

**Re-conceptualizing Environmental Security as Resilience:  
Strategic Planning for Human and National Security**

John M. Lanicci\*

Department of Applied Aviation Sciences, Embry-Riddle Aeronautical University

James D. Ramsay

Department of Social Sciences, University of New Hampshire

Elisabeth Hope Murray

Department of Security Studies and International Affairs, Embry-Riddle Aeronautical University

**Abstract**

This paper presents a new conceptual framework for environmental security as an integral and vital component of human security. The framework ties extreme environmental events and climatic anomalies to the destabilization of a country or region, which in turn can lead to instability, conflicts, weakening of the national economy, or exposure of vulnerabilities in critical infrastructure. The premise of this framework is that environmental security can be linked either directly or indirectly to homeland and national security concerns in both developing as well as developed countries and has direct links with the human security in any given region.

*Corresponding Author:*

*Dr. Jim Ramsay, Professor of Security Studies, University of New Hampshire.*

[james.ramsay@unh.edu](mailto:james.ramsay@unh.edu)

\* – Current affiliation: Atmospheric and Climate Science Consultant, New Smyrna Beach, FL

Given the interdependencies of food, water, and energy security, population, economic impacts from natural disasters, the possible security implications from global climate change, and the potential for destabilization in regions where environmental living conditions are increasingly desperate, it is logical to incorporate principles of environmental security into both national and homeland security strategy planning. The authors present an organizing framework for thinking about such a planning process that allows these complex linkages to be considered at the policy-making level in the US.

*“The loss of human security can be a slow, silent process--Or an abrupt, loud emergency. It can be human-made-due to wrong policy choices. It can stem from the forces of nature. Or it can be a combination of both...” (UNDP, 1994, pg. 22)*

## **1. Introduction – A Brief Overview of Environmental Security**

Threats to human security today seem to be increasing and are becoming global. AIDS and other critical health pandemics, pollution, climate change, the persistence of terrorism, asymmetric domestic insurgencies, a lack of gender mainstreaming, and progressively restricted access to food, water, and other vital resources are increasingly of greater concern. How U.S. national security strategic thinking incorporates these threats is central to America’s future success. Indeed, how the US manages to improve human security is likely central to the success of her foreign policy.

Essentially, it is believed that all complex adaptive systems spawn networks. Networks in turn give rise to wicked problems. Consequently, as a complex, adaptive system, human security presents “wicked” problems to policy makers. For example, human security is value-laden (i.e., it means different things to different constituents). It is complex in the sense that it is a composite of independent but universally applicable parts such as gender security, food security, water security, energy security, political and economic security, and of course,

environmental security. Finally, human security is dynamic in the sense that threats to it evolve over time, how its components interact with each other changes over time, and how nations must work together to enable greater levels of human security form and deform over time according to the prevailing political and economic will of nations. This paper attempts to re-conceptualize one aspect of the human security construct, that is environmental security, and thereby reposition human security as a major macro-level driver for U.S. homeland and national security strategic policy development.

One does not have to look far these days to find media headlines that illustrate the intertwined nature of today's major crises: political unrest, shortages of food, water, and energy, climate change, natural disasters, terrorism, mass migration, disease outbreaks, etc. What is not obvious from a cursory look at these news stories is that *environmental security* threads run through nearly all of them, and more importantly, that the interactions and connections among these threads have the potential to threaten every state as well as the individuals residing therein, no matter how prosperous or secure. Thus, environmental security, when seen through its proper lens, is critical to human security, and thus to national and homeland security decision-making. While these connections are discussed later in the paper, the stage must first be set by describing the concept of environmental security (ES) as it will be used here.

*a. History of Environmental Security as a Discipline*

While the concept of ES has been around since the 1970s (Myers, 2004), it was the end of the Cold War that first brought ES into the national policymaking spotlight in the US. During the 1990s, there was a growing interest in exploring the possibility of links between the natural environment and national security. The idea was to examine environmental degradation from single-event disasters such as tropical cyclones, or cumulative changes from climatic anomalies

such as drought, and its connection to the emergence of new or exacerbation of existing sustainability issues, resource contention, and geopolitical instability. This body of work took the form of a number of research and pilot programs conducted by a combination of academic institutions, non-governmental organizations, and the U.S. Federal Government (primarily through the Departments of State and Defense). During this period, seminal research on ES began to explore the complex linkages among environmental degradation, resource scarcity, and conflict in many regions of the world (e.g., Homer-Dixon, 1999, and others).

Interestingly, while this research was taking place, a debate emerged within the U.S. policy community as to the appropriateness of tying environment to security in the first place. The “pro-ES” argument was that an increasingly complex multi-polar world could only be understood by incorporating environmental issues and other non-traditional areas (e.g., social, economic) into a *redefined concept of security* (e.g., Tuchman Mathews, 1989, and others). The “anti-ES” argument acknowledged that while environmental, health, and socio-economic concerns have important *connections to security*, these issues should not be characterized as *security concerns* (e.g., Deudney, 1990). The two sides to this debate have been summarized nicely by both Dabelko and Simmons (1997) and Mansfield (2004). Levy (1995) also provides an interesting discourse on this debate, including some prescient views on potential security implications of global climate change.

According to Mansfield (2004), the U.S. policy community’s interest level in ES peaked during the mid to late 1990s when ES became a part of the U.S. State Department’s priority list and a tri-agency memorandum of understanding among the Departments of State, Energy, and Defense resulted in dedicated resources being spent on ES. The relationships among these environmental, socio-economic, and security issues were seen as important to understanding a

multi-polar world that contained much uncertainty. Indeed, many humanitarian relief operations undertaken by the U.S. military in the 1990s, both domestic and abroad, were linked to environmental events of one kind or another (see Figure 1), and involved significant expenditures by a Department of Defense (DoD) that was going through steep personnel and budgetary drawdowns driven by a perceived “peace dividend”. Despite the DoD budget cuts, several of the regional combatant commands saw ES as a constructive way to engage many developing countries, and established ES programs as a means to develop and nurture military-to-military contacts with these nations. It was believed that these military and diplomatic contacts could become very important should the U.S. military have to become involved in stabilization or other types of operations in those regions (e.g., Henk, 2006).

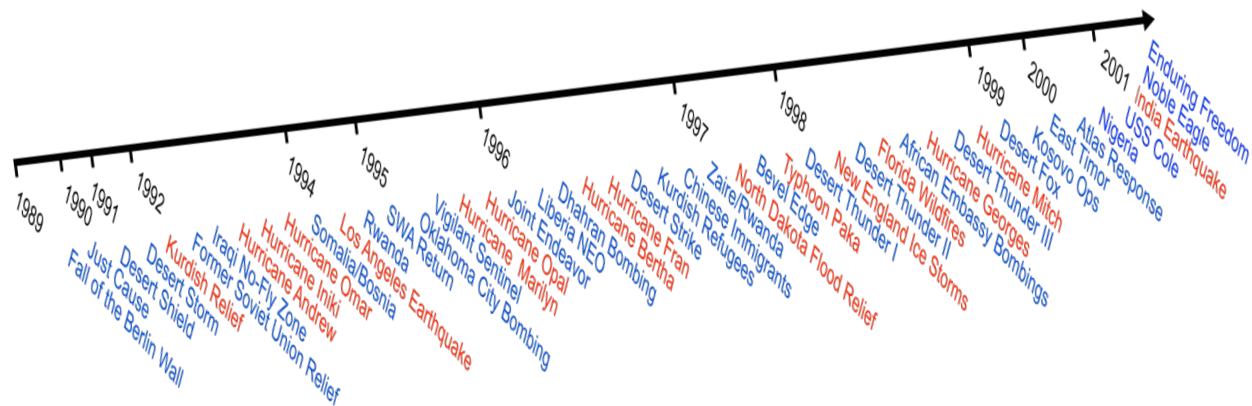


Figure 1. United States Transportation Command (USTRANSCOM) humanitarian relief operations from the end of the Cold War to the September 11<sup>th</sup> Terrorist Attacks. Note the large fraction of operations that are natural environment-related (red highlighting added by the authors; adapted from USTRANSCOM, 2002).

However, after the September 11<sup>th</sup> terrorist attacks, U.S. foreign policy was primarily directed towards the Global War On Terrorism (GWOT),<sup>1</sup> and the military has been the primary instrument of national power to address the threat, which the authors refer to in this paper as the

<sup>1</sup> Although there have been revisions to this term, “GWOT” is used throughout this paper as an historical reference point.

kinetic<sup>2</sup> approach to the GWOT. As a result of the post-September 11<sup>th</sup> operating environment, ES was not given nearly the same level of emphasis by the U.S. policy-making community as it was in the 1990s, until recent interest in possible connections between global climate change and national security was kindled with the advent of several policy-type papers on the issue (e.g., CNA, 2007; Busby, 2007; Council of the European Union, 2008).

Since then, some shifts in U.S. policy have taken place, resulting in changes such as the implementation of the 2013 Climate Action Plan (Executive Office of The President, 2013), and increased environmental awareness in U.S. foreign policy planning documents such as the Quadrennial Defense Review (Department of Defense, 2014), Quadrennial Diplomacy and Development Review (Department of State, 2015), and Quadrennial Homeland Security Review (Department of Homeland Security, 2014).

A more sustainable, long-term approach to addressing threats from transnational asymmetric terrorism (or insurgencies) and weapons of mass destruction involves the necessary shift away from primary use of the military instrument of power, towards a “preventative and sustainable” posture – where emphases on *prevention*, *sustainability*, and *resilience* become key to both homeland and national security strategies. Such an operating posture necessitates having the ability to monitor conditions continuously on a global scale, to identify potentially “deteriorating regions” around the world before they become the next Afghanistan, Somalia, or Syria. Devising and executing a national security strategy that is based on *prevention* and *sustainability* will be difficult and potentially controversial, especially as U.S. leadership

---

<sup>2</sup> The terms *kinetic* and *non-kinetic warfare*, respectively, have been used to distinguish between employment of personnel and weapons against physical military targets, and employment of “cyber” or “information” weapons targeted against enemy information systems. The latest edition of Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms* ([http://www.dtic.mil/doctrine/jel/new\\_pubs/jp1\\_02.pdf](http://www.dtic.mil/doctrine/jel/new_pubs/jp1_02.pdf)) recommends using the terms *lethal* and *non-lethal* (see their Figure B-3). For the purposes of this paper, the authors use the term *kinetic* to mean employment of physical military force against an enemy to achieve specific military objectives, and *non-kinetic* as the use of *other instruments of national power*, in addition to/instead of the military, to achieve national objectives.

struggles with appropriate responses to crises unfolding in multiple parts of the world.<sup>3</sup> It will involve a proactive approach to foreign policy that anticipates problems and addresses them before they turn into humanitarian crises or regional conflicts requiring military intervention. Part of this proactive approach will require a better understanding of the various linkages among the natural environment, shifting and growing populations, resource contention, and violence/instability in any region of the world, to include places within our own borders.

*b. ES Definitions*

King (2000) provided a thorough summary of the diverse definitions for ES that were found within the literature and in Federal Government agency regulations of that time. These ranged from environmental restoration, compliance, and conservation considerations, to more security-focused definitions. King's definition of ES is reproduced below:

*Environmental security is a process for effectively responding to changing environmental conditions that have the potential to reduce peace and stability in the world and thus affect U.S. national security. (pp. 14-16)*

King's definition of the environment was focused on the natural components of the earth's atmosphere, land, soil, vegetation, and ocean areas.

In this paper, the authors present a definition for ES that is similar to King's, but also incorporates elements of the approach taken to outline the national security threat from global climate change as described in the CNA (2007) report on the subject. Hence, leveraging the definition of Ramsay and Kiltz (2014), an updated definition of ES is proposed:

---

<sup>3</sup> As of the time of this writing, the transnational threat from the Islamic State of Iraq and Syria may yet again redefine the short-term approach taken to address immediate threats to U.S. national and homeland security, as well as human security more broadly. In the long term, however, a proactive approach for mitigating degraded environmental and living conditions could increase regional geopolitical stability, making it more difficult for terrorist groups to infiltrate at-risk regions and establish operations amidst resulting chaos.

*Challenges to national or homeland security posture that result from extreme environmental or climatic events acting locally or transnationally to destabilize the countries or regions of the world, resulting in geopolitical instability, resource conflicts, vulnerabilities in critical infrastructure, or some combination of these impacts. (pp. 118-119)*

This ES definition preserves King's original linkage to national security and his characterization of the natural environment, but goes further in two ways. First, it enhances King's definition by introducing a cause-effect argument involving changing environmental conditions and human activities that is applicable to both national and homeland security. Second, it links vulnerabilities in critical infrastructure to weather and climatic extremes, which can result in security challenges in more developed countries. This last point becomes important as the future of homeland security begins to emphasize principles of resilience and sustainability, especially to public health threats including pandemic, rather than focusing on law enforcement and counterterrorism. In addition, this definition suggests that national security solutions in the future will rely more on political and economic stability and development than on military interventions. In these ways, the core notions of ES will become a nexus between national and homeland security, as is discussed later.

### *c. Paper Objectives*

This paper employs the authors' ES definition presented above by introducing a "cascading effects" conceptual model that is adapted from the CNA (2007) report on the potential national security implications of global climate change. This framework is followed by an overview of national security strategy planning principles as articulated in a conceptual model used in the U.S. Army War College curriculum. Next is the introduction of ES as a nexus

between national and homeland security strategic planning. Here, ES is used as part of a “policy processor” that considers issues of environmental health, water, food and energy production, consumption and distribution, population dynamics, natural hazards vulnerabilities, and other considerations such as governance. By passing policy analysis through the processor in *both* national and homeland security strategic planning, a robust methodology emerges that recognizes the security implications of the interdependencies among food, water, and energy production/consumption, population dynamics, and natural hazards vulnerability, both domestically as well as internationally.

## **2. Environmental Security: The Cascading Effects of Extreme Weather Events and Climatic Anomalies**

The 2007 CNA report was developed by a panel of retired U.S. generals and admirals who conducted detailed interviews with scientific and business leaders in the US and abroad. The report described a series of potentially destabilizing impacts from climate change:

- 1) Reduced access to fresh water;
- 2) Impaired food production;
- 3) Health catastrophes; and
- 4) Population displacements from land loss. (pp. 13-16)

The report listed three geo-strategic consequences of the climatically induced impacts:

- 1) Greater potential for failed states and growth of terrorism;
- 2) Mass migrations; and
- 3) Potential escalation of resource-based conflicts. (pp. 16-18)

Lanicci and Ramsay (2014) visualized these effects and impacts in a multi-tiered ES Cascade Model, shown in Figure 2. The model displays perturbations to the geopolitical status

of a nation or region that may result from the effects and impacts of either an extreme weather event, climatic anomaly, or both. The flow of events in the ES Cascade Model implies a series of “reactions” to an original set of perturbing actions in the first tier. While the ES Cascade Model presented here suggests little feedback between the three tiers, it is assumed that geopolitical instability in the third tier can and often does exacerbate problems in the second, and occasionally first tier that were originally instigated by the natural environment. The model itself is not intended to prescribe any proactive measures that could be taken to prevent events on the first tier from setting off events on the second and third tiers, nor does it provide specific insight into the actions necessary for a country or region to return to its “pre-perturbed state” or reach a new “equilibrium state”. For example, while this model supports the idea that repeated climatic anomalies in the Middle East, specifically droughts and heat waves, could be one of multiple factors influencing the current civil war and resulting humanitarian crisis in Syria (see Gleick, 2014), it does not propose or prescribe any type of mitigating or restorative actions. Indeed, to accomplish any type of mitigating or restorative action, a more comprehensive approach for integrating ES principles into a reliable planning framework is needed. However, the model does provide a means to *begin* examining the problems and their interrelationships.

The ES Cascade Model is by no means the only framework for conceptualizing the relationships among environmental and socio-economic factors. Fraser (2002) provides a useful summary of various approaches taken by a number of researchers to contextualize the security effects and impacts resulting from changing environmental conditions. These approaches range from the fairly complex Environmental Scarcity/Conflict model of Homer-Dixon (1999), to the Environmental Cooperation construct suggested by Gleditsch (1998). One unique characteristic of the Cascade Model is that it can be modified to examine the effects and impacts from

environmental changes in either *developing* or *developed* countries, which allows it to form the backdrop for adaptation to strategic planning activities across a number of U.S. governmental agencies with both environmental and security interests.

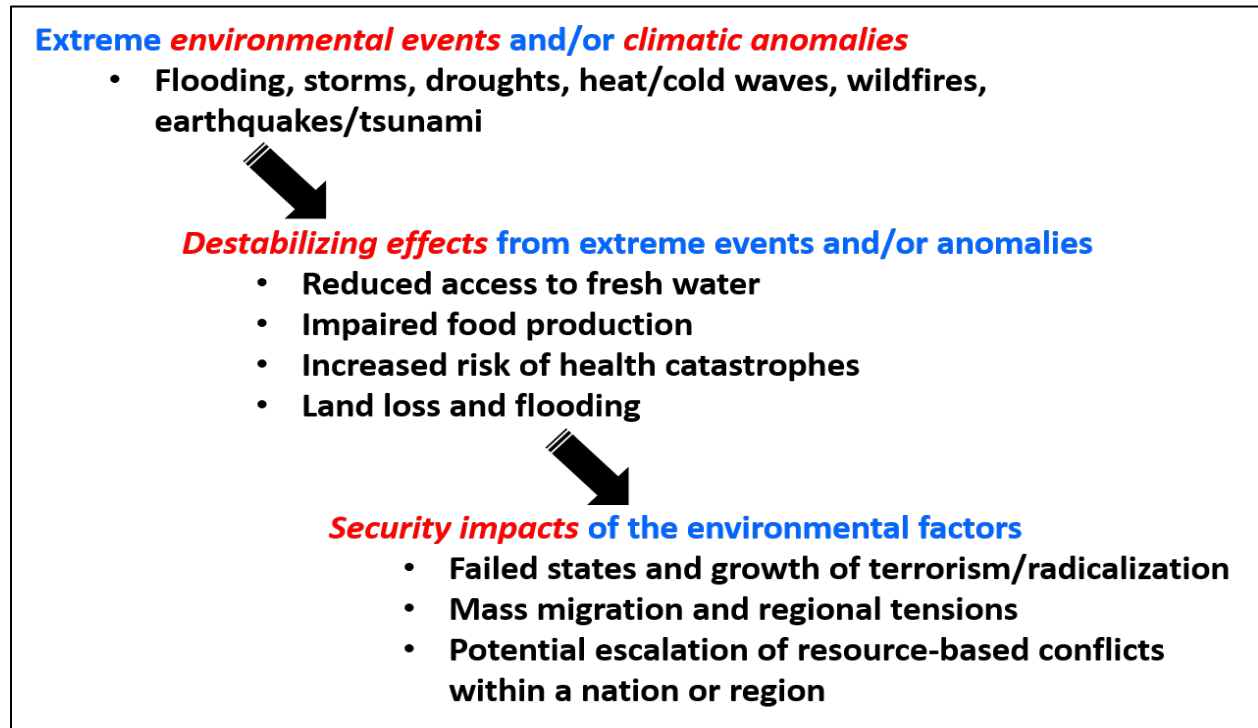


Figure 2. ES Cascade Model (Lanicci & Ramsay, 2014).

### 3. The U.S. Army War College's National Security Strategy Planning Model

Before moving to the authors' suggested approach for integrating ES into national and homeland security strategic planning, it is instructive first to introduce some basic concepts in national security strategic planning. The authors have utilized a conceptual model for national security strategic planning developed by Bartholomees (2012), which is taught at the U.S. Army War College (USAWC). The model, shown in Figure 3, begins with U.S. Grand National Strategy as articulated by the President through various means such as formal national security directives, pronouncements in presidential and cabinet-level speeches, and even through statements to the media by members of the administration (Bartholomees, 2012, p. 414).

Bartholomees uses historical examples to illustrate how different presidents' policies can be tied in various ways to a basic set of principles that encompasses enduring American beliefs and values. These are summarized in four National Interests (NIs):

- 1) Physical security;
- 2) Promotion of values;
- 3) A stable international order; and
- 4) Economic prosperity.

Collectively, these NIs are translated into a Grand National Strategy of

- 1) Preserving American security;
- 2) Promoting American values; and
- 3) Bolstering American economic prosperity.

In Figure 3, the actual formulation of strategy begins with the broad guidance outlined in the Grand Strategy and presidential policies, and is translated into a coherent plan by defining specific national interests, and determining whether these interests are *vital*, *important*, or *peripheral*.<sup>4</sup> The process continues by evaluating issues, trends, and challenges for each national interest, and then analyzing them in terms of how they meet the larger Objectives (Ends), are articulated as Strategic Concepts (Ways), and how the resources (Means) needed to achieve the objectives are provided. The analysis of resources (Means) often examines feasibility of pursuing U.S. security interests in terms of four instruments of national power: *Diplomatic*, *Informational*, *Military*, and *Economic*, also known by the acronym DIME.<sup>5</sup>

---

<sup>4</sup> According to Bartholomees (2012, p. 416), *vital* U.S. national interests will have immediate consequences for core national interests if they are not met; *important* national interests will result in damage that will eventually affect core national interests if not met; and *peripheral* interests will result in damage that is unlikely to affect core national interests if they are not met.

<sup>5</sup> DIME is but one of many formulations for describing the instruments of national power.

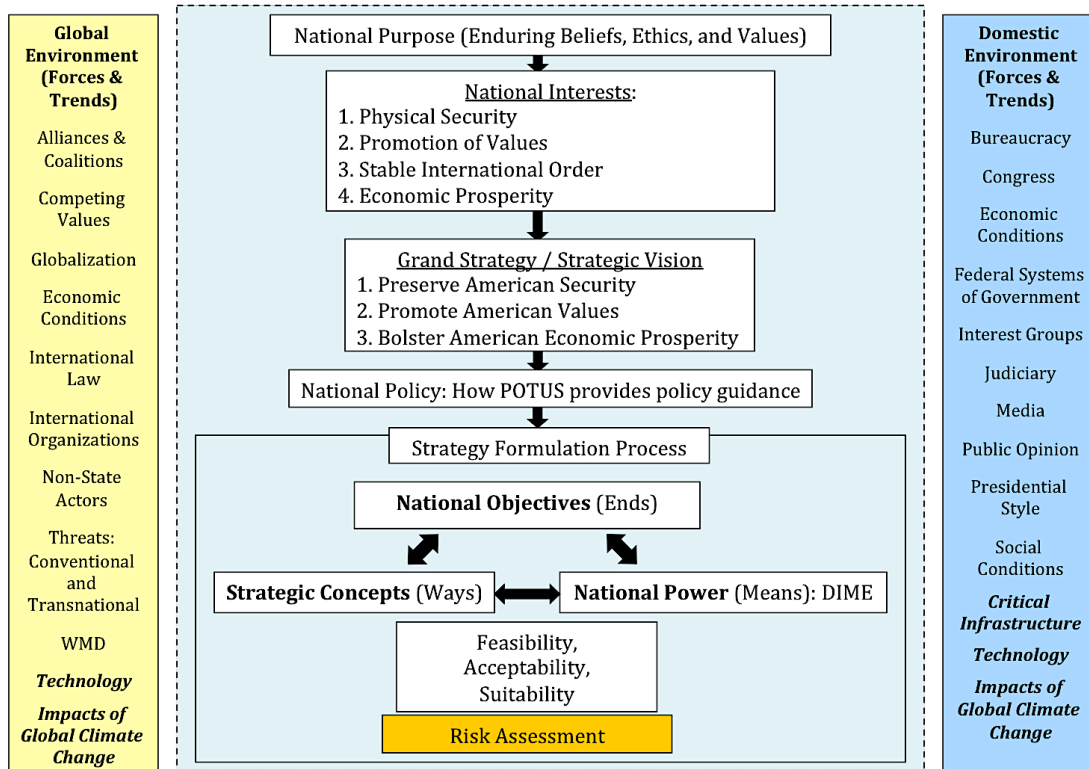


Figure 3. Army War College national security strategy planning model as modified by the authors. “POTUS” stands for President Of The United States and “DIME” stands for the four major instruments of national power: Diplomatic, Informational, Military, and Economic. Notice the additions of *critical infrastructure*, *technology*, and *impacts of global climate change* as drivers of policy-making in this modified conceptual model.

Note from Figure 3 that national security strategic planning occurs within the context and constraints of the global and domestic *forcing factors* shown on the yellow and blue side bars, respectively. The authors’ addition of the impact of global climate change as a driver on both side bars of the policy model is of particular importance, because issues associated with extreme weather events and climatic anomalies can have significant influences on policymaking at the national and international levels as seen in the ES Cascade Model in Figure 2. There is recent evidence of this influence at the national level in the wake of Hurricane Sandy in the bi-partisan enactment of the Disaster Relief Appropriations Act of 2013, also known as the “Sandy Supplemental Appropriations Bill” (PUBLIC LAW 113–2—JAN. 29, 2013). This bill authorized supplemental funding to over a dozen departments and agencies of the Federal

Volume 1, No. 1 (2017)

Government for aid and restoration following the storm. Although a small fraction of the bill's total allocation of \$61 billion, \$186 million was apportioned to the National Oceanic and Atmospheric Administration for "Procurement, Acquisition and Construction" activities that included monies for supercomputer acquisition in order to facilitate improved weather prediction.

*a. Challenges Facing Today's Policy Makers – The Immediacy of the Short-Term Threat Versus the Importance of a Viable Long-Term Strategy*

Beginning with two of the most significant threats to U.S. national and homeland security since September 11<sup>th</sup>, asymmetric transnational terrorism and weapons of mass destruction, examination of the strategy drivers in the USAWC model of Figure 3 reveals that nearly every global driver on the left-hand side bar is either directly or indirectly related to prosecution of the military response to these threats, particularly in Afghanistan, Iraq, and as we are currently witnessing, Syria. The stark reality of planning and executing national security strategy in a post-September 11<sup>th</sup> world is one in which the US and its allies face the twin challenges of planning for and conducting military operations against a non-state and often transnational adversary, while simultaneously trying to anticipate and confront regional instabilities before they become a crisis requiring employment of a currently downsizing military force.

Inasmuch as all presidents have used instruments of national power in idiosyncratic combinations to accomplish foreign policy objectives and execute the national security strategy, without question, the most expensive instrument to deploy is the military. Given that the major U.S. response to the events of September 11, 2001 was to use the U.S. military in a largely combat-oriented (kinetic) posture, it has become clear over the last several years that perhaps this may not have been the correct strategic response, and is not economically viable over the long-

haul. A 2013 Harvard study indicates the cost of the Iraq and Afghanistan wars to be roughly \$4-6 trillion (Bilmes, 2013), while a recent study by Brown University's Eisenhower Research Project puts the cost of both wars at approximately \$4 trillion (see <http://costsofwar.org> for details). In addition to the concept of efficacy, the sustainability of a prolonged military response to a security threat is in question when even economies as robust as the US cannot maintain long-term military operations as the primary instrument to achieve long-term national security.

A more sustainable, long-term approach to addressing threats from transnational asymmetric terrorism (or insurgencies) and weapons of mass destruction involves the necessary shift away from primary use of the military instrument of power, towards a “preventative and sustainable” posture – where emphases on *prevention*, *sustainability*, and *resilience* become key to both homeland and national security strategies. Such an operating posture necessitates having the ability to monitor conditions continuously on a global scale, to identify potentially “deteriorating regions” around the world before they become the next Afghanistan, Somalia, or Syria. Devising and executing a national security strategy that is based on *prevention* and *sustainability* will be difficult and potentially controversial, especially as U.S. leadership struggles with appropriate responses to crises unfolding in multiple parts of the world.<sup>6</sup> It will involve a proactive approach to foreign policy that anticipates problems and addresses them before they turn into humanitarian crises or regional conflicts requiring military intervention. Part of this proactive approach will require a better understanding of the various linkages among

---

<sup>6</sup> As of the time of this writing, the transnational threat from the Islamic State of Iraq and Syria may yet again redefine the short-term approach taken to address immediate threats to U.S. national and homeland security, as well as human security more broadly. In the long term, however, a proactive approach for mitigating degraded environmental and living conditions could increase regional geopolitical stability, making it more difficult for terrorist groups to infiltrate at-risk regions and establish operations amidst resulting chaos.

the natural environment, shifting and growing populations, resource contention, and violence/instability in any region of the world, to include places within our own borders.

*b. The Importance of Having Clear Definitions of Homeland, National, and Human Security*

Reese (2013) points out that the definition of homeland security still seems to be unclear, and states the critical importance of having a clearly defined concept in order to produce a viable strategy. Reese goes further and confirms earlier observations by Bellavita (2008) regarding the many and varied definitions of homeland security. An ill-defined concept such as homeland security presents challenges in describing how ES may relate to it. Similarly, the term *national security* does not generally have a universally accepted definition outside of the general understanding that it refers to the security and perpetuation of governmental institutions and can mean different things to different administrations. Traditionally within U.S. political discourse, national security has largely been the domain of both the DoD and of the Intelligence Community in concept and in execution, and has typically involved protecting U.S. interests from foreign threats (specifically military threats and by military means). Presumably, since it is the domain of a separate U.S. department, *homeland security* has developed a different primary focus than that of national security. Since September 11<sup>th</sup> (and arguably before), the concept of homeland security seems to have been primarily concerned with domestic (i.e., civilian) safety and affairs; that is, homeland security seems to be more concerned with threats to public safety and civil security than with the security of the nation state.

Particularly regarding national security, the core concepts of human security also challenge more traditional security norms (Furtado, 2008; Newman, 2010; and others). Looking more broadly, *human security* typically prioritizes individual security over the security of the state when individual rights are threatened by external factors. For example, human security

would emphasize establishment of food and water security, economic and political security for the general population as critical mechanisms to achieve a more stable level of state security. Thus, human security can contain elements and objectives of both homeland (civil security/public safety) and national (security/stability of the nation state) security.

Regardless of whether the term *security* means or refers to the same thing when used in national security, homeland security, or human security contexts, any appropriate definition of ES should consider characteristics of both foreign and domestic threats articulated at multiple levels of social expression: individual, local, regional, state, and, due particularly to the transnational character of climatic events, international levels. That is, ES can help link the theoretical and operational concepts of national, homeland, and human security. Prevention, sustainability, and resilience will play a role in making countries more secure, not just from the threats of international and domestic terrorism, but from the disruption to the economy and homeland security from catastrophic natural disasters (e.g., Flynn, 2007).

#### **4. Using Environmental Security as Part of a “Processor” in Proactive Strategy**

##### **Development**

In order to develop a proactive strategic planning approach that connects homeland with national security, it is necessary to include factors that are common to both domains. The authors posit that ES can be a *key common factor* because of the number of different issues that ES touches. In order to integrate ES into both homeland and national security strategic planning, it is necessary to introduce the various components that allow ES to be integrated into the strategic planning process. These components form a major portion of a “planning processor” that can be applied to both problems in the less developed nations (national security) as well as

more developed nations (homeland security) and, in so doing, support human security more broadly.

In order to articulate ES as a critical nexus between national and homeland security strategies, the authors propose three important ES policy principles as follows:

- 1) Failure to secure the environment has the propensity to act as a threat multiplier – especially in fragile states or regions with pervasive conflict; knowing how to avoid or offset catastrophic environmental changes is in a state’s vital interest.
- 2) ES may manifest differentially across different states and macro-regions; that is, failure to secure the environment may destabilize the political economy and more fragile livelihoods of less developed countries, potentially leading to radicalization, but may also act to create critical infrastructure vulnerabilities in more developed countries.
- 3) ES can be incorporated into both broad national security objectives as well as a long-term homeland security strategy that produces enhanced levels of human security.

So how does ES provide a framework within which to develop security strategies?

Figure 4 illustrates one possible way to integrate ES into strategic planning. Employing a portion of the USAWC model from Figure 3, the left side of Figure 4 begins with the high-level policy guidance directed by the Office of The President. Each government department has planners whose job is to develop long-range strategies for action consistent with presidential guidance and any legal directives driving the department. It is proposed to incorporate major components of ES into a policy analysis “processor” functioning as a “central knowledge bank” of ES and other important global monitoring indicators (the cylinder in the middle portion of Figure 4), providing departmental planners with a “snapshot” of current issues in different parts of the world, and providing an appropriate context for how well or poorly a nation may be

postured for dealing with both environmental as well as non-environmental problems. There are a number of comprehensive global databases available that characterize all countries' stabilities, using a number of parameters such as *vulnerability to effects of climate change*, and socio-economic factors such as *demography*, *presence of refugees*, and *poverty levels*. Two examples of such indices, shown here, are 1) the *Fragile States Index* (The Fund for Peace, n.d.); and 2) the *ND-GAIN Index* (ND GAIN, n.d.).

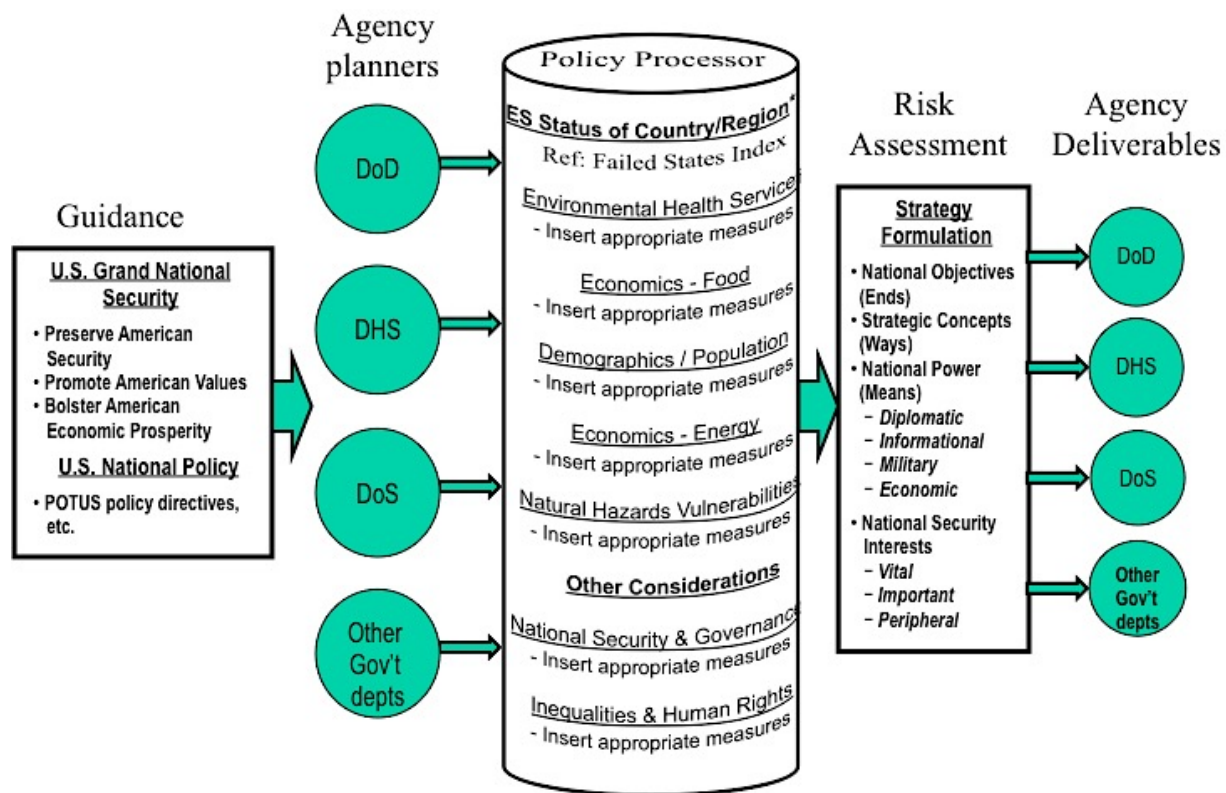


Figure 4. Strategic planning model incorporating elements of USAWC model (rectangular boxes) along with ES and other factors in the “Policy Processor” (shown by the cylinder), which could be employed by various agencies (green circles) in their strategy planning processes.

Using such indices and other data as a starting point, evaluations can be made of a state’s or region’s environmental health, food and energy security, population dynamics and

demographics, vulnerability to natural hazards/disasters, along with other considerations important in determining the nation's or region's ability to cope with perturbations to these conditions (as suggested in the Cascade Model of Figure 2). For example, consider the ES factor of *Natural Hazards Vulnerabilities*, which provides a means to compare how developing and developed countries are impacted differently by natural hazards. The natural hazards factor includes meteorological, climatic, and geophysical phenomena capable of producing natural disasters.<sup>7</sup> These phenomena range from single extreme events such as tropical cyclones, earthquakes, and flash floods, to longer-term climatic anomalies such as prolonged droughts, flooding, heat and cold waves. Figure 5 shows the geographic proportion of natural disaster events by casualty and economic loss in 2010.

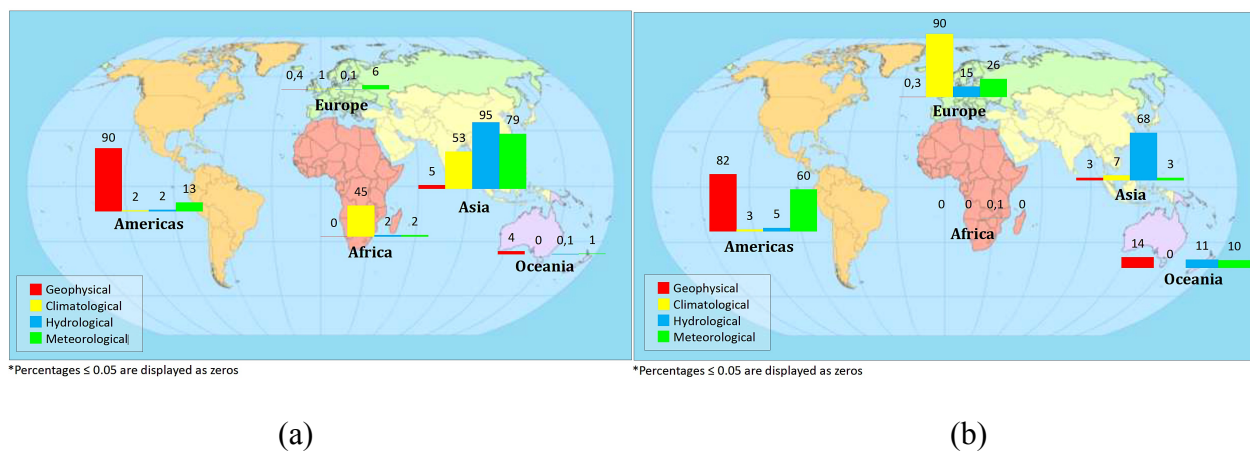


Figure 5. Natural disaster counts in 2010: (a) Percent share of reported victims by disaster sub-group and continent; (b) Percent share of reported economic damages by disaster sub-group and continent. Figure courtesy of the Centre for Research on the Epidemiology of Disasters (CRED) Emergency Events Database EM-DAT ([http://www.emdat.be/publications?field\\_publication\\_type\\_tid=All&page=1](http://www.emdat.be/publications?field_publication_type_tid=All&page=1)).

<sup>7</sup> This definition of “natural disaster” is adapted from Wisner, Blaikie, Cannon, and Davis (2004), who described it as “the consequence of a natural hazard which moves from potential into an active phase, and as a result affects human activities”, and can be best summed up by their statement, “disasters occur when hazards meet vulnerability.”

Analysis of the detailed disaster data used to construct Figure 5 (not shown) can reveal how such events impact countries differently. For instance, in 2010, the countries that experienced the greatest number of *disaster-related fatalities* were Haiti (220,000+ from an earthquake—an extreme event), Russia (55,000+ from a heat wave—a climatic anomaly), China (nearly 7,000 from three different extreme events), and Pakistan (nearly 2,000 from atypical monsoon flooding—a climatic anomaly) (Guha-Sapir, Vos, Below, & Ponserre, 2011). By contrast, the countries that made it onto the top five list of greatest disasters by *economic damages* were Chile (\$30B US from an earthquake—an extreme event), China (\$18B US from atypical summer flooding—a climatic anomaly), Pakistan (\$8.5B US from atypical monsoon flooding—a climatic anomaly), Haiti (\$8B US from an earthquake—an extreme event), and New Zealand (\$6.5B from an earthquake—an extreme event). In this brief examination of 2010 disaster data, it is seen that one country (China) made it onto all three top-five lists (number of disasters, fatalities, and economic damages), followed by Haiti and Pakistan with two apiece (fatalities and economic damages). A cross check of these three countries' ranks on the ND GAIN and Fragile States Indexes shows that although China made it onto all three disaster lists for 2010, according to these two stability indices, they are geopolitically more stable than either Pakistan or Haiti (see columns two and four in Table 1). It should not come as a surprise that when a natural disaster occurs in Pakistan or Haiti, the human security implications are dramatic and can largely influence neighboring states via the economy and also through aggressive social shifts such as mass migration. By contrast, although China has had its share of losses in terms of casualties and economics, they are better postured to cope with and recover from such disasters (relatively speaking), due largely to differences in critical infrastructure and fragile livelihoods as seen in Table 1.

Table 1. 2010 ND GAIN Index and Fragile States Index Scores and Ranks for China, Haiti, and Pakistan

| <b>Country</b> | <b>ND GAIN Index<sup>1</sup></b> | <b>ND GAIN Index Rank<sup>2</sup></b> | <b>Fragile States Index<sup>3</sup></b> | <b>Fragile States Index Rank<sup>2</sup></b> |
|----------------|----------------------------------|---------------------------------------|-----------------------------------------|----------------------------------------------|
| China          | 58.1                             | 80 / 177                              | 83.0                                    | 62 / 177                                     |
| Haiti          | 46.0                             | 22 / 177                              | 101.6                                   | 11 / 177                                     |
| Pakistan       | 49.4                             | 46 / 177                              | 102.5                                   | 10 / 177                                     |

1 – Lower the score, the worse the country's conditions are.

2 – Higher the rank, the worse the country's conditions are.

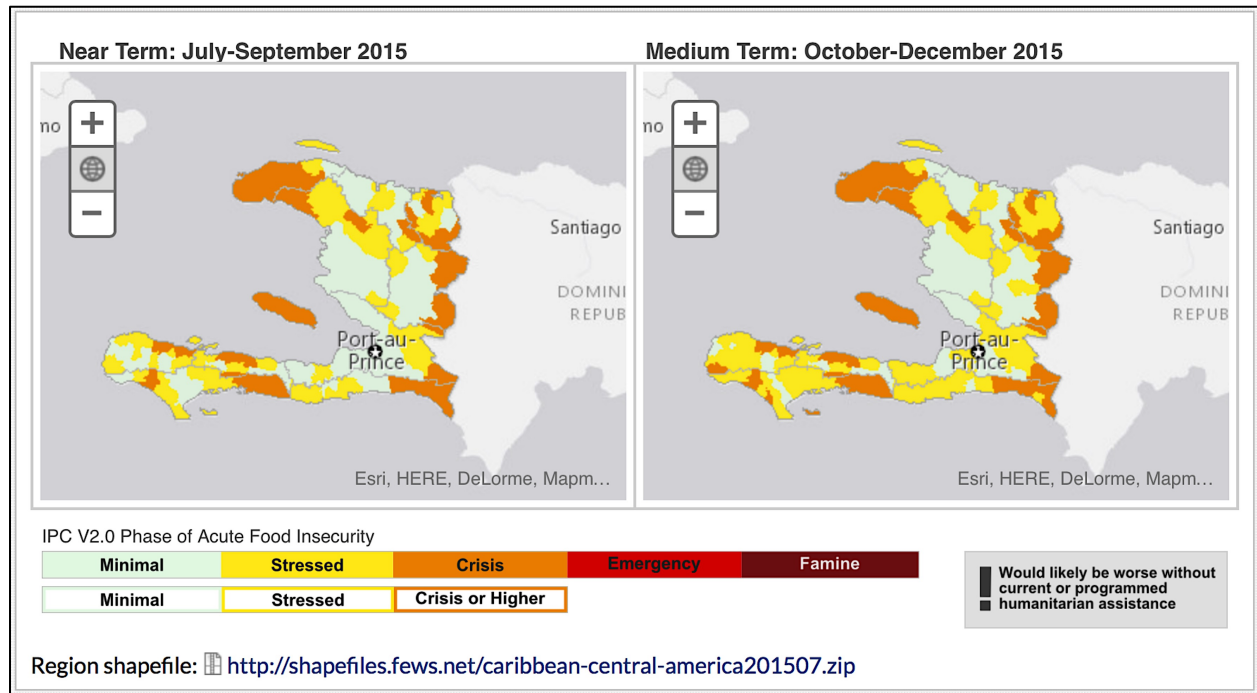
3 – Higher the score, the worse the country's conditions are.

## 5. Discussion

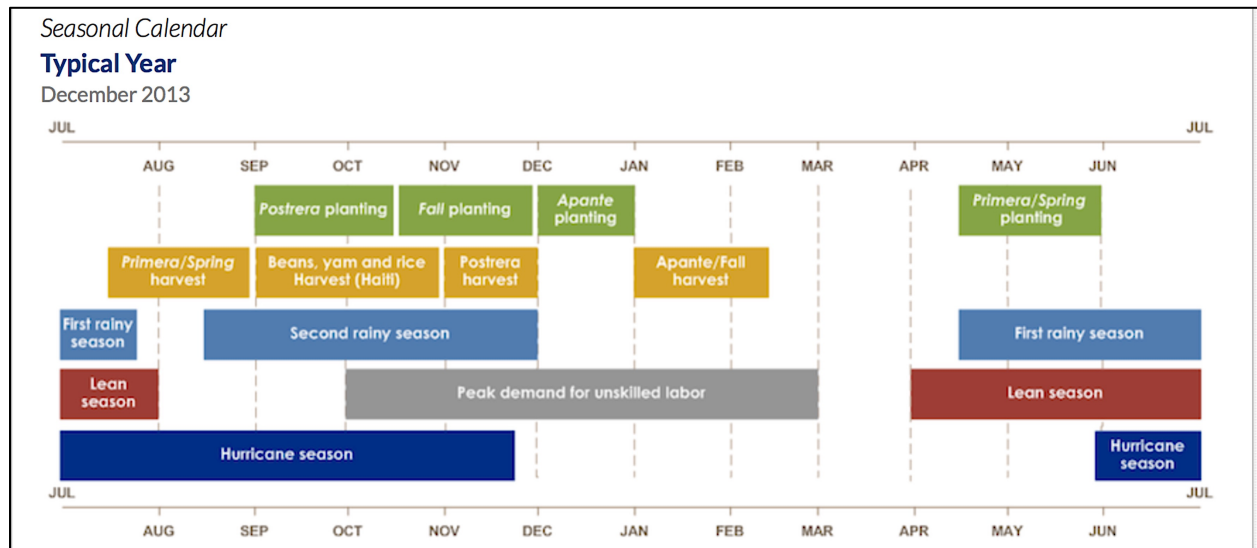
The cursory examination presented above illustrates how one of the factors in the policy processor during only one post-September 11<sup>th</sup> year reveals a great deal about three states' abilities to withstand perturbations to their environmental living conditions from one of the types of events in the ES Cascade Model of Figure 2. A full-blown analysis with more detailed examination of the individual factors that contribute to the indices above, together with careful analysis of the various ES and other factors shown in the policy processor portion of Figure 4, can produce a thorough appraisal of the geopolitical stability of a state or region, whether it is a developed state such as the US, an emerging state such as China, or a struggling one such as Haiti or Pakistan. The result should be a better-informed evaluation going into the Strategy Formulation portion of the model in Figure 4. Therefore, a strategic planning process model that takes these types of factors into account can provide a robust setting for developing policy, and also allow for suitable comparisons of approaches among different agencies with overlapping responsibilities (e.g., Department of State, Department of Defense).

There are several ways in which environmental information can be integrated into the policy and strategy formulation processes being proposed here. First, the inclusion of accurate, timely, and relevant environmental data/information can enhance the quality and utility of global

indices such as ND-GAIN and Fragile States. Second, continuous environmental surveillance of known vulnerable regions can provide non-governmental organizations and governments alike with timely warning of potential humanitarian catastrophes. A good example is the Famine Early Warning System (FEWS) Network operated by the U.S. Agency for International Development (<http://www.fews.net>). FEWS Net combines remotely sensed environmental information with key agricultural and economic data into a set of products designed to assist decision-makers and relief agencies in planning for and responding to humanitarian crises. Figure 6 shows examples of the types of products developed by FEWS Net for Central America and the Caribbean region, with specific focus on those aspects of the natural environment and agricultural process of greatest importance in determining vulnerability to food shortages, emergencies, or famine. Finally, the inclusion of regional estimates of climate change using downscaled global climate model projections can help communities, states, and countries develop adaptation and mitigation strategies for addressing hazards such as sea-level rise, droughts, wildfires, and flooding.



(a)



(b)

Figure 6. (a): Short- and long-term outlooks for food security in Haiti from the FEWS Net; (b): Explanatory timeline showing key weather/climate phenomena and agricultural milestones in Haiti and the Central American countries of Guatemala, Honduras, and Nicaragua. Graphics courtesy of FEWS Net (<http://www.fews.net/central-america-and-caribbean>).

## 6. Conclusions

Interestingly, the United Nations Human Development Report in 1994 called for an overhaul of the human security construct in order to link security policy, foreign policy and investment to human security better. Though scholars have worked to understand drivers to environmental insecurity such as over population, poverty, war, famine, drought, etc., better, we observe that such scholarship has not materially served to integrate human security into U.S. security policy better.

For example, in light of the frequency of humanitarian-related U.S. military deployments/operations since the early 1990s (recall Figure 1), it would appear as if the central instrument of national power supporting this part of the Grand National Strategy has been the military. However, by law it is the U.S. Agency for International Development's Office of Foreign Disaster Assistance that has the lead role for administering and distributing foreign humanitarian aid (Moroney, Pezard, Miller, Engstrom, & Doll, 2013). The military is often involved with these types of operations because they have rapid reaction and logistical capabilities that are unmatched by any civilian organizations. The military's involvement can vary dramatically from year to year, depending on the number and severity of natural disasters needing its support. Development Initiatives (2013) reported that from 2006 through 2009, an average of 2% of humanitarian aid reported to the Organisation for Economic Co-operation and Development was routed through the U.S. and other nations' militaries. However, in 2010 the share more than doubled and was nearly entirely shouldered by the U.S. military, mainly due to the Haiti earthquake and Pakistan floods.

Over the last eight years, ES has received renewed interest from the U.S., European, and other countries' policy communities due to the concerns about connections between global

climate change and national/international security. The current study presents an organizing framework for ES that allows it to be integrated into strategic planning for national and homeland security. Infusing ES principles into the current U.S. security mindset will not only allow us to conceptualize risks to critical infrastructure and vital/important overseas national interests more completely, it will allow a more financially sustainable approach to achieving both homeland and national security objectives, and in so doing, provide greater human security on an international scale. Indeed, it will enhance our political leadership's ability to use all instruments of national power more effectively.

As an integrating framework for policy planning, ES can be employed through use of geopolitical stability indices and supporting data that allow evaluations of human security criteria such as environmental health, food and energy security, population dynamics and demographics, vulnerability to natural hazards/disasters, gender mainstreaming, economic security, etc. This information can be integrated with other important facts and figures to determine a country or region's ability to cope with perturbations to the natural environment from extreme weather events and climatic anomalies (as suggested in the Cascade Model of Figure 2). Such renewed interest in ES presents some unique opportunities and challenges for the human security community; that is, better integration of environmental security into U.S. homeland and national security policy development is not only prudent, but provides a unique opportunity to better integrate human security by extension.

## References

- Bartholomees, J. B., Jr. (2012). *U.S. Army War College Guide to National Security Issues, Volume II: National Security Policy and Strategy, 5<sup>th</sup> Edition*. U.S. Army War College, Carlisle Barracks, PA, 286pp. (Available online from <http://www.strategicstudiesinstitute.army.mil/pubs/display.cfm?pubID=1110>)
- Bellavita, C. (2008). Changing homeland security: What is homeland security? *Homeland Security Affairs Journal*, Vol. IV, No. 2.
- Bilmes, L. J. (2013). The financial legacy of Iraq and Afghanistan: How wartime spending decisions will constrain future national security budgets. HKS Faculty Research Working Paper Series RWP13-006, March 2013.
- Busby, J. (2007). Climate change and national security An agenda for action. CSR No. 32, November 2007, Council on Foreign Relations, New York, NY.
- CNA Corp. (2007). National security and the threat of climate change. CNA Corporation, 4825 Mark Center Drive, Alexandria, VA.
- Council of the European Union. (2008). Climate change and international security. Report from the Commission and the Secretary-General/High Representative to the European Council. Brussels, 3 March 2008.
- Dabelko, D. G., & Simmons, P. J. (1997). Environment and security: Core ideas and US government initiatives. *SAIS Rev.*, Winter-Spring 1997, 127-146.
- Department of Defense. (2014). Quadrennial Defense Review 2014. Office of the Secretary of Defense, Washington, DC. (Available online from [http://archive.defense.gov/pubs/2014\\_Quadrennial\\_Defense\\_Review.pdf](http://archive.defense.gov/pubs/2014_Quadrennial_Defense_Review.pdf))

Department of Homeland Security. (2014). The 2014 Quadrennial Homeland Security Review.

Office of the Secretary of Homeland Security, Washington, DC. (Available online from

<http://www.dhs.gov/sites/default/files/publications/2014-qhsr-final-508.pdf>)

Department of State. (2015). Enduring Leadership in a Dynamic World: Quadrennial Diplomacy and Development Review 2015. Office of the Secretary of State, Washington, DC.

(Available online from <http://www.state.gov/documents/organization/241429.pdf>)

Deudney, D. (1990). The case against linking environmental degradation and national security.

*Millennium - Journal of International Studies*, 19: 461.

Development Initiatives. (2013). *Counting the cost of humanitarian aid delivered through the military* [PDF Document]. Retrieved from Global Humanitarian Assistance web site:

<http://www.globalhumanitarianassistance.org/wp-content/uploads/2013/04/gha-2013-briefing-military-involvement-humanitarian-aid.pdf>.

Executive Office of The President. (2013). The President's climate action plan. The White House, Washington, DC. 21 pp. (Available online from:

<https://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf>)

Flynn, S. (2007). *The Edge of Disaster*. Random House, New York, NY. 240pp.

Fraser, L. (2002). Related environment and security research. In *Global Environmental Change and Human Security: Conceptual and Theoretical Issues*. Richard A. Matthew and Leah Fraser, Eds. Global Environmental Change and Human Security Program Office, University of California Irvine, November 2002.

Furtado, F. J. (2008). Human security: Did it live? Has it died? Does it matter? *International Journal*, Vol. 63, No. 2, Russian Resurgence (Spring, 2008), 405-421.

- Gleditsch, N. (1998). Armed conflict and the environment: A critique of the literature. *Journal of Peace Research*, 35 (3), 381-400.
- Gleick, P. (2014). Water, drought, climate change, and conflict in Syria. *Wea. Climate Soc.*, 6, 331–340.
- Guha-Sapir, D., Vos, F., Below, R., & Ponserre, S. (2011). Annual disaster statistical review 2010 The numbers and trends. Centre for Research on the Epidemiology of Disasters (CRED), Université catholique de Louvain – Brussels, Belgium, 50pp.
- Henk, D. (2006). The environment, the US military, and southern Africa. *Parameters*, Summer 2006, U.S. Army War College, 98-117. (Available from <http://www.carlisle.army.mil/usawc/Parameters/06summer/henk.pdf>)
- Homer-Dixon, T. E. (1999). *Environment, Scarcity, and Violence*. Princeton University Press, Princeton, NJ, 253pp.
- Human Development Report. (1994). United Nations Development Programme (UNDP), 1994. (Accessed March 3, 2016 from: [http://hdr.undp.org/sites/default/files/reports/255/hdr\\_1994\\_en\\_complete\\_nostats.pdf](http://hdr.undp.org/sites/default/files/reports/255/hdr_1994_en_complete_nostats.pdf))
- International Federation of the Red Cross and Red Crescent Societies (2014). World Disasters Report Focus on culture and risk. (Available from: <http://www.ifrc.org/en/publications-and-reports/world-disasters-report/world-disasters-report-2014/>)
- International Federation of the Red Cross and Red Crescent Societies. (2015). World Disasters Report Focus on local actors; the key to humanitarian effectiveness. (Available from <http://ifrc-media.org/interactive/world-disasters-report-2015/#1440799632989-b8662527-d37d>)

- King, W. C. (2000). Understanding international environmental security: A strategic military perspective. U.S. Army Environmental Policy Institute, Dept. of Defense, Atlanta, GA.
- Lane, J. D., & McNair, S. S. (2015). Sending soldiers to fight Ebola. *Military Medicine*, 180 (6), 607-608.
- Lanicci, J. M., & Ramsay, J. (2014). The Impact of Hurricane Katrina on the Environmental Security of the US Gulf Coast Region and Beyond. *Critical Issues in Homeland Security: A Case Book*, J.D. Ramsay, and L. Kiltz, Eds. Westview Press, Boulder, CO, 150-172.
- Lelieveld, J., Beirle, S., Hoermann, C., Stenchikov, G., & Wagner, T. (2015). Abrupt recent trend changes in atmospheric nitrogen dioxide over the Middle East. *Science Advances*, 1 (7). (Available online from: <http://advances.sciencemag.org/content/advances/1/7/e1500498.full.pdf>)
- Levy, M. (1995). Is the environment a national security issue? *International Security*, Vol. 20, No. 2 (Autumn, 1995), 35-62.
- Lindborg, N. (2015). USAID and the effort to fight Ebola. *Hampton Roads International Security Quarterly*, (January 1, 2015): 26.
- Lumpkin, M. (2015). The US defense department response to the Ebola epidemic. *Hampton Roads International Security Quarterly*, (January 1, 2015): 57.
- Mansfield, W. H. (2004). The evolution of environmental security in a North American policy context. *The Environment Times*, Thursday, September 2, 2004, United Nations Environmental Programme, Grid-Arendal, Arendal, Norway, 3pp. (Available online from <http://www.grida.no/publications/et/ep2/page/2490.aspx>)
- Moroney, J. D. P., Pezard, S., Miller, L. E., Engstrom, J., & Doll, A. (2013). *Lessons from Department of Defense disaster relief efforts in the Asia-Pacific Region*. RAND

- Corporation, Santa Monica, CA. (Available online from [http://www.rand.org/content/dam/rand/pubs/research\\_reports/RR100/RR146/RAND\\_RR146.pdf](http://www.rand.org/content/dam/rand/pubs/research_reports/RR100/RR146/RAND_RR146.pdf))
- Myers, N. (2004). Environmental security: What's new and different? *The Hague Conference on Environment, Security and Sustainable Development*, The Peace Palace, The Hague, The Netherlands, 9-12 May 2004. (Available online from: <http://www.envirosecurity.org/conference/working.php>)
- ND Gain. (n.d.). The Notre Dame Global Adaptation Index. Retrieved September 29, 2014 from <http://gain.org/>.
- National Intelligence Council (NIC). (2000). The global infectious disease threat and its implications for the United States. *NIE 99-17D* January 2000. (Available online from: [www.cia.gov/publications/nie/report/nie99-17d.html](http://www.cia.gov/publications/nie/report/nie99-17d.html))
- Newman, E. (2010). Critical human security issues. *Review of International Studies*, 36 (1), 77-94.
- PUBLIC LAW 113-2—Jan. 29, 2013. (Available online from: <http://www.gpo.gov/fdsys/pkg/PLAW-113publ2/pdf/PLAW-113publ2.pdf>)
- Ramsay, J. & Kiltz, L., Eds. (2014). *Critical Issues in Homeland Security: A Case Book*. Westview Press, Boulder, CO, 367pp.
- Reese, S. (2013). *Defining Homeland Security: Analysis and Congressional Considerations*. Congressional Research Service 7-5700.
- The Fund for Peace. (n.d.). The Fragile States Index. (Accessed September 29, 2014 from <http://ffp.statesindex.org/>)

United Nations. (2004). A more secure world: our shared responsibility; report of the high-level panel on threats, challenges and change. (Available from

[http://www.un.org/en/peacebuilding/pdf/historical/hlp\\_more\\_secure\\_world.pdf](http://www.un.org/en/peacebuilding/pdf/historical/hlp_more_secure_world.pdf))

United States Transportation Command. (2002). Presentation given to U.S. Air Force Air War College by General John W. Handy, Commander, during Academic Year 2001-2002.

Wisner, B., Blaikie, P., Cannon, T., & Davis, I. (2004). *At Risk - Natural Hazards, People's Vulnerability and Disasters*. Wiltshire: Routledge.