PD.1 **ENVIRONMENTAL SECURITY: EXPLORING RELATIONSHIPS BETWEEN THE NATURAL ENVIRONMENT, NATIONAL SECURITY, AND HOMELAND SECURITY**

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1. INTRODUCTION

Environmental Security (ES) has been an interdisciplinary academic field since the mid 1970's. For many years, it was a pursuit of researchers trying to establish and understand relationships and interactions among climate, geography, and people, and the implications that changes in any of these factors had on human security, originally focusing on regions such as the Sahel of sub-Saharan Africa.

Over the years, there have been many different definitions and interpretations of ES. King (2000) pointed out that within the U.S. Federal Government, there were different ES definitions ranging from environmental restoration, compliance, and conservation considerations, to more security-focused definitions. For the purposes of this paper, we define ES as *an interdisciplinary study of extreme environmental events and climatic anomalies, the destabilizing effects of these events and anomalies on a country or region of the world, and the potential security implications of the resulting geopolitical instability*. This ES definition is a blend of King's (2000) ES definition and an interpretation of ES as described in the CNA (2007) report on climate change and national security, both of which focus on the environment as a potential national/international security issue, versus a human security issue.

Interest in the environment as a potential security issue for the U.S. and European countries gained momentum after the end of the Cold War, and peaked in the mid 1990's when then-U.S. Secretary of State Warren Christopher made ES a part of the U.S. State Department's priority list (Mansfield, 2004). This led to a Tri-agency memorandum of understanding among the U.S. Departments of State, Energy, and Defense, and resulted in dedicated resources being spent on ES. During this period, seminal works on ES in the research community attempted to unravel the complex multi-cause/effect mechanisms between environmental scarcity, geopolitical instability, and violence in many regions of the world (see, for example, Homer-Dixon, 1999). While interest in ES within the U.S. policy community waned after the September 11th attacks, recent concerns about potential security issues surrounding the impacts of climate change have sparked a renewed interest in ES (ECSP, 2009). It is this interest that will be addressed in this paper and the accompanying panel discussion later in this session.

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2. A "BUILDING BLOCK" APPROACH TO THE STUDY OF ENVIRONMENTAL SECURITY

As outlined in Lanicci and Ramsay (2009), our approach to ES uses "building-block" approach to describing ES, accounting for environmental health issues, food production and consumption, population dynamics, energy production and consumption, and vulnerability to natural hazards such as those produced by extreme weather events or climatic anomalies. The security side of the ES building-block construct uses the U.S. Army War College's strategy formulation model (Bartholomees, 2008) to examine Grand National Strategy, Ends, Ways and Means of executing the strategy, the instruments of national power, and determination of national interests as being vital, important, or peripheral to U.S. security concerns. The ES diagram is shown in Fig. 1.

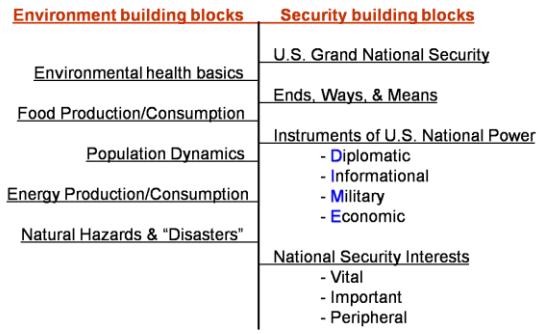

Fig. 1. ES building-block diagram, consisting of environmental science basics, natural hazards/disasters, and national security strategic planning principles derived from the U.S. Army War College model.

2.1 Environmental Science Concepts

We begin with an examination of basic environmental health concepts such as *stability*, *sustainability*, *supply and demand*, and *carrying capacity.* Within each of these concepts are underlying principles, which are outlined in Table 1. The true utility of the building-block approach comes when we examine how the environmental health concepts relate to areas such as food production, population dynamics, and even natural hazards and disasters. For example, the thesis provided was that societal dietary choices affect food production, and food production affects the environment; ergo food choices affect the environment. Certain types of food (e.g., beef) are very energy-intensive to produce. This, in turn, has an influence on energy production and consumption. Interactions among the environmental health concepts themselves are also

important to build an understanding of ES. For example, what happens to a region's *stability* if *carrying capacity* and environmental *sustainability* are stressed from factors such as land overuse, deforestation and consequent desertification? Similarly, climatic anomalies such as above/below normal temperatures and/or rainfall, or some combination of these will also stress not only ecosystems but geopolitical stability in the region. Now add factors such as migration, territorial disputes, and external influences (e.g., discovery of valuable natural resources and influx of outsiders to exploit those resources, etc.), and we begin to see clearly how failure to secure environmental systems can motivate disruptions to a nation's or region's security.

Table 1. Environmental health concept definitions.

Environmental Health Concept	**Definition (underlying principles)**
Stability	The ability to withstand environmental changes and stresses. Consists of *Inertia*, which is resistance to change; *Constancy*, the ability to maintain a specific dimension, such as population; and *Resilience*, the ability to recover from environmental shocks.
Sustainability	The basic premise that the earth's resources are finite. Is enabled when society takes no more renewable resources than are able to be replenished naturally.
Supply & Demand	What's demanded is supplied; and if the supply process disrupts or perturbs ecosystem health, then remediation is perhaps most successfully pointed toward factors that can affect both supply and demand characteristics.
Carrying Capacity	The maximum population of a particular species that a given habitat can support over a given time period.

2.2 Security Planning Principles

The national security strategy and policymaking model developed by the U.S. Army War College is shown in Fig. 2. Within the strategy formulation process, *Ends* are the broad objectives being sought in the Grand National Strategy. Bartholomees outlines three: 1) Preserve physical security of U.S. territory and its people; 2) Promote American values; and 3) Bolster American economic prosperity. The *Ways* are concepts by which the Ends are attained, such as Truman's policy of containment of the USSR during the Cold War. *Means* are the resources needed to achieve the Ends. The resources come from instruments of national power, known collectively as "DIME": 1) Diplomatic; 2) Informational; 3) Military; and 4) Economic. The strategy planning methodology moves downward in the diagram, from defining the Ends through analysis of the Means to support the Ends. Strategy formulation then becomes focused on specific geographic regions, where interests are defined as *Vital*, *Important*, or *Peripheral* to U.S. national security.

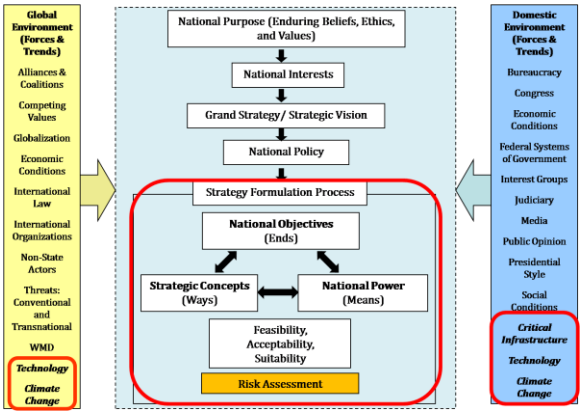

Fig. 2. Modified version of Army War College national strategy planning model (Bartholomees, 2008). Our focus is on the strategy formulation process (large circled area in the middle to lower portion), and we have added some additional forces and trends (small circled areas on lower left and lower right).

So where does ES come into the picture? We note that the *Forces and Trends* shown along the sides of Fig. 2 act as "drivers" to influence policy development and strategic planning. We propose that critical infrastructure is a driver on the domestic side, while climate change is a driver of both global *and* domestic sides of strategy formulation. We believe that ES can act as a nexus for both an overseas-focused counter-terrorism strategy as well as a long-term homeland security strategy that addresses climate change, critical infrastructure protection, and other concerns, as discussed below.

3. HOW CAN ENVIRONMENTAL SECURITY BE INTEGRATED INTO COUNTER-TERRORISM AND HOMELAND SECURITY STRATEGIES?

We argue that ES is an emerging strategic issue because in a globalized world, a broader view of security is needed to address resource contention and vulnerability. Emerging threats to nations/regions exist from water and cropland shortages, rapid industrialization, population growth, and urbanization, while transnational threats exist from natural resource depletion, pandemics, and the impacts of climate change. Can we identify, analyze, and predict the threats? The CNA report (2007) may provide some clues. Figure 3 shows our interpretation of their analysis methodology by means of a conceptual flow diagram of the environment/security relationship.

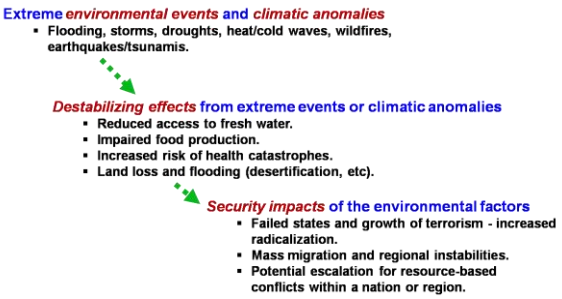

Fig. 3. CNA environment/security flow as interpreted by the authors of this paper.

We believe that the environment/security flow relationship in Fig. 3 can facilitate identification of environmental hazards/threats, analysis of how they may contribute to destabilizing a nation or region, whether through single-event natural disasters or long-term anomalies that add stress to an already stressed environment, and how the destabilization may manifest itself (e.g., resource conflict, mass migration, outbreak of disease, etc.). Furthermore, we believe that such analysis must be performed differently for developed vs. developing nations. That is, environmental hazards/threats may act to destabilize the political economy of less-developed countries, but may act to create vulnerabilities in critical infrastructure in more-developed countries, including the U.S. To address these threats, we propose integrating ES into a coherent national strategy that involves a robust Federal interagency planning process in order to use all of the instruments of national power more evenly. By integrating an overseas with a domestic component, a by-product will be the development of resiliency within the U.S., which can help protect us from both terrorist attack as well as natural disaster (see Flynn, 2007).

4. CONCLUSIONS

This paper presented a working definition of Environmental Security that addresses the national/international security implications of extreme environmental events and climatic anomalies and the potentially destabilizing effects of these events and anomalies on a country or region of the world. Such a definition of ES allows it to be utilized in identifying, analyzing, and perhaps predicting the impacts that climate change may have on U.S. and allied security interests around the world, but also on domestic critical infrastructure. Our ES construct takes a building-block approach by examining the environment through means of environmental health concepts such as stability, sustainability, supply and demand, and carrying capacity. These environmental science/health concepts can then be employed to analyze and evaluate environmental vulnerabilities to natural disaster events or prolonged climatic anomalies in areas of U.S. security interest.

By employing the Army War College's national strategy planning model and modifying it with the additional drivers of climate change and critical infrastructure, we believe that ES can be used as a nexus for both an overseas-focused counter-terrorism strategy as well as a long-term homeland security strategy. In the overseas areas, environmental effects can cause security impacts in areas already stressed by resource scarcity, overpopulation, deforestation/land overuse, population migration, and political instability, such as the Middle East and Sub-Saharan Africa. Environmental Security principles can be connected to Homeland Security planning by using the same types of vulnerability analysis and assessment tools to evaluate local or regional populations' risk from natural environmental anomalies or single disaster events.

In both overseas and domestic cases, when risk assessment reveals mitigation strategies are possible, planning should incorporate these strategies over long periods of time to reduce the vulnerability – and increase resiliency. The idea of improving domestic resiliency would yield improvements in protection from both terrorist attack as well as natural disaster.

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