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Connecting climate variability and conflict: Implications for empirical testing

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ABSTRACT

Quantitative research on climate variability and conflict is frequently criticized for being theoretically underdeveloped. In this article I discuss the most plausible suggested mechanisms connecting climate variability to conflict explicitly in reference to empirical testing. This approach could help solve the puzzle of how climate variability and conflict are related by highlighting how researchers can establish the key elements in the causal argument before moving on to testing it empirically. More specifically, I emphasize four key elements when evaluating each individual mechanism: first, who are the most relevant actors, second, what are the actors reacting toward (what type of climate variability), third, what conflict type is the most likely outcome, and fourth, what is the most appropriate temporal and spatial scale for each individual mechanism. Although empirical studies have moved toward more focus on theory and explicit tests of hypotheses derived from theoretical frameworks, an overview of how mechanisms are likely to manifest themselves and a discussion on how researchers can model them in analyses are missing in the research field. Adding technical fixes or new datasets to empirical testing does not automatically improve our understanding of the relationship between climate variability and conflict if the choices are not anchored in theoretical expectations.

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Introduction

The topic of climate variability and conflict has given rise to a heated debate among researchers, with some even calling for peace among climate–conflict researchers (Solow, 2013). One recent meta-review argues that there is strong causal evidence linking climate to conflict (Hsiang, Burke, & Miguel, 2013), where others are much more cautious to draw such strong conclusions (Buhaug et al., 2014). Nevertheless, most recent literature reviews emphasize the need for researchers to explain the empirical results in statistical analyses with causal arguments (e.g. Adger, Barnett, & Dabelko, 2013; Buhaug, 2015; Burke, Hsiang, & Miguel, 2015; Salehyan, 2014; and Scheffran, Brzoska, Kominek, Link, & Schilling, 2012 – although Buhaug et al., 2015 go further in establishing a consensus on that climate cause more violence than the other reviews). The implication of quantitative analyses where a simple, direct association between climate variability and conflict is assumed and the causal mechanism is ignored to a large extent is that the relationship between the independent variable, climate, and the dependent variable, conflict, is reduced to a simple stimulus–response relationship. The social world is much more complex; agency can be found in countries,

groups, and individuals alike and they all have the ability to respond to climate impacts in a variety of ways (Raleigh, Linke, & O’Loughlin, 2014). Social researchers do not start out with well-defined objects that can be exposed to stimulus in a sterile environment where the researcher can control for other factors that influence the relationship between the variables. Causal claims such as “if X, then Y” or “if drought, then conflict” are less fruitful because they assume that conflict is an immediate response to physical signals. Together this suggests that researchers within the climate–conflict research field should start with identifying causal mechanisms, select a population of cases where the outcome of interest is possible, and afterward adjust their empirical analyses.

In this article I discuss the most plausible suggested mechanisms connecting climate variability to conflict explicitly in reference to empirical testing. This approach could help solve the puzzle of how climate variability and conflict are related by highlighting how the researcher can establish what the key elements in the causal argument are before testing it empirically. One of the major challenges so far is little or no consensus within each individual mechanism on what the theoretical concepts are and how they should be operationalized empirically. There is already a host of well-written reviews on the general literature on climate and conflict (e.g. Buhaug, 2015; Burke et al., 2015; Gleditsch, 1998; Meierding, 2013; Salehyan, 2008; Salehyan, 2014; Scheffran et al., 2012). However, surprisingly few have attempted to present an overview with focus

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on connecting theory to empirical testing. Two major exceptions are Salehyan (2014) and Buhaug (2015), which both are explicit on key elements to consider when determining how to test causal arguments. However, they do not systematically evaluate individual mechanisms.

An exhaustive list of theoretical arguments connecting climate to conflict is close to impossible to make and is outside the scope of this article. I limit the focus to arguments concerning the production and consumption of primary commodities in Sub-Saharan Africa since the link between climate and conflict is most likely to be found in areas that are highly exposed and vulnerable to climate variability, and also have a high risk of violent conflict (Busby, Smith, & Krishnan, 2014; Ide et al., 2014). The mechanisms evaluated here can be clustered into three main thematic groups of arguments: *economic hardship*, *favorable economic conditions*, and *migration driven by economic factors* (where each group contains several individual mechanisms). The economic hardship argument claims that negative climate impact decreases the availability of resources, which give individuals incentives for participating in violence. The second group, favorable economic conditions, argues that positive climate impacts lead to abundant resources, which make individuals more likely to participate in violence. The third group of arguments concerns the role of migration driven by economic factors and emphasizes that climate variability could influence (real and expected) wage level differentials between individuals, but also that migration could be an adaptation strategy in rural households. Several of the mechanisms connecting climate variability to conflict are highly interrelated and often overlapping and may in fact not be rival arguments (Humphreys & Weinstein, 2008, p. 451).

More specifically, I focus on specific contexts and emphasize four key elements when evaluating each individual mechanism: First, who are the most relevant actors, second, what are the actors reacting toward (what type of climate variability), third, what conflict type is the most likely outcome (which ultimately is a reflection of the actors' strategies), and fourth, what is the most appropriate temporal and spatial scale for each individual mechanism? In other words, how are suggested mechanisms likely to manifest themselves? New variables, datasets, and methodological refinements are necessary for further development of the research field, but using disaggregated spatial analyses, for instance, without reference to spatial dynamics in the theoretical framework is unlikely to increase our understanding of the complex relationship between the natural system and human responses.

Furthermore, with large-scale focus on climate as a direct contributor to conflict, policymakers may feel compelled to generate policies to address this issue, even if the conclusion is not supported by scholars. Among the most prominent examples is the civil war in Darfur in 2003 where several policy documents have referred to climate as an explanation, including the "Post-conflict Environmental Assessment" by the United Nations Environment Programme (UNEP) that explicitly brings forward climate change (UNEP, 2007, p. 9). Several policymakers have also joined this conclusion. For instance, Ban Ki Moon, the United Nations Secretary General, said in a letter to the Washington Post that "[...] the Darfur conflict began as an ecological crisis, arising at least in part from climate change" (Moon, 2007). Scholars have raised concerns about such strong conclusions and argued that there is little or no evidence of a short-term drought in Darfur preceding the 2003 conflict (e.g. Kevane & Gray, 2008). Policies based on statements where the local political and social contexts are taken out of the equation could lead to "a modern form of environmental determinism" (Raleigh et al., 2014, p. 76) and do more harm than good.

The article is structured as follows: first, I present and briefly discuss the core concepts of the article, climate variability and conflict. I also discuss context to establish what the population of relevant cases is likely to be. This is a critical step since the same

phenomenon is likely to manifest itself in different ways under different conditions. Then I move on to describe how the key elements can be operationalized to facilitate empirical testing by focusing on the following four elements: first, who are the most relevant actors, second, what are the actors reacting toward (what type of climate variability), third, what conflict type is the most likely outcome, and fourth, what are the most appropriate temporal and spatial scales for each individual mechanism. Afterward each of the mechanisms is presented and discussed in light of the previous discussion on concepts, contexts and empirical operationalizations. The main aim is to make specific suggestion for each individual mechanism on how it could be tested in the most appropriate way.

Concepts and contexts: climate variability and conflict

Carefully developed concepts and identification of relevant contexts are required for meaningful discussions on the validity of empirical operationalizations and the interpretation of any empirical findings (Adcock & Collier, 2001, p. 529). Concepts are more than a definition; it is the ontology of a phenomenon and decide what is important about an entity (Goertz, 2006, p. 27). Discussions of contexts are also critical since the same score on a variable may have different outcomes depending on the context (Adcock & Collier, 2001), and the outcome of interest (violent conflict) is unlikely to manifest in all cases (Goertz, 2006).

Starting with a discussion of the concepts of interest; what constitutes climate variability and conflict, respectively? One source of confusion within the research field is the distinction between climate change and climate variability. Climate change says something about changes in mean climate at a location over long periods, whereas climate variability describes short-term changes in climate (such as standard deviations, the occurrence of extremes, etc.) (IPCC, 2007, pp. 871–872). An effect of climate variability (anomalously warm or dry periods) on conflict levels cannot automatically be translated into the conclusion that climate change (a warmer planet) will lead to more conflict.

Turning to the second core concept of interest, conflict, I use the term to describe when two (or more) social groups clash and at least one of the groups use physical violence to obtain or express its interests (Ide et al., 2014, p. 69). Conflicts in rural areas in Sub-Saharan Africa are often (although they need not be in all cases) concerned with (ethnic) power struggles, and the access to, use of or control over resources (Raleigh, 2014). To streamline the argumentation, the term "conflict" will be used interchangeably with "violent conflict". One critical element to evaluate is to what extent the identified actors are able to act collectively. Collective action literature states that even though people may have a common interest, this does not necessarily translate into mass participation, since the mobilization costs are high in large groups (Olson, 1965). This is particularly likely for participation in violent action (Kalyvas & Kocher, 2007).

While mechanisms are regular patterns, they should not be understood as law-like statements, making the context imperative: mechanisms manifest themselves differently depending on the context and influences how the dependent variable and independent variable interact (Falleti & Lynch, 2009). For instance, violent conflict is generally not considered as a likely outcome of drought events in Europe or in the US. Supporting this observation is Bretthauer's (2015) QSA study that finds that agricultural dependence and low levels of education are necessary conditions for armed conflicts over scarce resources. This finding is not very controversial; there is broad agreement on that developing countries is the relevant population of cases where there might be a connection between climate variability and conflict.

The interesting contexts when it comes to the climate–conflict relationship are those that make the population *vulnerable* to climate

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