

Does Climate Change Lead to Violent Conflict?¹

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A range of studies has raised the issue whether environmental degradation may lead to violent conflict, both international as well as civil war. Climate change and its impact on the environment and humans is often perceived to be the most prominent global environmental problem. Thus, it is plausible to ask whether the potential dangers stemming from climate change (see Chapters xx-yy) may actually cause or increase the likelihood of violent conflict. Answering this question is embedded in the much broader academic discussion of “environmental security” - which has raised the issue and led to initial results. This chapter will introduce the reader to the various concepts of environmental security, review the empirical record, highlight its shortcomings, and outline avenues of research how we could contribute to more confidently answer the core question.

1. Definitions of Environmental Security

In a very concise exposition of the term “environmental security”, Soroos (2000, 16-17) distinguishes a traditional and a comprehensive approach. While the traditional approach mainly focuses on the environmental causes of war or the environmental impacts of warfare, the comprehensive approach comprises a broader set of factors including economic wealth, degree of political rights and freedoms, as well as environmental quality. While the second approach has become extremely popular, it begs the question whether it is related to the term “environmental security” in a meaningful way. In effect, nearly all aspects of well-being could be reasonably subsumed under the comprehensive approach; as a consequence, it is even much

¹ I am grateful to Galina Churkina for comments on an earlier version of this

broader than the domain of environmental politics. Therefore, I suggest that the traditional approach offers a much more focused perspective and is more amendable to a research program than the comprehensive approach.

2. The State of Research

Within the more traditional conception of environmental security, a range of studies has been undertaken which try to shed light on the question whether environmental degradation is able to cause violent conflict by itself or in conjunction with other factors. This research has partially been shaped by Homer-Dixon who undertook a series of case studies (see below). In addition, a range of statistical studies has attended to the issue. In the following, I will briefly summarize the most pertinent findings of these groups and evaluate them.

In a series of articles, Homer-Dixon (1991; 1994) raises the issue of whether environmental scarcity leads to undesirable social effects which, in turn, may lead to the onset of violent conflict. Under the category of social effects, Homer-Dixon highlights the role of decreased regional agricultural production, population displacement, decreased economic productivity, and the disruption of institutions. In turn, these four types of social effects may lead to three types of conflict, namely those related to scarcity, group-identity, or relative deprivation.

Many ambiguities surround the influential research undertaken by Homer-Dixon. First, the selection of cases on the basis of the presence of high environmental scarcity and the occurrence of violence of conflict makes any inference on this link unnecessary: Due to the *method* of case selection, it is impossible to find the absence of any link. The method of inference remains unclear even within his own approach – thus potentially rendering any research results contingent on the specific researcher. Moreover, as Gleditsch (1998) suggests, Homer-Dixon is advancing “untestable models” due to their high complexity and lack of an appropriate set of cases to test his hypotheses. Furthermore, Homer-Dixon did not include any components into his research which incorporates the response options of governments.

Investigating the question why states had failed in the post WWII-era, the US State Failure Task Force also considered the question whether environmental factors may cause countries to revert from full democracies to partial ones or even to autocracies. The statistical results show that environmental change is not *directly* linked to state failure, however, environmental changes do influence one very important factor which is strongly related to state failure, namely infant mortality (Esty, Goldstone, Gurr, Harff, Levy, Dabelko, Surko and Unger 1999). The latter represents the much broader concept of “quality of life” within the state failure project. While government capacity to cope with environmental problems was included in the study, the authors were themselves unsatisfied with the validity of the indicator chosen (telephones per capita).

Despite the advances made by the State Failure Project, its methodological shortcomings may compromise their results. An important appraisal by King and Zeng (2000) shows that the omission of prior correction (i.e., correction for the rareness of the event of state failure) lets the State Failure Project be overconfident of its findings. Furthermore, the project is likely to be overly optimistic about its chance to predict state failure as it did not undertake its forecasts on data which were not used for arriving at the model’s causal structure.²

The most convincing results regarding a *direct* link between environmental degradation and the onset of violent conflict has been shown in a study by Hauge and Ellingsen (1998). In a broader quantitative analysis they are able to demonstrate that high degrees of deforestation, soil degradation, and lack of access to freshwater have led to violent conflict. They also show that non-environmental factors outweigh environmental ones in terms of explanatory power.

In conclusion, a range of studies has tried to shed light on the question whether environmental changes can account for the onset of violent conflict. Besides a range of methodological shortcomings, all the studies agree that environmental changes may either directly *or* indirectly account for the onset of civil or international war or state failures. Nevertheless, the studies disagree if there is a *direct* link between environmental degradation and war. The studies also were barely able to answer this basic question, partially for reasons of the factors omitted from their studies. In the following section, I will briefly suggest some very important omitted

factors which could help answer the question whether there is a direct link between environmental degradation and violent conflict.

3. Enhancing the State of Research

Besides employing appropriate methodology (see, e.g., King and Zeng 2000), research on the question of whether environmental degradation causes violent conflict warrants two enhancements. As suggested by the State Failure Project, aspects of policy intervention should be incorporated in such research. Furthermore, focusing on environmental thresholds may help clarify whether violent conflicts that actually occurred have any environmental origins. I will attend to both issues in reverse order (for a longer exposition, see Sprinz and Churkina 1999).

For environmentally-induced violent conflict to occur, the state of the environment must have sufficiently changed so as to qualify as a cause (see Figure 1). Marginal change will not suffice in this context. A reversal in the thermohaline circulation of the oceans (see Chapter xx), as compared to prevailing circulation patterns, certainly represents a major environmental change. Regrettably, all of the studies reviewed in the previous section assume that continuous environmental changes are appropriate explanatory variables. The reader may think of a 10% shortfall of potable water. Does this suffice for a violent conflict – which actually occurred - to qualify as being caused by environmental factors? A statistical analysis may suggest so by looking at continuous variation, but this interpretation would be grossly misleading. To qualify potential violent conflict as being environmental in origin, Sprinz and Churkina (1999) have suggested to focus on environmental thresholds, defined as a “point of a natural system (vegetative, aquatic, etc.) at which the essential characteristics of the natural system’s present state change dramatically or where this impacts socio-economic systems” (ibid.). As Figure 2 shows, we are looking for discontinuities between dose (e.g., water scarcity) and effect (e.g., the degree of wilting of plants), as a case in point. If such discontinuities occur, then the trajectories of responses serve as a criteria that something unusual has changed

² The data should be appropriately split between those for arriving at the causal structure and those (prior unused) data to test the forecasting capacity of the model.

(compare trajectories A and B following the discontinuity). In conclusion, environmental thresholds serve as qualifiers of the *causes* of violent conflict.

The development of new methodologies for diagnosing thresholds is warranted and could help us in sorting out which violent conflicts actually have no *environmental* origins; i.e., if no environmental threshold is passed, we should definitely not find any occurrence of environmentally-induced violent conflict.

Even if environmental thresholds are passed, there is no necessity to automatically fear that violent conflict may ensue (see Figure 1). In fact, governments and social groups are far from helpless. In particular, these actors may design anticipative or remedial environmental policies to counteract the possibility of war. In addition, using conflict management strategies may reduce or avoid the onset of war. Environmental policy is particularly important in the case of climate change. Should natural scientists strongly suggest that environmental thresholds are passed (e.g., change of fertile agricultural land to uninhabitable desert), environmental policies may try to anticipate such impacts and counteract unwanted effects. Drinking water is actually only necessary for very few uses, and as experience of the Middle East shows, water can be recycled in various qualities and allocated to uses which do not require potable water quality (e.g., some types of agriculture). Equally, environmental policy can try use tax laws, physical rationing, improvements of the state of knowledge by way of funding more research, etc. to lessen the likelihood of the occurrence of violent conflict (see Sprinz 1996; Sprinz 1997).

In addition to these environmental policy options, governments and social actors may intervene into violent conflicts in various ways. Third party mediation (e.g., by the United Nations or other international organizations), the use of peacekeeping troops, compensation schemes of the victims, etc. belong to the traditional array of conflict management strategies. As a result, we should not expect environmental problems which pass environmental thresholds to automatically lead to violent conflict.

4. Conclusions

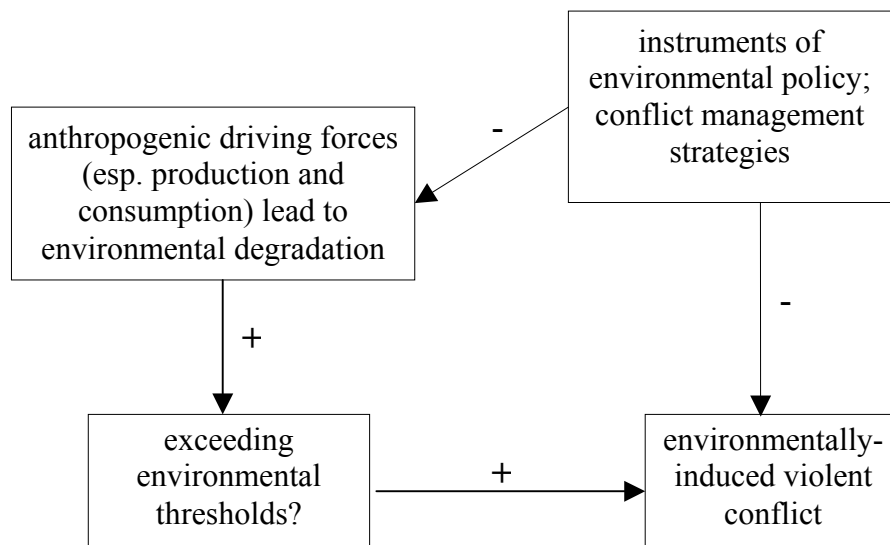
As this overview has shown, it would be premature to decide whether environmental degradation can account, by itself, for the onset of violent conflict. Present research suffers from a variety of shortcomings, both methodologically and empirically. The most important opportunities for intervention, namely environmental policy and conflict management strategies, are barely attended to. Policy-makers in search of corroborated evidence may not be satisfied, but a good research track will take a sufficient amount of time and sustained funding to provide appropriate guidance. What does all of this imply for climate change impacts and the probability of violent conflict?

Given the state of research, we cannot judge whether the dangers posed by climate change will increase the incidence of war. The science of climate change and climate impacts is itself a rather young research venture, and much of the climate impacts feared are results of computer simulation. These simulation studies clearly enhance our understanding of the climate system as well as of climate impacts, but climate change does not belong to the class of phenomena which permit very accurate forecasts so far which would form the basis for a rational, long-term strategy to avoid the incidence of climate wars. Moreover, war is a decision by at least two actors to use means of violence to try to settle a dispute. Therefore, we actually need decision-making models to better explain why war opposed to other means of dispute settlement has been chosen. The best we can presently hope for are credible climate policies which avoid any dangerous interference with the climate system. As a benign side-effect, such policies would also avoid or lessen the incidence of climate-induced wars.

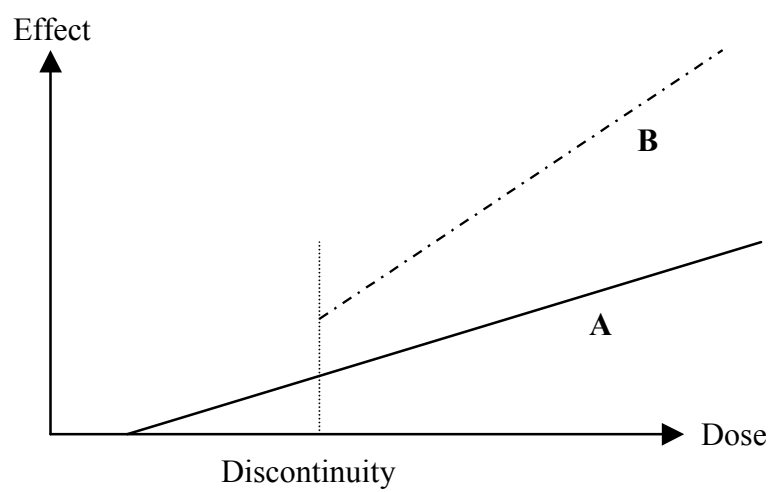
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Figure 1: Explaining Environmental Conflict

Source: Sprinz (1999, 188)

Figure 2: Environmental Thresholds

Source: Sprinz (1999, 190)