Environmental changes as causes of acute conflict assignment

Art & Culture

On The Threshold: Environmental Changes as Causes of Acute Conflict Part 1 Thomas F. Homer-Dixon Trudeau Centre for Peace and Conflict Studies, University of Toronto International Security, Vol. 16, No. 2 (Fall 1991), pp. 76-116 {draw: rect} We can narrow the scope of this research problem by focusing on how environmental change affects conflict, rather than security, but still the topic is too vast. Environmental change may contribute to conflicts as diverse as war, terrorism, or diplomatic and trade disputes.

Furthermore, it may have different causal roles: in some cases, it may be a proximate and powerful cause; in others, it may only be a minor and distant player in a tangled story that involves many political, economic, and physical factors. In this article, I accept the premise that environmental change may play a variety of roles as a cause of conflict, but I bound my analysis by focusing on acute national and international conflict, which I define as conflict involving a substantial probability of violence.

How might environmental change lead to acute conflict? Some experts propose that environmental change may shift the balance of power between states either regionally or globally, producing instabilities that could lead to war. 3 Or, as global environmental damage increases the disparity between the North and the South, poor nations may militarily confront the rich for a greater share of the world’s wealth. 4 Warmer temperatures could lead to contention over new ice-free sea-lanes in the Arctic or more accessible resources in the Antarctic. Bulging populations and land stress may produce waves of environmental refugees6 that spill across borders with destabilizing effects on the recipient’s domestic order and on international stability. Countries may fight over dwindling supplies of water and the effects of

upstream pollution. 7 In developing countries, a sharp drop in food crop production could lead to internal strife across urban-rural and nomadic-sedentary cleavages. 8 If environmental degradation makes food supplies increasingly tight, exporters may be tempted to use food as a weapon. Environmental change could ultimately cause the gradual impoverishment of societies in both the North and South, which could aggravate class and ethnic cleavages, undermine liberal regimes, and spawn insurgencies. 10 Finally, many scholars indicate that environmental degradation will " ratchet up" the level of stress within national and international society, thus increasing the likelihood of many different kinds of conflict and impeding the development of cooperative solutions. 1 Which of these scenarios are most plausible and why? In the following pages, I review some reasons for the current salience of environmental issues, and I note several examples of good research on links between environmental change and acute conflict. I then suggest a preliminary analytical framework that lays out a research agenda for exploring the issue. Using this framework, and drawing on the literature of conflict theory, I suggest hypotheses about the likely links between environmental change and acute conflict.

I propose that poor countries will in general be more vulnerable to environmental change than rich ones; therefore, environmentally induced conflicts are likely to arise first in the developing world. In these countries, a range of atmospheric, terrestrial, and aquatic environmental pressures will in time probably produce, either singly or in combination, four main, causally interrelated social effects: reduced agricultural production, economic decline,

population displacement, and disruption of regular and legitimized social relations.

These social effects, in turn, may cause several specific types of acute conflict, including scarcity disputes between countries, clashes between ethnic groups, and civil strife and insurgency, each with potentially serious repercussions for the security interests of the developed world. I do not hypothesize that the causal links between these variables will be tight or deterministic. As anti-Malthusians have argued for nearly two centuries, numerous intervening factors–physical, technological, economic, and social–often permit great resilience, variability, and adaptability in human-environmental systems. 2 I identify a number of these factors in this article; in particular, I examine whether free-market mechanisms may permit developing countries to minimize the negative impacts of environmental degradation. But I suggest that, as the human population grows and environmental damage progresses, policymakers will have less and less capacity to intervene to keep this damage from producing serious social disruption, including conflict. These hypotheses should be thoroughly tested using both historical and contemporary data at the regional and societal levels.

There is great need for empirical research by students of security affairs. The Recent Salience of Environmental Issues A paradigm-shattering example of such nonlinear or “ threshold” effects in complex environmental systems was the discovery of the Antarctic ozone hole in the mid-1980s. 16 The hole was startling evidence of the instability of the environmental system in response

to human inputs, of the capacity of humankind to significantly affect the ecosystem on a global scale, and of our inability to predict exactly how the system will change.

This altered perception of the nature of the environmental system has percolated out of the scientific community into the policymaking community. 17 It may also be influencing the broader public's view of environmental problems. Scientists, policymakers, and laypeople are beginning to interpret data about environmental change in a new light: progressive, incremental degradation of environmental systems is not as tolerable as it once was, because we now realize that we do not know where and when we might cross a threshold and move to a radically different and perhaps highly undesirable system.

As compared to the first two factors accounting for the renewed salience of environmental issues, this one is not at all circumstantial; it is rooted in a maturing understanding of natural systems and the global damage humans are inflicting on these systems. This understanding is likely to endure, as will strong concern about the environment. Over the next fifty years there will be no shortage of increasingly ominous environmental data to interpret through this new paradigm.

Even if there are no dramatic, nonlinear shifts in the ecosystem (though their probability may be quite high), environmental problems will remain prominent on our scientific, policy, and public agendas. Recent Research on Environmental Change and Conflict Although there is an old and rich body of thought on the social impacts of environmental change, 18 the literature on

the specific connections between environmental change and acute conflict is surprisingly thin. Here I briefly review several important studies.

Angus MacKay examines the relationship between climate change and civil violence in the kingdom of Castile (much of modern-day Spain). 19 During the fifteenth century, there were numerous well-documented episodes of popular unrest in Castile, and some seem to have been produced directly by climate-induced food shortages. In March of 1462, for instance, rioters rampaged through Seville after floods forced the price of bread beyond the means of the poor. Usually, however, the causal connections were more complex.

An important intervening factor was the fabric of religious and social beliefs held by the people and promoted by preachers, especially those beliefs attributing weather fluctuations to the sin of someone in the community. 20 MacKay thus argues against a simplistic “ stimulus-response” model of environment-conflict linkages and instead for one that allows for “ culturally mediated” behavior. Addressing a modern conflict, William Durham has analyzed the demographic and environmental pressures behind the 1969 “ Soccer War” between El Salvador and Honduras. 1 Because of the prominence in this conflict of previous migration from El Salvador to Honduras, and because of the striking evidence of population growth and land stress in the two countries (most notably in El Salvador), a number of analysts have asserted that the Soccer War is a first-class example of an ecologically driven conflict. 22 A simple Malthusian interpretation does seem to have credibility when one looks at the aggregate data. 23 But Durham

shows that changes in agricultural practice and land distribution–to the detriment of poor farmers–were more powerful inducements to migration than sheer population growth.

Land scarcity developed not because there was too little to go around, but because of “ a process of competitive exclusion by which the small farmers [were] increasingly squeezed off the land” by large land owners. 24 Durham thus contends that ecologists cannot directly apply to human societies the simple, density-dependent models of resource competition they commonly use to study asocial animals: a distributional component must be added, because human behavior is powerfully constrained by social structure and the resource access it entails. 5 While these studies are commendable, a review of all of the recent work on environmental change and conflict reveals a number of difficulties, some methodological and some conceptual. First, researchers often emphasize human-induced climate change and ozone depletion to the neglect of severe terrestrial and aquatic environmental problems such as deforestation, soil degradation, and fisheries depletion. Second, much of the recent writing on the links between environmental change and conflict is anecdotal. These pieces do not clearly separate the “ how” question (how will environmental change lead to conflict? from the “ where” question (where will such conflict occur?). I address the “ how” question in the following sections of this article. Third, environmental-social systems are hard to analyze. They are characterized by multiple causes and effects and by a host of intervening variables, often linked by interactive, synergistic, and nonlinear causal relations. Empirical data about these variables and relations are rarely abundant. Although the underlying

influence of environmental factors on conflict may be great, the complex and indirect causation in these systems means that the scanty evidence available is always open to many interpretations.

Furthermore, understanding environmental-social systems involves specifying links across levels of analysis usually regarded as quite independent. 29 Fourth, the prevailing “ naturalistic” epistemology and ontology of social science may hinder accurate understanding of the links between physical and social variables within environmental-social systems. 30 In particular, it may be a mistake to conjoin, in causal generalizations, types of physical event with types of intentional social action. 1 Fifth, researchers must acquire detailed knowledge of a daunting range of disciplines, from atmospheric science and agricultural hydrology to energy economics and international relations theory. Sixth and finally, the modern realist perspective that is often used to understand security problems is largely inadequate for identifying and explaining the links between environmental change and conflict. Realism focuses on states as rational maximizers of power in an anarchic system; state behavior is mainly a function of the structure of power relations in the system. 2 But this emphasis on states means that theorists tend to see the world as divided into territorially distinct, mutually exclusive countries, not broader environmental regions or systems. Realism thus encourages scholars to deemphasize transboundary environmental problems, because such problems often cannot be linked to a particular country, and do not have any easily conceptualized impact on the structure of economic and military power relations between states. Realism induces scholars to squeeze

environmental issues into a structure of concepts including “ state,” “ sovereignty,” “ territory,” national interest,” and “ balance of power. ” The fit is bad, which may lead theorists to ignore, distort, and misunderstand important aspects of global environmental problems. Mapping Causes and Effects This article proposes a research agenda to guide the study of environmental change and acute conflict. Before we can formulate plausible hypotheses, however, we need a clear analytical framework, such as suggested by Figure 1. This and subsequent figures in this article provide the basis for a detailed causal-path analysis of the links between environmental change and conflict.

Such an analysis can help bring some order into the profusion of predictions concerning these issues, and it can also help researchers address several of the impediments to research mentioned above. 33 {draw: rect} {draw: frame} {draw: rect} Figure 1 suggests that the total effect of human activity on the environment in a particular ecological region is mainly a function of two variables: first, the product of total population in the region and physical activity per capita, and second, the vulnerability of the ecosystem in that region to those particular activities.

Activity per capita, in turn, is a function of available physical resources (which include nonrenewable resources such as minerals, and renewable resources such as water, forests, and agricultural land) and ideational factors, including institutions, social relations, preferences, and beliefs. 34 The figure also shows that environmental effects may cause social effects that in turn could lead to conflict. For example, the degradation of

agricultural land might produce large-scale migration, which could create ethnic conflicts as migratory groups clash with indigenous populations.

There are important feedback loops from social effects and conflict to the ideational factors and thence back to activity per capita and population. Thus, ethnic clashes arising from migration could alter the operation of a society’s markets and thereby its economic activity. 35 To clarify the research agenda, we can divide the “ how” question (how will environmental change lead to conflict?) into two independent questions. First, what are the important social effects of environmental change? Second, what types of acute conflict, if any, are most likely to result from these social effects?

The first question asks about the nature of the arrow in Figure 1 between “ environmental effects” and “ social effects,” while the second asks about the arrow between “ social effects” and “ conflict. ” Figure 1 clarifies these aspects of our research agenda. If we wish to understand a society’s capacity to prevent severe social disruption (where the preventive action could be either mitigation of, or adaptation to, the environmental stress), we need to understand the arrows between the ideational factors at the top of the figure and “ population,” “ activity per capita,” and “ social effects” along the main spine of the figure.

If we wish to understand a society’s propensity toward conflict (given certain social effects due to the environmental stress), we need to understand the arrow between the ideational factors and “ conflict. ” When sufficiently advanced, this research should help identify key intervention points where policymakers might be able to alter the causal processes linking human

activity, environmental degradation, and conflict. These interventions will fall into two general categories: those that seek to prevent negative social effects and those that seek to prevent the conflict that could result from these social effects.

In the following pages I refer to these as “ first-stage” and “ second-stage” interventions. The Range of Environmental Problems Developing countries are likely to be affected sooner and more severely by environmental change than rich countries. By definition, they do not have the financial, material, or intellectual resources of the developed world; furthermore, their social and political institutions tend to be fragile and riven with discord. It is probable, therefore, that developing societies will be less able to apprehend or respond to environmental disruption. 9 Seven major environmental problems (the “ environmental effects” in Figure 1) might plausibly contribute to conflict within and among developing countries: greenhouse warming, stratospheric ozone depletion, acid deposition, deforestation, degradation of agricultural land, overuse and pollution of water supplies, and depletion of fish stocks. 40 These problems can all be crudely characterized as large-scale human-induced problems, with long-term and often irreversible consequences, which is why they are often grouped together under the rubric “ global change. 41 However, they vary greatly in spatial scale: the first two involve genuinely global physical processes, while the last five involve regional physical processes, although they may appear in locales all over the planet. These seven problems also vary in time scale: for example, while a region can be deforested in only a few years, and severe ecological and social effects may be noticeable almost immediately, human-induced greenhouse

warming will probably develop over many decades42 and may not have truly serious implications for humankind for half a century or more after the signal is first detected.

In addition, some of these problems (for instance, deforestation and degradation of water supplies) are much more advanced than others (such as greenhouse warming and ozone depletion) and are already producing serious social disruption. This variance in tangible evidence for these problems contributes to great differences in our certainty about their ultimate severity. The uncertainties surrounding greenhouse warming, for example, are thus far greater than those concerning deforestation. 3 Finally, when we consider the social effects of environmental change, especially of climate change, we should be especially aware of changes in the incidence of “ extreme” environmental events. Social impacts result “ not so much from slow fluctuations in the mean, but from the tails of the distribution, from extreme events. ” While a two-to-three degree celsius mean global warming might not seem too significant for agricultural production, it may produce a large increase in crop-devastating droughts, floods, heat waves, and storms. 46