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**NATO CONTRIBUTIONS TO
EUROPEAN ENVIRONMENTAL SECURITY**

Kent Hughes Butts



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FOREWORD

Environmental issues are promoting instability and conflict at an increasing rate. Forward-thinking international security strategists are suggesting that these catalytic issues be addressed before they lead to costly conflict. The U.S. Department of Defense has committed itself to using DOD assets to address environmental problems that could contribute to instability. This study builds upon these visionary concepts to recommend that the North Atlantic Treaty Organization (NATO) develop an environmental security assistance program to address environmental issues that threaten stability in regions strategically important to European security.

With NATO searching for a new mission to demonstrate its relevance in the post-cold war era, the concept of a NATO environmental security assistance program has great potential benefit. Such a program would also demonstrate how the new Alliance Strategic Concept can be executed, while helping to mitigate significant and well-publicized environmental problems. This would allow NATO to promote military-to-military contacts and enhance communication with former adversaries.

The Strategic Studies Institute is pleased to publish this monograph as a contribution to the debate on European security issues.



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SUMMARY

This study addresses the issue of European environmental security, delineates its current threat and identifies possible solutions.

The demise of the cold war has created a world that is much less stable and predictable. Previously constrained national ethnic and religious differences are now free to create instability which is increasingly seen as a threat to the interests of the industrialized world, and in particular, Europe. The U.S. Department of Defense (DOD), in examining threats to U.S. national security, determined four variables that would be particularly difficult to manage in the coming decade. They are regional dangers, nuclear dangers, dangers to democracy, and economic dangers. Serving as a catalytic element in all of these dangers are unresolved environmental issues. These issues are increasingly recognized for their contribution to promoting regional instability and conflict. This has been made clear by events in Haiti and Somalia during the past year and the involvement, or potential involvement, of international military forces in the resolution of these crises, which have their roots in environmental degradation.

Extreme environmental degradation is a direct threat to European security because it jeopardizes political stability in regions that are essential to Europe, which obtains much of its petroleum and strategic minerals from the former Soviet Union, the Middle East, and Africa. All three of these regions face difficult environmental problems for which too few resources exist to effect resolution. As a result, Europe runs the risk of losing access to these natural resources, faces growing waves of refugees fleeing those decimated areas for the physical and economic security of the European continent, and must be concerned with a traditional military threat from the former East Bloc countries. Still in possession of nuclear and other weapons of mass destruction and their waste materials, the governments of these countries are fragile and unable to

satisfy the demands for internal environmental security placed upon them by their newly formed democratic constituents.

The environmental degradation that affects these regions can be managed, but not without the technical and managerial expertise of the developed world. The Middle East is at risk from over-population and conflict over scarce fresh water resources. The former Soviet Union, and East and Central Europe are beset with toxic and hazardous waste spills, widespread air pollution and the threat from the continued poor management and storage of weapons of mass destruction and their waste products. Africa is also threatened by over-population and the resulting erosion of topsoil and desertification, which have sent literally millions of refugees across political borders.

Environmental security no longer reflects a concern of environmental groups for the environmental intransigents of the world's militaries. Today environmental security reflects the threat to national security posed by unattended international environmental problems and their capacity to promote conflict and political instability. The over-consumption of natural resources leads to resource degradation and a competition for these scarce resources by countries and ethnic groups. Moreover, when resources can no longer support the needs of the population, the government is hard pressed to maintain its legitimacy in the eyes of its people and its tenure is threatened.

The U.S. military has taken great strides to address environmental security issues. Internally, DOD has spent billions of dollars to rectify past environmental problems such as toxic and hazardous waste spills and soil erosion, and a failure to protect wildlife. However, in addition to improving its environmental stewardship, the military has accepted a larger mission defined by the Deputy Under Secretary of Defense for Environmental Security as "assisting to deter or mitigate impacts of adverse environmental actions leading to international stability." In executing this environmental security mission, the U.S. military has sent forces to assist in the cleanup of East European military bases, help manage the demilitarization of Soviet nuclear weapons, and establish a biodiversity and conservation program in Africa to help nations

better manage their fisheries and unique natural wildlife resources. The military organizations of the developing states are relatively well organized, present in all areas of a given country, and have the transportation resources necessary to have a meaningful impact upon issues that threaten their country's security. Thus, DOD has employed the military forces of developing nations to mitigate environmental problems that threaten security with a tangential benefit of maintaining good communication between the United States and the militaries of these countries. NATO has the mandate to undertake similar missions.

In 1991, the North Atlantic Council redrafted the Alliance Strategic Concept. This redrafting recognized that threats to allied security were less likely to occur from the aggression of traditional East Bloc enemies, but were more likely to occur from economic, social, environmental and political problems; and that these problems could, "lead to crisis inimical to European stability and even to armed conflicts." The Alliance decided that the objectives of its strategic concept could best be achieved through political means such as the use of dialogue and cooperation for the purpose of reducing the risks of conflict, fostering confidence-building measures and maintaining military-to-military contacts with Eastern and Central Europe and the former Soviet Union. This new Strategic Concept provides the framework in which lessons learned from the U.S. environmental security program can be translated to the NATO mission and used to address the serious environmental problems that pose a direct threat to European security.

To address environmental problems that threaten European interests, NATO should build upon the work done by its Committee on the Challenges of Modern Society (CCMS) and the framework of the North Atlantic Cooperation Council (NACC) to establish an environmental security assistance program that would address the environmental problems of the regions important to European security. This organization should be headed by a general officer and consist of teams that would interact with specific countries and regions, tailoring their assistance to provide the technical, managerial, or

training expertise necessary to mitigate the specific problems of that area.

The NATO teams could draw upon the technical and managerial expertise of NATO and the DOD programs to address such important issues as hazardous waste assessment and mitigation design, environmental threat monitoring, water resource management, the teaching of natural resource conservation practices, disaster relief planning and training, the restoration of military facilities and the management of the disposal of weapons of mass destruction. The NATO environmental security assistance program could also combine with other allied environmental security assistance programs such as the work being done by the United States European Command (EUCOM), and could also serve as a clearinghouse for environmental proposals to be funded by outside donors. This clearinghouse function could establish priorities, coordinate the currently unfocused efforts of multiple donor agencies and governments to address environmental problems in these critical areas, and concentrate environmental resources against the threats that are most relevant to European security. The program's objectives should be tied to the strategic aims of the European community and the Alliance, and should also reflect the goals of the multilateral lending institution programs from which much of the environmental mitigation monies come.

This program benefits both parties. The receiving countries, which typically lack the technical, managerial, and administrative expertise to execute these missions, will have their militaries trained to become environmental security resources and will have difficult environmental problems properly addressed. NATO benefits from reducing the sources of potential instability, while maintaining the military-to-military contact and communication that can help to diffuse misunderstandings and conflict. Moreover, NATO would further demonstrate its relevance to the modern security environment and take advantage of the requests of the former Soviet Union and East and Central Europe cooperation partners to increase their affiliation with NATO.

It makes sense to use military resources to address the root causes of potential conflict early and inexpensively rather than waiting until conflicts such as Somalia become full blown and then undertake missions that are costly both in financial resources and public support. The commitment of NATO environmental security assistance teams can help mitigate the causes of future conflict and preclude NATO out-of-area combat missions. The time has come for this visionary concept.

NATO CONTRIBUTIONS TO EUROPEAN ENVIRONMENTAL SECURITY

INTRODUCTION

This study argues that environmental variables, now broadly defined, are creating political instability in regions that are strategically important to the security of the European community. It examines methods used by the United States to address environmental security problems that could be applied to Europe, and recommends that the North Atlantic Treaty Organization (NATO), formerly dedicated to repelling the East Bloc and Soviet military threat, take advantage of these methods and its expanded Strategic Concept to promote solutions to environmental problems in areas strategically important to Europe. This will promote political stability and reduce potential security threats to the continent, while strengthening military-to-military contacts.

The cold war era is past and today's international environment is characterized by regional conflict and economic competition. In this new milieu, policymakers have come to understand that old issues, once subjugated either by totalitarian governments or by a need to focus on the much greater threat of thermonuclear war, have resurfaced and demonstrated their capacity to promote regional instability. In 1993, the U.S. Secretary of Defense defined the four dangers that threaten international security as: Regional Dangers, Nuclear Dangers, Dangers to Democracy, and Economic Dangers. Because the environment is a major variable in all of these, it is now considered to be a relevant issue to those who craft international security policy. The field of environmental security is increasingly recognized for its contributions to explaining and offering solutions to regional conflicts that threaten international stability.

The European community must concern itself with the multiple environmental problems of regions strategically important to its security, either directly, by posing health risks, or indirectly, by promoting political instability. For example, Chernobyl was an unfortunate accident that could be repeated. Were it not for favorable weather conditions at the time, much greater contamination of agricultural products and direct threats to human health could have resulted. The Former Soviet Union (FSU) retains numerous nuclear, biological and chemical weapons and processing sites that cannot be considered environmentally safe or properly managed. As the recent Tomsk nuclear accident indicates, other such incidents must be considered probable. Further, environmental degradation, land erosion, inadequate water, overpopulation, and scarcity and degradation of resources are issues that threaten political stability in the FSU, Eastern Europe, Africa and the Middle East. The Gulf War had its roots in competition over a scarce resource for which there is a global imbalance of supply and demand. Water resource management in the arid Middle East has the potential to promote conflict among such militarily powerful adversaries as Iraq, Turkey, and Syria. Perhaps more telling is the potential for instability caused by localized environmental problems that cause populations to lose confidence in the leadership of their governments and their ability to provide for their needs. When this occurs in regions strategically important to Europe, European security is directly threatened.

THE RISING IMPORTANCE OF ENVIRONMENTAL SECURITY

The meaning of environmental security differs between organizations and groups falling into issues related to physical damage of the environment by military forces, and international environmental problems that can lead to political instability and regional conflict. There are those who believe, for instance, that the military itself, by its very function, degrades the environment, and often perceive the military to be a violator of environmental security. Thus, maneuver damage from heavy tanks and other military operations that cause erosion and pollute the soil, or the production of weapons with the resultant

discharge of effluent into water systems (Rocky Mountain Arsenal for example) typify the type of environmental security threat that this group of critics decry. Others approach environmental security from the perspective of its contribution to international conflict or political instability. This group concerns itself less with the military as an agent of environmental damage and more with the ramifications of widespread environmental degradation. Thus, cross-border pollution such as the discharge from high sulfur coal-burning power plants that gives rise to acid rain in other countries, over grazing that results in migration, or the competition for scarce and strategically important resources are all legitimate topics for analysis by international security scholars.

However, the practitioners of environmental security have moved forward with workable definitions and have designed agenda to accomplish policy objectives. In her statement before the U.S. Congress, the Department of Defense Deputy Under Secretary of Defense for Environmental Security, Sherri Wasserman Goodman, captured a widely accepted definition of environmental security when she defined DOD's role as,

Ensuring responsible environmental performance in defense operations and assisting to deter or mitigate impacts of adverse environmental actions leading to international instability.¹

It is the second part of this definition, the contribution of environmental issues to political instability and conflict, that has the greatest relevance to European security. In what has become a watershed for the discussion of environmental security issues, Jessica Tuchman Matthews, in her article in *Foreign Affairs*, pointed out that natural resource, demographics, and environmental variables have a major impact upon economic performance and therefore have the potential for creating political instability.² To understand the relationship between environmental degradation and political instability, it is helpful to look at the social science literature concerning systems theory.

Applying systems theory to studies of state politics helps to explain the dimensions of environmental security. If society is thought of as a "system or pattern of human interaction,

enforced and reinforced by cultural, political, economic, social and physical supports," studies of variables which support the leadership or power center of such a system contribute to one's understanding of the state.³ Social theorists such as David Easton came to value the applications of systems theory to society. When the social structures and institutional entities of society are recognized and viewed as functional elements in systems, a framework is created that enlarges our explanatory and predictive capabilities.⁴

If a state system is properly maintained, communication extends to the full spatial reaches of the state and feedback or communication from the periphery to the core is assured. Such two-way communications (feedback loop) serves to both reinforce a sense of community and belonging throughout the system, and alert leadership elements when members of society perceive that the resources of the state are not being properly managed. The system receives two types of inputs—demands and support. If the system is functioning in equilibrium, resources will be managed in such a manner that demands will be met and popular support for the system will be sustained. If a system receives feedback on environmental conditions and demands, then it engenders appropriate responses to satisfy those demands and by so doing earns legitimacy (ensures support) from the members of the system.⁵ Thus, the physical resources necessary to sustain the political system are a critical system support. Equilibrium in the system is attained when the requisites or functions necessary for the system's survival are performed in an optimum manner. When environmental problems erode this resource base, equilibrium is prevented and governmental legitimacy is threatened.

Many authors have found the systems approach useful when analyzing environmental security. In his article "Redefining Security in International Security," Richard Ullmand considered a threat to national security as any event with the potential to drastically affect the quality of life for the population of a state or which might narrow the scope of policy options to the state's leadership.⁶ In *Foreign Policy*, Norman Myers also applied systems theory to environmental issues in countries that are of strategic importance to the United States.

He found a direct correlation between environmental degradation and retarded economic performance and a commensurate wave of stresses being placed on the state's political systems.⁷ Similarly, Thomas Homer-Dixon, *et al.*, reported evidence suggesting a correlation between scarcities in renewable resources—where scarcity was caused by overconsumption, population growth and an alteration in the pattern of distribution for the resource—and conflict.⁸

In the United States the recognition of this linkage between environmental instability and conflict has given rise to a growing body of policy that addresses environmental security issues. In 1991, the *National Security Strategy of the United States* incorporated the environment for the first time, pointing out that the management of natural resources in a sustainable fashion that provides for the needs of future generations represents a national security interest. Further, that because of the trans-boundary nature of global environmental problems and the stresses from regional and national environmental degradation, the environment is already contributing to political conflict.⁹ Congress, led by then Senator Al Gore and Senator Sam Nunn, Chairman of the powerful Senate Armed Forces Committee, created the Strategic Environmental Research and Development Program that dedicated millions of dollars of DOD funds to the solution of the overwhelming environmental problems facing the United States and the world. The rationale for diverting DOD, intelligence, and research assets to the solution of environmental problems was based on the concept that ethnic and regional conflicts among the many independent states having access to sophisticated conventional weapons and the potential to develop weapons of mass destruction "could well be exacerbated by environmental problems."¹⁰

European security increasingly turns upon events in the developing world which, because of ethnic tension and overpopulation, is particularly vulnerable to disruptions caused by environmental factors. Many developing countries have artificial political borders established by colonial fiat or political expediency in prior times. Africa's borders, for example, were delineated by the Berlin Conference in the last century and often encompass multiple culturally-distinct ethnic groups. In

South Africa there are over nine Black national groups of over one million people that speak different languages. When environmental problems threaten the governments of such countries, their inability to meet systemic demands for food, shelter, and employment is often seen by ethnic groups not represented proportionately in the existing government as evidence of discrimination and an improper allocation of resources. This sows the seeds for political instability.

In the cold war era, totalitarian or single-party states were often able to maintain order and governance among these various national groups through the use of force. The current emphasis on democracy and efforts by both the European community and the United States to promote democratic reform around the world has brought a reduction in the number of totalitarian or single party states and the establishment of numerous new democratic governments. Lacking the ability to use force to suppress popular demands, these governments are likely to be much more vulnerable to perceived benefit inequities and the ramifications of environmental degradation. This situation is magnified by the fact that population growth in the developing world quite often exceeds 3 percent per year and in some countries reaches a level of 4 percent per year, which doubles the population of the country in less than 20 years. When these governments fail, the resulting conflict or emigration often threatens the security interests of Europe and the United States.

The U.S. Department of Defense has not been alone in recognizing the threat to security posed by environmental issues. NATO has also integrated the environment into its strategic concept. In November 1991, the heads of state and government of the Alliance met in Rome to develop a new Strategic Concept. The strategic framework that underpins this concept articulated the security challenges and risks facing NATO. Recognizing that the threat has changed, the Alliance stated that risks to its security from aggression are substantially reduced, and that economic, social, environmental and ethnic difficulties, which promote instability, are now significant threats to Alliance security.¹¹ The concept broadened the Alliance mission from focusing exclusively upon the Warsaw

Pact threat; NATO's missions now include dialogue and cooperation with Eastern countries, the promotion of democracy and political stability, and the mitigation of environmental problems that threaten these missions.¹²

Thus, both NATO and the U.S. Department of Defense have institutionally recognized the importance of environmental matters to political stability and the mitigation of regional conflict. Such recognition is important given the substantial environmentally related threats faced by Europe today.

THREATS TO EUROPEAN ENVIRONMENTAL SECURITY

The principal threat to European security traditionally has been state-sponsored military aggression. NATO was organized to deter, and defend, against Soviet and East Bloc attack. The countries of Central and Eastern Europe are no longer occupied by Soviet forces and they have drastically reduced the size of their own military forces. In the former Soviet Union (FSU), military forces are being reduced and a nuclear weapons dismantling program has been instituted. Cooperation agreements between the United States and the FSU are well-developed and several of the former East Bloc countries have expressed an interest in joining NATO. Today, the primary threat to Europe comes from a breakdown of civil order, political instability, and economic failure, all of which have an environmental dimension.

While environmental factors are rarely a primary cause of the fall of a government, they frequently exacerbate existing problems or are a catalytic factor. Environmental problems can overload a political system preventing it from meeting popular expectations. Chief among them is the demand for economic development.

When economic development ceases or when the economy struggles, governmental legitimacy is threatened. This is the case in the Ukraine, where the once heralded Ukrainian government came to power on the popular belief that breaking with the Soviet Union would offer a rapid improvement in the standard of living. Mineral rich, industrialized and blessed

with a strong agricultural sector, the Ukraine was expected to flourish. However, in the 2 years since independence there has been a steady decline in Ukrainian production, hyperinflation of 50 percent a month, bread lines and increased poverty. In fact, the Ukraine's economic decline has been more dramatic than economic decline in Russia. As a result, Prime Minister Leonid Kuchma has been forced to resign, work stoppages are called to protest governmental decisions, and the collapse of government and reunification with Russia are now real possibilities, as only 47 percent of the population would now back independence from Russia.¹³

Factors that reduce the ability of a government to satisfy the needs of its people, often economic needs, threaten stability in regions important to European security. Environmental factors impair the quality of life at every level of socio-economic development. At the very basic subsistence level, eroded overgrazed soils, depleted aquifers, and destroyed habitats and eco-systems endanger the livelihood and ability of agrarian populations to feed themselves. A failure at this level results in massive migration or starvation. Such is the case in the Horn of Africa. At the rudimentary industrial level, polluted water and high concentrations of sulfur dioxide and other particulate matter in the air shorten the lives of the population, increase the cost of maintaining a work force and impair productivity at the most critical phase of a country's development. This is a chronic problem in the Former Soviet Union. Cleaning up industrial effluent and toxic and hazardous waste sites, necessary to improve the health of the population, would divert valuable resources needed to promote short-term economic development. In the most developed nations, auto emissions and fossil fuel power plant discharge give rise to global warming, acid rain, chemical smog, and the reduced ability of estuary eco-systems to support the life necessary to sustain fisheries. Addressing these issues is costly, controversial and often reduces the profitability of domestic industry, which may flee, transferring valuable jobs to countries with less stringent environmental laws. These environmental problems are promoting instability in countries critical to European interests, such as democratic reform.

Newly formed democratic regimes taking over from long-term totalitarian governments are under pressure to demonstrate their competence and the superiority of democratic forms of government. Their ability to succeed is greatly impaired when widespread respiratory disease, chronic infant mortality, and an inability to provide safe drinking water for an increasingly educated and environmentally aware population interfere with the country's industrial development program. These governments are often faced with political borders that fail to circumscribe culturally homogeneous populations. Multiple nationalities and ethnic groups within the same border complicate the governance process and make it even more important for the government to demonstrate its ability to equitably distribute scarce resources. Many environmental factors impede efficient political system management, such as increased population, uncontrolled migration, resource scarcity or degradation, public health problems and uncontrolled pollution. These factors are major contributors to instability in critical regions that are strategically important to the security of Europe.

Because of its resource wealth, insular nature and geographic separation from countries that threaten its national security, the United States has been, to some degree, protected from threats experienced by the European continent. Europe has no such barrier between itself and the culturally distinct neighbors to the east. These countries, and those regions from which Europe obtains its strategic mineral resources and important trade, are threatened by difficult environmental problems.

The control of nuclear weapons, other weapons of mass destruction and their waste in the FSU has been greatly complicated by the dissolution of the former superpower. The fact that the Ukraine, Belarus, and Kazakhstan, for example, retain nuclear capability and the potential for nuclear accidents of regional proportion, must be considered disturbing to European states. Concern for environmental problems associated with managing the downsizing of the Soviet nuclear arsenal is shared by Europe's allies, and U.S. Senators Richard Lugar and Sam Nunn sponsored legislation providing

\$800 million for this purpose.¹⁴ Twenty five million dollars in FY93 funding have been allocated to Belarus for the remediation of nuclear problems on former Soviet military bases.¹⁵

In addition to nuclear weapons, Eastern Europe and the former Soviet Union continue to produce nuclear power with outdated and unsafe nuclear reactors. Sixteen large Soviet-produced graphite reactors, similar, if not identical to, the nuclear reactor which malfunctioned at Chernobyl still operate in the former Soviet territories.¹⁶ Traditional weather patterns and seasonal wind directions place Europe at risk from accidents that might occur at these plants. Thus far, efforts to provide alternative sources of power to the countries dependent upon these reactors have proven unworkable.

Beyond these threats, Europe suffers from the continued environmental problems associated with cold war weapons production and the economy of the former Soviet Union. The Soviets' almost total disregard for environmental responsibility has created a nightmare of environmental problems that span the length and depth of the former Soviet Union. In the north and south, waters have been heavily polluted either by the dumping of nuclear reactor or other industrial waste products. Such cavalier treatment of water resources has polluted fisheries and threatened the livelihood and environmental health of the European fishing industry.¹⁷ Unfortunately, the former Soviet Union lacks the resources necessary to mitigate these problems.

Natural resource management is an environmental issue very important to stability. Energy production in the former Soviet Union is critical to efforts to modernize the economy and sustain newly established democratic regimes. Yet energy production has fallen. Coal production is not meeting established goals and is increasingly recognized for its health risks by the general populace and coal miners, who are now demanding greater attention to environmental health problems. Petroleum production has fallen consistently since the late 1980s due to a combination of such environmental difficulties as a lack of water resources, drought and electrical power disruptions, which plague oil production in Western

Siberia.¹⁸ The accident at Chernobyl drew popular attention to the risks associated with Soviet graphite reactors and created powerful opposition to efforts to expand nuclear power production. Recognizing the importance of the energy variable to regional political stability, the United States Overseas Private Investment Corporation has agreed to support Texaco's proposed \$80 million restoration of western Siberian oil fields by providing Russia with \$2.8 million in loan guarantees and insurance.¹⁹ Such intervention will be required frequently if the former Soviet states are to overcome their substantial environmental problems.

Environmental problems, such as resource scarcity, threaten European security in many ways. Many of the regions upon which the European community depends for resources and trade are already threatened by instability. They are the former Soviet Union and Eastern Europe, the Middle East and Southern Africa and Maghreb. The Middle East and former Soviet Union are strategically important to Europe. Over 80 percent of the world's petroleum reserves are located in the politically troubled Middle East. The FSU, a major oil producer, exports over 2 million barrels of oil per day. Europe depends upon oil imports for most of its petroleum needs, importing over 7 million barrels of oil per day.²⁰ Europe is virtually 100 percent dependent upon foreign imports for the four most critical strategic minerals: chrome, cobalt, manganese and platinum. Southern Africa alone accounts for over 50 percent of the reserves of these minerals; and, in conjunction with the FSU controls 90 percent, 63 percent, 91 percent and 99 percent, respectively, of their reserves.²¹ The Maghreb of North Africa is also a source of petroleum for Europe and has historic colonial ties that make it a sensitive area for Europeans. These regions are struggling with high rates of population growth, newly elected democratic regimes, long simmering ethnic conflict, the new threat of political Islam, and weak economies. Environmental factors greatly complicate the regional governments' ability to manage these threats. (See Figure 1.)

REGIONS CRITICAL TO EUROPEAN SECURITY



Figure 1.

Population and Migration.

Europe is threatened by the high population growth in the developing world and migration trends which reflect the freedom of human resource mobility after the breakdown of controls that existed during the cold war era. Population growth puts pressure on the social infrastructure of a country and increases demands on the government which can only be met through increasing resources and economic growth. Thomas

Malthus pointed out that increases in population bred pressures on government that led to wars and recognized that the population growth in Europe was increasing geometrically while the food production natural resources were increasing arithmetically. Europe was saved from chronic resource scarcity by the opening of the new world which served as an outlet for excess population and a source of additional resources. Today, no such escape valve exists.

Populations can double in as little as 35 years when annual population growth rates exceed 2 percent, which is the case in much of the developing world. Cultural norms, often based on agricultural needs, have sustained high population growth rates. At the same time, life extending technologies, better nutrition and access to medicine have reduced death rates. Population growth is now increasing exponentially and the states' economies and natural resource bases cannot keep pace. This environmental problem threatens the ability of governments to meet the needs of their populations and promotes domestic instability and outward migration pressures, frequently to the more developed countries of industrialized Europe.

Examining three countries of the Maghreb with particularly close ties to Europe, Algeria, Morocco, and Tunisia, makes clear the problems of the burgeoning population. The population of these countries is some 60 million. Their annual population growth rate is approximately 2 percent. Thus, within 40 years their population will exceed 120 million people.²² Unemployment among these countries averages approximately 17 percent.²³ To these countries, Europe represents the new frontier that the Americas provided to Europe 400 years ago. The average per capita gross domestic product (GDP) for the Organization for Economic Cooperation and Development (OECD) countries averages \$17,097. The average GDP per capita for Algeria, Morocco and Tunisia is less than \$1,200. This explains the fact that as of 1992 there were 5.5 million immigrants from the Maghreb in Europe.²⁴ Algeria, Morocco, and Tunisia, alone, account for some 46 percent of all non-European community foreign employees.²⁵

Trends and migration pressures indicate that Europe will serve increasingly as a target for East-West and South-North migrations. (See Figure 2.) Through the early 1980s, barriers in communication and transportation, and the political controls of the cold war era reduced the migration of workers and asylum seekers to the industrialized world. Since then,

POPULATION AND IMMIGRATION PRESSURES



Figure 2.

economic conditions have deteriorated, a world recession has occurred, sophisticated transport systems have become commonplace in the developing world, and political barriers to migration have fallen away. As a result, Europe has experienced increases in those seeking asylum from approximately 70,000 in 1983 to a 1990 total of some 442,000. Discounting East Germans and ethnic Germans from the East, Germany accepted over 190,000 asylum applications in 1990, an increase of approximately 60 percent from the previous year alone.²⁶

While many immigrants seeking asylum can speak to the issues of ethnic conflict, war and oppression in the countries from which they emigrate, much of the conflict has its roots in a scarcity of resources that precludes the government from satisfying the needs of all ethnic groups within its borders. This failure and subsequent loss of legitimacy provides a fertile ground for radical philosophy, such as political Islam and oppression. In Algeria, for example, the Islamic Salvation Front (ISF) received the majority of the votes in the recent election. Their success in the election and inability of the government to deal with the demands of its population forced a military coup in January 1992.²⁷

An even greater threat to Europe comes from continued East-West migration from the FSU and eastern Europe. The harsh realities of life in the East Bloc gave rise to large scale migrations to Western Europe throughout the 1950s and early 1960s. The construction of the Berlin Wall and the enforcement of the Iron Curtain reduced outflows from the Warsaw Pact to approximately 100,000 people per year. The fall of the Iron Curtain brought a wave of new immigrants and, in 1989, some 1.3 million people fled eastern Europe and the former Soviet Union for Western Europe. Continued political instability and economic failure in the new republics of the former East Bloc are giving rise to conflicts throughout the FSU. Approximately 600,000 people are thought to be "internally displaced" in the FSU. The continued shaking out of economic and political organizational structures and political borders can be counted upon to threaten western Europe for years to come.²⁸

Recognizing the threat to their social and economic stability, western European countries have attempted to emplace more demanding control over the flows of immigrants from east and central Europe. The Berlin Conference of October 1991 created new measures for controlling immigration and laid a plan for obtaining agreements from supplying countries to aid in stemming the migration flow. However, Europe must develop greater efforts to promote economic and environmental improvement in the emigrant countries if it is to be successful in stemming the flow of illegal immigrants.²⁹ In addition, if the continued political turmoil in the Middle East and spread of political radical Islam continues, Europe will have the potential of internal security threats posed by the large number of Moslem immigrants whose presence in Europe continues to grow.

The magnitude of the immigration problem and the need for Europe to take definitive action becomes clear when one recognizes that there are already 10 million immigrants in the European community, a total approximately equal to Belgium's population. OECD estimates for the next 30 years call for an additional 30 million immigrants to arrive in Europe. With the 1990 foreign populations of Germany at 8.2 percent, France at 6.4 percent, Belgium at 9.1 percent, and Britain at 3.3 percent, it is likely that the additional immigrants will exacerbate the growing trend in xenophobic, violent behavior toward immigrants, and popularity of racist and anti-foreigner propaganda on the part of opposition political parties.³⁰ With an estimated 17 million people out of work in Europe and an unemployment rate at an unusually high 11 percent, opposition to increased immigration is certain to promote widespread debate.³¹

The average world population growth is approximately 1.7 percent per year. This adds approximately 100 million people per year to the world's population. Between the years 1990 and 2030, estimates are that global population will increase by some 3.7 billion, 90 percent of which will be in the developing world.³² Thus, in the countries of the Middle East, upon which Europe depends for much of its energy needs, and in Southern Africa which supplies most of Europe's strategic minerals,

rapidly increasing populations create spiraling poverty by causing increasing environmental decline. Burgeoning populations in these areas have no choice but to till marginal soils and steep slopes, to hack away the remaining tropical rain forests and over-graze narrow flood plains. The result will be an even greater decline in the ability of these areas to provide for their food and water needs and irresistible pressures to migrate and seek a reallocation of scarce resources by way of violent conflict. These population and migration pressures threaten European security interests and have their roots in environmental problems their governments cannot solve.

The Economic Threat.

Economic growth can, of course, sustain burgeoning populations and arrest environmental decline and, thus, promote longevity in newly formed democratic regimes. However, in the areas of strategic importance to western Europe, it is unlikely that this will occur, leaving them vulnerable to the environmental threat. The growth in real per capita income for sub-Sahara Africa in 1991 was -1 percent. In the Middle East and North Africa, it was -4.6 percent and in eastern Europe, real per capita income fell 14.2 percent.³³ Poverty is correspondingly high with 7.1 percent of the population in eastern Europe, 33.1 percent of the population in the Middle East and North Africa, and 47.8 percent of those living in sub-Sahara Africa living in absolute poverty with an annual per capita income of less than \$370 per year.³⁴

In the most important area to European security, the former Soviet Union, instability resulting from economic collapse is a growing possibility. The FSU's real GDP growth in 1992 was -18.5 percent.³⁵ Real national income growth for 13 of the 15 FSU countries was negative for 1991, while consumer prices escalated at a rate of least 70 percent during 1990 and 1991 for all FSU countries with some seeing consumer prices increase by nearly 125 percent.³⁶ This runaway inflation and falling productivity does little to support the new democratic regimes struggling to demonstrate their legitimacy to a population that expected radical improvements in lifestyle and

economies under western-oriented economic and democratic systems.

The chances for any near-to-medium-term improvement in the economic stability of the FSU are slim indeed. The republics generally lack legal, economic and fiscal legislation and regulations and the political organizational power to enforce them. Lacking this framework, regional administrations have increasingly ignored central authority economic directives and potential foreign investors have lost confidence. Traders seeking to export FSU minerals describe the situation as chaotic, with a decreasing amount of sales made by official organizations and most business done through a system of bribery and corruption with plant production managers and newly created entrepreneurial middlemen.³⁷ Traditionally dependent upon mineral exports for its foreign exchange, the FSU is witnessing significant falls in its most critical mineral exports. From their 1980s' peaks, crude steel production for 1991 had fallen 19 percent; gold production had fallen 29 percent; cobalt production had fallen 64 percent and the extremely critical category of oil exports was down 50 percent. Industrial output for 1991 fell by nearly 2 percent, while agricultural output fell by over 4 percent.³⁸

Auguring against any rapid improvement in these dismal production figures is the high debt of the FSU. Soviet Union debt doubled to approximately \$67 billion during the 5 years prior to its collapse, and its credit-worthiness was tarnished by a liquidity crisis that precluded the payment of some 4.5 billion in short-term debt in 1990.³⁹ The FSU has yet to recover from the Council for Mutual Economic Assistance (COMECON) drop of export market prices in the global economy and the move to convertible currency, which occurred in 1991. Russia, which owes 85 percent of this approximately \$68 billion debt, recently watched as its parliament overrode President Yeltsin's austere budget to create a new budget deficit of some \$22 billion, twice what President Yeltsin had proposed and equal to one quarter of the country's GNP. This decision by a Russian parliament, led by old Communist hardliners, caused the IMF to delay providing an additional \$1.5 billion in funding.⁴⁰

Part of Russia's problem is that it has attempted to move to a market economy without establishing a legal foundation for taxation, property loss, or privatization. Regional administrators have therefore been forced to use informal and illegal methods to establish economic policy.⁴¹ As a result, "Russia is experiencing hyper-inflation, collapse of government, disastrous capital flight, and economic chaos."⁴² The by-product of this collapsing economy is sabre rattling and a growing disenchantment with the liberal central government leadership by the Russian military, which blames the failing economy and exponential inflation for the lack of success in bringing new recruits into the Army.⁴³ In addition, the failure of the central government to meet the demands of the political system is leading increasingly to a Soviet-style breakup of the Russian Federation. Maverick provinces such as Chechenya, Tataria and Bashkiria are claiming increased autonomy or declaring their independence, while Nizhny Novgorod and other provinces are pursuing aggressive economic plans in contravention of Russian federal statutes.⁴⁴ Add to this the fact that Russia is helping to fight a civil war in Tajikistan that threatens to further strain its economic resources and promote additional ethnic conflict. Some Russian experts fear that the great danger in this economic collapse is the potential threat to nuclear power stations or chemical factories should internal civil war within Russia or the former FSU occur.⁴⁵

The FSU Environmental Threat.

In addition to the threat of instability plaguing the FSU, two other areas also seriously affect European security: the presence of weapons of mass destruction and the potential for environmental degradation from nuclear, chemical and biological waste and further nuclear-related accidents. Russia recently admitted to producing 45,000 nuclear warheads and now has on hand a 1,200 metric ton inventory of bomb-grade uranium. Since the breakup of the FSU, Russia has been unable to gain control over many of its nuclear weapons, which remain in the hands over the governments of Belarus, the Ukraine, and Kazakstan. The Soviets have and are continuing to negotiate to gain control over these weapons and recently

reached an agreement in principle for Ukraine to turn over such weapons.⁴⁶ Because of the internal chaos and breakdown in control over its former republics and the overwhelming need for foreign currency, often through the sale of weapons, the possibility of nuclear arms falling into the wrong hands is genuine.⁴⁷ Indeed, the head of the American Central Intelligence Agency, Mr. R. James Woolsey, testified before Congress that, "Russia has yet to create an effective system for controlling exports of sensitive military equipment and technologies related to the development of nuclear, chemical, or biological weapons."⁴⁸ These weapons and their waste are a primary environmental health threat.

Even more likely is the possibility of further environmental damage to Europe because of nuclear accidents in the Soviet Union. The Chernobyl disaster of 1986, which resulted in the death of over 250 people and contaminated livestock thousands of miles away in Britain, was but the most publicized of many nuclear accidents. Since 1986, at least four other major accidents have further threatened European confidence in Soviet management. The most recent was the chemical explosion at the Siberian Research Complex in Tomsk. Two hundred separate safety problems or accidents occurred in 1992 alone.⁴⁹ The FSU has 45 nuclear power reactors in operation and 15 of them are RBMK models similar to the one involved in the Chernobyl accident. These graphite core reactors are highly unstable because an accident causing the loss of water increases the nuclear chain reaction.⁵⁰ Lacking the estimated \$5 billion required for upgrading the most important reactors, the Russian government has stated its plan to operate the plants for their full 30-year life and is also moving forward with a plan to build an additional 30 nuclear plants.⁵¹

Radioactive contamination is the leading environmental problem in the Soviet Union, well ahead of water and air pollution. In addition to the potential for an accident at a nuclear power plant, the FSU has many former nuclear research facilities and nuclear waste storage sites at which a devastating environmental accident could occur. The plutonium producing plant at Chelyabinsk has experienced a series of accidents and experts fear that poorly constructed nuclear dumps could

easily leak and further contaminate the area. The 1957 accident at Chelyabinsk spread radioactive contamination over approximately 8,000 square miles of the country.⁵² With the proper wind conditions, Europe is indeed vulnerable to fallout from accidents occurring at these nuclear sites.

The Soviet Union has been cavalier in its approach to the disposal of nuclear materials. Well known is its disposal of nuclear reactors in its northern seas from the Pacific Ocean to the Baltic. The effects on the Soviet population of improper handling and storage of nuclear materials are pronounced. Sizeable portions of the population have birth defects and other forms of impaired health because of exposure to radiation. Industrial waste has poured untreated into virtually all the major Soviet rivers, and industrial cities have a sulfur dioxide emission rate that is often four times greater than that in the European community.⁵³ Such pollution threatens not only the economic viability and human resource base of the FSU, but also Europe. In many of the former republics and regions of the Russian federation, little expertise is available to help manage these environmental problems and increasingly the civilian governments are unable to exert control or manage the state resources. Visitors to the former Soviet Union and those who conduct business there frequently speak of the relative efficiency of the military. Under such conditions the potential for further instability and a direct environmental threat to Europe from Soviet environmental problems is pronounced.

SOLUTIONS

The evolution of environmental security has brought with it new opportunities and concepts for dealing creatively with today's global problems. Narrowly defined approaches to problem solving, ossified during the four decade cold war, have been broadened to include important linkages between variables upon which political stability depends. Environmental factors are now broadly defined and recognized for their importance to national security; failing to address environmental problems can undermine a government's legitimacy and promote instability. Yet, many newly formed democratic regimes are struggling with weak economies and

newly established political infrastructures, and lack the resources necessary to address environmental problems effectively. The resulting instability threatens European security. These environmental problems should be addressed by Europe's strongest central organization—the military.

Early optimism concerning the rise of a politically unified European community has been replaced by frustration and a sense of opportunity lost. During the cold war, Europe was often led by the United States and galvanized by the common threat of the Soviet empire. With both these factors significantly diminished, European countries have, as has the United States, turned their attention to domestic problems exacerbated by the weak global economy, and have allowed centrifugal forces to undermine the grand vision of a monetarily and politically unified European community. Germany's rigid fiscal policies, necessitated by the costly reunification effort, led to the unravelling of the monetary union as weaker countries were forced to pursue unilateral monetary policies. The economic integration that was to pave the way toward European unity has been delayed, and with it a common economic policy with which to address European security issues.

Less successful yet are efforts to achieve political integration and the united leadership required to create a common European foreign policy. Lacking the visionary leadership of a Schuman and the unifying fear of communism, nationalism and competing domestic priorities have overcome political union. Denmark's willingness to agree to the Maasticht Treaty under exemptions for important defense and monetary policies elucidates the weakness of European political unity. Much like the 1994 South African elections, Maasticht 1996 will only be a meeting to develop a plan for political union.⁵⁴

While efforts to achieve economic and political union may be problematic, NATO remains a viable security organization with a history of foreign policy success, a functioning organizational infrastructure, the leadership and resources of the United States, and an expanded strategy. NATO's priority on protecting the security and freedom of member countries has not changed, but it has a more relevant strategic concept.

The 1991 Rome Declaration of Peace and Cooperation formalized efforts to broaden NATO's purpose from deterring the East Bloc military threat to include promoting stability. This new concept has many new missions, from out-of-area peacekeeping to environmental assistance.⁵⁵ Although many individual countries are slow to support political and economic union, NATO, as the Council on Foreign Relations discovered during a research trip to Europe, is enjoying widespread support.

Everyone, including French and Russian representatives, acknowledges the need for NATO. France is moving to rejoin the Alliance's military committees. Central European nations seek membership. East European representatives are even more outspoken than their West German counterparts in advocating the importance of NATO's survival.⁵⁶

Thus, unlike other organizations, NATO need not create new organizational frameworks or mount costly and time consuming efforts at consensus building and leadership development to be effective. NATO is politically acceptable to key regional actors, its members have expanded out-of-area operations into places such as Somalia, and it can address security issues immediately. How should this be achieved?

The U.S. Model.

While the United States is a member of the Alliance and NATO, its environmental program has been developed separately, concentrating largely on domestic issues. U.S. participation in NATO thus far has focused primarily on deterring the Communist threat, and on attempting to develop new missions and a force structure that meets both European needs and the post-cold war domestic pressure to downsize the military. Yet, it has the potential to participate in and lead NATO environmental outreach efforts. Therefore, in developing an environmental program for NATO, it is instructive to examine the DOD approach which is making a substantial contribution to environmental security. DOD is the largest agency of the U.S. Government, with a budget of approximately \$264 billion per year. DOD bases and training

areas occupy some 25 million acres of the United States and DOD manages over 1,000 installations.⁵⁷ Half of DOD's environmental security mission is to ensure that DOD operates in a responsible environmental manner that maintains the support of the American people.

Given the length of the cold war and the importance of DOD facilities in developing weapon systems and munitions to deter Soviet aggression, the Department of Defense should be expected to have a great quantity of industrially-related environmental problems yet to remediate. This is the case. Estimates of the cost of cleaning up DOD installations run from \$30 billion to \$400 billion. The Defense Environmental Restoration Program has spent \$6.5 billion through the end of FY93 on remediating toxic and hazardous waste related to DOD activities and on the cleanup of formerly owned defense bases. For FY94 alone, DOD is requesting \$2.3 billion from Congress to continue its cleanup efforts.⁵⁸ Because DOD often must develop new technologies to cleanup specific toxic and hazardous waste sites and has approximately 18,000 potential hazardous waste sites, DOD funding for cleanup is expected to remain over \$2 billion a year into the foreseeable future. Because of the dollar values involved and the political importance to individual members of Congress, toxic and hazardous waste cleanup and DOD cleanup of bases designated for closure by the Base Realignment and Closure Committee have top priority at DOD and require the close attention of its environmental leadership.

To ensure that DOD does not create new forms of toxic and hazardous waste, and that it is executing its daily operations missions in accordance with state, local and federal environmental laws, the Department of Defense is spending \$2.5 billion in FY94 on compliance.⁵⁹ Because DOD installations comprise small cities, forests, deserts and wetlands that are part of estuarian environments, achieving compliance is a complex and difficult task. To help, DOD has entered into cooperative agreements with the Environmental Protection Agency, state and regional regulators, and environmental groups to develop synergies that allow it to bring the greatest expertise to bear on achieving compliance, which

sometimes runs counter to maintaining operation readiness. For example, at larger U.S. bases such as Camp LeJune and Ft. Bragg, the red cockaded woodpecker, an endangered specie, has been found to inhabit important training and artillery impact ranges for some of the military's most important units. In situations such as this, the military must modify training and seek workable solutions with environmental groups that help to monitor wildlife. DOD spends some \$30 million yearly to identify and protect natural and cultural resources such as flora, fauna, historic and archeological sites and artifacts.⁶⁰ Thus, DOD is one of the largest land managers in the United States, and is arguably a positive force for environmental conservation because development on DOD lands is limited and much land is preserved in its natural state to serve as multi-use and training land.

Recognizing the important contribution that DOD can make to conservation, the U.S. Congress in 1991 appropriated some \$10 million to promote the stewardship of DOD in natural and cultural resource areas. Under the Legacy Program, multiple government and nongovernment partners work with the Department of Defense on hundreds of separate efforts to inventory, protect, and manage scarce biological resources. In other projects, the DOD is working closely with the leaders of western tribal Indian councils to preserve archeological sites that have been deemed priceless. Thus, Congress is helping DOD to make a contribution to the aesthetic side of environmental preservation. While it is difficult to set a dollar value on the maintenance of an endangered specie or the restoration of an historical, archeological site, DOD and Congress recognize the importance of these efforts and increasingly use DOD resources to satisfy the demands of the American people for such preservation.

Because DOD remains a major contractor for defense systems and maintains many industrial munitions plants involved in the production of weapons systems and munitions, it has moved aggressively to establish a pollution prevention program so that it can minimize the amount of funding spent to clean up toxic and hazardous wastes in the future. The program has been successful, and DOD has been able to

reduce by 55 percent the amount of hazardous waste it produces annually. Given the fact that hazardous waste disposal costs for industry have gone up 600 percent between 1987 and 1991, such a reduction is an obvious way for DOD to contain its environmental costs.⁶¹

A primary component of the pollution prevention program is the engineering solution: determining how weapons systems are designed, constructed, utilized and maintained, and eliminating characteristics of a weapon system that produce toxic or hazardous waste. Such engineering solutions require cooperation between DOD and industry. In addition, as the result of the 1984 Montreal Protocol and Title IX of the Clean Air Act Amendments of 1990 and recent Presidential emphasis, DOD is moving aggressively to phase out ozone depleting substances from its inventory.⁶² While many of these substances have recently developed substitutes, many important uses of the substances are related to critical defense weapon system components for which there is currently no substitute. DOD is working closely with industry and investing millions of dollars in research and development programs to meet the requirements of these agreements and legislation, and is also making a strong effort in the area of environmental technology.

Working closely with EPA and other knowledgeable organizations, DOD is prioritizing its environmental technology requests of R & D laboratories to ensure that they are dedicated to high priority uses. DOD is also reenergizing its focus on the strategic environmental research and development program originally proposed by Senators Nunn and Gore. For FY94, DOD has requested \$325 million from Congress to execute its environmental technology program.⁶³ As previously mentioned, DOD has many toxic and hazardous waste sites that are unique to the defense sector and must develop technology to remediate these sites. The technology that is being developed could be exported to other countries and used to facilitate environmental cleanup in some of the more problematic Euro-Asian hazardous waste sites.

The U.S. Army Corps of Engineers is a DOD asset and a major command of the U.S. Army. It has a larger, nonmilitary

function, performing work for other agencies of the U.S. Government on a reimbursable basis. The Corps is known best for its work in constructing military and civil works projects both in the international arena and in the United States. However, environmental protection is a primary mission of the Corps. As America became less interested in domestic water resource development schemes and its priority shifted to environmental stewardship, the Corps of Engineers has been called upon to perform an increasing amount of environmental service to the United States and its overseas allies. The Corps is heavily involved in toxic and hazardous waste remediation efforts in the United States and has served as a major contractor at the Hanford, Washington, nuclear waste area and other superfund sites. For a number of years the Corps of Engineers has been one of the primary agents of the Environmental Protection Agency's superfund remediation work, generally accounting for over 40 percent of superfund cleanup in a given year.⁶⁴ Because the Corps has operations in virtually all states, its national organization, technology and cleanup procedures developed to clean up such diverse sources of pollution as nuclear, chemical, nerve agent, and carcinogenic industrial wastes in one state are easily transferred to similar sites in other states.

The Corps of Engineers makes many contributions to environmental security beyond its toxic and hazardous waste cleanup role. It is responsible for the nation's waterways, harbor and river transport artery maintenance, water resource schemes such as dams, and also manages some 12 million acres of U.S. land. To help it perform its tasks properly, the Corps of Engineers has developed several labs such as the Construction Engineer Research Laboratory (CERL) in Illinois and the Waterways Experimentation Station (WES) in Mississippi. Both labs have made major contributions to environmental systems management. CERL has been a leader in the development of geographic information systems for environmental management, designing computer systems that allow training areas to be digitized and complex training requirements balanced against environmental constraints. The WES is well-known for developing computerized water flow management programs that have allowed civilian agencies to

better manage water flows from critical estuaries such as the Chesapeake Bay.

In addition to these activities, under the Water Resources Development Acts of 1986, 1988 and 1990, the Corps of Engineers was assigned the responsibility for wetland permitting.⁶⁵ Because wetlands provide a primary feedstock for commercial and sport fishing, are valuable for recharging ground water, provide nesting areas for threatened and endangered species and serve as stops on waterfowl flyways, the Corps' management of the wetlands allows it to make a major contribution to the nation's environmental security.

Under section 404 of the Water Resources Development Act of 1990, the Corps of Engineers has been given regulatory supervision over the remaining 93 million acres of U.S. wetlands, and considers approximately 15,000 individual permit applications per year.⁶⁶ As part of its wetlands management role, the Corps has established a wetlands research and development program and in 1991 began a \$22 million 3-year study targeted at restoring and developing wetlands and improving their management in combination with other organizations and research and development agencies. The Corps is also a leader in several major efforts to restore wetlands in the Kissimmee River of Florida and Everglades National Park. In these projects, the Corps is working closely with the state of Florida in a joint effort as well as with the Fish and Wildlife Service and the Environmental Protection Agency. The Corps of Engineers Wetland Projects also support international agreements such as the North American Waterfowl management plan of the United States and Canada.⁶⁷

These domestic contributions of DOD are significant and offer models upon which NATO might develop programs for addressing critical environmental problems both within the Alliance and out-of-area in regions strategically important to European security. The militaries in Europe receive the same criticism for land use and abuse as do DOD forces in the United States. To the degree that European militaries are able to accomplish their cleanup, compliance, conservation, and pollution prevention missions in a successful manner, they will

garner public support, more easily maintain access to training areas, and maintain control of their operational programs. Recognizing this, some defense organizations are changing their behavior. In Britain, the Ministry of Defense (MOD) has environmental stewardship of some 242,000 hectares throughout Britain. To overcome criticism that MOD management limits public access, the Ministry has institutionalized environmental compliance as a method of doing business and gaining public support. It is closely monitoring the impact of exercises, appointing conservation officers for its units, replanting trees, and even using horsemen to patrol areas where the use of 4-wheel drive vehicles might otherwise erode the delicate flora.⁶⁸

Although still evolving, the U.S. environmental security mission is an excellent role model for other militaries to follow in their effort to meet increasingly stringent environmental standards while maintaining their operational readiness. In addition to internal environmental security missions, the military can make a great contribution to the second tenet of DOD's definition of environmental security: mitigating impacts of adverse environmental actions that lead to international instability. Secretary of Defense Les Aspin has articulated four threats to the national security of the United States and in each of these DOD can make a contribution. These threats are regional dangers, nuclear dangers, dangers to democracy, and economic dangers.

One of the primary tools for addressing international environmental security is the U.S. Security Assistance Program, once largely utilized to develop military capabilities among allies. The Security Assistance Program is now being used creatively to help nations develop the economic health and environmental infrastructure necessary to maintain stability. Since 1991, Congress has provided \$30 million for DOD efforts to promote biodiversity and conservation efforts and democratic awareness on the part of foreign militaries. This makes good sense. The military in the developing world is often the best organized and efficient element of the government, and is present in all areas of the country, to include distant frontiers and areas composed of minority ethnic

groups. Encouraging the military to accomplish civic action and environmental projects in areas populated by disenfranchised minority groups promotes nation building and demonstrates the concern of the government for its divergent population base.

The chief cause of political instability is poverty. The United States is increasingly aware that its Security Assistance Program nation-building projects help governments address the needs of the civilian population, reducing the conditions of poverty and promoting legitimacy in the eyes of the people. Thus, the DOD Security Assistance Program has helped host country militaries to rebuild water supply systems, construct hospitals, drill wells, build sanitary landfills, roads and airstrips for previously isolated sections of the country. Such projects contribute to the economic and health and overall environmental well-being of a nation and identify the military with nontraditional roles and as making a positive contribution to the needs of the people.

This work recognizes the contribution of military environmental security projects to reducing poverty and promoting economic sustainability. For example, in Africa, DOD established its coastal security program which provides patrol boats, law of the sea education, training in boarding procedures, and communication systems to fledgling naval units of host government militaries along the African littoral. With these assets the countries have been able to patrol their exclusive economic zones and limit poaching and the rapacious over-fishing of foreign trawler fleets. Such a program reduces the likelihood that valuable local fisheries, critical to the well-being of the health and economy of a nation, are depleted beyond their carrying capacity, and allows the government to obtain royalties from foreign fleets.⁶⁹

DOD expanded upon the concept of the Coastal Security Program to establish a biodiversity in conservation program that encourages the military to conserve its wildlife resources. The focus of the program has been on antipoaching and habitat maintenance projects such as developing bridges and roads in game parks, putting in small dams to maintain wetlands and fisheries, and developing the local military capacity for

protecting terrestrial wildlife against all too prevalent poachers. This program has many advantages. It maintains military-to-military contact and helps sustain natural resources that are important both to domestic hunters and fishermen and to the tourist industry, which brings hundreds of millions of dollars into Africa every year. Assistance programs in these areas stand against the forces of poverty and contribute to the political stability of the governments that receive the assistance.

Another area of international importance within the DOD organization is the Center for Global Environmental Excellence located in the Construction Engineer Research Laboratory. The purpose of this center is to "provide a proactive ability to spatially evaluate the environmental risks and sensitivities of actions (or inaction) and policies worldwide using a format similar to an environmental assessment or impact statement based on emerging technological capabilities."⁷⁰ Because of the DOD global mission and Presidential executive orders of 1978 making the United States responsible for its environmental actions overseas, the center can make a major contribution to DOD's ability to execute its environmental security mission. Identifying potential environmental problems and mitigating them is more cost effective than attempting to wrestle with the potential political instability that can result. The Center accomplishes this with computer models that help plan environmental stewardship on a global basis. The format combines spatial analysis of geographic information systems with advanced and emerging remote sensing technology. By digitizing large quantities of existing environmental data, it can offer information to help manage such diverse environmental variables as treaty negotiations, water use planning, mineral resource prospecting and development, vegetative resource health and disease control, insect control planning, disaster planning, and land use management. This geographic information system has the capability of doing environmental sensitivity analysis that would allow governments to better manage their environmental efforts and more efficiently allocate resources to critical environmental problems in a timely fashion.⁷¹

Other DOD related programs include initiatives from the civilian leadership of the United States. For example, Senators Nunn and Lugar proposed legislation that provided \$800 million to assist the Soviet Union's nuclear environmental disarmament program. The legislation has been broadened every year so that it does not focus exclusively on dismantling weapons, but allows for environmental cleanup, such as the \$25 million allocated to Belarus to clean up nuclear related waste on a former Soviet military base.⁷² The Corps of Engineers has been actively involved in helping its Soviet counterpart design facilities in which disassembled nuclear weapons could be safely stored. Because of the limited development of Soviet technology in this area and the superior experience of the Corps of Engineers in constructing facilities for storing sensitive radioactive waste, this project is providing technology transfer and making a significant improvement in nuclear security for the former Soviet Union and its European neighbors.

Vice President Gore was the force behind the establishment of the environmental task force that combined intelligence collection assets of the DOD and the Central Intelligence Agency to address problems. Data from the intelligence agencies has been provided to high-level civilian academics whose mission is to develop ways of using the data for global environmental improvement. The potential benefits of this program are now being realized.

Recently civilian academics have been able to monitor undersea volcanic eruptions by using data collected from naval intelligence assets. The Navy's underwater sound surveillance system (SOSUS) was designed at a cost of \$15 billion to track enemy ships and submarines. It is a network that surrounds the globe with underwater listening devices tied directly to U.S. Navy shore stations through 30,000 miles of undersea cable.⁷³ The Navy now filters out high frequency signals and pipes the low frequency signals required directly to scientists at the National Oceanic and Atmospheric Administration Pacific Marine Environmental Laboratory in Newport, California. Monitoring undersea disruptions will aid in predicting plate tectonic shifts, earthquakes and tsunamis. Dr. D. James

Baker, the agency's administrator, pointing out the revolutionary impact that this information will have on the earth sciences, stated, "we want to understand the environment," and that the new information, "gives us a window on the ocean that we can't get in any other way—almost a global picture of what is happening."⁷⁴ Given the potential for these systems to provide critical environmental data on such topics as soil contamination, marine data on overfishing and poaching, climatic change, and disaster prediction, this task force has the potential of further demonstrating the unique contributions of military assets to the realm of environmental security.

The Department of Defense definition of its environmental security mission includes ensuring that its military operations and training are conducted in compliance with environmental laws, and deterring or mitigating the environmental causes of political instability and conflict in the international arena. The contributions that DOD has made in these areas are not balanced. There has clearly been a greater emphasis placed on the former aspect of its mission, that of ensuring DOD compliance and stewardship. Only now is the international conflict and instability component of environmental security beginning to receive the substantial DOD resources available. Nevertheless, the DOD environmental security program offers an excellent model on which to pattern NATO environmental security activities.

A NATO Approach.

Now that NATO is no longer needed to protect Western Europe against the Soviet Union, it could be very useful in providing the sense of security within which the new democratic republics of Central and Eastern Europe can thrive.⁷⁵

Jean Kirkpatrick

As recognized in the New Strategic Concept, NATO is in the particularly fortuitous situation of having extensive membership and capabilities well suited for executing these new security functions, which the European Union, WEU and CSCE cannot duplicate; NATO is in the best position to address Europe's environmental security problems. Because

the United States is a member, and quite often takes a major leadership role in NATO policy and activities, the environmental management skills and capabilities developed through the DOD program are available to NATO. Bringing these substantial capabilities to bear on NATO's cooperation and dialogue concept would be relatively easy to achieve. First, because the use of the military for nontraditional contributions to national security is a favorite theme of the Clinton administration, the use of DOD assets to support a NATO environmental security program should have U.S. support. In addition, U.S. environmental elements are already at work in Europe assisting cooperation partners. The Corps of Engineers, for example, has performed work in Poland and the FSU on major environmental threats such as nuclear disarmament and waste storage. Moreover, Mr. Gary Vest, the Principal Assistant Deputy Under Secretary of Defense for Environmental Security, is a co-chair of pilot studies for the NATO Committee on the Challenges of a Modern Society and is already providing new concepts for NATO's participation in environmental security measures. By drawing upon the U.S. program and assuming an environmental security assistance mission, NATO could demonstrate its relevance at a time when many question its very existence. It would also establish greater contacts with the former East Bloc militaries, which are already demonstrating that they are losing faith in the new democratic regimes, and help reduce the threats to governmental legitimacy and stability caused by chronic, often untreated, environmental problems. It would also reinforce the idea of civil primacy in the civil-military relations.

For its part, NATO has established the institutional framework for international environmental security projects and activities. In its redrafting of the Alliance Strategic Concept, the North Atlantic Council stated that,

Risks to Allied security are less likely to result from calculated aggression against territory of the Allies, but rather from the adverse consequences of instabilities that may arise from serious economic, social and political difficulties, including ethnic rivalries and the territorial disputes, which are faced by many countries in Central and Eastern Europe. . . They could, . . . lead to crises inimical to European stability and even to armed conflicts.⁷⁶

In discussing the concept's broad approach to security and protecting peace in the new Europe, the Alliance points out the "opportunities for achieving Alliance objectives through political means" are substantially greater in the new security environment, and that security and stability have political, economic, social, and environmental elements as well as the indispensable defense dimension.⁷⁷

Efforts to achieve NATO objectives include the use of dialogue and cooperation with the purpose of decreasing the risks of conflict by reducing misunderstandings; fostering confidence-building measures; and establishing regular military contacts with Eastern and Central Europe utilizing the framework of the London Declaration.⁷⁸

In addition, such creative uses of NATO are reinforced by the Charter of Paris for a New Europe, which encourages the Alliance to "develop broader and productive patterns of bilateral and multilateral cooperation in all relevant fields of European security, with the aim, inter alia, of preventing crises or, should they arise, ensuring their effective management."⁷⁹ Thus, NATO has the institutional framework and strategic concept upon which to build an environmental security assistance program toward countries whose environmental problems pose a threat to political stability and European security.

Individually, some member countries have established environmental directives that encourage such international cooperation. Germany, for example, recognizes that its Federal Armed Forces have multiple capabilities with which to mitigate environmental damage or enhance environmental protection. Under Article XXXV of the Basic Law, administrative assistance and disaster relief can be provided, and under other directives technical support may also be provided for environmental purposes. Indeed, the Federal Armed Forces in their own regulation encourage "providing technical and logistical equipment, specialized knowledge and methods developed and used for the defense mission . . . for the purpose of protecting the environment."⁸⁰ The German technical concept for environmental protection also states that "environmental problems can only be solved by international

cooperation, and this applies to the Federal Armed Forces as well.⁸¹ Thus, the United States, Britain, and Germany, the most powerful military members of NATO, have committed their armed forces to promoting environmental stewardship and international environmental outreach.

NATO has begun nascent efforts in international environmental cooperation. In the mid 1970s, representatives from NATO's Naval Forces formed a working group to exchange information about environmental protection and national regulations and to standardize procedures for dumping waste at sea.⁸² However, the NATO Committee on the Challenges of Modern Society (CCMS) has been the leader on environmental issues through its pilot studies on critical environmental issues. Created in 1969 to provide a social dimension to the Alliance, CCMS programs have assumed greater significance as NATO's military dimension has waned. The 1992 NATO Work Plan for Dialogue, Partnership and Cooperation emphasizes NATO's Third Dimension, scientific and environmental programs, and highlights the CCMS role in developing institutional relationships with cooperation partners—the countries of East and Central Europe and the former Soviet Union. The CCMS has a record of success promoting environmental technology development and transfer, and cooperation between the United States and Europe and between NATO and its cooperation partners. One of the important pilot projects that has been initiated by the CCMS under the framework of the North Atlantic Cooperation Council (NACC) is the "Cross-Border Environmental Problems Emanating from Defense Related Installations and Activities Studies." These studies address radioactive contamination in the Barents, Kara, Laptev and Baltic Seas as a result of decommissioned nuclear vessels, and the drainage of polluted rivers into these marine areas.⁸³ Participating in this study are the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Russia, the Slovak Republic, Kyrgystan, and the Ukraine as well as eight NATO member countries.⁸⁴

In late February 1993, the CCMS for the first time met in formal session with the members of the NACC. At this meeting the NATO Assistant Secretary General for Scientific and

Environmental Affairs stressed the importance of the Alliance's scientific and environmental programs to its new objectives, and emphasized NATO's commitment to addressing important environmental issues, such as defense related and natural disaster problems in critical regions. During this meeting, cooperation partners requested assistance with environmental problems concerning water pollution, and soil and air contamination. All member countries in attendance agreed that international cooperative action was the only method to successfully address most European cross-border environmental pollution problems.⁸⁵ NATO military elements have the technical expertise and organizational capabilities to help the Cooperation Partner militaries address these issues.

CCMS has initiated other pilot projects aimed at furthering important international environmental contact with critical regions. Its work has produced a NATO environmental mission statement demonstrating the commitment of NATO commanders to environmental stewardship and an environmental principles statement for NATO commanders. Other important issues addressed by the CCMS pilot studies include the role of the military in executing the Montreal Protocol.⁸⁶ However, much of CCMS effort has been dedicated to building consensus among the NATO military forces and impressing upon its commanders that environmental stewardship is a mission that should be part of the military's daily activities. That is to say, the CCMS focus has been more internal than international. Clearly, the CCMS and NATO have the potential to do much more in addressing environmental security out of area rather than focusing primarily upon the externalities of their own military operations.

To address the environmental problems of the FSU, Central and Eastern Europe, NATO and other allied military organizations, such as the U.S. European Command (EUCOM), should develop a strategy for using the military component to execute NATO's strategic concept of promoting regional stability in environmentally troubled areas. The institutional recognition of the need and importance of executing such a strategy has been articulated in the written frameworks of the DOD, NATO, NACC and many member

countries. The Cooperation Partners of East and Central Europe, themselves, are requesting such assistance. NATO should capitalize on their interest by using the dialogue and cooperation tenets of the new Strategic Concept to promote environmental assistance toward these and other strategically important areas with an environmental security assistance program similar to the U.S. Security Assistance Program. The objective of this program should be to mitigate environmental problems that have the potential to erode economic and health factors, undermine governmental legitimacy, and promote instability, and further involve host nation militaries in the solution of their country's environmental security issues.

The NATO environmental security assistance program should not operate in a vacuum. It should seek synergy by working in close cooperation with other NACC and bilateral and international programs, such as those of the International Atomic Energy Agency and the Helsinki Commission, whose missions are to promote stability and environmental improvement in critical regions. For instance, the U.S. Agency for International Development (USAID) spent nearly \$500 million in FY91 on its environmental programs, concentrating on education, training, economic policies, and infrastructure.⁸⁷ A NATO environmental security assistance program could capitalize on new USAID built roads to distant regions of a given country to provide environmental assistance in the newly opened area, or assist USAID in broadening training programs to include the host government military. Moreover, the NATO environmental security assistance program should focus on those countries receiving priority from the NACC civilian policymaking arm so that environmental assistance teams support the overall Alliance security strategy.

NATO militaries have diverse technical assets, including engineers, public health, sanitation, environmental and industrial and weapons of mass destruction (WMD) waste cleanup specialists, which can be formed into assistance teams. These resources can make significant contributions in such diverse areas as developing food distribution systems; providing medical and health care; upgrading waste water, sewage, transportation, and other public utilities necessary to

sustain the economy, education and training, disaster relief and emergency management. Environmental assistance teams can perform environmental mitigation operations themselves, conduct joint mitigation and improvement exercises with host government militaries, and train host government militaries to conduct environmental mitigation programs. (See Figure 3.)

The environmental programs of other agencies would also benefit from a NATO environmental security assistance program. The Organization for Economic Cooperation and Development (OECD) has many environmental programs dedicated to eastern Europe and the Soviet Union, funded for several hundred million dollars. The Poland, Hungary, Assistance for Economic Restructuring (PHARE) Program is

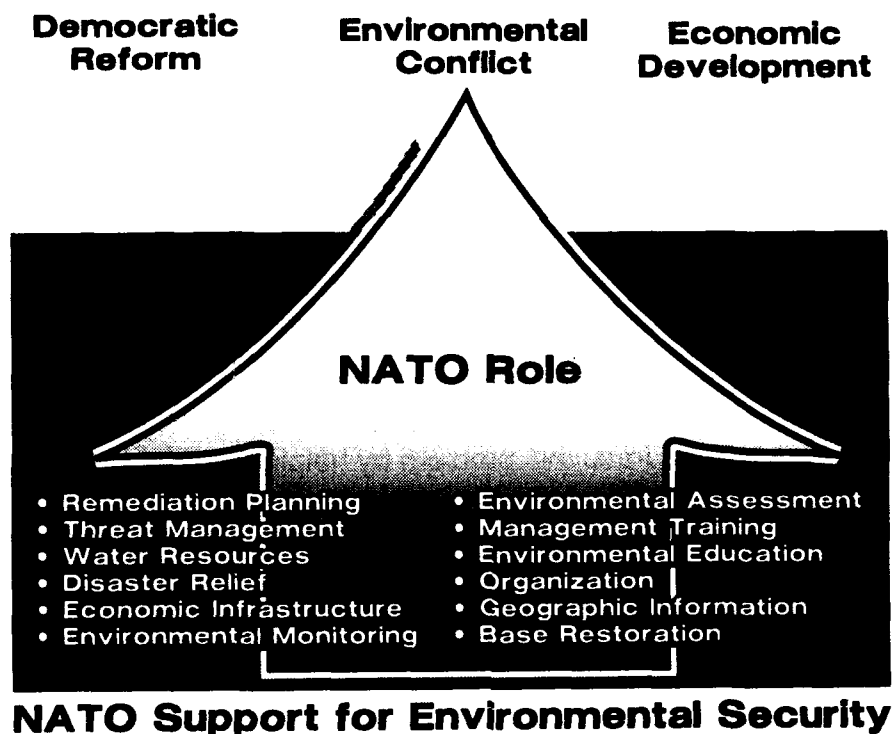


Figure 3.

also well funded and includes multiple environmental improvement objectives. The U.N. Environmental Program and the U.N. Development Program both target developing countries and, as previously mentioned, the U.S. Congress has multiple individual environmental initiatives, such as the Nunn-Lugar proposal, for Eastern Europe and the FSU.⁸⁸ These are but a few of the many programs whose objectives and initiatives could be coordinated and supported by the NATO environmental security assistance program. *In fact, NATO could serve as a clearing house for environmental proposals to be funded by outside donors. This clearinghouse function would establish priorities, bring order to the current, uncoordinated, and unfocused efforts of multiple donor agencies and governments, avoid waste and duplication of effort, and allow the concentration of resources against the environmental problems most likely to threaten European security interests.*

The program's objectives could also be tied to the goals of multilateral lending institution programs in order to gain their financial support, or support for multilateral initiatives to the developing countries assisted by the teams. Developing countries, whether in Eastern Europe, the FSU, the Middle East, or Africa, frequently have one thing in common concerning environmental problems: lack of administrative resources to properly evaluate, chronicle, and address their environmental issues. Simply put, the environmental problems dwarf the bureaucratic resources available. The NATO program can address this problem by helping to develop host country militaries into environmental security resources, which can execute environmental projects, such as building primary water treatment facilities, dams and irrigation schemes, or provide emergency management assistance, such as monitoring radiation from potential nuclear disasters in the FSU and evacuating the populace caught in its path, or assisting in the cleanup of toxic and hazardous waste at former East Bloc military bases. NATO teams could also train the host government military to properly evaluate environmental problems and prepare grant requests from multilateral organizations whose mission it is to aid in the solution of such problems.

Under this environmental security assistance team concept, military training teams could be sent to target countries with country-specific tailored programs that could include:

- establishing geographic information systems for local or national environmental planning;
- creating environmental security cells at national or regional level to promote cooperation between civilian and military environmental resources;
- establishing lecture programs on critical environmental issues such as the legal and financial requirements to solve environmental problems;
- overseeing of environmental infrastructure construction;
- developing assessment and remediation plan;
- monitoring environmental threat;
- managing water resources;
- encouraging natural resource conservation practices;
- planning and training for disaster relief;
- providing environmental health education training;
- developing energy conservation programs; and,
- restoring of military facilities;⁸⁹

The environmental security assistance program concept is mutually beneficial. Those countries to which its teams are deployed would benefit from having additional resources to assist in their efforts to bring environmental problems under control. Further, their indigenous military forces would be trained to perform nontraditional military missions that promote nation building and help to develop governmental legitimacy. NATO for its part, would further demonstrate its relevance in the post-cold war security environment, and take advantage of the good will of European and Cooperation Partners to further

promote the concept of European unity and the value of U.S. military participation in European security endeavors.

As the \$2 billion already spent on the seemingly endless quagmire of Somalia demonstrates, precluding conflict is much more cost effective than the ad hoc commitment of combat forces. The commitment of NATO Environmental Security Assistance teams can help mitigate the causes of future conflict and preclude NATO out-of-area combat missions, which could split the Alliance. It is a visionary concept whose time has come.

ENDNOTES

1. Sherri Wasserman Goodman, Deputy Under Secretary of Defense (Environmental Security), Statement before the United States Senate Committee on Armed Services, Subcommittee on Military Readiness and Defense Infrastructure, June 9, 1993, p. 2.

2. Jessica Tuchman Matthews, "Redefining Security," *Foreign Affairs*, Spring 1989, pp. 162-178. Another early and important effort to broaden the definition of national security to include environmental challenges was Michael Renner, *National Security: The Economic and Environmental Dimensions*, Washington: World Watch Institute, May 1989.

3. W. A. Douglas Jackson and Marwyn S. Samuels, *Politics and Geographic Relationships*, Englewood Cliffs, New Jersey: Prentiss-Hall, 1971, p. 5.

4. David Easton, *A Framework for Political Analysis*, Englewood Cliffs, New Jersey: Prentiss-Hall, 1965. See also, Karl W. Deutch, "The Growth of Nations: Some Recurrent Patterns of Political and Social Integration," *World Politics*, January 1953, pp. 168-195, and Gabriel Almond, "A Developmental Approach to Political Systems," *World Politics*, Vol. XV, No. 2, January 1965, pp. 183-214.

5. *Ibid*, p. 128.

6. Richard H. Ullmand, "Redefining Security," *International Security*, Vol. 8, No. 1, Summer 1983, pp. 129-153.

7. Norman Myers, "Environment and Security," *Foreign Policy*, Spring 1989, pp. 23-41.

8. Thomas F. Homer-Dixon, Jeffrey H. Boutwell and George W. Rathjens, "Environmental Change and Violent Conflict," *Scientific*

American, February 1993, pp. 38-45. See also, Thomas F. Homer-Dixon, "On The Threshold: Environmental Changes As Causes of Acute Conflict," *International Security*, Vol. 16, No. 2, Fall 1991, pp. 76-116. Not all authors believe that there is a correlation between environment and conflict. See, for example, Daniel Deudney, "The Case Against Linking Environmental Degradation and National Security," *Millennium: Journal of International Studies*, Vol. 19, No. 3, 1990, pp. 461-476.

9. *National Security Strategy of the United States*, Washington: U.S. Government Printing Office, August 1991, p. 22.

10. Sam Nunn, "Strategic Environmental Research Program," Senate floor speech, June 28, 1990.

11. NATO, "The Alliance's New Strategic Concept," November 7, 1991, NATO Press Service, Press Communique S-1 (91) 85, p. 3.

12. *Ibid.*, p. 6.

13. Vladimir Shlapentokh, "The Ukraine Migraine: How the Escalating Feud With Russia Could Lead to Something Worse," *The Washington Post*, September 5, 1993, p. C2. See also, Alexander Tkachenko, "Ukrainian Premier Steps Down," *The Washington Post*, September 10, 1993, p. A32, and Steven Erlangen, "Ukraine Questions the Pricetag of Independence," *The New York Times*, September 8, 1993, p. A8.

14. Don Oberdorfer, "Bush Offers \$175 Million For Non-Nuclear Ukraine," *The Washington Post*, December 10, 1992, p. A12.

15. Rachel Fleishman, Special Assistant for International Security, Office of the Deputy Under Secretary of Defense for Environmental Security, Interview, Washington, DC, September 2, 1993.

16. Commission of the European Communities, "EC Assistance to the Soviet Union and the Countries of Central and Eastern Europe in Nuclear Safety," News Release, IP (91) 526, June 1991. See also, George Rodrigue, "Under a Cloud: Soviet Nuclear Program Left Legacy of Ills, Anger," *The Dallas Morning News*, August 10, 1993, p. 1.

17. Victoria Pope and Julie Corwin, "Radiation in Russia," *U.S. News and World Report*, August 9, 1993, p. 40. See also, George Rodrigue, "A Ravaged Land: Pollution Woes Intensify During Post-Soviet Era," *The Dallas Morning News*, August 8, 1993, p. 1.

18. Jean-Christophe Fueg, "Soviet Oil Production Begins to Falter," *World Oil*, August 1989, p. 83. See also, various issues of Energy Information Agency, *International Oil and Gas Exploration and Development Activities*, Quarterly Reports.

19. Stephen A. Holmes, "Russia-U.S. Sign Space, Energy Deal," *The New York Times*, September 3, 1993, p. A6.

20. Directorate of Intelligence, Central Intelligence Agency, *Handbook of International Economic Statistics—1992*, Washington: U.S. Government Printing Office, 1992, p. 128.

21. U.S. Bureau of Mines, *Mineral Commodity Summaries, 1993*, Washington: U.S. Government Printing Office, 1993.

22. U.S. Department of Commerce, *Statistical Abstract of the United States 1992: The National Data Book*, Washington: U.S. Government Printing Office, 1992, p. 820.

23. William T. Johnson, *NATO's New Front Line: The Growing Importance of the Southern Tier*, Carlisle Barracks, PA: Strategic Studies Institute, 1992, p. 8.

24. The Economist, *The Economist Book of Vital World Statistics*, New York: Times Books (Random House) 1990, pp. 34-35. See also, "EC's Matutes Discusses Ties With Maghreb," *Foreign Broadcast Information Service (FBIS)*-WEU-92-048, March 11, 1992, p. 6.

25. "Eurostat, Composition of Extra EC Foreign Residents," (IP 90 492) Luxemburg, Brussels, June 19, 1990.

26. U.S. Committee for Refugees, *World Refugees Studies, 1991*, Washington: USCR, 1991, pp. 7-13. For an in-depth perspective on migration and European security see Lawrence Freedman and John Saunders, *Population Change and European Security*, New York: Brassey's, 1991.

27. Remy Leveau, *Algeria: Adversaries in Search of Uncertain Compromises*, Chaillot Papers, Paris: Institute for Security Studies, 1992.

28. U.S. Committee for Refugees, 1991, p. 9.

29. Organization for Economic Cooperation and Development, *Trends and International Migration*, Paris: OECD, 1992, p. 33.

30. "EC: Immigration from Eastern Europe Studied," *FBIS*-WEU-93-114-A, June 16, 1993, p. 5.

31. Perhaps the European country struggling most with immigrant-related social stability problems is Germany. In the last year, nonviolent ultra-right wing offenses, such as distributing Nazi propaganda, have doubled to approximately 7,000 and over 2,500 violent acts have been perpetrated against foreigners in the past year. See, for example, Rick

Atkinson, "Germany Unable To Stem Flood of Attacks on Foreigners," *The Washington Post*, August 28, 1993, p. A15, and "Push Comes to Shove: Western Europe is Ailing, Angry and Afraid of the Future," *U.S. News and World Report*, June 14, 1993, pp 53-64.

32. World Bank, *World Development Report 1992: Development and the Environment*, New York: Oxford University Press, 1992, p. 7.

33. *Ibid.*, p. 32.

34. *Ibid.*, p. 30.

35. International Monetary Fund, *World Economic Outlook: May 1993*, Washington: International Monetary Fund, May 1993, p. 14.

36. Directorate of Intelligence, *Handbook of International Economic Statistics—1992*, pp. 56-57.

37. George J. Coakley, Chief, Division of International Minerals, U.S. Bureau of Mines, Interview, Washington, DC, September 2, 1993.

38. Directorate of Intelligence, p. 62.

39. The World Bank, *The World Debt Tables, 1992-93: External Finance For Developing Countries, Vol. 1, Analysis and Summary Tables*, Washington: The World Bank, 1993, p. 29. See also, Louis Uchitelle, "New Man, Old Burden: Moscow Owes \$68 Billion," *The New York Times*, December 16, 1992, p. A14.

40. Lee Hockstader, "Russian Parliament Rejects Budget Cuts, \$22 Billion Deficit Could Risk Loss of Aid," *The Washington Post*, August 28, 1993, p. A18, and "The Case of Aiding Russia," *The Washington Post*, September 9, 1993, p. A20.

41. Peggy McInerny, "Regional Economic Development Thwarted," Kennan Institute for Advanced Russian Studies, Meeting Report, Vol. 10, No. 13, 1993.

42. McInerny, "Collapse of a Civilization, Not an Economy," Kennan Institute for Advanced Russian Studies, Meeting Report, Vol. 10, No. 11, 1993.

43. Roland Evans and Robert Novak, "Yeltsin's Challenge," *The Washington Post*, April 26, 1993, p. A19.

44. Serge Schmemmann, "Russia's Peril: Soviet Type Breakup," *The New York Times*, March 15, 1993, p. A-6.

45. "The Commonwealth and the Military," Vol. IX, No. 9, 1992. See also, McNerny, "Caucuses, Ethnic Conflict and Economic Decline," The Kennan Institute for Advanced Russian Studies, Meeting Report, Vol. 10, No. 14, 1993, and Steve Le Vine, "Brutal Tajik Civil War Shakes All Central Asia, Communists Rule Again After 20,000 Die," *The Washington Post*, February 5, 1993, p. A1.

46. William J. Broad, "Russian Says Soviet Atom Arsenal was Larger Than West Estimated," *The New York Times*, September 26, 1993, p. 1, and Elaine Sciolino, "U.S. Will Draw Up Strategy to Aid Ex-Soviet States," *The New York Times*, February 8, 1993, p. A1.

47. Fred Hiatt, "U.S. May Buy Soviet Uranium," *The Washington Post*, November 24, 1992, p. A17.

48. R. Jeffrey Smith, "CIA Chief Says Russia's Controls on Spread of Arms Remains Weak," *The Washington Post*, February 25, 1993, p. A18. See also, Jim Hoagland, "Lots of Russian Nukes For Sale," *The Washington Post*, February 23, 1993, p. A18.

49. Pope and Corwin, "Radiation in Russia," p. 40. See also, Commission of the European Communities, "Chernobyl Four Years On," (Statement by Mr. Cardoso E. Cunha and Mr. Ripa Di Meana), press release, IP (90) 342, April 26, 1990, and, Commission of the European Communities, *Nuclear Safety: The European Community Following the Chernobyl Accident*, Brussels, Directorate-General for Information, 1989. Other relevant sources are, Michael Dobbs, "After the Soviet Union's Collapse Are Its Nuclear Safeguards Next?", *The Washington Post*, September 7, 1993, p. A12, and Rick Maze, "Nuclear-Arms-Control Fears Take Center Stage," *Army Times*, March 15, 1993, p. 30.

50. *Ibid.*

51. Pope and Corwin, p. 40.

52. Michael Dobbs, "In the Former Soviet Union, Paying the Nuclear Price," *The Washington Post*, September 7, 1993, p. A1. See also, George Rodrigue, "Suffering for the Past," *The Dallas Morning News*, August 11, 1993, p. 1.

53. Robert J. Samuelson, "Of Deutchmarks," *The Washington Post*, February 2, 1993, p. A21.

54. Dan Zanini, Senior Army Fellow, "Council on Foreign Relations Trip Report from its May 1993 Visit to NATO," Washington, DC, August 1993.

55. "Rome Declaration on Peace and Cooperation," NATO Press Service, Press Communique S-1 (91) 86, November 8, 1991.

56. Dan Zanini, Trip Report, p. 4.
57. William H. Parker III, "Environment Moves to Front Burner," *Defense* 90, March/April 1990, p. 21-32.
58. Sherri Wasserman Goodman, 1993, p. 4.
59. *Ibid.*, p. 9.
60. *Ibid.*, p. 8.
61. *Ibid.*, p. 10.
62. *Ibid.*, p. 11.
63. *Ibid.*, p. 12.
64. Henry J. Hatch, "Chief of Engineers Charge," Address to the 45th Meeting, Environmental Advisory Board, Ft. Worth, Texas, April 12, 1989, p. 5.
65. Patrick J. Kelly, "The Greening of the Corps: A Balanced Approach in Protecting Wetlands," *Military Engineer*, March-April 1991, pp. 31-34.
66. *Ibid.*, p. 32.
67. *Ibid.*, p. 33.
68. Ann Hills, "A Green Ministry," *Geographical Magazine*, May 1991, pp. 16-20.
69. Scott Fisher, "Biodiversity Country Projects," Washington, Office of the Assistant Secretary of Defense, International Security Affairs, Africa Region, March 1992, p. 1.
70. Corps of Engineer's Research Lab, Environmental Sustainment Laboratory, "Center of Global Environmental Excellence," Champaign, IL, 1992.
71. Robert Lozar, Director, Environmental Sustainment Laboratory, Corps of Engineers Research Laboratory, Interview, Washington, DC, September 1, 1993.
72. Rachel Fleishman, interview, September 2, 1993.
73. William J. Broad, "Long Secret Navy Devices Allow Monitoring of Ocean Eruption," *The New York Times*, August 20, 1993, p. A1.
74. *Ibid.*

75. Jean Kirkpatrick, "Despite Optimism After Communists Fall, Europe Has Not United," *Sunday Patriot News*, December 5, 1993, p. B15.

76. NATO, "The Alliance's New Strategic Concept," 1991, p. 3.

77. *Ibid.*, p. 6.

78. *Ibid.*, p. 7.

79. *Ibid.*, p. 8.

80. Federal Ministry of Defense (Germany), *The Technical Concept*, "Environmental Protection in the Federal Armed Forces," Bonn: Federal Ministry of Defense, 1990, p. 42.

81. *Ibid.*, p. 46.

82. *Ibid.*

83. Wendy Grieder, U.S. National CCMS Coordinator, U.S. Environmental Protection Agency, "Memorandum: Status of the NATO/CCMS Program," May 10, 1993, and "NATO Works with Cooperation Partners on Environmental Problems," *NATO Review*, April 1993, p. 34; see also, Jean-Marie Cadiou, "The Environmental Legacy of the Cold War," *NATO Review*, October 1993, pp. 33-35.

84. *Ibid.*

85. *Ibid.*

86. NATO, "Interim Report of CCMS Pilot Study on Defense Environmental Expectations," (ASG/SEA 93) 85, February 17, 1993, Brussels, March 25, 1993. See also, Gary D. Vest and Robert Coles, co-chairs, Executive Board and Sub-Groups I, II, and III of the pilot study, "Meeting Minutes," NATO School (SHAPE), August 25-27, 1993.

87. U.S. Army Corps of Engineers, "Peacetime Engagement and National Assistance in Eastern Europe and the Soviet Republics," (draft working paper), Washington, DC, November 21, 1991.

88. Randy Ridley, "DNA is Key To Nunn-Lugar," *Defense News*, November 8-14, 1993, p. 24, and Kurt Tamoff, *The Environment As a Foreign Policy Issue*, Washington: Congressional Research Service, The Library of Congress, November 25, 1991, p. CRS-13.

89. Odelia Funke, "Environmental Dimensions of Security: The Former Soviet Bloc Nations," paper prepared for The International Studies Association Meeting, Atlanta, GA, March 31- April 4, 1992, pp. 17-18. See also, Government Accounting Office, *Former Soviet Union: Assistance by*

the United States and Other Donors, Washington: U.S. Government
Printing Office, (GAO/NSIAD-93-101), December 1992.