

Environmental Security: A Case Study of Climate Change

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*Nature cannot be fooled.
-Richard P. Feynman*

Introduction

The security of individuals, communities, nations, and the entire global community is increasingly jeopardized by unpremeditated, non-military environmental threats. These threats are self-generated: we perpetrate them on ourselves, by fouling our air and water, and overharvesting our land. These threats are not felt equally around the world. Southern countries face severe problems from desertification, while northern industrial countries deal with acid rain, and polar regions see large depositions of persistent organic chemical pollutants. Climate change will cause uneven effects over the entire globe for the next fifty to 100 years, with some countries benefiting and others suffering.

Despite these omnipresent connections, environmental issues are still not high on the national security agenda. Those who study environmental problems such as deforestation, loss of biodiversity, and climate change generally don't see the connection through to its higher-order effects, and those who study security problems such as non-proliferation, terrorism, and civil conflict often don't recognize the environmental roots and effects of these problems.

So why is this such a hard gap to bridge? Thinking in this multidisciplinary way is not traditional for either environmentalists or security specialists, the majority of whom have defined their fields in specific ways. Consequently the nexus of environmental security is seen neither as a security issue nor an environmental issue. However, environmental issues are often security concerns because even without directly causing open conflict, they have the potential to destabilize regimes, displace populations, and lead to state collapse.

The environment is the planetary support system on which *all other* human enterprises depend. If political, social, cultural, religious, and most importantly economic systems are to remain secure and viable, the environment must also remain secure and viable. This makes global environmental conditions a legitimate national security concern for all countries.

What is Environmental Security

Environmental security (ecological security or a myriad of other terms) reflects the ability of a nation or a society to withstand environmental asset scarcity, environmental risks or adverse changes, or environment-related tensions or conflicts. The chart below illustrates the potential for economic activity to cause environmental changes that lead to conflict.

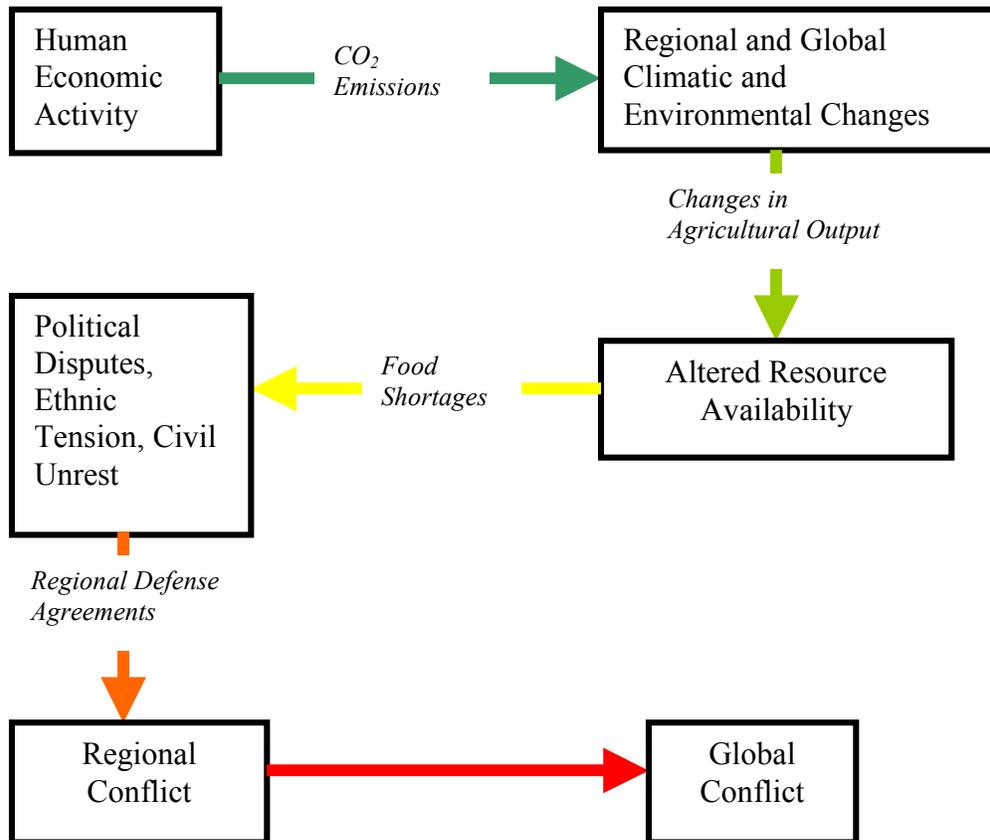


Figure 1: Environmental Routes to Conflict

Unlike potential conventional military threats, these environmental threats are real and ongoing. However, not every environmental issue will result in a security problem, and most security problems are generated from complex situations involving environmental, political, social, and economic issues. Therefore when considering problems of environmental security, it is important to recognize that higher-order effects result from more intervening variables.

Case Study: Climate Change

In order to illustrate our understanding of the nexus of environmental issues and national security, we will examine the problems that global climate change will present for the nation and its military. The mechanics of climate change are simple. Sunlight falls on the earth and the earth's surface reflects it back as infrared heat, which escapes into space. Greenhouse gases in the atmosphere, such as carbon dioxide (CO₂), methane (CH₄) and the newly-discovered

trifluoromethyl sulfur pentafluoride (SF₅CF₃) (Sturges et al 2000) prevent this heat from escaping into space by reflecting it back down to the earth's surface. Without this effect, there would be no life on earth, since the planet's surface would be no warmer than the surrounding space. However, since the industrial revolution, anthropogenic greenhouse gas emissions are pushing this effect farther than any time in recorded history (IPCC 2001).

Since 1998, the U.S. Global Change Research Program has been publishing the work of hundreds of scientists around the country who have been analyzing the effects of climate change on nineteen regions and five sectors of the United States, and while their findings vary from report to report, they have consistently found that changes in ambient air temperature will lead to changes in precipitation and weather patterns, which will in turn lead to further, higher-order changes¹. This paper will demonstrate that, in each case, these changes affect either the mission or the readiness of the military.

Arctic Changes

Climate change will cause thawing of permafrost in Alaska and other polar regions, resulting in shifting ground, erosion, landslides, and land subsidence (NAST 2000). Since the bearing capacity of permafrost decreases with warming (IPCC 2001), this will affect buildings, transportation, and defense infrastructure such as runways, roads, and radar installations at the 11 active military facilities located in Alaska. Structural damage, such as that pictured below, will reduce military readiness and force the Department of Defense to spend time and funds to repair and strengthen facilities.

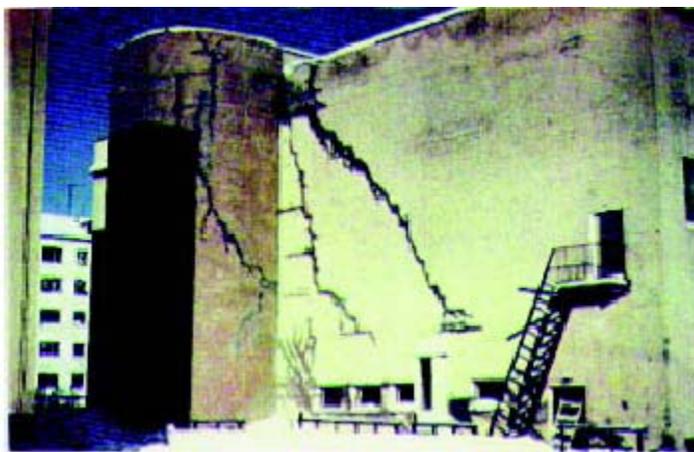


Figure 2: Example of land subsidence on a building in Siberia
[photo credit: S. Yu. Parmuzin]

Increased temperatures in the Arctic will mean that there will be more ice-free open water during the year, and the sea ice that does form will be thinner (Weller et al 1999). Ice-free surface waters will likely also result in increased shipping and military traffic through Arctic waters. This will present both an issue and an opportunity. First, the United States will need to increase its military presence in the Arctic, in order to monitor shipping and military traffic.

¹ For more information on the progress of the U.S. National Assessment of Climate Change, go to www.usgcrp.gov/usgcrp/nacc/default.htm.

Incidentally, this increase could lead to a policy conflict with the Canadians, since they regard the Northwest Passage as their own internal waters (Chalecki 1998). Second, since climate change will also render Arctic waters north of Russia ice-free for a greater part of the year, the United States may try to take advantage of that new mobility, thus escalating the ongoing debate between the United States and Russia over the Northern Sea Route (ONR 2001).



Figure 3: U.S. Coast Guard polar icebreakers escorting a ship
[photo credit: John Booth, CNN]

Climate change in the Arctic will increase both the scope and duration of northern operations for the Navy and the Coast Guard, who must be prepared to meet them.

Civil Disaster Relief and Humanitarian Assistance

The lowest priority, and arguably least favorite, mission of the armed forces is “operations other than war” (OOTW). OOTW includes aid to civil authorities during emergencies and natural disasters. This aid includes both personnel and funds that could have gone to counter-terrorism training or other uses.



Climate change will mean more natural disasters as a result of shifting weather and precipitation patterns. The Midwest will face a greater risk of tornadoes and riverine floods, the Gulf Coast and other shorelines will face a greater risk of high seas and hurricanes, and (due to changes in amount and timing of precipitation) the West will face greater risk of wildfires. These disasters will change the readiness of the military by forcing the reallocation of troops away from combat operations toward disaster relief.

In addition, countries less able to cope with natural disasters will likely face large numbers of refugees, either internally or from nearby countries. As they compete with the local population for scarce resources, civil and ethnic unrest may require peacekeeping troops.

Figure 4: USAF C-5 Galaxy delivering trucks and equipment to Guam after damage from Super Typhoon Paka

[photo credit: Senior Airman Diane S. Robinson, USAF]

Climate change, through its effects on precipitation and soil moisture, will also affect worldwide agricultural output, directly impacting international food security. As a net food exporter, the United States has a vital national interest in the stability of global food markets. Climate change-induced fluctuations in harvest will cause market export patterns to change.

The Agricultural Sector report of the National Assessment indicates that food security is one area where the United States might benefit, as average crop productivity increases (NAST 2000). However, most developing countries will be hard hit, having to import food or suffer shortages. This will likely result in U.S. troops being deployed for humanitarian assistance, such as recent missions to Kenya after severe flooding and to Honduras after Hurricane Mitch. In addition,

severe food shortages may cause civil unrest in harder-hit countries, again requiring peacekeeping troops.

Energy Security

Climate change will have its most complex and vexing effect on national security in the realm of energy. Simply put, climate change will keep us in the Middle East for the foreseeable future. As ambient air temperatures increase, energy demand for cooling will also increase, requiring more imported oil.² This means that U.S. troops will remain a constant presence in the Middle East, exposed to terror attacks from Muslim fundamentalists.



Figure 5: Khobar Towers after the 1996 bombing by 14 suspected Hezbollah members
[photo credit: DoD]

If the United States decides to decrease its dependence on Middle East oil, the current administration is likely to turn to nuclear power to make up the shortfall. This presents another set of security concerns that will affect the military's mission. Increased reliance on nuclear power means a greater chance of diversion of fissile material by nonnuclear states or terrorists. To prevent this, the armed forces will undoubtedly be called upon to provide secure escort for nuclear materials. In addition, as reactors become more critical to the nation's power grid, they themselves become more attractive as terror targets and will require increased National Guard protection.

Changes in Infectious Disease Vectors

Infectious diseases are the world's leading cause of death, and climate change will increase disease exposure risks worldwide. Recent research has demonstrated that this risk is increased for all terrestrial and marine biota, not merely humans (Harvell et al 2002). As worldwide

² Regardless of the outcome of the current dispute over drilling in the Arctic National Wildlife Reserve, proved domestic oil reserves will only support current rates of domestic consumption for three years (EIA 2000).

transportation increases and trade in goods and services is becoming globalized, infectious disease is becoming globalized as well. As a result, U.S. armed forces stationed overseas will face increasing exposure to a variety of diseases in new regions. This will reduce military readiness directly by incapacitating troops.

Changing disease vectors will likely exacerbate social and political instability in tropical and desert countries where the United States has interests. This may slow down transitions to democracy and free market economies, and contribute to humanitarian emergencies and civil conflicts. As a result, military troops are more likely to be sent as peacekeepers, along with U.S. aid money. Infectious disease-related embargoes and restrictions on travel and immigration will cause foreign policy friction between the United States and other countries (National Intelligence Council 2000).



Figure 6: Malaria-carrying *Anopheles* Mosquito
[photo credit: Lawrence Berkeley Lab]

How the Military Can Help Ensure Environmental Security

Most environmental security decisions are policy decisions, and the military is not generally engaged in policy formation. However, in a perfect world, policy decisions are informed by scientific data. This is where the military can help ensure environmental security.

We have already examined how the military's mission and readiness will be affected by environmental changes: the continuation of climate change means that the armed forces will see greater involvement in peacekeeping operations, smaller-scale contingencies, operations other than war, regional wars, and counter-terrorism operations, all possibly from a reduced level of readiness. The next question to ask is how can the military contribute to enhancing environmental security?

First, while recognizing that the armed forces are not the country's largest greenhouse gas emitter, the military should strive to cut its production of CO₂ and other greenhouse gases wherever possible. There has already been significant progress within the services to avoid ecosystem disruption, to decrease use of harmful chemicals, and to conserve natural resources during operations. The military should also adopt energy-efficient and environmentally-friendly technologies and policies.

Second, in order to plan for increased non-combat operations as a result of environmental change, the national security community will need to know where these changes are occurring

and how fast. Policymakers and intelligence analysts should use military informational systems and sensors to gather environmental data, including data on such seemingly diverse topics as disease outbreaks, water quality, and weather patterns. Only by increasing our knowledge base can we continue to put the pieces together and anticipate hitherto unforeseen security concerns.

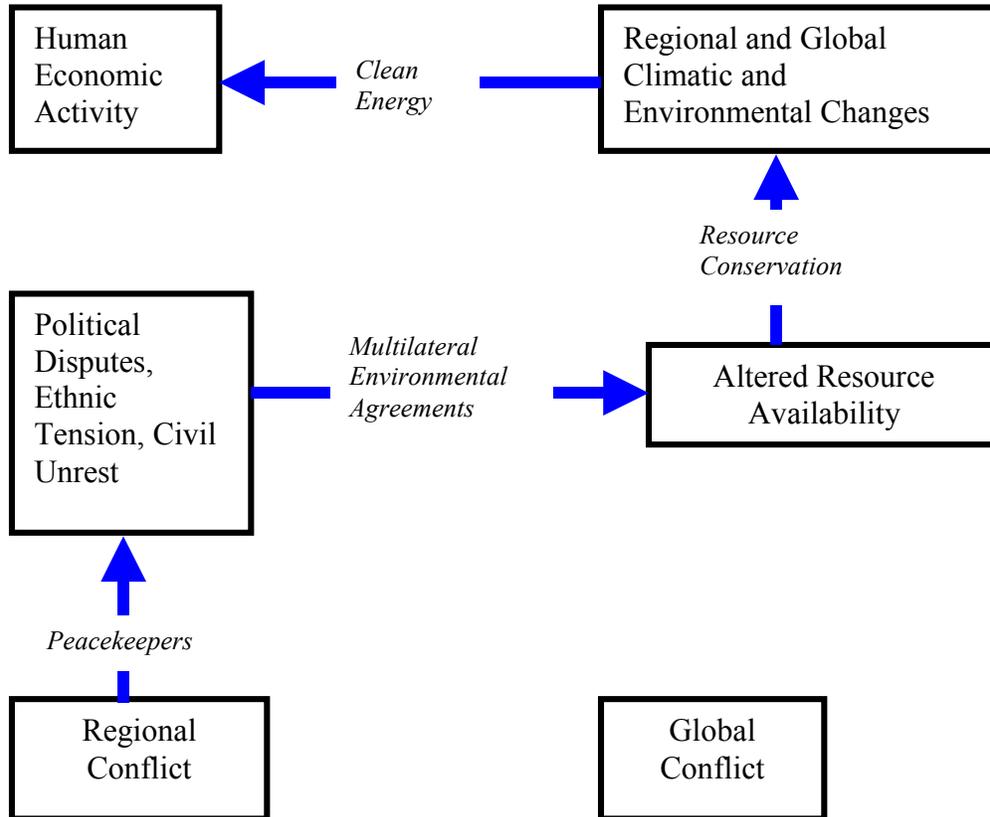
Conclusion

The lessons to be learned from studying the nexus of environmental issues and security issues are applicable not only to the United States or to the Asia-Pacific region, but to the whole world. First, the case study of climate change demonstrates that we must take responsibility for our role in causing environmental degradation; the head in the sand approach of the current Administration benefits no one except a select few.



Second, the United States, the countries of the Asia-Pacific region, and all countries must cooperate in order to mitigate the effects of environmental degradation, including limiting greenhouse gas emissions, conserving natural resources, and developing and sharing energy-efficient technologies. In the short term, policymakers will be forced to rely on military assistance to recover from the effects of environmental degradation, but in the long term, nations must work together to reduce the insecurity that comes from these non-military, environmental threats.

Appendix A. Feedback Loops to Reduce Environmental Conflict



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