compliance, environmental crime, and foreign environmental policy and performance. Civil Applications was formed in the early 1990s with a group of scientists, now known as MEDEA, to investigate the degree to which intelligence information and assets could enhance our understanding of the Earth's environment. The long-term assessment element focuses on the impact of environmental change on national, regional, and international political, economic, and social dynamics. Specific DEC programs include: assessing transboundary environmental crime; supporting environmental treaty negotiations and assessing foreign environmental policies; assessing the role played by the environment in country and regional instability and conflict; supporting the international environmental efforts of other US government agencies; and providing environmental data to civil agencies.

Environmental Protection Agency-Office of International Activities

The U.S. Environmental Protection Agency (EPA) is committed to protecting the U.S. environment from transboundary and global threats. To this end, EPA has embraced the concept of environmental security and it contributes to security through a broad range of activities: anticipating future national security concerns of an environmental nature and determining how to prevent or mitigate them; addressing regional environmental threats and promoting regional environmental security; abating global environmental problems such as climate change, loss of biodiversity, and destruction of the ozone layer; managing hazardous conditions resulting from the legacy of the Cold War; and enforcing international environmental treaties and combating environmental crimes.

While also facing the new responsibility of environmental security, the EPA is still very active in its more traditional roles of environmental protection. In 1999, the EPA initiated interagency discussions to determine U.S. trade and environmental policy objectives for the World Trade Organization's meeting in Seattle. Also during the past year, the EPA reached an agreement on ten new bilateral projects with China dealing with the intersection of urban air

quality, public health and climate change. Another country that the EPA has worked very extensively with during the past year is Japan. The EPA recently coordinated the U.S. response to a Japanese law mandating higher fuel efficiency targets of road vehicles. For more information, please contact: Environmental Protection Agency, Mail Code 2660R, 1300 Pennsylvania, Washington, DC 20460. Tel: 202-5646462; E-Mail: grieder.wendy@epa mail.epa.gov.

United States Agency for International Development / Center for Population, Health and Nutrition

The technical structure of USAID is divided into four Regional Bureaus and the Bureau for Global Programs, Field Support, and Research. The Regional Bureaus provide technical and programmatic expertise to the missions in each of the four regions (Asia, Africa, Latin America/Caribbean, and Europe/NIS). The Global Bureau is divided into five centers, each corresponding to one of the Agency's five focus areas. As its name suggests, the Global Bureau focuses its efforts on global leadership, technical support to the field, and research and evaluation. The Center for Population, Health and Nutrition (PHNC) performs these functions in Washington, D.C. for the PHN sector. Integral to performing these functions is the pivotal relationship of the PHNC to its partners and stakeholders within USAID, such as missions and regional bureaus, and outside of the Agency, such as the NGO community, host governments, and multilateral organizations.

The Center for Population, Health and Nutrition's (PHN) goals are to stabilize world population growth and to protect human health. In order to achieve these goals, the Agency has adopted a strategy based on four strategic objectives: reducing unintended pregnancies, reducing maternal mortality, reducing infant and child mortality, and reducing STD transmission with a focus on HIV/AIDS. These are a refinement of the historical strategic direction of the Population, Health and Nutrition sector. Looking to the future, the PHN strategy also incorporates principles from the Cairo Program of Action and reflects Agency mandates in the areas of women's empowerment. The PHN program focus, therefore, is on improving the quality, availability, and use of key family planning, reproductive health, and other health interventions in the PHN sector, with sustainability and program integration as essential crosscutting themes. For over thirty years USAID has supported PHN activities through a variety of programs in many countries. From 1985 to 1996, USAID provided approximately $9.670 billion in PHN assistance to developing countries, making it the largest international donor in this sector in the world. In FY1996, obligations in the sector totaled approximately $916 million.

The PHN Center is composed of three offices with complementary objectives and activities: the Office of Population, the Office of Health and Nutrition, and the Office of Field and Program Support. These offices work together to support the field and accomplish the goals and objectives of USAID in this sector. Each office, its divisions, and activities are described below.

Office of Population (POP)

Commodities and Logistics Management Division (CLM): Provides a centralized system for contraceptive procurement, maintains a database on commodity assistance, and supports a program for contraceptive logistics management.

Communications, Management, and Training Division (CMT): Increases the awareness, acceptability, and use of family planning methods and expands and strengthens the managerial and technical skills of family planning and health personnel.

Family Planning Services Division (FPSD): Increases availability and quality of family planning and related services through strengthening government programs, local private voluntary organizations, for-profit organizations, and commercial channels.

Policy & Evaluation Division (P&E): Improves demographic research and data collection, assists in creating a supportive policy environment for population, family planning, and other reproductive health programs, supports strategic planning, and guides efforts to evaluate program impact.

Research Division (R): Supports biomedical research to increase understanding of contraceptive methods and to develop new fertility regulation technologies. Also, through operations research, the Research division seeks to improve the delivery of family planning and reproductive health services.

Office of Health and Nutrition (HN)

Child Survival Division (CS): Provides technical guidance and assists in strategy development and program implementation in child survival, including interventions aimed at child morbidity and infant and child nutrition.

Nutrition and Maternal Health Division (NMH): Provides technical guidance and assists in strategy development and program implementation in nutrition and women's health, especially maternal health.

continued on following page....

Office of Science and Technology Policy/National Security and International Affairs

The White House Office of Science and Technology Policy (OSTP) advises the President on science and technology priorities that support national needs, leading interagency coordination of the Federal Government's science and technology enterprise, and fostering partnerships with state and local governments, industry, academe, non-governmental organizations, and the governments of other nations. OSTP also acts as the Secretariat for the National

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Health Policy and Sector Reform Division (HPSR): Assists in the design, implementation, research, and evaluation of health and nutrition policy reform, management and financing issues, including health care financing, quality assurance, pharmaceuticals, private sector, and data activities.

Environmental Health Division (EH): Assists in the design, implementation, research, and evaluation of environmental health activities and issues, including water and sanitation, hazardous wastes, vector-borne tropical diseases, food hygiene, solid waste, air pollution, and occupational health.

HIV/AIDS Division (HIV-AIDS): Provides technical guidance and assists in strategy development, program design, and implementation of HIV/AIDS control activities worldwide.

Office of Field and Program Support (OFPS)

The Office of Field and Program Support (OFPS) was created as a demand driven, service-oriented unit within the PHN Center to ensure that state-of-the-art technical direction is translated into field strategies and programs which achieve impact both globally and at the country level. OFPS has two major functions:

Field Support: Includes Joint Programming and Planning, coordination between the Global Bureau, Regional Bureaus, other donors and the field, and significant technical input into strategic planning and performance monitoring.
Program Support: Includes programming/budgeting for the Center, personnel management, and other tasks related to the global management of PHN resources.

The PHNC and the Missions have developed and implemented the Joint Programming and Planning Country Strategy (JPPC). JPPC is a framework that identifies priority countries for the PHN sector and establishes mechanisms to maximize access to resources for the highest priority countries. The joint programming and planning process brings together staff from all areas at USAID to plan the effective allocation of resources in order to achieve the objectives of country programs. Within the JPPC strategy, Joint Programming Countries are those with the highest potential for worldwide, as well as local or regional, impact across sectors in the PHN arena. A significant level of USAID resources, both in terms of technical staffing and field support, will be committed to achieving results in these countries. Joint Planning Countries are other sustainable development countries that are lower priority in terms of global impact but have PHN sector activities in the form of bilateral programs. Although relatively fewer resources are committed to them than to Joint Programming countries, Joint Planning Countries still receive support from USAID. These countries may also access PHN technical resources. Certain countries are termed special circumstance countries because of significant investments made to date, policy considerations, or crisis conditions. USAID is committed to developing and maintaining strong responsive relationships with these countries and to support their initiatives in the PHN sector. One of the important lessons learned over the thirty years of USAID's efforts in the PHN sector is that maintaining a close connection between field implementation and technical innovations is critical to achieving a lasting impact.

USAID's PHN technical staff offers "one-stop shopping" to USAID's field missions. In this capacity, the PHNC has developed projects that provide access to state-of-the-art technical assistance through a network of Cooperative Agreements (CAs) and contractors. The PHNC also works with missions to translate global initiatives to country-specific situations and provides a ready mechanism by which missions can benefit from the experience and knowledge that USAID has gained worldwide. Working closely with Missions, USAID is developing new approaches for the changing needs of the PHN sector. USAID maximizes the global impact of its programs through support for effective strategic planning at the country level and the allocation of resources across country programs.

This information was excerpted directly from the USAID/PHN web site at http://www. info.usaid.gov/pop_health. Fore more information, contact Joanne Grossi, Office of Population, USAID, Ronald Reagan Bldg. G-PHN-POP Rm 3.06 -041U, Washington, DC 20523. Tel: 202-712-0867; Fax: 202-216-3404; E-mail: jgrossi@usaid.gov; Internet: http//www.info.usaid.gov/pop_health. Please refer to the article by Craig Lasher in ECSP Report *Issue 4 1998 for an additional perspective on USAID/PHN efforts.*

Science Technology Council (NSTC) created by President Clinton in November 1993 to strengthen interagency policy coordination. One of the principal priorities of OSTP is strengthening the contribution to science and technology to national security and global stability. Working with the NSTC, OSTP's works to promote the role of science and technology in sustainable development including areas such as protecting the environment, predicting global changes, reducing the impact of natural disasters, promoting human health, bolstering the fight against infectious diseases, fostering the information infrastructure, and assuring food safety. As effective progress in these areas requires an international response, OSTP is engaged in priority bilateral and multilateral activities that address these goals. These included ongoing dialogues with Russia, China, Japan, South Africa and the Ukraine, and in the APEC, the OECD, the Summit of the Americas, and the G-7. For more information, contact: Office of Science and Technology Policy, 1600 Pennsylvania Avenue, NW, Washington, DC. Tel: 202-395-7347; E-Mail:Information@ostp.eop.gov; Internet: http://www.whitehouse.gov/WH/EOP/html/OSTP_Home.html.

United States Agency for International Development, Global Environment Center

The Global Environment Center in the U.S. Agency for International Development's (USAID) Bureau for Global Programs, coordinates the USAID's environmental programs. The Center provides technical and programmatic leadership and support to USAID and its field missions for sustainable natural resources, cities, energy systems, and climate change. For more information, please contact the: USAID Global Environment Center, G/ENV Room 3.08-063, Washington, DC 20523-3800; 202-216-3174 (fax). Internet: http://www.info.usaid.gov.

United States Department of Commerce/National Oceanic and Atmospheric Administration, Office of Global Programs

The concept of an International Research Institute for Climate Prediction (IRI) (http://www.cip.ogp.noaa.gov/) was first presented by the United States (Bush administration) at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, 1992, and further advanced by the U.S. (Clinton administration) at the International Forum on Forecasting El Niño: Launching an International Research Institute, in Washington, DC, in 1995. It was agreed that the IRI would embody an "end to end" capability for producing experimental climate forecasts based on predicting ENSO phenomena, and generating information that could be incorporated by decision makers worldwide to mitigate climate-related impacts in sectors such as agriculture, water management, disaster relief, human health and energy. For information, contact: Jim Buizer, Assistant Director for Climate and Societal Interactions, Office of Global Programs (NOAA/OGP), 1100 Wayne Ave., Ste. 1225, Silver Spring, MD 20910. Tel: 301 427-2089 ext. 115; Fax: 301-427-2082; email: buizer@ogp.noaa.gov; Internet: http://www.ogp.noaa.gov; or Kelly Sponberg, Manager, Climate Information Project, Tel: 301-427 2089 ext. 194; Fax: 301-427-2082; email: sponberg@ogp.noaa.gov; internet: http://www.cip.ogp.noaa.gov/; IRI Homepage: http://iri.ldeo.columbia.edu/

United States Department of Energy

The Department of Energy (DoE) engages in a variety of activities related to environmental security. Over one-third of DoE's budget is spent addressing the legacy of environmental concerns in the manufacture of nuclear weapons. DoE also engages in activities to help reduce U.S. dependence on imports of oil. DoE also runs a number of programs devoted to technology development and to the sustainable use of resources:

Office of Nonproliferation and National Security

Within the DoE, the Office of Nonproliferation and National Security has sponsored research and workshops that focus on regional environmental security, instability, and the proliferation of weapons of mass destruction. The Office's focus is on regions where nuclear proliferation is an existing concern and its analysis has two goals: (1) determine how environmental issues may intensify or generate regional instabilities; and (2) assess the potential for enhancing regional stability through the use of confidence building measures which focus on environmental problems. The focus on environmental issues also provides and opportunity for scientists and officials to familiarize themselves with the technology and process of cooperative monitoring and verification for environmental issues before applying them to arms control issues which may be more sensitive.

Office of Environmental Management

The Office of Environmental Management (EM) interacts with foreign governments, international corporations, and international regulatory and consensus standards bodies. Principle topic areas include: characterization, handling, transport, and storage or nuclear and chemical wastes; addressing the decontamination and decommissioning of nuclear facilities; developing systems with foreign partners to ensure proper control and monitoring and return of foreign spent fuel provided under the 1950s "atoms for Peace Program." EM's international agreements allow the United States to obtain unique technical capabilities and engage in exchanges of scientific and technical data and expertise unavailable from U.S. experience like comparative designs of waste storage systems.

Office of Energy Research

The Office of Energy Research focuses on the production of knowledge needed for technology to fulfill the DoE's energy, environment, and competitiveness missions. Research supports the environmental security initiative by providing information on: regional and global environmental change and the consequences of that change; advanced and alternative technology to prevent and/or mitigate environmental pollution (including bioremidiation methodologies); advanced health information on toxic pollutants; advanced tools to diagnose and treat human disease; and risk management methodologies. The Office of Health and Environmental Research is responsible for managing the DoE's seven National Environmental Research Parks which operate under the premise that appropriate research can aid in resolving environmental problems locally and internationally.

Climate Change

Through the Office of Policy and International Affairs, the DoE participates in U.S. international delegations that implement Administration policy and negotiate international agreements. DoE provides analysis of policy options for limiting emissions, works with stakeholders, and articulates Administration policy in a wide variety of fora. The DoE co-manages with the EPA the U.S. Country Studies Program (USCS) and the U.S. Initiative on Joint Implementation (USIJI). USCS assists over sixty developing and transition economy countries in conducting studies on emission inventories, technology options, climate impacts, and migration options. USIJI is a pilot program to develop projects, which reduce emissions of greenhouse gases in other countries.

Intergovernmental Activities

United Nations Development Programme

Through a unique network of 134 country offices, the United Nations Development Programme (UNDP) helps people in 174 countries and territories to help themselves, focusing on poverty elimination, environmental regeneration, job creation, and the advancement of women. In support of these goals, UNDP is frequently asked to assist in promoting sound governance and market development and to support rebuilding societies in the aftermath of war and humanitarian emergencies. UNDP's overarching mission is to help countries build national capacity to achieve sustainable, human development, giving top priority to eliminating poverty and building equity. Headquartered in New York, UNDP is governed by a thirty-six member Executive Board, representing both developing and developed countries. The 1999 UNDP Human Development Report outlined a detailed definition of human security and proposed measures to address insecurities. For more information contact: UNDP, One United Nations Plaza, New York, NY, 10017. Tel: 212-906-5315; Fax: 212-906-5364; E-Mail: hq@undp.org; Internet: http://www.undp.org.

United Nations Environment Programme

The mission of the United Nations Environment Programme (UNEP) is to provide leadership and encourage partnerships in caring for the environment by inspiring, informing, and enabling nations and people to improve their quality of life without compromising that of future generations. UNEP was established as the environmental conscience of the United Nations system, and has been creating a basis for comprehensive consideration and coordinated action within the UN on the problems of the human environment. Recognizing that environment and development must be mutually supportive, UNEP advocated a concept of environmentally sound development, which later led to the adoption of "Sustainable Development" concept in the Brundtland Commission Report and

the United Nations Perspective Document for the Year 2000 and Beyond. Other notable projects include Managing Water for African Cities, an International Children's Conference, and a Convention on International Trade in Endangered Species. Dr. Klaus Töpfer is the current director of UNEP. For more information contact: Mr Tore J. Brevik, Chief, Information and Public Affairs, UNEP, P.O. Box 30552, Nairobi, Kenya. Tel: 254-2-62-1234/3292; Fax: 254-2-62-3927/3692; E-Mail: ipainfo@unep.org; Internet: http://www.unep.org.

United Nations Food and Agriculture Organization

The Food and Agriculture Organization (FAO) was founded in October 1945 with a mandate to raise levels of nutrition and standards of living, to improve agricultural productivity, and to better the condition of rural populations. Since its inception, FAO has worked to alleviate poverty and hunger by promoting agricultural development, improved nutrition and the pursuit of food security-the access of all people at all times to the food they need for an active and healthy life. FAO offers direct development assistance, collects, analyses, and disseminates information, provides policy and planning advice to governments, and acts as an international forum for debate on food and agriculture issues. FAO is active in land and water development, plant and animal production, forestry, fisheries, economic and social policy, investment, nutrition, food standards, and commodities and trade. It also plays a major role in dealing with food and agricultural emergencies. A specific priority of FAO is encouraging sustainable agriculture and rural development, a long-term strategy for the conservation and management of natural resources. It aims to meet the needs of both present and future generations through programs that do not degrade the environment and are technically appropriate, economically viable and socially acceptable. The current Director-General is Dr. Jacques Diouf. For more information please contact: FAO, Viale delle Terme di Caracalla, 00100 Rome, Italy. Tel: 39-065705; Fax: 39-0657053152; Internet: http://www.fao.org.

United Nations Population Fund

UNFPA is the lead UN body in the field of population. UNFPA extends assistance to developing countries, countries with economies in transition and other countries at their request to help them address reproductive health and population issues, and raises awareness of these issues in all countries, as it has since its inception. UNFPA's three main areas of work are: to help ensure universal access to reproductive health, including family planning and sexual health, to all couples and individuals on or before the year 2015; to support population and development strategies that enable capacity-building in population programming; and to promote awareness of population and development issues and advocate for the mobilization of the resources and political will necessary to accomplish its areas of work. The current Executive Director of UNFPA is Dr. Nafis Sadik. Ongoing projects of note include a project to empower women and goodwill ambassadors for promoting women's reproductive health issues. For more information contact: United Nations Population Fund, 220 East 42nd Street, New York, NY 10017. Tel: 212-297-5020; Fax: 212-557-6416; E-Mail: ryanw@unfpa.org; Internet: http://www.unfpa.org.

World Health Organization

The mission of the WHO is the attainment by all peoples of the highest possible level of health. Health, as defined in the WHO constitution, is a state of complete physical, mental, social well-being and not merely the absence of disease or infirmity. In support of its main objective, the Organization has wide range of functions, including the following: to act as the directing and coordinating authority international health; to promote technical cooperation; to assist governments, upon request, in strengthening health services; and to promote and coordinate biomedical and health services research. Dr. Gro Harlem Brundtland is the Director-General of the WHO. Dr. Brundtland has been a key figure in the integration of environment, population, health, and security issues. For more information, contact: WHO, Avenue Appia 20, 1211 Geneva 27, Switzerland. Tel: 41-22-791-2111; Fax: 41-22-791-0746; E-Mail: info@who.int; Internet: http://www.who.int. ■

Bibliographic Guide to the Literature

The guide includes a wide range of publications, organized by theme, which relate to environment, population, and security. This listing is an update to the ECSP bibliography printed in the ECSP Report *Issue 5 (1999). You can find a complete listing on-line at http://ecsp.si.edu.*

The Environmental Change and Security Project will continue to publish updates to this bibliography; we welcome suggestions regarding citations to include. Entries are formatted according to Kate L. Turabian's Manual for Writers of Term Papers, Theses, and Definitions.

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