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More droughts, more war?

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Historically, violent conflicts tend to predominantly erupt in bad years, when droughts, floods, or heatwaves put the functioning of societies to the test. Does this mean that violent conflicts will become more frequent as extreme weather becomes increasingly common, globally, because of climate change?

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While each conflict has its specific grievances, the natural and economic environment can tip the scales. During a drought, the opportunities for gainful employment are sparse, and so the time and energy spent on fighting are comparatively cheap. However, the loot is mostly unaffected by the current drought. The winner will move to the top of the food chain for a while to come. This, in a nutshell, is the famous “opportunity cost" model of conflict (Chassang & Padro-i-Miquel, QJP09), which can explain the historical association between weather and violence.

Our point of departure is that we do not consider a static climate environment, where each year has the same likelihood of crop disaster. Indeed, there is no climate change in our story yet: Rain changes every year, but how much a farmer *expects* it to rain does not change from year to year. We want to know whether a lasting change in the weather distribution itself will increase or decrease the frequency of conflict.

There are two main hurdles to overcome: If bad years become the new normal, there will be more years where fighting is “cheap”, but there is also less to gain from fighting, so we need to understand which incentives dominate. The other challenge is to find a tractable but reasonable assumption regarding what this old and new “normal” is in terms of climate distribution. That is where collaboration across disciplines is critical.

The opportunity cost model predicts that violent conflict occurs when annual rainfall falls below some threshold, which is determined by the farmers' expectation about future rainfall and future conflicts. If the frequency of bad years increases without anybody noticing, the threshold remains unchanged. Mechanically, this will increase the frequency of conflict. We believe it is more interesting and realistic to study a scenario where the farmers are aware of the change in weather distribution. However, this recalibration of the threshold makes the prediction less straightforward: If there is less to gain from an attack, the required threshold for peaceful resolution goes down at the same time as the probability of low rainfall increases. Could this reverse the pattern?

To study realistic changes in the rainfall distribution, we use simple models that are common in hydrology and agronomy. In these models, climate change primarily means an increase in the variability of rainfall – meaning both more droughts and more floods. These models' simplicity makes them useful for capturing the “big picture" but does not allow for explicit predictions at a particular place and time. In other words, we are not able to identify emerging geographic hot spots of climate-induced conflict. But that's fine since we are more interested in uncovering the main drivers rather than fitting an excessively complex model.

Indeed, we find that generic predictions are impossible: Sometimes, more variable rainfall leads to more conflict, sometimes to less. This means two things: First, we need more detailed data to make useful predictions. Not just on the impact of climate change on the entire rainfall distribution, but also on how rainfall is linked to people’s economic livelihood. Second, the farmer’s awareness of climate change *matters*. It can mitigate the impact of the increased risk of droughts. To predict conflict risk, it is not good enough to treat humans as robots whose decisions are mechanically triggered by outside events.

The natural next step is to ask what aspects of climate change drive conflict risk up or down. We find that three quantities determine the threshold for peace. Paraphrasing with some simplification, these are the average rainfall, the frequency of droughts, and drought intensity. Since climate change affects all three, we show that this can explain why, all things considered, it sometimes increases and sometimes decreases conflict frequency.