



**THE FAST-CHANGING ARCTIC:
RETHINKING ARCTIC SECURITY
FOR A WARMER WORLD**
Edited by Barry Scott Zellen

ISBN 978-1-55238-647-7

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4. Conceptualizing Climate Security for a Warming World: Complexity and the Environment-Conflict Linkage¹

Daniel Clausen and LTJG Michael Clausen, USCG

Introduction

Currently, a new concern is circulating among policy-makers, think tanks, and scholars: securing the planet's climate. This interest has accelerated as analyses of the security implications of climate change have made their way into think tank reports, popular books, and, most importantly, official national security documents like the *National Security Strategy* and *Quadrennial Defense Report*.² In addition to acknowledging the challenge of decreasing GHG emissions, these reports also examine the various regional effects of climate change and how the military might be tasked with responding to regional contingencies involving disasters or violence influenced by environmental factors. These reports tend to converge on a common representation of climate change as a "threat multiplier."³ As these reports predict, as climate change impacts ecosystems, it will cause critical food and water shortages, spur mass migration, and strain government capacities and credibility, thus

leading to more conflict and the collapse of order. According to these reports, the first victims will likely be states that lack reserve capacities in capital, scientists, engineers, or flexible political institutions able to adjust to the effects of climate change. In addition, the reports state that these ecologically induced crises could destabilize entire regions, feeding terrorist movements and sparking interstate conflicts and civil wars.⁴

While the common image these reports depict is both plausible and analytically useful, it also suffers from multiple uncertainties, not the least of which is that stemming from the environment-conflict linkage. Currently, the exact interaction between environmental factors, political institutions, and outcomes are anything but certain. Scholars who are actively engaged in studying what has been termed “environmental security” often disagree in stark terms on the precise relationship between environmental variables and the onset of conflict, both civil war and interstate.

This chapter will begin by recounting how climate change has evolved as an object of national security thinking and discourse, beginning from the 1980s and stretching to the recent “Climategate” issue. It will then examine the research climate change scientists and national security-oriented think tanks have done in terms of formulating plausible scenarios with a special focus on the way climate change has been defined as a “threat multiplier.” It will then examine how different scholarly traditions have studied and depicted the environment-conflict linkage. As this chapter will show, one of the particular complications of studying the environment-conflict linkage is that the relationship between environmental factors and conflict is rarely straightforward, and, thus, is left open to interpretation by scholars from different backgrounds and theoretical orientations.

Sometimes acrimony between different schools can take place on either definitional grounds or even on differences on what is worthy of study. Environmental factors can encompass anything from environmental degradation, to renewable resource scarcity, to non-renewable resource scarcity, to resource abundance (having a commodity that is highly valued on the world market).⁵ Scholars have disagreed on which if any of these variables is important in conflict onset and intensity. In addition, there is disagreement about how to study environmental factors, whether the environment or resources can or should be theorized outside of the political institutions that are established to manage it, or even outside of larger world patterns of consumption that condition environmental processes.⁶ The paradox of the environmental

security literature is that the environment is often acknowledged as an increasingly important factor in understanding the unfolding dimensions of world politics even as it is identified as a potential source misunderstanding and obfuscation.

For this reason, future policy-makers and scholars need to think critically about how exactly the environmental factors can “cause” conflict. Because of the importance of the environment-conflict linkage for understanding world politics, the essay will finish with some suggestions for how scholars can further explore the relationship and integrate the insights into scenarios for climate change.

The Rise of Climate Change as an Object of National Security

Since the 1980s, the issue of climate change has been on and off the political agenda – to say nothing of its framing as a national security issue. After James Hansen (then director of NASA’s Goddard Institute of Space Studies) famously asserted in 1988 that climate change was near certain,⁷ speculation and research began on the linkages between national security, climate change, and environmental degradation. That same year, the IPCC was created under the guidance of the UN Environmental Programme (UNEP) and World Meteorological Organization (WMO) to represent the consensus of scientists on the issue of climate change. It wasn’t until the 1990s, however, that the Strategic Environmental Research and Development Program (SERDP) was created within the DoD to address issues of environmental concern. This corresponded with a gradual rise in policy statements placing the environment and environmental degradation within the sphere of national security.

The 1991 *National Security Strategy* features a brief section on the environment that mentions issues of food security, ozone depletion, water supply, deforestation, biodiversity, and treatment of wastes, in addition to the problem of climate change.⁸ In addition, a Global Environmental Affairs Directorate at the National Security Council and an Office of Environmental Security led by a Deputy Undersecretary of Defense were established to address the rising interest in the connections between the environment and security. Around this same time, the idea that environmental scarcity could fuel a future anarchy of ungovernable spaces was first elaborated in the scholarship of Thomas

Homer-Dixon and then popularized by Robert Kaplan in his famous 1994 article for the *Atlantic Monthly*,⁹ an article that was widely circulated among policy-makers. This popular speculation would lead to the creation of the new subfield of environmental security and a flurry of new initiatives for securing the environment within the Clinton administration. Thus, the 1997 *National Security Strategy* reflected Kaplan's concerns of resource scarcity fueling an increasing number of post-modern conflicts.¹⁰

Despite a growing awareness of climate change, the issue remained largely neglected. The Kyoto Protocol of 1997, though signed by the United States, was never sent to the Senate for ratification. Bipartisan resistance to the protocol centered on its failure to address pollution from rising industrial powers like China and India. While the Pentagon did commission one report in 2003 that garnered some media attention, the issue remained largely undervalued as a national security priority.¹¹ Even though interest was growing in some circles of the defense community about the linkages between environmental degradation and conflict, without national leadership, these projects remained largely on the back burner. As the national security community dealt first with the immediate threat of Al Qaeda and addressing gaps in homeland security, then wars in Afghanistan and Iraq, and then rising nuclear threats from Iran and North Korea, the issue of climate change was neglected, both as a political issue and as a security concern.

Since 2007, however, there has been a dramatic rise in the attention paid to climate change, both as an international political issue and as a mounting security threat. That year both Al Gore and the IPCC won the Nobel Peace Prize for their work in raising awareness of the issue. The IPCC's 2007 synthesis report judged that the evidence for climate change is "unequivocal"¹² and that the evidence that human-generated greenhouse gases are the cause of increased temperatures is "very likely" (over 90 per cent).¹³ That year also saw the issuance of an influential report by the Center for Naval Analysis (CNA) backed by retired generals framing climate change as a "threat multiplier."¹⁴ In addition, the Triangle Institute for Security Studies hosted a conference that addressed the impacts of climate change on national security.¹⁵ Following these influential reports, several other studies and volumes were published, along with a National Intelligence Assessment issued by the Office of the Director of National Intelligence.¹⁶

Most importantly, the notion of climate change as a security issue has now captured the attention of political and military senior leadership.

Whereas the 2006 *Quadrennial Defense Review* made no mention of climate change or environmental security, the DoD 2008 *National Defense Strategy* acknowledged both that “climate pressures may generate new security challenges” and that there was a need to “tackle climate change.”¹⁷ Riding this new wave of engagement with the issue of climate change, the 2010 DoD *QDR* and *NSS* devote entire sections to the subject. The *QDR* addressed the full range of effects that climate change is likely to have on the security environment, and what needs to be done to tailor future force structure, mitigate the DoD’s carbon footprint, and help spur new technological developments in clean energy;¹⁸ the *NSS* meanwhile emphasizes the risk climate change poses to national security and the need for a broad shift toward an energy efficient economy. As the 2010 *NSS* stated: “The danger from climate change is real, urgent, and severe.”¹⁹

Estimates, Scenarios, and the Special Role of the Scientific Epistemic Community

It is not an insignificant point that many of the recent reports and scholarship that connect climate change to national security point to climate change’s already perceptible influences – from the increased likelihood of hurricanes, to the spread of desertification in parts of Africa, to increased tension over scarce water resources in the Darfur region of the Sudan. As Buzan, Waever, and de Wilde write about past attempts to frame environmental issues as security threats: “Environmental issues often point to an unspecified, relatively remote future and therefore involve no panic politics.”²⁰ The vagueness of environmental predictions often conflicts with a national security culture that privileges threats that are certain, proximate, and grounded in an understanding of the international system as a competition among states.

While most reports on climate change note the ambiguity involved in modeling environmental systems, the consensus among scientists is that, not only is climate change verifiable, but predictions up until this point have been too conservative. Because of the ambiguities involved in modeling environmental systems, one group of scholars (a combination of former government officials and Brookings Institute, Center for Strategic and International Studies, Center for Naval Analyses, and Center for New American Security scholars) has purposely used the word *scenarios* rather than prediction to

describe their approach.²¹ These authors argue that because climate change involves a complex relationship of interlinked variables that are difficult to predict – demography, energy policy, technological change, and their interactions with complex ecological systems – one should not dwell on the most likely scenario, but rather, examine a range of plausible ones. This logic applies not only to rate of climate change but also to its effects. As many scholars have pointed out, the linkages among environmental stress, environmental shocks, and trends such as political violence, migration, and the spread of disease are difficult to theorize with precision.²²

Currently, the average obtained from IPCC climate change scenarios projects that over the next twenty to thirty years the earth's average temperature will rise by 1.3 degrees Celsius. This scenario assumes that there are no trigger effects or feedback loops and thus extrapolates largely from trends known to date.²³ While the geographical impact of climate change will vary, in the next twenty to thirty years vulnerable regions will face prospective food shortages, droughts, and flooding. Among the possible implications of these environmental changes will be pandemics, political instabilities, and potential energy and food shocks. These ecologically induced crises could destabilize entire regions, feeding terrorist movements and sparking interstate and civil conflicts. What is significant about this scenario is that it has been described as inevitable.²⁴ Though climate change may bring some benefits to the United States in the form of near-term increases in agricultural yields,²⁵ these benefits will be offset by irregular weather patterns and political and economic losses from the failure of poorer countries to cope with climate change.

Another plausible scenario, explored by Leon Fuerth,²⁶ assumes that various tipping points and feedback loops are activated and thus that the earth's temperatures increase more rapidly. In this scenario, methane released from melted ice sheets, the decline in carbon-absorbing forests, and the rate of rapid industrialization lead to double the climate change increase predicted in the first scenario – temperatures increase over the next twenty years by 2.6 degrees Celsius instead of the expected 1.3 degrees. Water scarcities increase, crop yields decline rapidly, coastal regions are subject to drastic flooding, and global fisheries decline as a result of coral bleaching and ocean acidification.²⁷ These multiple ecological breakdowns strain political institutions (especially in the less-developed world), leading to mass migration, intra- and interstate conflict, and possibly the resurgence of virulent fascist ideologies.²⁸ As many

scholars have stressed, however, because of the many complex systems involved in predicting these events – both ecological and political – speculation on the consequences of abrupt climate change are at best useful stories for understanding what is at stake.²⁹

Seeing Climate Change through its Effects: Climate Change as a “Threat Multiplier”

Currently, much of the national security literature designates climate change as a “threat multiplier.”³⁰ The idea is that climate change’s impact on ecosystems will cause critical food and water shortages, spur mass migration, and strain governments’ capacities and credibility, thus leading to more conflict and anarchy – especially in those countries that lack the resources to deal with these effects. According to this research, the first victims will likely be states that lack reserve capacities in capital, scientists, engineers, or flexible political institutions able to adjust to the effects of climate change.³¹ This is not to reinforce stereotypes of the poor in the Global South as the inevitable seed of world anarchy – to suggest as much would in any case ignore the source of much carbon pollution.³² Though there is currently a wealth of research challenging these neo-Malthusian assumptions of easy connections between environmental scarcities and violent conflict,³³ the saliency of the environment-conflict linkage will likely increase as the severity of environmental shocks increases. As current environmental security thinking suggests, because of this threat of expanded ungovernable spaces, the United States will need to continue to secure U.S. energy supplies, most likely through increased stability operations in unstable areas of the world where energy is abundant, and expand capabilities for guarding sea lanes in newly opened up areas of the Arctic Ocean.³⁴

Analysts who examine the threat of climate change to U.S. security often point out that potential ecological catastrophes threaten the “resilience of the international community,”³⁵ creating dangerous imbalances between nations that have the capacity to deal with climate change and those that do not. While some might quibble that some of this language conflates global justice with the United States’s vital security interests, the connection is analytically useful for a number of reasons. As weak states become afflicted by environmental stresses, the United States will have to face the possibility of

a rapid surge in migration, the spread of pandemics, and the breakdown of political stability in energy-rich countries and countries that are becoming increasingly embedded in the global economy, thus affecting the economic security of U.S. citizens.

There is a growing consensus that the impact of climate change will continue to strain the United States's credibility as a global security provider, peace broker, and disaster relief provider. As the United States and other countries try to attenuate the impact of climate change on their own soil, security scholars are worried that the United States and the world will lose established levels of international cooperation – the current state of the international community as such. This loss of cooperation could affect U.S. efforts to uproot terrorism, stop nuclear proliferation, and confront rogue regimes.

Though accurate and analytically useful, the term “threat multiplier” could also lead to some dangerous gaps in understanding how to respond to climate change. The idea of climate change as a threat multiplier leads the defense community to focus more on responding to the outcome of climate change (an intensified environment of threats defined in the usual terms of disaster relief, increased terrorism, rogue and collapsed states) than attenuating its causes – greenhouse gas emissions.³⁶ As the current *QDR* illustrates, however, the DoD has taken proactive steps toward lowering its carbon footprint and establishing programs that spur important technological developments in energy efficiency and alternative fuels.

However, out of all the claims made about the negative impacts of climate change, the prediction that conflict – both interstate and intrastate – will be more frequent and intense is the most contentious. As the following review of the academic literature will demonstrate, conceptualizing the linkage between environment change and conflict is anything but a straightforward intellectual task. *Different Perspectives in the Study of Environment and Conflict*

The three major traditions that deal with the environment-conflict linkage – neo-Malthusianism, neoclassical economics, and political ecology – disagree in often stark terms about, not only how the environment can be said to “cause” conflict, but also, what types of variables should be studied, how they should be studied, and what type of language should be used to portray conclusions. Despite these differences, each has something different to offer security planners seeking to understand the environmental causes of conflict. This is perhaps best demonstrated by Colin Kahl's *Demographic and*

Environmental Stress Model, which integrates many of the insights from the three approaches. Taken together, each of the traditions should give future students of the environment-conflict linkage pause before making simplistic and automatic assumptions about the way scarcity and degradation cause conflict.

Reading through the literature, one is often struck by the sheer number of issues that are explored under the environmental security label. The literature on environmental security discusses instances when states or substate groups come into conflict directly over resources, when subnational groups use a valuable resource to finance rebellion, when degradation or scarcity produces grievance-based violence, or when environmental problems overwhelm government legitimacy and thus provide permissive conditions for rebellion.³⁷ Within this hodgepodge of concerns, the “environment” can come to stand for land scarcity, soil erosion, depletion of freshwater, timber, or fish stocks, demographic pressure that can lead to these effects, or even strategically valuable resource wealth like petroleum and mineral reserves. In addition, “security” can mean anything from threats to regime security, threats to regional or international order, or threats to people’s health and livelihood. Given that many of the issues within what is called the “environmental security” literature often deal with grievances, distributional justice, and/or structural violence (rather than threats to “national security” narrowly defined) some authors have argued that it is more accurate to describe the enterprise as the study of environmental *insecurity*.³⁸

Generally speaking, there are three different traditions of examining the linkage between environmental causes, politics, and conflict: 1) neo-Malthusianism, 2) neoclassical economics, and 3) political ecology.³⁹ Each of these three approaches represents a different theoretical tradition, angle of vision, and political objective. The neo-Malthusian approach emphasizes the way trends in demography and the environment create acute scarcities that contribute to violent conflict. Alternatively, the neoclassical economics tradition stresses the adaptability of human systems (especially free market and democratic systems) in dealing with problems of the environment. Political ecology approaches, while more varied and difficult to lump together, generally share a concern for the liberation of impoverished and oppressed groups and try to deconstruct the way specialized forms of knowledge and discourse have been used to oppress marginalized groups. In addition to these three approaches, I also examine the claims of environmental skeptics as a fourth “school” for

discussion. Typically, skeptics have come from both the neoclassical economics and the political ecology groups (though often for different reasons).

As my short sketches will demonstrate, though each approach has very important – and in some case irreconcilable – differences, they also have important linkages and create forms of knowledge that complement the other.

1. THE NEO-MALTHUSIAN APPROACH

Neo-Malthusians generally point to accelerating pressures on natural resources and planetary life-support systems as a major cause of conflict in the future. Though the notion that population growth itself puts strains on the planet has long been refuted, this groups often links population growth with environmental degradation and the failure of political institutions to manage environmental uses.⁴⁰ These failures can lead to increased migration, threats to state stability, increased state oppression to pre-empt threats to the state, and conflict between the state and aggrieved ethnic or political groups. Homer-Dixon's work in the nineties in particular has been very influential. Homer-Dixon's chief argument is that, as opposed to earlier times when human adaptive capacities were activated, mutually reinforcing patterns of degradation make the current crises – in particular the environmental effects of climate change – more difficult to overcome.⁴¹ The later contributions of the scholars in what is called the Toronto School (including Homer-Dixon's work) explore the complexity involved in the environment-conflict linkage using primarily case study analysis. Many of these studies found that, while environmental factors were rarely necessary or sufficient conditions, they nevertheless lead to structural opportunities for violence.

Critics have pointed to neo-Malthusianism's pension for environmental determinism. Neo-Malthusians have been accused of ignoring both interactions with political institutions that make conflict more likely and the way political institutions and ideas help produce scarcity to begin with. Though scholars such as Barnett⁴² laud the sophistication of case study work done by Homer-Dixon and others as part of the Toronto School's Project on Environment, Population, and Security, critics still suggest that the "positivist vernacular"⁴³ used by neo-Malthusians often denotes a linear relationship between environmental stress and conflict that has yet to be proven.

Because neo-Malthusians focus on the environment as an independent variable, they also ignore important dynamics involved in civil war onset. As the literature on civil strife points out,⁴⁴ revolts are often difficult to start

because of problems of coordination and the free-rider dilemma. The free-rider problem in civil wars amounts to this: how does a revolt start when the risk taken on by the initial organizers is so much greater than the risk taken on by those who decide to bandwagon later on? Thus, critics of the neo-Malthusian approach point out that an emphasis on resource scarcity over-predicts the occurrence of civil strife.

2. NEOCLASSICAL ECONOMICS

In the neoclassical economic approach, much more of an emphasis is put on the human capacity to cope with environmental change and, in a rebuttal to neo-Malthusians, resource abundance (not scarcity) is linked with conflict.⁴⁵ For scholars in this group, the market mechanism plays an important role. Market incentives triggered by scarcity lead to new innovations in technology and management to create coping mechanisms. In a similar way, representative governments respond to political demands to obviate critical scarcities that affect their constituencies. In addition, those who focus on the “resource curse” could be placed into this group. The abundance of a highly valued commodity severely stunts the development of sophisticated, variegated market economies by giving incentives for parties to find and hold valuable resources rather than innovate. The availability of resources also stunts the development of governments responsive to citizen needs, giving incentives for the government to be just strong enough to hold valuable territory and live off rents from its resources. In what is termed the “honey pot” hypothesis, resource abundance creates incentives for groups to capture resources. Where there is a weak state, substate groups can compete with the government for control of these resources. This literature tends to emphasize “greed” (defined as opportunities for banditry or state capture in order to generate income) over “grievance” (defined as human rights abuses and political oppression) as motivation for intrastate conflict.

Critics of the neoclassical economics approach have pointed out that on a local scale the mechanisms for mediating resource scarcity, in the form of a market mechanism or a responsive government, are often imperfect or absent in much of the less-developed world. On a global scale, critics point out that – in contrast to past claims of impending demographic doom – current negative trends of population growth, consumption, and environmental limits are much more embedded and reinforcing than was ever the case before. As

Homer-Dixon argues, these patterns lend themselves to reinforcement and trigger effects that stress the environment in irreversible ways.⁴⁶

In addition, a great deal (though not all) of the “honey pot” theories tend to focus more on non-renewable resources than on renewable resources that have been overstressed. Forestry, fisheries, and agriculture – resources that are renewable when used in moderation – tend to contribute to the employment of large populations. When these resources are depleted, much larger portions of the population suffer, leading to grievance-based violence.

Moreover, the neoclassical economics approach ignores the way “resource curse” explanations can be linked with the neo-Malthusian literature:⁴⁷ the availability of resource rents from non-renewable resources like oil might prevent the government from undertaking policies to manage renewable resources like fisheries or agricultural land in ways that benefit the larger population. Over time, this neglect could lead to clashes among substate groups over increasingly scarce resources. These critical scarcities might also create better incentives for people to join rebel groups (the “greed” explanation) to capture valuable nonrenewable resources.

3. POLITICAL ECOLOGY

Though very difficult to encapsulate in a thumbnail sketch, political ecology can be described as a mix of post-structural and critical theory, non-equilibrium ecology, and rich ethnographic case study analysis. While this captures some of the essence of the approach, another way to think of this tradition is in terms of its normative objectives. Political ecology tends to focus less on accumulating and testing generalizable theories and more on interrogating the complexity of social and ecological relationships. In particular, the literature is interested in exposing how systems of environmental management often disenfranchise the poor.⁴⁸ Thus, as the title of Peet and Watt’s book *Liberation Ecologies* suggests, a key theme in political ecology is creating a scholarship that can foster the liberation of marginalized people.

Much of the literature is also hostile to the neo-Malthusian approach and the way its scholarship has informed U.S. strategic thinking since the mid-90s. A common accusation of political ecologists is that neo-Malthusians posit simplistic linkages between environmental degradation, scarcity, and conflict. In addition, they criticize neo-Malthusians for ignoring the way scarcities are conditioned by larger systems – domestic and local systems, but in some cases world systems – of production and consumption.⁴⁹

For Kahl, political ecology's focus on regimes of production and distribution misses just how much material factors matter. Kahl criticizes political ecologists for downplaying the role of environmental stress in conflict; instead, he highlights the way the material fact of demographic stress conspires with systems of inequality to cause conflict.⁵⁰ Even though political ecology's case study approach to environmental factors has provided a solid contribution to the field, political ecologists have nonetheless been dismissive of the contributions and nuance of Toronto school (neo-Malthusian) case studies.⁵¹ Perhaps the strongest criticism of political ecology has to do with its lack of policy relevance. Because political ecology studies often seek to upset simplistic ways of viewing the world, their work often suffers from a high degree of indeterminacy.⁵² Thus, unlike for example the work of think tank policy papers, their conclusions are rarely reducible to easy-to-read executive summaries or bullet points. This is at once a major strength of political ecology studies, but also a major limitation on their ability to reach mainstream audiences.

4. ENVIRONMENTAL SECURITY SKEPTICISM

Finally, it should be noted that there is also a strain of literature that questions the salience of the environment-conflict linkage. In a sense, this is a continuation of the skepticism found in the neoclassical and political ecology approaches. This literature, however, is important enough to include in its own section because it questions the very merit of the explosion of interest in "environmental security." Raleigh and Urdal, for example, note that statistical literature studies that include a large number of cases (a large N) is at best mixed on the association between resource scarcity and violence.⁵³ While the State Failure Task Force Report of the late 1990s⁵⁴ found that soil degradation, deforestation, and freshwater scarcity were not directly linked to conflict, Hauge and Ellington (1998) found that the same factors, with high population density, were highly associated with civil war – but also, that these factors were secondary to political factors.⁵⁵ Theisen, however, is unable to replicate the results of Hauge and Ellington in his statistical study. He concludes that, because the Hauge and Ellington study is so frequently the sole statistical study cited in the environmental security literature, and because these results are not subject to replication, the relationship between scarcity, degradation, and conflict has very little support in the large statistical study research.⁵⁶

In addition, criticisms of the environmental security literature have also come from the political ecology camp. Environmental security models that rely on understandings of the environment as an “independent variable” often simplify complex processes that reflect the issue of resource *distribution* and discourses that drive these distribution patterns. As Benjaminsen argues, reading the neo-Malthusian literature one “often gets the impression that degradation is something measurable” when the idea of degradation is always subject to “conflicting views regarding how the land should be used and what the landscape ought to look like.”⁵⁷ In addition, the environmental security literature tends to treat “conflicts as internal to ‘groups’ or ‘societies’ with little or no analysis of interactions with the international political economy.”⁵⁸ This approach, then, leaves larger issues of global environmental justice unexplored.

Colin Kahl’s DES Model

Thus far, Kahl’s Demographic and Environmental Stress Model (DES) has done the most to integrate environmental and political variables into one comprehensive account. The independent variable in the model – demographic and environmental stress (DES) is a composite variable that encompasses (1) rapid population growth, (2) the degradation of renewable resources, and (3) the maldistribution of renewable resources. It should be noted that the third variable assumes that political, social, and economic processes have an important impact on the way scarcity is produced in populations (a concession to political ecology). A resource may be in ready supply, yet nevertheless experienced as scarce by local populations because the resource is so poorly distributed or managed.

The author contends that there are two main pathways through which DES can cause violence – *state failure* and *state exploitation*. The state failure pathway creates incentives for “social groups to engage in violence via the logic of the security dilemma.”⁵⁹ In other words, as crucial resources become scarce, rival states or substate groups will be more likely to compete for these resources. When this happens within the state, fierce competition can reduce the government to merely one competitor amongst other comparatively powerful groups. The state exploitation pathway, however, assumes a different dynamic. In this pathway, better organized and powerful state elites are able to pre-empt competition from competitor groups or capture scarce resources

through violence in order to protect their own narrow self-interests.⁶⁰ Kahl argues that *groupness* (the degree to which people align with an ethnic, religious, or class group over the state) and institutional *inclusivity* (the degree to which important government institutions allow diverse groups to influence policy through legitimate processes) are important for understanding whether DES leads to conflict.⁶¹ In the case of groupness, strong cleavages in group affiliations within the state and the absence of cross-cutting loyalties and identifications help to overcome the collective action problem early in revolts (the free-rider problem identified in the civil strife literature noted above). By contrast, an ethnically homogenous state, a unified national identity, or cross-cutting identifications can help neutralize conflict.⁶² Similarly, an inclusive government with legitimate processes for protesting policies can also help neutralize violent conflict. In contrast, government processes that exclude large populations with high levels of groupness will fuel the logic of the security dilemma.

The strength of the state to deter violence plays a significant role in determining the pathways of violence. When elites are unified against a weaker minority, higher levels of DES will be needed to push minority groups toward violent revolt. In this case, state exploitation is the most likely pathway. In cases where the minority is especially weak and state capacities for oppression extremely advanced, violence may not even register because it is deeply submerged in state structures of human rights abuses. In the case of state weakness, substate actors will find it easier to garner support among their in-group and challenge the state for ever scarcer resources, thus leading to greater challenges to state authority.⁶³

By taking into account the importance of demographic and environmental stresses as an independent variable, Kahl's work addresses the neo-Malthusian "independent variable"; however, by acknowledging the way distribution systems *create* scarcity, he also acknowledges some of the concerns of political ecology. Finally, by demonstrating how dysfunctional coping methods are the pathways toward conflict, Kahl demonstrates how the insights of the neoclassical economics approach can inform studies of the environment-conflict linkage.

The Limitations of the DES Model

Though Kahl's model is a significant achievement, there are nevertheless several important gaps that need to be explored.

First, along the lines of political ecology, the model fails to take into account the complex ways that DES is a product of the deep structural processes of power within the world system. Though DES assumes maldistribution as a key process which produces scarcity in disadvantaged populations, the model leaves the global systems of production and consumption that help to create scarcities un- (or under-) theorized.⁶⁴ For example, Kahl's model fails to take into account how much the measured "stress" in the independent variable is due to the combination of oil shocks, rising interest rates, falling/rising commodity prices, and the structural adjustment programs during the period of conflict. Though a discussion of these factors does appear in Kahl's discussion section, they are largely exogenous to his model. Maldistribution, in other words, may be the condition of a larger story that includes more than just relations between civil society and local government. This larger story may also be more important theoretically if our concern is the welfare of vulnerable populations in the Global South.⁶⁵

Second, along the lines of neoclassical economics, the model fails to take into account the processes of productive institutions and mechanisms that can reflect back on DES to alleviate these problems to begin with. In other words, Kahl never closes the circle. As the neoclassical economic position notes, market mechanisms and democratic institutions can not only relax mechanisms of civil strife but also help alleviate the problem of DES through adaptive processes. These adaptive processes should not be limited to so-called rational management approaches to the environment either. There is a wealth of scholarship, for example, that points to effective indigenous methods for land management. This problem remains unresolved because Kahl's concern is civil strife, not processes of environmental management. Yet, as many authors have argued, understanding what processes are available for managing environmental stress is just as important as understanding why conflict occurs.⁶⁶

My third critique regards the positioning of DES as an important independent variable. As my review of the "skeptics" above notes, the statistical literature currently finds only a weak association between environmental degradation and conflict. While demographic stress and the grievance of populations makes this independent variable more significant, lumping the three together into a composite variable misses just how different each of these variables are in their relationship to the onset of violence. Thus, one could imagine the model drawn much differently. Theisen's conclusion that

political dysfunction and poverty have much more explanatory power than resource scarcity,⁶⁷ for example, suggests that political issues and poverty should be positioned as the independent variable, with the environmental factors positioned as intervening variables.

A fourth critique can be directed at Kahl's methodological approach. Because Kahl relies heavily on two case studies to elucidate his claims (the Philippines and Kenya), his study is limited to a thick description of DES and the intervening variables of groupness and institutional inclusivity to demonstrate the utility of his model. As he states, one of the reasons he decides to take this route is because much of the data he needs is not easily quantifiable. In addition, Kahl claims that statistical approaches are not very effective at answering "how" questions.⁶⁸ Though Kahl is largely correct, his approach nevertheless does little to counter environmental security skepticism. Future scholars will need to think creatively of ways to test Kahl's model through large N statistical studies.

My criticisms of Kahl's model are purposely unfair: they ask the model to provide answers to questions and to perform tasks it was never intended to do. Yet these criticisms point to important avenues of further research, facilitated by future conjunctions between research agendas. While future research should not try to include everything, it should attempt to make important connections between currently disparate approaches – for example, that between qualitative case study research and large quantitative statistical studies, or that between the neo-Malthusian/neoclassical economics approaches and political ecology. Though Kahl's approach is a good starting point, there is still much to be done.

Conclusion: New Paths of Exploration and Synthesis

As this essay has shown, greater efforts to link the concerns of different traditions in environmental security can help to construct a more nuanced understanding of the role the environment plays in the onset and intensity of conflict. By incorporating *both* the environment and regimes of resource distribution, Kahl's model avoids the either/or tradeoff between the two that is assumed in other approaches. As my criticisms have shown, however, Kahl's approach is far from perfect. Still, there are good reasons why researchers should continue to look across traditions for insights on how environmental factors can contribute to conflict. Even as defense planners begin to think

about how climate change can lead to civil war onset and interstate conflict, they will do well to remember the points made by environmental security skeptics and especially the weak linkages that are found between environmental factors and conflict in the statistical literature. As these studies have found, variables such as soil degradation, deforestation, and water scarcity are at best secondary to issues of poverty, low economic growth, and high dependence on primary commodities for export.⁶⁹ These studies serve to remind us that environmental factors are one part (sometimes even a relatively small part) of a larger picture.

Despite the work done by Kahl and other scholars, there are still quite a few avenues for improving the state of knowledge on the role of environmental causes on conflict. Scholars and security planners should continue to:

- Create greater synergies between statistical studies that look for relationships among a large number of cases and more nuanced case studies that take into account how environmental factors work in different political and social contexts. This will allow scholars and security planners to understand the limit of generalizations about the environment and conflict.
- Direct more attention to smaller political units like provinces in order to complement larger studies that use the state as their unit of analysis.⁷⁰
- As a way of addressing environmental security skeptics, investigate the degree to which instances where conflict does not register are actually instances where populations are suffering from acute forms of political oppression and structural violence (in other words, environmentally facilitated insecurity).⁷¹
- Examine the feedback loops that allow political institutions, ideas, and activism to react back on environmental “independent variables” – both positively and negatively. This may mean thoughtful engagement with the environmental management literature. The implication is that understanding which state capacities are best at obviating

environmental stress is just as important as understanding how environmental stress causes conflict.

- And finally, researchers should seek to avoid the mysticism that often accompanies positioning the environment scarcities or valuable resources as “strong” independent variables. Scholars can do so by looking at the role of political entrepreneurs in either promoting or helping to prevent violent conflict in contexts of high environmental stress.⁷² By doing so, scholars and security planners will also help to create more policy-relevant studies for those looking to intervene in future crises.

As security planners continue to develop regional scenarios for climate change, it is important to remember that there is nothing automatic about linkages between environmental causes and violence. The evolution of politics in different regions will depend quite a bit on complex political and ecological variables that are rarely clear-cut. By comparing and contrasting the insights of statistical studies and in-depth case studies, security scholars can begin to understand that limitations of generalizations about environmental variables as well as begin to identify new hypothesis for testing. An attention to building nuance and sophistication in our understanding of the environment-conflict linkage will ultimately benefit decision-makers and policy planners as they seek to understand the environmental factors in the future of world politics.

Though the environmental security literature will continue to inform our understanding of conflict onset and intensity in the twenty-first century, one should also be aware of the limitations of this research. Much of the current and future literature, whether case studies or large statistical analyses, will be based on what has happened in the past. An understanding of past cases may be of limited utility in comparison with a very unique future. This future may include more acute forms of environmental stress than could ever be found in studies of the recent past. Thus, even as scholars continue to probe for relationships between different environmental causes and conflict, it is important for security planners and analysts to be bolder than their academic counterparts. Whereas the scholarly community is more apt to proclaim that the future is not evidence,⁷³ security planners will need to actively think about the limits of current studies and account for the worst of all possible cases.

Notes

- 1 The first part of this chapter was originally published in *Strategic Insights* 9, no. 2 (2010): 13–25; http://calhoun.nps.edu/public/bitstream/handle/10945/11519/SI_V9_I2_2010_Clausen_13.pdf.
- 2 See, for example: Center for Naval Analysis (CNA), *National Security and the Threat of Climate Change* (2007), <http://www.cna.org/reports/climate>; Thomas Finger, *National Intelligence Assessment on the National Security Implications of Global Climate Change to 2030* (Office of the Director of National Intelligence, 2008), http://www.dni.gov/testimonies/20080625_testimony.pdf; Peter Schwartz and Doug Randall, *An Abrupt Climate Change Scenario and its Implications for United States National Security* (Pasadena: Jet Propulsion Laboratory Pasadena, October 2003), http://www.edf.org/documents/3566_AbruptClimateChange.pdf; Kurt M. Campbell and Christine Parthemore, “National Security and Climate Change in Perspective,” in *Climatic Cataclysm: The Foreign Policy and National Security Implications of Climate Change*, ed. Kurt M. Campbell (Washington, D.C.: Brookings Institute Press, 2008); Kurt Campbell, Jay Gullledge, J. R. McNeill, John Podesta, Peter Ogden, Leon Fuerth, R. James Woolsey, Alexander T. J. Lennon, Julianne Smith, Richard Weitz, and Derek Mix, *The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change* (Center for Strategic and International Studies/ Center for American Security; November, 2007); Joshua W. Busby, “Who Cares about the Weather?: Climate Change and U.S. National Security” *Security Studies* 17, no. 3: 468–502; White House, *National Security Strategy* (2010); White House, *National Security Strategy* (2010).
- 3 The term “threat multiplier” is specifically used in by the Center for Naval Analysis (CNA), *National Security and Climate Change* (2007), 3 and 6.
- 4 The scenario described above is generally consistent with the reports cited in the first note. See especially: Cambell and Parthemore (2008), 14; for an exploration of linkages between climate change and terrorism, see Paul J. Smith, “Climate Change, Weak States and the ‘War on Terrorism’ in South and Southeast Asia.” *Contemporary Southeast Asia* 29, no. 2 (2008): 264–85.
- 5 In many of the studies surveyed, important variables are under-represented: the effect of extreme weather events, coastline erosion, and the impact of environmental refugees on state legitimacy. These are important research issues.
- 6 A particularly important problem is that of endogeneity. It is difficult to clearly delineate whether environmental degradation and scarcity cause bad political institutions and thus lead to conflict, or whether conflict and dysfunctional political institutions are the cause of environmental degradation and scarcity.
- 7 Kurt M. Campbell and Christine Parthemore, “National Security and Climate Change in Perspective,” in *Climatic Cataclysm: The Foreign Policy and National Security Implications of Climate Change*, ed. Kurt M. Campbell (Washington, D.C.: Brookings Institute Press, 2008), 4.
- 8 White House. *National Security Strategy* (1991).
- 9 Thomas Homer-Dixon, “On the Threshold: Environmental Changes as Causes of Acute Conflict,” *International Security* 16, no. 2 (1991): 76–116; Robert Kaplan, “The Coming Anarchy,” *Atlantic Monthly*

- (February 1994): 44–76; <http://www.theatlantic.com/doc/199402/anarchy>.
- 10 White House. *National Security Strategy* (1997); <http://www.fas.org/man/docs/strategy97.htm>.
 - 11 Peter Schwartz and Doug Randall, *An Abrupt Climate Change Scenario and its Implications for United States National Security* (Pasadena: Jet Propulsion Laboratory Pasadena, October 2003); <http://www.gbn.com/articles/pdfs/Abrupt%20Climate%20Change%20February%202004.pdf>.
 - 12 Intergovernmental Panel on Climate Change, *Climate Change: Fourth Assessment Report (AR4)* (WMO/UNEP, 2007), 30; http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_synthesis_report.htm.
 - 13 *Ibid.*, 39.
 - 14 Center for Naval Analysis (CNA), *National Security and the Threat of Climate Change* (2007); <http://www.cna.org/reports/climate>.
 - 15 For video recordings of the presentations at this conference, see: <http://tiss.sanford.duke.edu/ClimateChangeVideo-Recording.php>.
 - 16 Thomas Finger, *National Intelligence Assessment on the National Security Implications of Global Climate Change to 2030* (Office of the Director of National Intelligence, 2008), http://www.dni.gov/testimonies/20080625_testimony.pdf.
 - 17 Department of Defense (DoD), *Quadrennial Defense Review* (2010): 5.
 - 18 *Ibid.*, 84–88.
 - 19 White House, *National Security Strategy* (2010): 47.
 - 20 Barry Buzan, Ole Weaver, and Jaap De Wilde, *Security: A New Framework for Analysis* (Boulder, CO: Lynne Rienner, 1998), 83.
 - 21 Jay Gulledge, “Three Plausible Scenarios of Future Climate Change,” in *Climatic Cataclysm: The Foreign Policy and National Security Implications of Climate Change*, ed. Kurt Campbell (Washington, D.C.: Brookings Institute Press, 2008), 50–51.
 - 22 See Homer-Dixon, “On the Threshold”; Colin Kahl, *States, Scarcity, and Civil Strife in the Developing World* (Princeton, NJ: Princeton University Press, 2006); CNA (2007); Carolyn Pumphrey, “Introduction,” in *Global Climate Change: National Security Implications*, ed. Carolyn Pumphrey (Strategic Studies Institute/ Triangle Institute for Security Studies, 2008), 1–22, <http://www.strategicstudiesinstitute.army.mil/pubs/display.cfm?PubID=862>.
 - 23 John Podesta and Peter Ogden. “Scenario 1: Expected Climate Change over the Next Thirty Years,” *Climatic Cataclysm: The Foreign Policy and National Security Implications of Climate Change*, ed. Kurt Campbell (Washington, D.C.: Brookings Institute Press, 2008): 97–132; Finger (2008); Kurt Campbell, Jay Gulledge, J. R. McNeill, John Podesta, Peter Ogden, Leon Fuerth, R. James Woolsey, Alexander T. J. Lennon, Julianne Smith, Richard Weitz, and Derek Mix, *The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change* (Center for Strategic and International Studies / Center for American Security, November, 2007).
 - 24 Podesta and Ogden, “Scenario 1,” 97; Campbell et al., *Age of Consequences*, 42.
 - 25 Finger, *National Intelligence Assessment*.
 - 26 Leon Fuerth, “Scenario 2: Severe Climate Change over the Next Thirty Years,” *Climatic Cataclysm: The Foreign Policy and National Security Implications of Climate Change*, ed. Kurt Campbell (Washington, D.C.: Brookings Institute Press, 2008): 133–54.
 - 27 Fuerth, “Scenario 2,” 133–35; Campbell et al., *Age of Consequences*, 42–43.
 - 28 Fuerth, “Scenario 2,” 143; Ken Booth, *A Theory of World Security* (Cambridge: Cambridge University Press, 2007).

- 29 For more on the difficulty of predictive analysis and climate change, see Joshua Busby, "Who Cares about the Weather?: Climate Change and U.S. National Security," *Security Studies* 17, no. 3 (2008): 468–504.
- 30 CNA (2007); DoD (2010), 85, refers to climate change as an "accelerant of instability or conflict."
- 31 Campbell and Parthemore, "National Security and Climate Change in Perspective," 14; Homer-Dixon, "On the Threshold".
- 32 This is a point that cannot be stressed enough. As Peluso and Watts argue, much of the literature on environmental security often recreates the world's poor as the threat to civilization; while I would suggest this is at best a thematic shadow that haunts the literature, environmental security scholars should be clear whenever possible to acknowledge the sources of economic insecurity for the poor. For a fuller discussion, see Nancy Peluso and Michael Watts, "Violent Environments," in *Violent Environments*, ed. Nancy Peluso and Michael Watts (Ithaca, NY: Cornell University Press, 2001), 3–38.
- 33 The criticisms of neo-Malthusian assumptions of the easy linkage between scarcity and conflict vary by different concerns. Edited volumes such as Peluso and Watts, *Violent Environments*, examine some of the ways environmental security narratives reinforce stereotypes of the poor (especially in the Global South) as the basis for anarchy and disorder. Another author examines the way the environment-conflict linkages can possibly justify endless interventions by the Global North into the sovereign political domains of the Global South: see Jon Barnett, "Destabilizing the Environment-Conflict Thesis" *Review of International Studies* 26 (2000): 271–88; other scholars find little empirical evidence in statistical studies to support the strong linkage between renewable resource scarcity and conflict: see Clionadh Raleigh and Henrik Urdal, "Climate Change, Environmental Degradation, and Armed Conflict," *Political Geography* 26 (2007): 674–94; Ole Magnus Theisen, "Blood and Soil? Resource Scarcity and Internal Armed Conflict Revisited," *Journal of Peace Research* 45, no. 6 (2008): 801–18; and Henrik Urdal, "People vs. Malthus: population pressure, environmental degradation, armed conflict revisited," *Journal of Peace Research* 42, no. 4 (2005): 417–34. This is just a small sample of the literature from what we term the "environmental security skeptics."
- 34 Pew Center on Global Climate Change, *National Security Implications of Climate Global Change* (August 2009); <http://www.pewclimate.org>; DoD (2010), 84.
- 35 Campbell and Parthemore, "National Security and Climate Change in Perspective," 17.
- 36 One author, for example, Anthony Patt, criticizes a recent volume that evaluates climate change as a national security problem for not focusing enough on the issue of mitigation. See Anthony Patt, "Book Review: *Climatic Cataclysm: The Foreign Policy and National Security Implications of Climate Change*," *Global Environmental Politics* 9, no. 2 (2009): 129–31.
- 37 Elizabeth Chalecki, "Environment and Security," in *The International Studies Encyclopedia*, ed. Robert A. Denemark (Blackwell, 2010); Simon Dalby, "Environmental Security and Climate Change," in *The International Studies Encyclopedia*, ed. Robert A. Denemark (Oxford: Blackwell, 2010).
- 38 Jon Barnett, "Destabilizing the Environment-Conflict Thesis," *Review of International Studies* 26 (2000): 271–88; see also Peluso and Watts (2001), 3–38; B. Hartmann, "Will the Circle Be Unbroken? A Critique of the Project on Environment, Population, and Security," in *Violent Environments*, ed. N. Peluso and M. Watts (Ithaca, NY: Cornell University Press, 2001): 39–63.

- 39 Colin Kahl, *States, Scarcity, and Civil Strife in the Developing World* (Princeton, NJ: Princeton University Press, 2006), 4–25; see also Chalecki, “Environment and Security” and Dalby, “Environmental Security and Climate Change.”
- 40 For examples of the neo-Malthusian literature, see: Norman Myers, “Population, Environment, and Conflict,” *Environmental Conservation* 7 (1987): 15–22; Thomas Homer-Dixon, *Environment, Scarcity, Violence* (Princeton, NJ: Princeton University Press, 1999); Thomas Homer-Dixon and Jessica Blitt (eds.), *Ecoviolence: Links among Environment, Population and Security* (Lanham, MD: Rowman and Littlefield, 1998).
- 41 Homer-Dixon, “On the Threshold.”
- 42 Jon Barnett, “Destabilizing the Environment-Conflict Thesis.”
- 43 Ibid., 283.
- 44 See, for example, Jack Goldstone, *Revolutions of the Late Twentieth Century* (Boulder, CO: Westview, 1991).
- 45 For examples of this literature, see Richard M. Auty, “Natural Resources and Civil Strife: A Two-Stage Process,” *Geopolitics* 9, no. 1 (2004): 29–49; Indra de Soysa, “The Resource Curse: Are Civil Wars Driven by Rapacity or Paucity?,” in *Greed and Grievance: Economic Agendas in Civil War*, ed. M. Berdal and D. Malone (Boulder, CO: Lynne Rienner, 2000): 113–35; Indra de Soysa, “Ecoviolence: Shrinking Pie or Honey Pot?,” *Global Environmental Politics* 2, no. 4 (2002): 1–34.
- 46 Homer-Dixon “On the Threshold”; Kahl, *States, Scarcity, and Civil Strife*, 17.
- 47 Kahl, “On the Threshold,” 20.
- 48 For a concise introduction and exploration of political ecology research, see Roderick Neumann, *Making Political Ecology* (New York: Hodder Arnold, 2005). For other representative writings, see: Tania Murray Li, *The Will to Improve* (Durham, NC: Duke University Press, 2007); Richard Peet and Michael Watts, “Liberating Political Ecology,” in *Liberation Ecologies: Environment, Development, Social Movements*, ed. R. Peet and M. Watts (New York: Routledge, 2004), 3–47; Michael Watts, “Violent Environments: Petroleum Conflict and the Political Ecology of Rule in the Niger Delta, Nigeria,” in *Liberation Ecologies: Environment, Development, Social Movements*, ed. R. Peet and M. Watts (London: Routledge, 2004), 273–98.
- 49 Peet and Watts, “Liberating Political Ecology,” 12; for one particularly acrimonious exchange between Homer-Dixon and Peet and Watts, see *ECSP Report-Issue 9* (2003): 89–96.
- 50 Kahl, “On the Threshold,” 115.
- 51 See Homer-Dixon for a critique, *ECSP Report-Issue 9*.
- 52 Kahl, “On the Threshold,” 25.
- 53 Raleigh and Urdal, “Climate Change”: 674–94. See also, Henrik Urdal, “People vs. Malthus: population pressure, environmental degradation, armed conflict revisited,” *Journal of Peace Research* 42, no. 4 (2005): 417–34.
- 54 Daniel C. Esty, Jack. A. Goldstone, Ted Robert Gurr, Barbara Harff, Marc Levy, Geoffrey D. Dabelko, Pamela Surko, and Alan N. Unger, *State Failure Task Force Report: Phase II Findings* (McLean, VA: Science Applications International, for State Failure Task Force, 1998).
- 55 Wenche Hauge and Tanja Ellingsen, “Beyond Environmental Scarcity: Causal Pathways to Conflict,” *Journal of Peace Research* 35, no. 3 (1998): 299–317; see also, Raleigh and Urdal, “Climate Change,, 680.
- 56 Ole Magnus Theisen, “Blood and Soil? Resource Scarcity and Internal Armed Conflict Revisited,” *Journal of Peace Research* 45, no. 6 (2008): 801–18.
- 57 Tor Arve Benjaminsen, “Does Supply-Induced Scarcity Drive Violent Conflicts in the African Sahel? The Case of the Tuareg Rebellion in Northern Mali,” *Journal of Peace Research* 45, no. 6 (2008): 821.
- 58 Neumann, *Making Political Ecology*, 160; also see Simon Dalby, *Environmental*

- Security* (Minneapolis: University of Minnesota Press, 2002), 89–90.
- 59 Kahl, “On the Threshold,” 26.
- 60 *Ibid.*, 26.
- 61 *Ibid.*, 27.
- 62 For a visual illustration, see *ibid.*, 52.
- 63 For a complete visual of this theoretical design, see *ibid.*, 59.
- 64 For an alternative diagram model taking into account these processes, see Watts and Peet, *Liberating Political Ecology*, 30.
- 65 In this regard, Paul Collier’s suggestions regarding what countries in the Global North can do to be ethical consumers of valuable resources is essential reading. See, especially, Paul Collier, *The Bottom Billion* (Oxford: Oxford University Press, 2007).
- 66 Barnett, “Destabilizing the Environment-Conflict Thesis”; Dalby, “Environmental Security and Climate Change.”
- 67 Thiesen, *Blood and Soil*, 801.
- 68 Kahl, “On the Threshold,” 60.
- 69 See Thiesen, *Blood and Soil*; see also, Esty et al., “State Failure,” and Raleigh and Urdal, “Climate Change”; for more on the robust connection between civil war and poverty, low economic growth, and primary commodity dependence see Paul Collier and Anke Hoeffler, “Greed and Grievance in Civil War.” *Oxford Economic Papers* 56, no. 4 (2004): 563–95.
- 70 Raleigh and Urdal’s (2007) study is a good first attempt at examining the environment/conflict relationship at smaller scales. They use 100 km square units to examine the relationship between land degradation, freshwater availability, and population density and the risk of violence. However, in the future, a focus on more salient *political* units smaller than the state (for example at the province level) might be more instructive.
- 71 See: Philippe Le Billon, “Diamond Wars: Conflict Diamonds and Geographies or Resource Wars,” *Annals of the Association of American Geographers* 98, no. 2 (2008): 347.
- 72 See, for example, Daniel Moran’s comments regarding how easy it is to lose sight of human agency when strong “independent variables” are considered. Daniel Moran, “Climate Change and Climate Politics” *Strategic Insights* 9, no. 2 (2010): 8.
- 73 Raleigh and Urdal, “Climate Change,” 674, 676; see also, Nils Petter Gleditsch, “Armed conflict and the environment,” *Journal of Peace Research* 35, no. 3 (1998): 393.