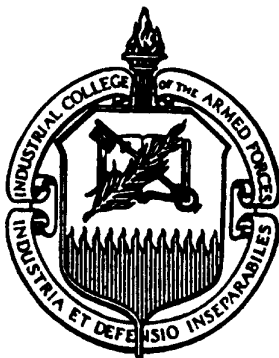


**1997
Executive Research Fellow**

**Promoting Environmental Security for National and
Business Interests**

Steven B. Siegel
Civilian
Department of the Army

Faculty Research Advisor
Dr. Gregory D. Foster



19971113 085

The Industrial College of the Armed Forces
National Defense University
Fort McNair, Washington, D.C. 20319-5062

DTIC QUALITY INSPECTED 3

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

DISCLAIMER

This research report represents the views of the author and does not necessarily reflect the official opinion of the Industrial College of the Armed Forces, the National Defense University, or the Department of Defense.

This document is the property of the United States Government and is not to be reproduced in whole or in part for distribution outside the federal executive branch without permission of the Director of Research and Publications, Industrial College of the Armed Forces, 408 4th Avenue, Fort McNair, D.C. 20319-5062.

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED		1b. RESTRICTIVE MARKINGS		
2a. SECURITY CLASSIFICATION AUTHORITY N/A		3. DISTRIBUTION / AVAILABILITY OF REPORT Distribution Statement A: Approved for Public Release; distribution is unlimited.		
2b. DECLASSIFICATION / DOWNGRADING SCHEDULE N/A				
4. PERFORMING ORGANIZATION REPORT NUMBER(S) NDU-ICAF-97		5. MONITORING ORGANIZATION REPORT NUMBER(S) N/A		
6a. NAME OF PERFORMING ORGANIZATION Industrial College of the Armed Forces	6b. OFFICE SYMBOL (if applicable) ICAF-FA	7a. NAME OF MONITORING ORGANIZATION National Defense University		
6c. ADDRESS (City, State, and ZIP Code) Fort McNair Washington, D.C. 20319-6000		7b. ADDRESS (City, State, and ZIP Code) NDU-LD-SCH Ft. McNair Washington, D.C. 20319-6000		
8a. NAME OF FUNDING / SPONSORING ORGANIZATION N/A	8b. OFFICE SYMBOL (if applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER N/A		
8c. ADDRESS (City, State, and ZIP Code)		10. SOURCE OF FUNDING NUMBERS		
		PROGRAM ELEMENT NO.	PROJECT NO.	
		TASK NO.	WORK UNIT ACCESSION NO.	
11. TITLE (Include Security Classification) <i>Promoting ENVIRONMENTAL Security for National and Business interests</i>				
12. PERSONAL AUTHOR(S) <i>Mr. Steven B. Siegel, DA</i>				
13a. TYPE OF REPORT Research	13b. TIME COVERED FROM <i>Aug 96</i> TO <i>Apr 97</i>	14. DATE OF REPORT (Year, Month, Day) <i>April 97</i>	15. PAGE COUNT <i>83</i>	
16. SUPPLEMENTARY NOTATION				
17. COSATI CODES		18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP			SUB-GROUP
19. ABSTRACT (Continue on reverse if necessary and identify by block number) See Attached				
20. DISTRIBUTION / AVAILABILITY OF ABSTRACT <input type="checkbox"/> UNCLASSIFIED/UNLIMITED <input checked="" type="checkbox"/> SAME AS RPT. <input type="checkbox"/> DTIC USERS		21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED		
22a. NAME OF RESPONSIBLE INDIVIDUAL Susan Lemke		22b. TELEPHONE (Include Area Code) (202)	22c. OFFICE SYMBOL NDU-LD-SCH	

ABSTRACT

This paper establishes an integrated framework for coordinating and leveraging US government resources in the environmental security area. Its premise is that although a number of activities are on-going in the environmental security area, these are not being done in a cohesive, integrated and comprehensive manner that makes efficient use of limited, and dwindling federal resources. Further, this framework incorporates the private sector as a partner in national security resourcing and implementation activities that incorporate the environment. The private sector could be key in trying to fill the funding gap that exists to satisfy environmental security needs worldwide. In 1995, the global market for environmental technologies, products and services was estimated at \$427 billion; this is expected to increase to over \$500 billion in 2000. At this time, although the US is the lead producer of environmental technologies, we currently export only about 6% of our total output. Where the global environmental market includes environmental concerns and needs that affect US security interests, an "environmental security market" is created. The framework presented in this paper provides a feasible, affordable approach to penetrate this market.

DTIC QUANTITY UNLIMITED 3

SECTION 1: INTRODUCTION

PURPOSE OF PAPER

The purpose of this paper is to provide a framework for leveraging public and private sector resources in the promotion of environmental security interests.

The specific objectives of the paper are twofold:

- (1) From the public perspective, to enhance planning and management of national security interests in a period of declining resources -- particularly with regard to foreign aid.
- (2) From the private perspective, to increase penetration and competitiveness of US industry in the rapidly growing, highly competitive and dynamic global environmental technology marketplace.

The approach taken to develop the framework for a public-private sector partnership involves: establishing the linkages between national security and the environment; identifying existing policy measures and programs by the federal government and others that support national environmental security objectives; and incorporating this information into a framework that provides a mechanism allowing government and market forces to work together to meet environmental security demands.

BACKGROUND

Much has been written and said on the subject of environmental security - with little agreement on what it is and what should be done about it. A fundamental question often raised in these discussions is whether the environment has an impact on security - either national, regional, or global?

Some say no. Deudny observes "The fashionable recourse to national security paradigms to conceptualize the environmental problem represents a profound and disturbing failure of imagination and political awareness. A frequently raised critical view is that "combining environment and security will have the unintended and inappropriate "securitizing" of environmental issues. Expressing a pessimism about the ability to change existing security institutions and mindsets, these observers think a militarization of approaches to the environment is more likely than a greening of security. According to this perspective, specific departments and agencies (and environmental NGOs) are employing the honorific term "security " only to win more attention and funding for environmental priorities."¹

The vast majority, however, have said yes. The bandwagon is full of domestic and international leaders in government and business who agree that "environmental security" is a strategic and critical concern. Increasingly, the concept of "environmental security" is gaining ground among those involved in the "traditional" world of national security. Each year brings new evidence that environmental scarcity and degradation are critical *contributing* factors underlying many of the

international conflicts that affect our “traditional” security interests. For example, the US government recognizes environmental security as a key component of US national security policy. The National Security Strategy (1996) states “ The dangers we face today are more diverse ... large-scale environmental degradation, exacerbated by rapid population growth, threatens to undermine political stability in many countries and regions.”² Environmental security has received increased consideration with the end of the Cold War; policy makers are looking more closely at broader global and environmental issues that have a potentially significant impact on our nation’s security.

Dabelko and Dabelko provide a good overview of the key arguments for and against consideration of the environment as a security issue. They come out on the side of the need to redefine security more broadly in a post Cold War, highly integrated world. “Economic and ecological developments in an increasingly interdependent world present potential threats for actors at all levels of analysis. The causes, effects and solutions of these economic and environmental challenges ignore national boundaries, calling into question many assumptions of statist definitions of security.”³

Others complain that a major problem in the environmental security field is methodological and that rigorous analysis is what is needed. According to Marc Levy, Instructor of Politics and International Affairs at Princeton University, and a recognized expert on international security issue, “in spite of impressive achievements, however, the research program devoted to studying the links between environmental change and violent conflict is in danger of obsolescence if it does not

correct some quite serious methodological flaws. The most important implication is a need to explore the causes of regional conflict as an important end in itself, and to abandon the current fad of merely demonstrating links to environmental deterioration." Levy found previous research into environmental scarcity and conflict, particularly that by leading authority Thomas Homer-Dixon "rather disappointing." He states that the findings of these studies are virtually identical to the conventional wisdom that prevailed before the research was carried out. And then adds, "How surprising is it that arid states get into conflicts over water, or that peasant unrest has some connection to agricultural productivity?"⁴

There is substantial subjectiveness and judgement in understanding and analyzing security issues overall. When environmental issues are factored in, the situation becomes much more complex. It is very hard to identify and measure the impact that the environment might have upon national security interests. There is no agreed upon calculus that universally applies in answering the question -- what constitutes an environmental risk to US security. Or to address other questions such as: How bad is the risk? To whom? What should be done to fix the problem? Who should fix it? When should it be done? What kind of environmental security policy should the US have? How many resources should the US devote to support this policy? What kinds of resources? Who should supply them? How should the US prioritize the use of these resources? And who is going to pay? There is a need to consider and act upon these types of questions in a more systematic and integrated way than we are doing today.

NATIONAL SECURITY AND THE ENVIRONMENT

When US national security interests are threatened directly or indirectly by environmental factors, an environmental security issue is born. To determine whether an environmental factor constitutes a national security threat, it is first necessary to provide a working definition of a national security threat. Ullman's definition of a national security threat in the post cold war world serves as a good point departure for assessing environmental security issues. He defines a national security threat as an action or sequence of events that:

- 1) threatens drastically and over a brief span of time to degrade the quality of life for the inhabitants of a state, or
- 2) threatens significantly to narrow the range of policy choices available to the government of a state or to private nongovernmental entities (persons, groups, corporations) within the state.⁵

Can environmental forces be considered as a threat in Ullman's definition? Yes, because it focuses on the condition of the security of the party threatened, rather than the causes of the threat. The causes could be anything, including environmental. Security is couched in terms of quality of life and the range of policy choices. Clearly, environmental factors affect quality of life. Could an environmental security threat be over a brief span of time. Yes. For example, Iraq's torching of Kuwaiti oil wells and dumping of oil into the Persian Gulf in 1990 meets this criterion. But what about the narrowing of policy choices? In the ongoing Middle East peace process, addressing the

environmental problem of water scarcity is a requirement for any strategic policy decision between Israel and its Arab neighbors. King Hussein of Jordan projects that “..water is the only issue that could provoke a conflict between his kingdom and the Jewish state.”⁶

But what about potential threats, such as global climate change, that occur over a longer period than “ a brief span of time” as indicated by Ullman. Can these be considered national security threats too? US security policy says yes. The National Security Strategy regards environmental security issues as fundamentally similar to other national security concerns; these can occur quickly or over a long period of time. “The decisions we make today regarding military force structures typically influence our ability to respond to threats 20 to 30 years in the future. Similarly, our current decisions regarding the environment and natural resources will affect the magnitude of their security risks over at least a comparable period of time, if not longer. The measure of our difficulties in the future will be settled by the steps we take in the present.”⁷ Therefore, as point of departure for discussing environmental problems, the broader interpretation of national security threats provided by current national security policy will be used - and then we will see if Ullman's should be expanded.

RESOURCE ACCESS AND THE PRIVATE SECTOR

With international aid coming under criticism by a US public and government focused on domestic concerns, who is going to pay for US environmental security policy? The point of dwindling

federal resources is addressed by Deputy Secretary of State Strobe Talbot in a recent article he authored "... I'd like to make a final appeal. It has to do with money. We don't have enough. We the foreign affairs agencies of the US government --State, the US Agency for International Development (USAID), the US Information Agency (USIA), and the Arms Control and Disarmament Agency (ACDA) -- are not just in straightened circumstances; we're facing a crisis. And this isn't just a problem for us; it constitutes - no exaggeration - a threat to the vital interests of our nation. To put it simply, starkly and indisputably, the foreign policy of the United States is so woefully underfunded that the safety and prosperity of the American people will suffer if we don't take urgent corrective action. The international affairs account of the federal budget has declined over 40% over the past decade... While Congress is undernourishing our foreign policy in general, it is starving our environmental programs. Just a few examples: We haven't been able to come up with the seed funding for a project that would help reduce chloro-fluoro carbons (CFCs) worldwide. Our environmental assistance to the New Independent States of the former Soviet Union has fallen from nearly \$75 million in FY'95 to less than \$10 million in FY'97. That's a dramatic retreat on a crucial front."⁸

While recognizing the need for action, current efforts are focused on public sector solutions - governments and multilateral institutions (e.g., the World Bank) to address environmental security. A key area requiring more concerted attention is the private sector. At present, US and foreign industry actions that contribute to US security interests by addressing environmental problems are not being considered adequately in the security planning and analysis process.

There is a large and growing market overseas for US environmental products and services. As an indicator of this, a study by Environmental Business International (EBI) estimates that the global market for environmental technologies and services was about \$427 Billion for 1995, and this is expected to increase to about \$543 Billion in 2000.⁹ Finding the intersection between this market for industry, and environmental security and stability is an issue that needs to be addressed in any assessment of US national security interests. Should the US encourage business overseas because of jobs, balance of trade and security reasons? Should private sector involvement in environmental markets be considered to be important to US national security interests, and if so, what should be done to stimulate this, particularly if public funding sources for foreign environmental projects are insufficient? We need to find a way to fully engage the US environmental industry in domestic security interests. It seems to make sense for US business to engage in enterprises that are both in the interest of the business community as well as contributing to domestic security interests. The intent is to promote global stability and welfare while leveraging, and minimizing US taxpayer dollars toward a broader integration of national/global security and US industry interests.

After all it was in Adam Smith's *Wealth of Nations* where the thesis that a nation's interests is best served when individual interests are addressed through the market's "invisible hand," rather than through altruistic methods.¹⁰ The problem is that in the US and the world in general, prices established in the market do not necessarily reflect the full costs of a good or services. Frequently, there exist hidden costs or costs that are not seen in the market - economists call these externalities. For example, the costs of maintaining forwardly deployed forces in the Persian Gulf area, to assure access by the US and its allies to foreign oil, is not reflected in the price of gasoline at the pump.

To “correct” these imperfections, governments will often intervene in the marketplace by applying policy measures such as subsidies.

NEED FOR A NEW APPROACH

Most of the pieces exist today to take a logical, defensible step in ameliorating and preventing environmentally-related security problems. Nevertheless, the key pieces -- environmental policies, institutions, and implementing mechanisms -- could be better leveraged and coordinated to support US security interests. This paper proposes a framework that uses the pieces currently available to formulate an integrated public-private sector partnership for enhancing environmental security policy objectives while advancing global environmental markets. This is accomplished by incorporating the private sector into issues involving environmental security interests and establishing a systematic means to assess environmental security risk conditions.

As a process it will not be perfect, but the benefits of trying to do something sooner rather than later can be significant. We can either move now or spend the next 10 years just doing more studies. This not to say that study and research are not necessary -- they are. But these efforts need to be tied to results -- progress not papers. We have the pieces of the puzzle in play today, however, these need to be brought together through a coordinated public-private sector approach with agreed upon goals and objectives that can yield results in the near term and be continually

modified and improved into the mid- and long-term. With time and use, this process will help develop and refine the analytical techniques and data required to support strategic planning and decisionmaking.

The need for identifying, analyzing and prioritizing environmental security issues in a systematic, integrated framework is not new. For example, the Conference on Environmental and National Security held in June 1995, found that “ A national strategy, involving appropriate US government agencies, is needed to prioritize international environmental security issues in order to enhance US national security. The Conference recommended that the US adopt and implement a clear, concise environmental security policy that:

- Identifies and focuses agencies’ capabilities into a coherent, integrated approach

- Creates a framework for a US government policy making process to identify threats, assess risks and prioritize resources

- Persuades, through diplomatic and other means, other countries and international organizations to pursue environmental security goals consistent with our own.¹¹

PAPER ORGANIZATION

The remainder of this paper is organized as follows. Section 2 - discusses the scope and key characteristics of environmental security problems with examples and opinions on the relationships between the environment and national security. Theory and cases on environmental problems contributing to instability or conflict are presented. Section 3 - Environmental Security Policies and Activities, identifies US policies in the areas of environment and security, as well as programs established to administer them. Section 4 - Trade Promotion - The Nexus Between Environment, National Security and the Private Sector, highlights programs and services available through US and other sources that *do or could* stimulate business participation in environmental areas that contribute to national security interests. Thus, Sections 3 and 4 constitute discussion of environmental security policies and activities aimed at addressing the environmental problems illustrated in Section 2. Section 5 - Environmental Security Framework, provides an approach that allows government and market forces to work together to meet environmental security demands. The emphasis of this framework is to better integrate the existing resources available today to stimulate US business participation in environmental areas that contribute to national security. Section 6 - Concluding Remarks, provides overall summary comments and recommendations.

SECTION 2: ENVIRONMENTAL SECURITY PROBLEMS

INTRODUCTION

There are many ways to describe and classify environmental problems in the world. Some are long term and subtle like erosion, with others are quick, intense and long-lasting like the Chernobyl nuclear disaster. It is not clear, nor will there likely be consensus on the security implications of any of these. This section describes some of the theory linking the environment to security; different ways of structuring and weighing the various types of environmental problems; and examples of environmental problems that could or may have contributed to security interests or global stability.

The tremendous growth in population projected may have serious environmental security implications. "Population pressures already contribute to violent disorder and mass dislocations in poor societies. Internally displaced persons who might become refugees pose a long-term threat to the integrity of their own and other nations as well as to global stability. As the world's population grows to exceed 8 billion people by 2025, most of this increase will occur in the cities of developing countries. Worldwide, urban population is expected to increase from 1 billion people in the 1985 to 5 billion in 2025."¹²

The wide range of problems considered under the environmental security umbrella also suggest that *one-size-will-not-fit-all* in the development of feasible, affordable responses to these problems. In a security context, Richard Matthew, author of an article on the *Greening of US Foreign Policy*, comments on the challenge of finding the right responses to environmental problems, “ Environmental problems tend to emerge gradually through the complex interaction of economic, political, demographic, and technological variables. Unlike the staples of foreign policy -- war and trade -- they cannot usually be resolved through superior force or the signing of a treaty, and they rarely offer a quick or tangible payoff to policymakers. ”¹³

THE ENVIRONMENT-SECURITY LINK

A number of studies have been conducted to demonstrate a causal link between environmental change and conflict (and ultimately to security implications). Most noted among these is the work done by Thomas Homer-Dixon. Using several case studies, Homer-Dixon researched the issue “Does environmental scarcity cause violent conflict? And if it does, how does it operate?” He refers to environmental scarcity as covering the relationships among environmental change, population growth and unequal social distribution of resources. He examined six types of environmental change that could contribute to violent conflict:

- greenhouse-induced climate change
- stratospheric ozone depletion
- degradation and loss of good agricultural land
- degradation and removal of forests

- depletion and pollution of fresh water supplies
- depletion of fisheries.¹⁴

A principal finding of this work was that environmental scarcity can have negative economic, political and social impacts, which in turn cause instability or violent conflict. For example "In Haiti, the irreversible loss of forests and soil in rural areas deepens an economic crisis that spawns social strife, internal migration, and an exodus of "boat people."¹⁵ He produced a model to reflect this process by which environmental scarcity leads to intermediate social effects (e.g., poverty, ethnic tension, migration) that result in conflict and instability. This model is useful in understanding that environmental factors are contributory factors, rather than the sole causal factors to instability and conflict.

The Clinton Administration believes that environmental degradation can lead to both political and societal stress, and even major instability. As Richard Smith, Deputy National Intelligence Officer for Global and Multilateral Affairs indicates ...there can be no doubt, however one defines "environmental security" that foreign environmental developments, activities and trends either impact or have the potential to impact, directly and seriously, the well being of the US. These impacts have become more pressing since the landmark report of the World Commission on Environment and Development - the Brundtland Report - which clearly noted this link between security and the environment.¹⁶

WEIGHING THE RISKS

There are dimensions and tools available today to weigh and assess the relative condition or degree of environmental security threat or risk. For example, Kasperson provides an approach for distinguishing varying degrees or conditions of environmental threat in terms of things that can hurt you today, near-, mid- and long-term. This definition allows for short and long term environmental problems to be considered as potential contributors to national security concerns. The four conditions are *environmental criticality*, *environmental endangerment*, *environmental impoverishment*, and *environmental sustainability*.

Environmental criticality refers to situations in which the extent and/or rate of environmental degradation preclude the continuation of current human-use systems or levels of human well-being, given feasible adaptations and societal capabilities to respond.

Environmental endangerment refers to situations in which the trajectory of environmental degradation threatens in the near term (this and the next generation) to preclude the continuation of current human-use systems or levels of human well-being, given feasible adaptations and societal capabilities to respond.

Environmental impoverishment refers to situations in which the trajectory of environmental degradation threatens in the medium- to longer-term (beyond this and the next generations) to

preclude the continuation of current human-use systems or levels of well-being and to narrow significantly the range of possibilities for different future uses.

Environmental sustainability refers to situations in which nature-society relations are so structured that the environment can support the continuation of human-use systems, the level of human well-being, and the preservation of options for future generations over long time-periods.¹⁷

Environmental security threats can also be identified and assessed based on their impact on national security risk. Kraverath also uses Ullman's definition of national security as a reference in the establishment of dimensions for identifying and assessing environmental security threats. The dimensions he suggests are: (1) effect on regional instability, (2) the required demonstration of immediacy, (3) linkages to threats arising which demand a US military retaliation, (4) linkages to America's economic revitalization, (5) the ability to promote democracy, (6) effects on quality of life or national well-being, and (7) influence on limiting the range of policy choices available to the government or private nongovernmental entities within the state.¹⁸

The PERICLES Methodology, developed by the US Army, is an analytical approach that incorporates quantifiable measures of risk associated with foreign nations. Indicators of country risk or instability were derived from an assessment of economic, political, social/cultural, and environmental-infrastructure factors. Environmental measures identified as contributing factors to stability and security problems include annual fresh water withdrawals per capita, rate of deforestation, and access to sanitation. Since the data on these factors are in different units of

measurement, they are scaled and combined into a standardized indicator of environmental security risk. Each indicator (which is assigned a color for presentation purposes) reflects an assessment of environmental security risk as: negligible, marginal, moderate, serious, or critical (presented in order of increasing risk).¹⁹

<u>Environmental Security Risk</u>	<u>Indicator</u>	<u>Color</u>
Negligible	1	Blue
Marginal	2	Green
Moderate	3	Yellow
Serious	4	Orange
Critical	5	Red



EXAMPLES OF THE ENVIRONMENT-SECURITY LINK

We should not limit matters of environmental scarcity or environmental security risk to the developing world. Environmental security risk are often associated with more traditional national security interests. For example, Greenwald points out the risks posed by environmental problems on stability in the Former Soviet Union and Eastern Europe. "Degradation of the environment can lead to conflict and the loss of economic viability. For the states which composed the Soviet Union

and Eastern Europe the consequences of environmental degradation are a harsh reality which threaten to undermine their struggle for democracy."²⁰ Cases of environmental security risk range from the dying Baltic (e.g., radioactive waste, heavy metals, and fertilizers) and Aral Seas (due to diversion of rivers that feed it) to the more near-term concern from the continued operation of ten Chernobyl-type reactors which threaten radiation leakage.

Environmental security risks are also not limited to people-induced environmental problems. There are some that say that natural disasters constitute a threat to security. "A closer look at natural disasters destroys the myth that such times of national emergency allow political consideration to be put to one side. The dramatic focus provided by a disaster stimulates those who seek to change society, while defenders of the status quo understand clearly that their temporary lack of control in the face of the event provides a good opportunity for their opponents...The corruption which followed the Managuan earthquake of 1972 is considered a major factor in turning the Nicaraguan bourgeoisie against Somoza, thus allowing the multi-class Sandanista-led alliance to gain power through the revolution of 1979."²¹

To illustrate how an environmental problem can become an environmental security problem to the US, let us examine the problem of water scarcity in the Middle East. According to the World Bank, the international standard for per capita water consumption is about 1700 cubic meters per head per annum, yet eight countries in the Middle East region have water availability of less than 500 cubic meters per head.²² Water availability in the Middle East is determined by a number of factors that are not necessarily unique to the region, including rapid population growth, industrial

and agricultural expansion, and numerous cultural attitudes/behaviors. These issues, when combined with the political, economic and cultural dimensions of the Middle East, make the region particularly susceptible to instability and international conflict. The importance of addressing Middle East "hydropolitics" in terms of US policy and involvement is based upon our strategic interests in the region, which are centered on two issues: (1) the national security of the State of Israel, and (2) the conditions required to ensure access to reliable oil supplies.

Stability in the Middle East is an extremely complex matter; water scarcity is a contributing element, but widely regarded by both the US and Mideast countries as an extremely critical one. There is considerable historical evidence on the adverse effects of water scarcity in the Mideast, as well as substantial agreement regarding the instability likely to result from dwindling water availability in the region. For example, violent conflicts that erupted between Israel and its Arab neighbors in the 1967 and 1973 wars have focused on the control of water resources in the Jordan River Basin and the West Bank Mountain Aquifer. Further, Turkey has recently threatened to restrict the flow of the Euphrates River to Syria as a means of pressuring this country, which it suspects of supporting Kurd separatists. In the mid-80s, the US intelligence community estimated that there were ten places in the world where war could occur as a result of declining freshwater supplies - half of which are in the Mideast.

The US has recently recognized environmental security, to include water scarcity, as in the national security interest. The centerpiece initiative of US national security policy regarding the Mideast, for example, is the Arab-Israeli Peace Process. The Peace Process includes multilateral working

groups on five critical issues -- one of which is water. The US has lead responsibility for this working group, the goal of which is to manage and control water resources more efficiently in the Jordan River Basin and West Bank Aquifer. This working group serves as an example of preventive defense as articulated in the National Security Strategy.

As a "superpower", should every environmental issue in the world concern the US security-wise? Exhibit 1 on the following page provides additional examples of environmental problems that have or might promote instability regionally or globally. In particular, it provides a summary of the impact that environmental degradation, including desertification, deforestation, and water scarcity, can have on national and global national security issues. Examples are provided for the countries of Brazil, China, India, Indonesia, Nigeria, Papua New Guinea and Rwanda. Which ones are environmental security problems to the US? And if they are, what are US responsibilities for treating them?

Exhibit 1: Examples of Environmental Security Problems

COUNTRY	UPRISING OR CONFLICTS	GOVERNMENT ACTIVITY	ACCESS TO LAND
Papua New Guinea	Faced with massive environmental devastation caused by the Panguna copper mine, the inhabitants of the island of Bougainville have been fighting a small but fierce war of secession since 1988.	Since it opened in 1972, the mine has operated almost exclusively for the benefit of the national government and foreign shareholders. Royalty payments to local landowners amounted to only 0.2% of the cash revenue of the mine and both the central government and the British/Australian-owned copper company ignored the concerns of the Bougainvilleans.	Local people have not been adequately compensated for land damaged or lost.
Brazil	To save the forests that are the basis of their livelihood, rubber tappers throughout Brazil in the 1970's began organizing protests to stop logging by placing themselves directly in front of chainsaws and bulldozers. Today landless rural workers have organized similar invasions to seize land from wealthy landowners. Despite frequent violence from landowners, some 700,000 people have taken part in the occupations over the past decade.	Facing an economic crisis, a skyrocketing debt, and pressure from foreign investors to promote an export economy, the Brazilian government subsidized a series of giant hydroelectric, highway-building and mining projects to lure corporate farmers and ranchers to the Amazon, resulting in deforestation and mass displacement of small-scale farmers, rural workers, and indigenous peoples.	With 4% of its landowners holding 80% of all arable land, and 12 million rural workers owning very little or none, Brazil has long had one of the most unequal land distributions in the world.

India	Opponents of India's Sardar-Sarovar dam project, the centerpiece a massive irrigation scheme in the Narmada River, have staged hunger strikes, initiated acts of civil disobedience, and vowed to drown in the encroaching reservoir rather than relocate. The project was started in 1987.	Propped up by more than \$450 million in loans from the World Bank, the giant irrigation project would cultivate water-intensive export crops such as sugar cane, oil wazzu seeds, and cotton. But by 1993, opponents had so effectively rallied worldwide opinion against the dam that the World Bank pulled its funding from the project. The Indian government, however, seems intent to press forward.	An estimated 240,000 to 320,000 people would be displaced by the dam. More than 100,000 hectares of arable land and 14,000 hectares of forest would be flooded. While the Indian government has offered resettlement, many of the people already relocated have come into conflict with host populations and have received inferior land.
-------	---	--	---

Indonesia	Tribal people in Irian Jaya (West Papua New Guinea), have engaged in a guerrilla war to secede from Indonesia for more than 20 years. They are demanding improved social and environmental management in the region.	Irian Jaya, along with Kalimantan and Sumatra, is one of the "outer islands" to which the government began to relocate millions of people in the late 1970's, with the support of a \$500 million loan from the World Bank and additional funds from foreign investors.	Purportedly to alleviate population pressure and unemployment due to land scarcity on Java and other "inner islands", the transmigration have been called a political tool by environmental and human rights advocates. Critics say that many immigrants are strategically relocated to rebel strongholds, in order to dissipate resistance and oust the rebels from their land.
Rwanda	While often attributed solely to ethnic tensions between the Hutu and Tutsi tribes, the slaughter of up to 1 million people in Rwanda in 1994 was triggered by a complex web of explosive population growth, severe land shortages, land degradation, lack of non-agricultural employment, and structural adjustment of the economy.	Choked with debt, Rwanda was pressured by foreign investors into a structural adjustment program. The collapse in the price of coffee- the country's largest export crop-caused additional economic misery. These tensions eventually exploded into mass killings perpetrated by militias the government had formed.	Access to land plays a very significant role in Rwanda, which is the most densely populated country in Africa and the least urbanized country in the world. Faced with mounting population pressures and a low number of nonagricultural jobs, the average farm size in 1993 had declined to less than one-half hectare.

Nigeria	<p>Faced with environmental devastation from oil operations Valley in their homeland on the Niger Delta, the Ogoni and other indigenous groups organized demonstrations against Shell Oil, which were violently suppressed. By some accounts, the military has been linked to the killing of 2,000 people and the displacement of 80,000 others. In November 1995, despite worldwide protests, the military dictatorship executed Ogoni spokesperson Ken Saro-Wiwa and eight other activists.</p>	<p>Oil production in Ogoniland accounts for 50% of Nigeria's crude oil output, which in turn provides 90% of the country's foreign exchange and 80% of government revenue. Little if any of the revenue is returned to the communities affected.</p>	<p>The Ogoni have been denied the mineral and oil rights to their land.</p>
China	<p>Construction of the massive Three Gorges Dam on China's Yangtze River has been strongly criticized by environmentalists in China and abroad. Designed to be the world's largest hydroelectric project, the dam will uproot 1.4 million people and flood 11,000 hectares of farmland. By the end of 1995, some 25,000 people had already been relocated, some forcibly. Many evacuees, dissatisfied with the forced resettlement and the compensation offered, have protested and attacked government offices, according to internal documents obtained by Human Rights Watch/Asia.</p>	<p>Officials are presenting the project as an act of nationalism and continue to push for its completion despite international condemnation. Citing concern over its environmental impact, major lenders such as the World Bank and the United States have denied funding for the project.</p>	<p>The dam is expected to flood 13 cities, 140 towns, and 1,352 villages. Much of the land at risk is very fertile; the land offered as compensation is generally far less productive.</p>

Source: Handout from the Overseas Private Investment Corporation (OPIC), March, 1997.

SECTION 3: ENVIRONMENTAL SECURITY POLICIES AND ACTIVITIES

OVERVIEW

In the post-Cold War era, as military threats have subsided or disappeared, other threats, especially environmental ones, have emerged with greater clarity.²³ In the US, many government agencies and departments have recognized the importance of environmental issues to the security of the US and are working to incorporate environmental issues into their policies, plans and programs. Similarly, the US Government is working with a number of international entities to pursue its environmental agenda. This section provides a review of the key government policies and related activities with regard to environmental security; as the reader will see, the depth and breadth of policies addressed in this section provide the basis for the framework discussion in Section 5 of this paper.

US POLICIES AND ACTIVITIES

Legislative Branch

Congress had mandated, in Section 102 (2) (F) of the National Environmental Policy Act, that all Federal agencies... recognize the worldwide and long range character of environmental problems, and where consistent with the foreign policy of the US, lend appropriate support to initiatives, resolutions and programs designed to maximize international cooperation in anticipating and preventing a decline in the quality of mankind's world environment.²⁴

Senator Sam Nunn spoke of the need to “harness some of the resources of the defense establishment to confront the massive environmental problems facing our nation and the world today.”²⁵ He initiated the “Strategic Environmental Research and Development Program (SERDP), which utilizes national security assets, chiefly those of the Department of Defense, the Department of Energy, and the intelligence community, to address these global issues.” In a floor speech on June 28, 1990 he said “ I am persuaded that there is also a new and different threat to our national security emerging -- the destruction of our environment. The defense establishment has a clear stake in countering this growing threat. I believe that one of our key national security objectives must be to reverse the accelerating pace of environmental destruction around the globe.”²⁶

Executive Branch

White House. President Clinton, in his 1996 State of the Union Address, described a range of diverse threats to our security in the post-Cold War world. “The threats we face today as Americans respect no nations' borders. Think of them: terrorism, the spread of means of mass destruction, organized crime, drug trafficking, ethnic and religious hatred, aggression by

rogue states, environmental degradation."²⁷ In this statement, the President acknowledged that underlying causes of conflict and instability, such as environmental degradation, may threaten our national interests in regions of strategic importance.

National Security Strategy. In 1996, for the first time, the National Security Strategy recognized that a number of transitional problems which once seemed quite distant, like environmental degradation, natural resource depletion, rapid population growth and refugee flows, now pose threats to our prosperity and have security implications for both present and long-term American policy. The National Security Strategy cited numerous examples of the need to consider environmental issues as a component of national security planning.

The Office of Science and Technology Policy. OSTP indicates that threats due to environmental scarcity " can increase the likelihood of destabilization of countries in the developing world. Regional civil conflicts, hastened or exacerbated by environmental stress, could involve the United States in costly and hazardous military interventions, peacekeeping, or humanitarian operations. As is the case in Haiti, severe environmental degradation and resource depletion may make economic recovery much more difficult, thereby prolonging dependence on aid and impeding a nation's recovery from social or political chaos and progress toward democracy and prosperity."²⁸

Department of State. In 1996, Secretary of State Warren Christopher wrote a memo to his under and assistant secretaries regarding the subject of "Integrating Environment Issues into

the Department's Core Foreign Policy Goals". In the section on environmental policy and the national interest, he points out "Pollution's impact on a nation's health takes an enormous toll on its manufacturing, service, and agricultural productivity. When this occurs in developing countries, it makes for weaker trading partners and for greater reliance on foreign assistance".²⁹

In his address to the alumni and faculty of Stanford University on April 1996, Secretary of State Warren Christopher stated that the Clinton Administration has recognized from the beginning that our ability to advance global interests is inextricably linked to how we manage the Earth's natural resources. There is an essential connection between environmental degradation, population growth, and poverty that regional analysts must take into account. He indicated that the Clinton Administration is determined to put environmental issues into the mainstream of American foreign policy, and sees it necessary to integrate fully environmental objectives into our diplomacy and to set forth our priorities for the future. As the flagship institution of American foreign policy, the State Department serves as the spearhead of the government-wide efforts to meet these environmental challenges, focusing on a four-pronged strategy.

- *Global.* Because pollution knows no boundaries, and in that the growing demand for finite resources puts pressure on the resources on all others, we need to focus on environmental issues that transcend our borders. This includes issues pertaining to

greenhouse gases from power plants, automobiles and burning forests which affect our health and climate.

- *Regional.* This element of the strategy seeks to confront pollution and the scarcity of resources in key areas where they dramatically increase tensions within and among nations.

Nowhere is this more evident than in the parched valley of the Middle East where the struggle for water has a direct impact on security and stability.

- *Bilateral.* Bilateral -- country to country -- relationships and partnerships serve to strengthen ties and enhance cooperation on a broad range of shared interests, from investing in environmental technologies to controlling pesticides and toxic chemicals.

- *Business and NGO Partnerships.* This element of the strategy works with the private sector and nongovernment organizational community to promote environmental security, advance sustainable economic growth (not at the expense of the environment), and expand global environmental business opportunities.³⁰

Also during this speech, Mr. Christopher indicated that the State Department will establish Environmental Hubs in our embassies in key countries. These will address pressing regional natural resource issues, advance sustainable development goals, and help US businesses to sell their leading edge environmental technology. He also stated that starting Earth Day 1997, the Department will issue an annual report on Global Environmental challenges. This

report will be an essential tool of our environmental diplomacy, bringing together an assessment of global environmental trends international policy developments and US priorities for the coming year.

According to James Steinberg, the State Department's Director of Policy Planning, .." now we're focusing more on internal factors that can destabilize governments and lead to civil wars and ethnic strife. Now we're paying much more attention to early warning factors, like famine and the environment. One intelligence official indicated that "We've been looking at some of these softer issues for a long time." As George Moose, the Assistant Secretary of State for African Affairs indicated" if the intelligence community had studied Somalia's water table levels in the three years before the outbreak of famine and clan warfare there, the information might have warned diplomats of an imminent crisis. He argues that the rapid spread of the Sahara desert set off the 1989 conflict between Senegal and Mauritania, when herdsmen from the two countries went to war over a dwindling amount of grazing land.³¹

It is interesting to note that the new Secretary of State, Madeline Albright, has not only continued the environmental security focus at State Department, but expanded upon this mission. For Earth Day '97 she released the first annual assessment of the global environment (as mandated by former Secretary of State Christopher). The document catalogues problems in the world's air, oceans and forests that she said threaten security of the American people, and highlights environmental concerns as the priority for the national security agenda. As part of this report, Secretary Albright designated US embassies in Costa Rica, Uzbekistan,

Ethiopia, Nepal, Jordan and Thailand as “environmental hubs” that seek to establish regional cooperation on issues such as deforestation, water supplies and biodiversity.³²

Department of Defense. The DoD's Environmental Security Program fulfills four overriding and interconnected goals. The first is to comply with the law. The second is to support the military readiness of the US armed forces by ensuring continued access to the air, land and water needed for training and testing. The third goal is to improve the quality of life for military personnel and their families by protecting them from environmental, safety, and health hazards and maintaining quality military facilities. The fourth goal is to contribute to weapon systems that have improved performance, lower cost, and better environmental characteristics.

In a statement before Congress on May 13, 1993, Deputy Undersecretary Goodman defined DOD's environmental security mission as “ensuring responsible environmental performance in defense operations and assisting to deter or mitigate impacts of adverse environmental actions leading to international instability.”³³

“DOD is contributing to the resolutions of environmental problems through the creative use of its Security Assistance Programs. In Africa, for example, the US Civic Action program has been specifically funded by Congress to provide biodiversity and conservation support to struggling countries. Under this program, the US military has helped host government militaries improve their countries' fisheries management, flood control and irrigation, wildlife protection and wildlife management programs. DOD's participation in these environmental

roles enables the United States to maintain the military-to-military contact essential for base access and overflight, to establish agreements and communication with politically important militaries and military governments that would otherwise be lost, and to address problems that threaten regional political stability”³⁴

Department of Energy. The Department of Energy is involved in a number of activities to promote the environment and national security issues. These include: nuclear weapons clean-up; reduced dependence on imported oil; research, development and demonstration of environmentally sound alternatives to fossil technologies (energy efficiency, renewable energy, nuclear and cleaner fossil fuels); participation in the climate change action plan; and a variety of other environment initiatives.

Environmental Protection Agency. EPA's mission is to control and abate pollution in the areas of air, water, solid waste, pesticides, radiation, and toxic substances.³⁵ EPA is participating, along with several other organizations, in developing the environmental security policy for the US Government, and is a partner in the joint EPA, DOE, State Department MOC on the environment and national security.³⁶

Departments of Defense, Environment and Energy Cooperation. The Departments of State, Defense and Energy have placed environmental security in their mission statements in major initiatives announced in the last year. They are now convinced that the USG must pay close attention to environmental conditions that present a real threat to US security. Recognizing

that cooperation with other key US Government agencies is important to designing the most effective forms of environmental cooperation, on July 3, 1996, Secretary Perry, Secretary O'Leary and Administrator Browner signed a Memorandum of Understanding (MOU) on environment and security. This was the first formal interagency mechanism for cooperation between these agencies, other governments and industry to jointly address critical environmental concerns. Methods of cooperation include information exchange, research and development, monitoring, risk assessment, technology demonstration and transfer, emergency response training, regulatory reform and environmental management. The MOU seeks to reduce threats to environmental quality affect broad national economic and security interests, as well as the health and well-being of individual citizens and sets forth a framework to strengthen coordination of efforts on a broad range of scientific and technical topics.³⁷

Central Intelligence Agency. The Central Intelligence Agency has stated that “the environment is an important part of the Intelligence Community agenda”. In a speech given by the Director of Central Intelligence John Deutch, he noted the following: the environment will continue to have a key place on the intelligence agenda: environmental factors influence the internal and external political, economic and military actions of nations important to our national security; our intelligence customers, including the policy and military communities, need and ask for support on environmental issues and problems; the intelligence community has unique technical collection resources and analytic expertise that can fill key data gaps for environmental scientist or help relief agencies cope with natural disasters; and through a productive partnership with the

scientific community we can provide strategic warning of environmental hazards that could endanger our health and welfare. These activities do not threaten our traditional missions; the vital work on environmental intelligence requires only a modest commitment of resources. It would be short-sighted to ignore environmental issues as we seek to understand and forecast developments in the post-Cold War world and to identify threats to national welfare.³⁸ The intelligence community identifies potential security problems and some of them have been identified as having contributing factors that are environmental. So today, we can address those environmental problems that have been recognized by the security community as impacting on national security.

The US Agency for International Development (USAID). USAID views environmental problems as a major threat to the economic and political interests of the US and the world at large. Both industrialized and developing nations contribute to the threat. In response, USAID is pursuing an integrated approach to environmental issues as outlined in Agenda 21 of the United Nations Conference on Environment and Development (UNCED) or Earth Summit, which sets forth guidelines for ecologically sustainable development. It has developed policies aimed at what it views to be the root cause for environmental degradation -- pressures of poverty and rapid population growth. Resultant programs are geared toward every sphere of development, involving environment, economic growth, population and health, and democracy.³⁹

GLOBAL POLICIES AND ACTIVITIES

Woodrow Wilson Center. In addition to the above federal activities, the Woodrow Wilson Center's *Environmental Change and Security Project (ESCP)* has provided specialists and other interested individuals with a "road map" to the myriad of views, activities, and policy initiatives falling under the rubric of environment, population and security. ECSP gathers information on related international academic and policy initiatives, organizes meetings of "The ECSP of the Woodrow Wilson International Center for Scholars", conducts public seminars and publishes reports and related papers on environment and security issues.⁴⁰

North Atlantic Treaty Organization (NATO). The Roundtable on Environmental Security, which occurred on the occasion of NATO Committee on the Challenges to Modern Society (CCMS) Plenary Meeting in Washington DC on November 14, 1995, highlighted the importance of the relationship between environment and security. There was a general understanding during the Round Table that man-made environmental degradation, resource depletion and natural disasters may have direct implications for the security of the international security. Large scale environmental changes, like climate change, ozone depletion, floods and persistent drought may lead to regional or global disruptions of stability and security. With no established conflict management mechanisms, localized environmental problems may escalate into conflicts of concern to NATO. A pilot study is underway to analyze the relationship between environmental change and security in an international, regional and global level. The goal is to provide conclusions and recommendations to enhance environmental aspects in security deliberations, and to include

security considerations in national and international environmental policies and instruments.

Launched by NATO's Committee on the Challenges of Modern Society this past March, the study calls for the NATO representatives to work closely with representatives of the North Atlantic Cooperation Council and the Partnership for Peace countries.⁴¹

United Nations. Several areas under the United Nations system address the environment. In June 1992, the United Nations Conference on the Environment and Development (UNCED), otherwise known as the Earth Summit, was held in Rio de Janeiro, Brazil. The US Government joined over 160 countries in signing onto the Framework Convention on Climate Change (FCCC). The FCCC was entered into force on March 21, 1994. FCCC is non binding in terms of emission reduction requirements through the year 2000, however, the ultimate objective is to stabilize green house gas (GHG) concentrations at a level that would prevent dangerous anthropogenic interference with the climate systems. All parties are to inventory GHG emissions, and developed country parties are to adopt and report on national policies and measures to mitigate climate change with the aim of returning their emissions to 1990 levels by the year 2000. Currently, discussions are underway to develop binding emissions and timetables by the industrialized nations for the post-2000 timeframe.⁴²

In 1992, the US assigned to the United Nations Security Council issues related to environmental security. The UN Security Council has noted its probable jurisdiction and corrective powers over certain environmental problems that threaten international peace and security. Malone suggests that "Remedial measures by the Security Council could range from recommending that member

states provide assistance to alleviate the emergency to requiring the state of origin to monitor, assess, report on, and /or redress the environmental damage through restoration of resources or financial compensation" and adds that here might be come cases where the UN would conclude to resolve serious environmental emergencies through "the use of force if necessary."⁴³

Uruguay Round. The US participated with some 121 other countries in Marrakesh, Morocco, on April 15, 1994, to sign the Uruguay Round global trade accord that completed seven years of negotiations culminating in major areas of trade liberalization, but also for beginning a process that will integrate environmental objectives into world trade rules. As part of the Uruguay Round, a vital new forum was established to discuss ongoing and new issues related to global trade -- the World Trade Organization (WTO). WTO is a global economic alliance among 125 countries which covers environmental measures that are service and product-related under the Uruguay Round agreements. In the post-Uruguay Round period, "trade and environment" have been designated as a priority next generation issue for the Administration. The WTO's Committee on Trade and Environment (CTE), provides for a concrete, but non-exclusive work program; it makes recommendations on changes to existing trade rules. In its work, the CTE will consider, among other things, the relationship between the rules of the multilateral trading system and the use of trade measures for environmental purposes, including those of multilateral environmental agreements; requirements for environment purposes relating to traded products; and economic instruments such as environment charges and taxes. It will also take up issues relevant to dispute settlement and how WTO rulemaking and procedures can be made more accessible to the public and to the environmental community.

WTO does have its limitations. In particular, it does not cover a wide range of disputes such as transboundary pollution. In case of a violation of agreement, objecting states may request remediation by the WTO which can hold bilateral negotiations to resolve the dispute and if not adequately resolved, is also capable of authorizing the damaged state and other parties to retaliate proportionately with trade sanctions.⁴⁴

The International Conference on Treaty Compliance and Enforcement. This Conference, which was to be hosted by the US within two years, promises to give teeth to existing environmental treaties, many of which suffer from egregious monitoring and compliance problems. This multitiered approach of forging partnerships with business and promoting bilateral, regional and global initiatives promises to channel environmental problems into social settings in which the resources and will power necessary to solve them are available.

National Security Council. The NSC seeks to advise the President with respect to the integration of domestic, foreign, and military policies relating to the national security. Members of the NSC include the President, Vice President, Secretaries of State and Defense. The Director of the CIA and the Chairman of the Joint Chief of Staff serve as advisors. ←

Other federal agencies also participate such as USAID and the US Ambassador to the United Nations. The NSC is the primary formal mechanism for coordinating and integrating federal agencies toward a single, coherent foreign policy.

OBSERVATIONS

The policy assortment outlined above -- from President Clinton on down and across -- determines that there does exist a range of policy measures to address environmental and national security issues, however, there is no integrating policy to establish the requirement for environmental problems and solutions to be systematically developed, evaluated, prioritized and credited towards national security interests, and particularly, the role of the private sector. Further, few of these policies address the critical role of the private sector and activities that need to be undertaken to secure their participation.

From the State of the Union Address, January 23, 1996, President Clinton said "We must challenge businesses and communities to take more initiative in protecting the environment, and we have to make it easier for them to do it."⁴⁵ The next section identifies the range of programs available, within the US Government and elsewhere, that could be employed to induce private sector participation and investment in environmental technologies.

SECTION 4 TRADE PROMOTION - THE NEXUS BETWEEN ENVIRONMENT,

NATIONAL SECURITY AND THE PRIVATE SECTOR

Global Environmental Market
(\$ billions)

	1994	1995	2000
United States	165.5	172.1	209.4
Canada	10.8	11.3	14.5
Latin America	6.6	7.4	13.0
Western Europe	127.4	132.5	161.2
East Europe/Russia	6.4	6.9	10.2
Japan	65.3	67.8	81.7
Rest of Asia	14.2	16.6	36.4
Aust./New Zealand	6.2	6.5	8.3
Middle East	3.8	4.0	5.4
Africa	1.8	2.0	3.2
Total	408.0	427.0	543.0

Source: Environmental Business International, Inc.
San Diego, California.

Exhibit 2

•.technologies output. This is proportionally far less than Europe and Japan which each export over 20% of their production today in environmental technology support. ⁴⁶

(2) Increasing exports is difficult for the US environmental technology industry as this sector is dominated by small- and medium-sized firms. Many of the companies entering the environmental technology market are small and new-to-exporting. As a result they may lack the resources and experience to effectively compete overseas.

(3) Working in a collaborative public-private sector partnership in this area achieves mutually economic, environmental and technology goals for the country. This point stems from a directive by President Clinton in 1993 to develop a strategy to give US companies the trade development, promotional efforts and technical assistance they need to increase their envirotech exports, create US jobs, and promote a better world environment.

Environmental Technology Financing

With the emergence of an environmental technology markets comes the need for financing.

Locating and securing financing is an increasingly critical factor in deciding who wins and loses in the global marketplace. Firms that come to the table with a complete financing package for environmental technology projects, products and services have a better chance of successfully concluding a deal than those still trying to identify financing sources.

Environmental technology financing will typically fall into two categories: trade finance and infrastructure projects. Each of these types of financing is described in more detail below, including financing barriers and characteristics.⁴⁷

Trade Finance. Many sales/exports are routine transactions, but there is often a lag between when goods are produced and shipped, and when payment is received, requiring the exporter to extend credit to customers. Most US sales/exports and investment transactions are handled by commercial banks which provide working capital loans, trade finance and other banking services. Currently, the US Government offers a variety of programs to assist US firms, particularly small businesses and new-to-exporters, with assistance in identifying and accessing financing sources. Additionally, agencies such as the Eximbank's and the Small Business Administration, can assist in extending credit to customers which may run into problems such as risk of default, the need for working capital to carry on business until payment is received, and the lack of finance if a lender cannot be found.

Large-scale Project Financing. Another, more complicated area of finance involves large infrastructure projects, such as wastewater treatment facilities. For those pursuing such projects it is important to note that financiers, such as commercial banks and equity funds, are looking for financially viable projects -- projects that generate sufficient revenue over time to cover the costs of the project and to generate a reasonable rate of return. Environmental technology projects often have difficulty meeting this criterion. First, it is difficult to ensure the project will generate a steady revenue flow. Generally, the likeliest revenue source will be the users of the service. But in many

developing countries for example, basic services, such as water and garbage, are provided at no cost. Currency risks (depreciation or devaluation) are another major hurdle. Finally, environmental projects must compete for capital with other utility and infrastructure projects that offer similar or better returns and less risk. Traditional projects often have better returns because the full costs of environmental degradation and clean-up have not been incorporated into the financing package; and less risk because the technologies involved, though environmentally damaging, have a track record with the financial community that newer environmentally sound technologies do not yet have. Most environmental infrastructure projects that have been successfully completed have received funds from a multilateral development bank, a sovereign guarantee, or are completely financed by the project sponsor.

Financing Sources

Although the above difficulties appear daunting, a number of financing mechanisms are emerging to increase market penetration for environmental technologies in the international marketplace. These sources could provide the leverage needed to overcome these obstacles and can help facilitate private sector financing.⁴⁸

Federal Sources. Several US Government agencies provide financial support that could assist US companies involved in environmental technology sales or investments. (See Exhibit 3.) The Eximbank is the primary US Government agency project financing for US export sales through its programs of export credit insurance, loan guarantees, and direct loans. Eximbank has declared that

increasing its support for environmentally-beneficial projects is one of its top priorities. Technologies and services that reduce greenhouse gas emissions, remediate contaminated areas, and promote renewable energy are premier environmental projects that Eximbank seeks to finance. Eximbank also now offers various enhancements, including longer payback periods, for environmental projects.⁴⁹ The Overseas Private Investment Corporation (OPIC) supports the US private sector in developing countries and emerging markets by offering investment services that are not commercially available. OPIC provides insurance against political risks overseas (currency inconvertibility, expropriation, and political violence); project financing in the form of loan guarantees and direct loans for US business expansion overseas; and equity capital through a number of OPIC-backed investment funds in countries that are not adequately served by private investment sources. In response to its statutory mandate, OPIC-backed projects have set environmental standards and protected resources while diversifying economic opportunities.⁵⁰ The US Trade and Development Agency (TDA) is the only federal agency specifically charged with providing funds in the initial stages of proposal development. TDA provides support for feasibility studies, orientation visits, and conferences that present US technology and equipment capabilities for the subject sector. TDA's early support improves the likelihood that US technology, equipment and services will be used in project implementation in developing countries and emerging markets.⁵¹ The Small Business Administration (SBA) supports small businesses by guaranteeing commercial loans for facilities and working capital; providing trade finance and co-guaranteeing loans.⁵² This program is designed to assist small businesses requiring capital to expand sales or manufacturing for international markets.⁵³

Exhibit 3
Federal
Export
Support

USG Agency \ Export Assistance	Technical Assistance/ Training	Market Identification	Feasibility Studies	Export Financing	Investment Project Financing	Insurance
US Department of Energy	*	*				
US Agency for International Development	*	*	*			
Environmental Protection Agency	*	*	*			
Trade and Development Agency	*	*	*			
Export-Import Bank of the U.S.			*	*		
Overseas Private Investment Corporation					*	*

Multilateral and Bilateral Financing Sources. US companies can participate in competitive solicitations put out by the World Bank, and regional multilateral development banks (MDBs), including the Inter-American Development Bank (IDB), the Asian Development Bank (ADB), the European Bank for Reconstruction and Development Bank (EBRD) and the African Development Bank (AfDB).

Also, as part of our activities under the Climate Change Convention, the US supports the Global Environmental Facility (GEF) which serves as the primary financial mechanism to address environmental problems that transcend national boundaries whose solutions contribute to global benefits. The GEF is implemented by the World Bank, the United Nations Development Programme (UNDP), and the United Nations Environment Programme (UNEP). The GEF provides funds to assist low and middle income countries with investments and technical assistance in four areas: (a) climate change; (b) biodiversity; (c) international waters; and (d) ozone depletion. The GEF funds the incremental cost of actions designed to achieve global, rather than local benefits.⁵⁴

Traditional Commercial Bank Financing. Commercial banks can provide financing for environmental technology exports. These can include both domestic and overseas banking facilities. Venture capitalists can also be a source of financing for emerging technologies.

Innovative Options. A number of new, innovative financing sources are emerging to fill the void of traditional financing sources for environmental technologies. These are directed at mitigating many of the barriers that confront financing for these technologies. These options typically blend public and private sector sources of financing and thus lead to reduced risks (real or perceived) for the funders. The North American Development Bank is one example. NADBank, which was created as part of the North American Free Trade Agreement, uses capital paid in by the US and Mexican Governments to support environmental infrastructure development along the US-Mexico border. NADBank loans will help spread project risks and help attract private capital. Other examples of innovative approaches and models developing to finance environmentally sound projects include: the Energy Capital Holding Company (ECHO), a consortium of private investors which finances environmentally and commercially sound energy projects in Latin America and the Caribbean; the EnviroTech Investment Fund, which was created by the Edison Electric Institute's (EEI) member companies, promotes investment in electrotechnologies and renewable energy technologies that promote environmental responsibility; the Environmental Enterprises Assistance Fund (EEAF) which provides equity and debt investment capital for environmentally responsible technologies in developing countries; and the E & Company Fund established by the Rockefeller Foundation to develop bankable projects for clean investments. The World Bank's International

Finance Corporation is in the process of establishing a Renewable Energy and Efficiency Fund (REEF) to promote environmentally sound energy projects with reduced net emissions of carbon dioxide -- the chief cause of global climate change problems.⁵⁵

Appendix 1 provides more detailed information on financing sources available to stimulate private and public sector investment in environmental technologies.

OBSERVATIONS

The huge market anticipated for environmental technologies is based upon domestic and international policy initiatives, its economic attractiveness, and the demands by societies for a healthy, sustained environment. The availability of funding sources and vehicles should not be an obstacle in the establishment and development of an international environmental technology market.

The US government, multilateral institutions and the private sector have established financial mechanisms that are capable of supporting US (and foreign) industry in developing this market. This section, in combination with Appendix 1, discuss a robust assortment of untapped financial resources that could significantly contribute to the growth of environmental technology investment and trade in the global environmental marketplace. The key now is to educate the private sector and governments to the range of financing options available; use these funds to develop and implement successful environmental technology projects; and continually monitor and assess the adequacy of these financing mechanisms to promote environmental technologies.

SECTION 5: AN ENVIRONMENTAL SECURITY FRAMEWORK

This section of the report presents an Environmental Security Framework for pulling together the various pieces that ^{of e}compr~~ise~~ an environmental security strategy for the US. To develop and implement the Environmental Security Framework, a new Committee on Environmental Security (CES) is proposed. This Committee will focus on the critical issues related to identifying, assessing and prioritizing environmental threats with national security implications; recommending solutions; and monitoring, coordinating and reporting on their outcomes/success. Currently, no such group formally exists to better coordinate the various federal agency programs, with the private sector, in the national security/environmental/trade areas.

The Committee does not anticipate significant new funding to conduct its work and will work very closely with other federal working groups that already exist. Committee members include federal government agencies with missions involved in the national security, environmental and or trade promotion areas. These include, but are not necessarily limited to, DoD, State Department, EPA, DOE, USAID, and the NSC. In addition to federal government agency representatives, the Committee will also include representatives of the private sector (most likely through industry trade groups) and NGOs.

Five steps comprise⁶⁵² the Environmental Security Framework. These steps are graphically depicted in Exhibit 4 and described in more detail below. In general, these steps should be performed in the sequence order depicted.

Step 1: Identify and Assess National Security Objectives with Respect to the Environment

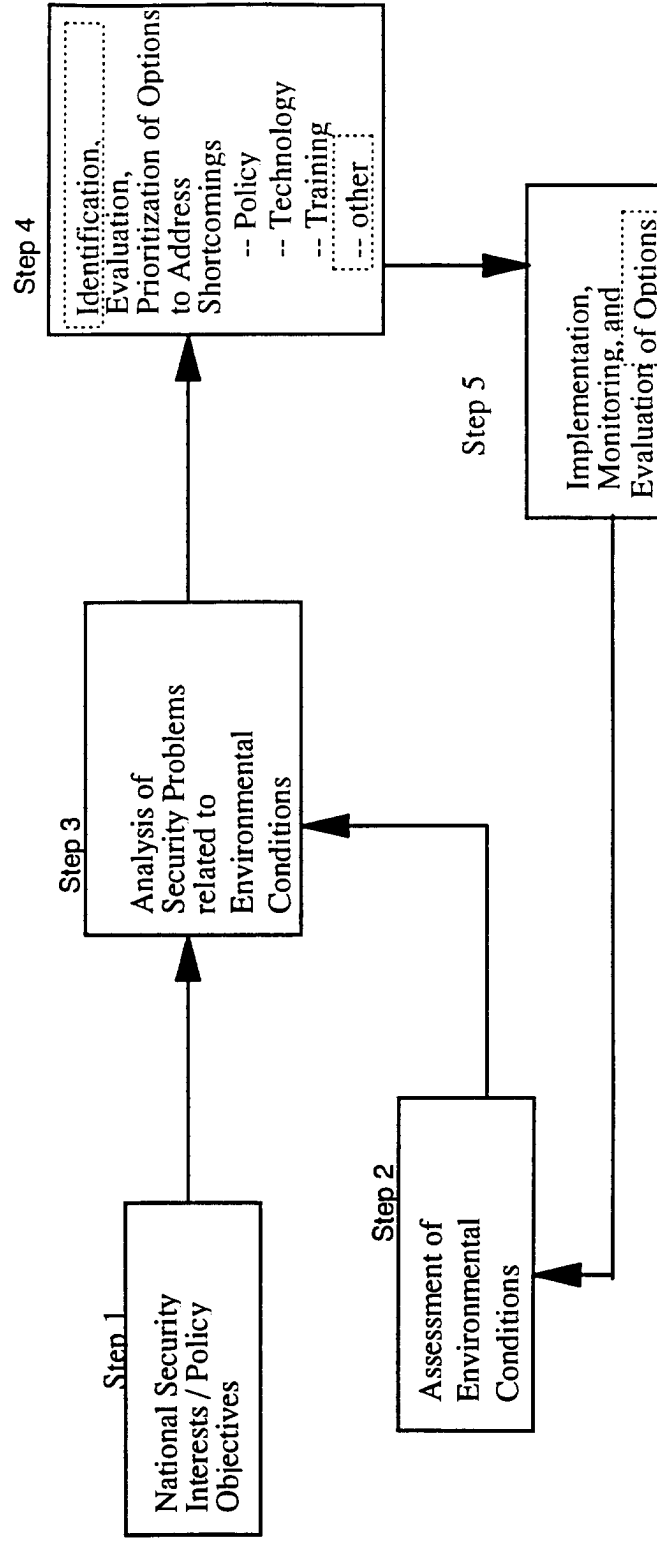
This step involves (i) identifying national security policy objectives and (2) assessing them for their relevance to global environmental issues. To accomplish this step we will draw upon discussions, reports, documents, and other materials obtained from federal agencies and others that will be part of the CES. Section 3 of this report provides baseline information on federal agency national security objectives, highlighting those with relevance to the environment. This listing of information, though not exhaustive, provides a good reference point for the analysis. As a result of the work conducted to date in Section 3 it is evident that although the US does have a number of policy measures that make the link between environment and national security, these are still in their infancy and require much more thought and integration.

Step 1 Result: Listing of National Security Objectives with Respect to the Environment.

Step 2: Assess the Impact of Environmental Problems as They Pertain to National Security

Interests

Environmental Security Framework
Exhibit 4



The purpose of this step is to measure or represent the scope and severity of environmental problems that might concern US national security interests. Section 2 provided some of the

theory and methods for assessing environmental conditions using quantitative and subjective data.

This step will review and select the appropriate data and tools for establishing and using a set of standard indicators of environmental condition in this and subsequent steps of the Environmental Security Framework. Data and tools to conduct this step are available from sources such as DOD, the State Department, USAID, EPA and NGOs. The challenge of the CES is to gain consensus on the use of one or more of the available environmental assessment methods and to apply this/these throughout the Environmental Security Framework for the purpose of maintaining consistency in measurement and analysis.

Step 2 Result: Listing of Environmental Problems that may actually or potentially affect environmental security interests.

Step 3: Analyze and Prioritize Environmental Security Problems

This step evaluates the actual or potential contribution of environmental problems to US security interests. It will identify cases where current efforts or practices are insufficiently addressing an environmental security problem. This step involves articulating and understanding the major cause-effect linkages between environmental conditions and security interests which results in the identification of an environmental security problem. These environmental security problems can then be prioritized in terms of the relative importance of the security interest affected in conjunction with the magnitude and scope of the environmental condition.

The need for a process to better relate environmental problems to security interests has recently received increased attention. The US intelligence community presently includes environmental security problems in its analysis of the world's "hot spots", which are or may become unstable or violent and affect US interests. In these analyses, environmental conditions or problems are assessed with regard to their actual or potential contribution (e. g., major or minor) to instability in a region or country.

Conceptually, this step has already been addressed in the environmental security community. For example, Gareth Porter proposes a system of *Integrated Security Resource Planning (ISRP)*, which would be aimed at ensuring that adequate resources are allocated to global environmental threats. He suggests " a final overall index of seriousness of each threat analyzed - *a national security impact index*It would reflect the four main dimensions of any national security threat: the gravity of the potential impacts from the threat; the probability of the threat actually being realized; the duration of the treat; and the timing of onset of the threat." He adds that each of these four dimensions could be quantitatively assessed, weighed, and then combined to produce the national security impact index which compares the relative importance of each threat considered. Porter states that although data and quantitative analysis tools are lacking, he believes order of magnitude estimates could be developed that would improve environmental security policy and decisionmaking."⁵⁶

Step 3 Result: Listing of national security interests that have prioritized in terms of national security objectives and their importance on the one hand, and the magnitude and extent of the environmental problems on the otherhand.

Step 4: Identification, Evaluation, and Prioritization of Options to Address Problems

This step involves identifying measures that address environmental security or problems identified in Step 3. Among the options or types of mechanisms to be considered are: legislative or regulatory measures; financial incentives/disincentives, technology, training and education, etc. One or more options can be considered based upon their potential applicability to an individual environmental security problem. Sections 3 and 4 and Appendix 1 provide an overview of the kinds of options presently available that could be used to address environmental security problems. This "menu" of options produces a prioritized list of measures (e.g., use of military forces) that is aligned with the prioritized list of environmental security problems (eco-terrorism) from Step 3. Consensus needs to be reached regarding the methods (which should mature with use) to analyze and then prioritize the options to be implemented. The menu should be updated regularly.

The analysis of the options is not a trivial task. Combining the uncertainties of national security with environmental forces is the stuff that analysts love and hate - especially when it involves the government sector and public services. For example, options that promote pollution prevention technology exports should be guided by a life cycle cost-benefit analysis which accounts for the

costs of government intervention.⁵⁷ According to a recent article in the Economist addressing federal intervention in the export marketplace "The reason why government export promotion is wrong in principle begins with a simple observation: everything has a price. ... The easiest case is where an export-promoting government offers a subsidy: cash to cover a discount, say, or a generous export deal, or aid to the buyer whom is linked formally or informally to the purchase." I agree. Export promotion should include the cost of politics and business, in order *to determine whether it pays for the country* to promote exports. In the case of environmental security, this requires the capability in this Step to identify the costs and benefits of public and private environmental initiatives and evaluate them against US national security interests. The same article later points out that in "The more complicated case, but also now the most common and the most insidious, is where the price is non-financial."⁵⁸ This is certainly the case with matters of the environment and security - when considered separately as well as jointly.

Part of this Step involves deciding the appropriate way or ways to address the problems - through the public or private sector or both. Traditionally public resources have been used to address National Security issues. The idea of using market mechanisms to address strategic interests of the US is not new, even when the subject at hand is the environment. For example, an article in the Washington Post referred to 2000 economists who released a statement stating that 'climate change carriers with it significant environmental, economic, social and geopolitical risk' and "preventive steps are justified". They endorsed a system of market mechanisms, such as carbon taxes or trading of marketable emissions permits, among countries. The statement prepared by leading economists said well-designed policies relying on market mechanisms may in

fact improve US productivity in the longer run.⁵⁹ Thus, regarding environmental security, private sector options would give more decisionmaking to consumers or users of products or processes involved with priority environmental security issues. The use of market-oriented approaches to influence environmental resource allocation decisions is common in many European countries. For example, certification schemes in Sweden encourage consumers to buy products made from environmentally sound wood by giving such products a label or a stamp of approval. ... Certification schemes allow consumers rather than governments to choose what sort of wood to buy.⁶⁰

Step 5: Implementation, Monitoring, and Evaluation of Options

The CES will have the authority to sponsor and responsibly use dollars from existing channels in the implementation, monitoring and evaluation of options. Implementation will involve pursuing the result of the prior step. This could involve a number of activities, from developing new policies to issuing financial incentives to promote exports, or simply sharing of technical information between the public and private sector participants. The Monitoring action will involve measuring the effects of the options implemented. Monitoring will involve collecting data on the options, as well as the conditions they were to address, from a number of sources. These can range from existing data bases and reporting mechanisms, such as the Department of State's first annual report on the environment and foreign policy, to the use of intelligence satellite global data. The challenge is to sift through and analyze data from this wide array of data sources that is sometimes inconsistent, and in different units of measure. In this phase, we will also monitor

activities taken by other nations that may assist in achieving US environmental security objectives.

The final evaluation phase will draw upon the collected data from the monitoring phase and use this to assess how well the action is performing. It is in this phase that we will determine how well the action is doing with regard to effectiveness (both national security objective and environmental condition), efficiency, trends, etc. As part of this evaluation, a cost-benefit assessment will be performed. This information will then be fed back into Step 2 (the assessment of environmental conditions), in order to provide continual monitoring and adjustments, as necessary. Thus, we will be continually assessing performance of various options based upon their impact on environmental conditions.

The US Government regularly uses methodologies based on quantitative and subjective information and develops grades that indicate the relative risk or potential instability at the country level. For example, as discussed in Section 3, the Eximbank is a US Government agency which helps finance the overseas sales of US goods and services. The Federal Credit Reform Act of 1990 legislated that "common standards be developed for country risk assessment for all US government agencies providing cross-border loans, guarantees, and insurance." As a result, the Eximbank developed the Interagency Country Assessment System (ICRAS). ICRAS is a country risk methodology which evaluates foreign country economic conditions and displays each country's relative "economic risk" as an indicator of the likelihood that US Government loans to an individual country will be repaid. ICRAS evaluates countries on 35 "sovereign" and 11 "private sector" risk categories. Preliminary analysis suggests that there may exist a correlation between the ICRAS risk ratings and foreign state instability. The Government accounting Office

(GAO) chairs the weekly ICRAS steering Group meetings at which individual risk assessments are updated and ratings are reviewed.

Example of the Framework Application

The brief example below illustrates how the environmental security framework could be applied to an issue potentially impacting US national security. Although the example is expressed in subjective terms, quantitative measures would also be applicable.

Problem The CES finds that global climate change poses a high priority security threat to the well-being of the US and has been recognized as such by the current Administration. (Step 1)

Global climate change provides a long-term potential risk to the US. Most commonly referred to as the heating of the atmosphere, a number of climate related symptoms have been attributed to climate change. These include extreme cases of heat waves, crop failures, forest fires, flooding, droughts, etc. Actions by mankind have had a major detrimental impact on climate change, primarily through emissions of coal and oil. Although debate about climate change and its impacts is on-going, the most noteworthy statements linking climate change and fossil burning was made by the UN Intergovernmental Panel of Climate Change (IPCC), which represents 2,500 scientists, which said that climate change impacts due to fossil burning is likely to cause widespread economic, social and environmental dislocation. Several countries, in particular Brazil and China, each of which has tremendous energy growth plans using coal and other fossil based fuels, are of particular concern to the international community with respect to climate change. (Step 2) The

CES compares the problem of climate change to other national security threats, and decides it receives a higher priority than most of the other security problems in the long term, with less attention given in the short term. (Step 3)

Options. Possible options that could address global climate change include:

- Promoting exports of clean energy/environmental technologies (renewable energy, energy efficiency), carbon scrubbers for coal, etc. to reduce their consumption of carbon-based fuels.

- Impose economic sanctions on polluting countries through the UN or WTO

- Take an aggressive position at the upcoming Council of Parties meeting in December 1997 in Kyoto, Japan, as part of the Framework Convention on Climate Change that will set mandatory, stringent targets for emission levels and timetables for when these will be met. This could include setting up mechanisms for carbon trading between emitting and non-emitting countries. (Based on the fact that it doesn't matter where in the world that the carbon reductions occur.)

During the prioritization phase of this step, the CES analysis recommends taking a strong position in the Kyoto convention, based on its high benefit-cost ratio - this option is regarded as a "low cost" environmental diplomatic approach with potentially large long term environmental benefits.

Furthermore, the CES also recommends the US initiate a prototype export promotion strategy that provides modest incentives (e.g. low interest loans and political/economic risk insurance) to exporters of clean energy/environmental technologies and services. Although the potential cost-benefit ratios appear promising for this option, this initiative is planned for only a relatively short period of time to assess the responsiveness of the US environmental industry to these incentives, and in turn their contribution to reducing the global climate change threat. (Step 4)

Feedback. The last step in the Environmental Security Framework provides an indication of how well the two options are performing. After two years of monitoring and evaluation, the CES realizes the adoption of pollution emission standards established from the Kyoto convention is not a successful option due to the US' inability to meeting the standards. Thus, the CES recommends that the Kyoto standards be modified and a new schedule of standards be developed. But in the case of the export promotion option, the response has been greater than expected in that US environmentally clean exports have increased significantly as result of the new incentives. Furthermore, the loan default rates linked to this option have been almost zero, and none of the importing countries have had any major conflicts or instabilities. Also the growing market shares have benefitted US industry and the balance of trade in general. However, it is not clear whether these exports are measurably reducing global climate process changes or making any difference at all. To estimate the actual benefit-cost ratios, additional data are needed, which is a costly proposition. Thus, the Environmental Security Framework carries this new requirement of data collection and analysis for consideration as a new option in the next cycle.

OBSERVATIONS

The Environmental Security Framework is shown here principally to encourage discussion on how to more systematically address growing environmental security problems using tools and organizations available at a relatively low cost. Although simple methodologically, it provides a much-needed one-stop shopping approach to environmental security management, which is needed in the US government to better integrate the increasing complexities of the problems as well as the administration of the environmental security policy the US has today and in the foreseeable future. It also promotes considering the untapped capabilities of the private sector to a greater extent than at present. It is worth engaging the government and industry sectors in a dialogue that deals with the fundamental principles outlined in the Framework. There is little new here regarding policy, analytical tools and data bases; and may be a bit rough in these areas, but with use they should improve.

SECTION 6: CONCLUDING REMARKS

Environmental issues and their impact on national security objectives is an area receiving increased attention throughout our government, by the public and the world overall. With increasing populations and decreasing resources, the world is facing growing environmental scarcity.

As Section 2 demonstrates, there exists a number of environmental problems that can and have stimulated violent conflict, and thus pose threats to our national interests. Among these are degradation and erosion of farm land, ozone depletion, depletion and pollution of water supplies, forestry depletion, and greenhouse-induced climate change patterns. These problems touch peoples' lives in a number of ways including social, economic, health, political and technological. Further, the fact that environmental problems often transcend national boundaries and are not yet fully accounted for in product/service costs both perpetuates and escalates the problems to regional and often global levels.

In follow-up to the post-Cold War era, policy makers are looking much more closely at the causes of conflict and instabilities occurring worldwide. As a result of their research and analysis many have come to the conclusion that the environment is a key driver. This view is shared by many in

the US government; the environment is a good example of where the government can step in to address problems or needs that have escaped the invisible hand of the marketplace.

As Section 3 demonstrates, a wide spectrum of policy makers in the Administration and Congress have recognized the linkages between environment and national security and have set forth policy measures to begin to address this situation. At least 10 federal agencies have missions or objectives that seek to understand and respond to the "environmental security" arena. These are complemented by a range of programs, services, and incentives/disincentives available today, or in process, by the private sector and multilateral development community that could be used to more systematically and cohesively address environmental security concerns.

Given the magnitude of the environmental problems it is clear that no single organization, or even country can provide the solution. In the case of the US, environmental security requirements are greater than public sources alone can handle. As Deputy Secretary Talbot stated in his speech at the Foreign Service Institute "While Congress is undernourishing our foreign policy in general, it is starving our environmental programs." And similar patterns are occurring in other countries and among donors in the international financial community. Thus, it is imperative that the key players, including governments, private firms, the international financial community and NGOs work together more effectively to recognize the problems, find solutions, and see these through to successful implementation, monitoring and follow-up. This team approach will make the best use of dwindling resources, enhance cooperation, reduce duplication of efforts, address existing gaps and lead to a better world.

One of the vital aspects of this framework is the key role that the private sector will need to play in advancing environmental security issues. They bring knowledge, expertise, technology, contacts and very importantly, financial and human resources to bear on the problem, resources that are not available from other sources. Further, they have a vested interest in stimulating markets for US environmental products and services overseas. In addition to the private sector, another key element is the multilateral development bank community (i.e., the World Bank, the Inter-American Bank, the Asian Development, etc.). These organizations can not only provide funding in the environmental security equation, they can also apply conditions in the loans they provide to developing countries which require changes in the way that these countries operate.

Section 5 of this paper sets forth a simplified framework to incorporate the issues and players. This framework provides an approach for systematically collecting and analyzing available data resources on the environmental/national security threat, prioritizing environmental issues according to their potential implications, and establishing a mechanism for addressing these problems through the concerted effort of a team of international players. The Environmental Security Framework proposed in this Section will be administered through a newly formed Committee on Environmental Security that has as its members a number of federal agencies involved in national security, environment and export promotion issues. Further, informal advisors will be invited to participate as representatives of the private sector, MDB community and other key players. The CES is not proposing a huge bureaucracy but rather a streamlined

organization where the planning, work and implementation will be performed primarily by the participating agencies and other players.

APPENDIX 1: FINANCING SOURCES APPLICABLE FOR ENVIRONMENTAL TECHNOLOGY PROMOTION

OVERVIEW

Provided below is more detailed information on financing sources available to stimulate private and public sector investment in environmental technologies. This is a representative, not comprehensive listing of financing support available. In some cases these are dedicated funds for environmentally clean goods and services, whereas in most cases, they are programs and services to advance exports for which clean technologies are eligible. This information is organized according to the stage of the project cycle for which financing is being sought: feasibility study financing, project financing and trade finance.

Feasibility Study Financing

Evaluating the commercial feasibility of international projects is a necessary step to making a long-term investment. However, the costs associated with evaluating a foreign market --overseas travel, hiring of consultants and formulating a business plan, can be prohibitive.

US Trade and Development Agency (TDA). TDA is the primary US Government agency charged with providing support for feasibility studies and other project planning support (orientation visits, conference support, etc.) Subsequent financing for project implementation must be identified before TDA will commit to provide assistance and host-government approval is required to conduct feasibility studies. TDA is required to support projects which are environmentally benign or beneficial.

US Agency for International Development (USAID). USAID provides seed money for a number of environmental funds that support pre-feasibility , feasibility and project financing. These funds are often cost shared with other government, private sector or non-profit organizations. Among the environmental initiatives that USAID supports are the Association of Southeast Asian Nations (ASEAN) Environmental Improvement Project which is specifically designed to promote pollution prevention in ASEAN member nations; and the Asia Environmental Technology Fund and the Latin America Fund for the Environment which provide grants to small businesses in the environment sector in these regions.

Project Finance: US Sources.

Export-Import Bank of the United States (Eximbank) The Eximbank provides loans or guarantees for new projects (not expansions) and relies for repayment, wholly or in part, on the cash flow from the project. Eximbank limited-recourse transactions should involve at least \$25 million of US

content. Eximbank will consider project financing in any country in which it is not prohibited by US law from doing business.

Overseas Private Investment Corporation. OPIC assists US investors in environmental projects through three principal programs (1) financing investments through direct loans and loan guarantees; (2) insuring investments against a broad range of political risks; and (3) providing a variety of investor services, including advisory services; investment missions and outreach. All of these programs are designed to mitigate the risks associated with overseas investment. OPIC's loans and loan guarantees are extended in the form of project financing. For ventures in which project financing is impractical, OPIC will consider more conventional secured lending techniques.

OPIC can provide a significant portion of medium and long-term funds for financing in countries where conventional financial institutions are frequently reluctant or unable to lend. Under certain circumstances, OPIC may purchase equity in a project, including convertible notes and certain other debt instruments with equity participating features. The terms and conditions of such participation are decided on a case-by-case basis.

OPIC is required by statute to assess the environmental impacts of projects under consideration of political risk insurance and financing. OPIC's authorizing statute was amended in 1985 with the Congressional intent of ensuring that "great care ... be paid to assuring the environmental soundness of US Government supported foreign assistance projects". In particular, OPIC has found that it responsible and proactive environmental assessment and management activities enhance the competitiveness of US investors, as well as project developers, suppliers and contractors associated

with overseas investment projects. In addition to conducting environmental impact assessments of the projects it finances, OPIC also provides financing to support a number of privately owned and managed direct investment funds that have the capability to provide equity capital to facilitate business formation and expansion; several of these funds are targeted toward environmentally sound investments and each must meet the organization's environmental thresholds.⁶¹

US Agency for International Development (USAID). USAID provides project financing for environmental technology projects in developing countries through its Center for Economic Growth (CEG). CEG will consider market-term financing for projects in developing countries through its Private Sector Revolving Fund. For loans or guarantees, the Center will consider only private enterprises with substantial local ownership. Projects must have a substantial developmental impact; provide sound, sustainable, environmental development; generate net employment opportunities; earn net foreign exchange; develop managerial and technical skills; and/or transfer technologies. Loans may be used to capitalize a new enterprise and/or expand an existing enterprise.

Although not technically a financing source, another example of the heightened international interest in and commitment to improved environmental practices by both the public and private sectors is the emergence of voluntary environmental management standards developed by national standards bodies through the world. To address the growing need for an international consensus approach, ISO, the International Organization for Standardization, has undertaken the development of international voluntary environmental management standards. ISO is a private sector,

international standards body based in Geneva, Switzerland. ISO was founded in 1947 to promote the international harmonization and development of manufacturing, product and communications standards. The US is a full voting member and is officially represented by the American National Standards Institute (ANSI). ISO produces internationally harmonized standards through a structure of Technical Committees. ISO's Environmental Management Standards (EMS) are a series of voluntary standards and guideline reference documents which include environmental management systems, eco-labeling, environmental auditing, life cycle assessment, environmental performance evaluation, and environmental aspects in product standards. EMS help an organization to establish and meet its own policy goals through objectives and targets, organizations structures and accountability, management controls and review functions all with top management oversight. EMS do not set requirements for environmental compliance nor do these standards establish requirements for specific levels of pollution prevention or performance. The Environment Management Systems specification document calls for environmental policies which include a commitment to both compliance with environmental laws and prevention of pollution.⁶²

Project Finance - Multilateral Development Banks

The MDBs make loans to governments or agencies that can obtain a sovereign guarantee. These loans generally cover the hard currency portion of the project. International competitive bidding is the procedure normally used for procurement of goods and works financed by the public sector arms of the MDBs, ensuring the contract is awarded to the supplier with the lowest evaluated cost. Project and investment financing from multilateral organizations can be extended through loans,

guarantees, equity and grants, repayment of which may be based on the economic viability of the venture. The environment is being increasingly emphasized by the MDBs. The private sector arms of these institutions also support environmental projects.

The International Bank for Reconstruction and Development (World Bank). The World Bank finances projects in developing countries by making large loans with long maturities (15 to 20 years) and grace periods (five years). Loans must be made for productive purposes and must stimulate economic growth. Loans are made to or guaranteed by the borrowing government. Typically, the Bank finances about 40 percent of total project costs. Supplemental funding is provided by the borrowing country, other agencies and commercial bank enterprises. The Bank lends funds for a variety of carefully selected and clearly defined projects. There are two basic categories of lending activities -- investment loans and adjustment loans. Investment loans, by far the most common type of lending, account for more than 75 percent of the Bank's total annual commitments. These loans finance individual projects and segments of a country's investment program in a specific sector (i.e., transportation or agriculture). Adjustment lending helps countries to reform economic and fiscal policies and address balance-of-payments problems. Any Bank member country with an annual per capita income below the borrowing threshold level (\$4,095 in FY 1994) may apply for loans or credits. The borrower may be a government, a government agency, or a private enterprise or institution that can obtain the host government's guarantee.

Global Environment Facility (GEF). GEF provides grants and concessional funds for investment projects and technical assistance for the incremental costs of activities (when compared to less

environmentally attractive options) with global environmental benefits. Firms can become involved with GEF projects which are identified by GEF and submitted to the United Nations Development Program (UNDP) representative (for technical assistance projects) or to the World Bank (for investment projects). GEF resources are intended to facilitate projects with global environmental benefits for which official development funds are not normally available to complement, no substitute for, regular aid programs. Of special interest to small firms, is the *Small Grants Program* for projects of less than \$50,000. The latest replenishment of GEF's Core Fund, \$800 million of project funds (GEF II) will place greater emphasis on global warming and greenhouse-gas reduction.

Multilateral Investment Guarantee Agency (MIGA). MIGA was formed by the World Bank to facilitate investment in developing member countries and to complement the activities of national investment insurance programs, private insurance companies and the IFC. MIGA offers long-term political risk insurance and provides advisory and consultative services. MIGA's Guarantee Program is designed to encourage investors to take advantage of commercially attractive foreign opportunities by providing insurance against war, revolution, civil disturbance, breach of contract, currency transfer and expropriation.

International Finance Corporation (IFC). The IFC invests in private ventures in developing countries by providing equity financing and loans without government guarantees, in collaboration with other investors. Always a minority partner, IFC seeks project sponsors from industrial and developing countries with which the corporation can form joint enterprises. IFC investment

projects range from \$4 million to several hundred million dollars and are carried out with its 154 member countries. IFC finances up to 25% of a project's costs in a variety of forms depending on the project need. IFC offers technical/advisory services, assembles financing packages, unites investors and arranges bank syndications. IFC is in the process of establishing a Renewable Energy and Efficiency Fund, up to \$500 million, to stimulate investment in energy pollution projects; the IFC contribution is about 25% of the total investment with the remainder to be raised in the private sector capital markets.

Trade Finance

Government-backed trade finance may range from pre-export working capital needed to fulfill purchase orders, to short-term (180 days) export receivables financing, to customer financing with terms of 10 years or more.

Eximbank. Eximbank provides export credit support to either US exporters on a short-term basis, or to foreign purchasers of US products on a longer-term basis (2-10 years). Through loan guarantees and insurance, Eximbank provides credit at attractive interest rates to foreign buyer's to encourage their purchase of US goods and services. Exports must contain at least 50% US content.

-- Short term loan/guarantee programs under Eximbank auspices include: the Working Capital Loan Guarantee program which provides a 90 percent repayment guarantee to lenders on secured short-term loans against inventory and foreign receivable; the Credit Insurance Policies program which provides protection against both the political and commercial risks of foreign buyer defaulting on a credit obligation; the New-to-Export program for US firms with few exports over the preceding two years; and the Umbrella Policy for US firms with limited exporting experience that provides comprehensive medium-term coverage.

- Medium- and long-term loans/guarantees enable US exporters to obtain guarantees on payment from their overseas customers for up to 85 percent of the value or 100 percent of the US content of an export transaction, whichever is less. Only borrowers can qualify for direct loans and only lenders (not necessarily a financial institution) may receive intermediary loans. Evidence of foreign, officially supported export credit competition is required to receive any kind of concessionary financing unless the product is in an industry known to receive frequent foreign government subsidies.

- Environmental Exports Program (EEP) - To respond to the growing needs of environmental exporters, Eximbank has developed the EEP to provide support for a broad range of environmentally related exports. One of the major features of the program is enhanced medium- and long-term support (up to 12 years, the longest terms Eximbank will extend) for environmental projects, products and services.

- Eximbank Engineering Multiplier Program (EMP) - The Eximbank's Engineering Multiplier Program is designed to stimulate exports of US architectural and engineering goods and services by funding project-related feasibility studies and pre-reconstruction engineering services. Eximbank will provide direct loans or guaranteed loans for up to 85 percent of the exports' value, provided the buyer pays a minimum 15 percent to the exporter. Exports cannot exceed \$10 million and repayment periods range from 2-5 years.

- Eximbank Medium-Term Export Credit Insurance for Environmental Services - Eximbank is committed to increasing support to firms providing environmental services to foreign customers. To do this, Eximbank offers the Medium-Term Export Credit Insurance Policy for environmental services. Maximum coverage under this policy is \$10 million; larger amounts may be financed under Eximbank loans or guarantees.

US Small Business Administration. The Small Business Administration supports small businesses by guaranteeing commercial loans for facilities and working capital; providing trade finance and co-guaranteeing loans with state and local export offices. Relevant SBA programs are described below.

- The SBA Export Finance Program guarantees up to \$750,000 for either short- or long-term loans to help small businesses increase their export sales. This program is designed to assist small businesses requiring capital to expand sales or manufacturing for international markets, as well as to meet their working capital needs.

- Export Working Capital Program (EWCP) EWCP helps small businesses export their products and services. Proceeds can be used to finance labor and materials needed for manufacturing or purchasing goods or services, or foreign accounts receivable, but may not be used to pay existing obligations, fixed assets or establish joint ventures. Similar to SBA's regular business loan program, the EWCP can guarantee up to 85 percent of a loan up to a limit of \$750,000. The maximum guarantee for loans up to \$155,000 is 90 percent.

- International Trade Loan Program (ITLP) - ITLP provides long-term, primarily fixed-asset financing to help establish or expand international operations. SBA can guarantee up to \$1.25 million (\$1 million plus \$250,000 for working capital), less the amount of SBA's guaranteed portion of other outstanding loans.

REFERENCES

- ¹ "Environment and Security: Core Ideas and US Government Initiatives", Geoffrey D. Dabelko and P.J. Simmons, For the Workshop on Environmental Threats and National Security: An International Challenge to Science and Technology, Monterey, CA, December 10-12, 1996
- ² A National Security Strategy of Engagement and Enlargement, The White House, February 1996, p.i.
- ³ "Environmental Security: Issues of Conflict and Redefinition", Geoffrey D. Dabelko and David D. Dabelko, The Woodrow Wilson Center Environmental Change and Security Project Report, Spring 1995, pp 3-10.
- ⁴ "Time for a Third Wave of Environment and Security Scholarship", The Woodrow Wilson Center Environmental Change and Security Project Report, Spring 1995, pp 44-46.
- ⁵ "Redefining Security" International Security., Richard H. Ullman, 8 nl summer 1983, 129-153..
- ⁶ Israeli Sources of Conflict and Change, Patricia Harrington, April 1993, p.23.
- ⁷ A National Security Strategy of Engagement and Enlargement, The White House, February 1996, p 26.
- ⁸ S. Talbot, " Our Mission and the Global Environment", State Department Magazine, November/December, 1996, pp. 15-17.
- ⁹ " The Global Environmental Market and United States Environmental Industry Competitiveness", Environmental Business International , 1996.
- ¹⁰ An Inquiry into the Nature and Causes of the Wealth of Nations, Adam Smith, 1776.
- ¹¹ Environmental Security/National Security Conference, Washington DC, June 1995.
- ¹² "Meeting the Challenge of Global Threats" 1996 National Security Science and Technology Strategy

- ¹³ "The Greening of US Foreign Policy", Richard A. Matthew, Issues in Science and Technology, Fall 1996, p40.
- ¹⁴ "Environmental Scarcities and Violent Conflict: Evidence from Cases", Thomas F. Homer-Dixon, International Security, Vol.19, No. 1 (Summer 1994).
- ¹⁵ Homer-Dixon, p. 33.
- ¹⁶ "The Intelligence Community and the Environment: Capabilities and Future Missions", Richard Smith, Woodrow Wilson Center Environmental Change and Security Project, June 22, 1995, pp 103-108.
- ¹⁷ Regions at Risk: Comparisons of Threatened Environments, Jeanne X. Kasperson, Roger E. Kasperson, and B.L.Turner II, 1995, p25.
- ¹⁸ Reconciling Environmental Degradation; and US National Security, Scott Kraverath, December 1994.
- ¹⁹ Political Economic Risk in Countries and Lands Evaluation Study, Theodore Ahrens, US Army, Concepts Analysis Agency, Bethesda, Md, August 1996.
- ²⁰ "The United States and Environmental Security: Deforestation and Conflict in Southeast Asia", Peter T. Greenwald, June 1992, p10.

- ²¹ "Towards a Redefinition of Security in Central America: The Case of Natural Disasters", Lloyd Pettiford, Disasters Volume 19, Number 2, p 150-1.
- ²² Middle East Economic Digest, March 1, 1996.
- ²³ "Environmental Security as a National Security Issue", Current History, Gareth Porter, May 1995, p.218.
- ²⁴ National Environmental Policy Act.
- ²⁵ Sam Nunn, "Strategic Environmental Research Program," Senate floor speech, June 28, 1990.
- ²⁶ Ibid, Nunn.
- ²⁷ President Clinton, 1996 State of the Union Address.
- ²⁸ "Meeting the Challenge of Global Threats" 1996 National Security Science and Technology Strategy , The White House Office of Science and Technology Policy, 1996.
- ²⁹ Memorandum to Under and Assistant Secretaries of State, from Secretary of State Christopher, subject "Integrating Environment Issues into the Department's Core Foreign Policy Goals", February, 1996.
- ³⁰ Christopher, Warren. April 9, 1996. "American Diplomacy and the Global Environmental Challenges of the 21st Century." Washington, DC.
- ³¹ "The Greening of US Diplomacy: Focus on Ecology", NY Times, International, October 9, 1995.
- ³² US Department of State, Environmental Diplomacy: The Environment and US Foreign Policy, Washington, DC, April 1997.
- ³³ Sherri Wasserman Goodman, Deputy Under Secretary of Defense (Environmental Security), Statement Before the Subcommittee on Installations and Facilities of the House Committee on Armed Services, May 13, 1993, p.9.
- ³⁴ Environmental Security: What is DOD's Role? Strategic Studies Institute, U.S. Army War College, Kent Hughes Butts, 1993, pps. vi-vii.
- ³⁵ "Environmental Protection Agency", 1996 Federal Staff Directory, 1996.
- ³⁶ "The Environment and Diplomacy: New Challenges for American Foreign Policy", Remarks by Ambassador Mark G. Hambley, Workshop on International Environment and Security Issues, National Defense University, Ft. McNair, p.11, 1996.
- ³⁷ Ibid, p. 11.
- ³⁸ Deutch, John, Director Central Intelligence, "The Environment and the Intelligence Agenda". World Affairs Council, 1996.
- ³⁹ Protecting the Environment: USAID's Strategy. pp. 1-4.
- ⁴⁰ Environmental Change and Security Project Report, The Woodrow Wilson Center, Issue 2, Spring 1996.
- ⁴¹ Environmental Change and Security Project Report, Issue 2, Spring 1996, p.133.
- ⁴² National Security Strategy, p. 31.
- ⁴³ "A Conceptual Framework for Security Council Authority in Environmental Emergencies", Linda A. Malone, 1996, p19.
- ⁴⁴ Ibid Malone, p.18.
- ⁴⁵ 1996 State of the Union Address.
- ⁴⁶ Alonzo, Anne. 1996. "Why the Emphasis on Environmental Technologies Exports?". US Department of Commerce: Washington, DC.

- ⁴⁷ "It Pays to Be Prepared: Financing Environmental Exports", Eric Fredell, Business America, US Department of Commerce, April 1996.
- ⁴⁸ Ibid.
- ⁴⁹ Financing Environmental Projects, Craig O'Connor, Export-Import Bank of the United States, Paper presented to Industrial College of the Armed Forces, Washington, DC, 1997, p. 1.
- ⁵⁰ Working for America - OPIC at Twenty-Five, 1996 Annual Report. Overseas Private Investment Corporation, Washington, DC.
- ⁵¹ Power Money, p. 37.
- ⁵² Business America, p. 34.
- ⁵³ Power Money, p. 77.
- ⁵⁴ Quarterly Operational Report, Global Environment Facility, November 1996.
- ⁵⁵ Power Money: The International Business Executive's Guide to Government Resources. Second Edition, William A. Delphos, Washington, DC, 1996.
- ⁵⁶ "Advancing Environmental Security through Integrated Security Resource Planning", Gareth Porter, Woodrow Wilson Center Environmental Change and Security Project Report, Spring 1996, pp. 35-36.
- ⁵⁷ "Don't Be a Salesman," Economist, February 1, 1997.
- ⁵⁸ "Don't be Salesman." The Economist, February 1, 1997, p. 17.
- ⁵⁹ "Economists Urge Reduced US Emissions": The Washington Post, Reuter, February 14, 1997.
- ⁶⁰ "The Coming Anarchy", Robert D. Kaplan, Atlantic Monthly, February 1994, pp. 44-76
- ⁶¹ Overseas Private Investment Corporation, "Program Handbook", 1996, Washington, DC.
- ⁶² Overseas Private Investment Corporation, "Program Handbook", 1996, Washington, DC.