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Climate change causes conflict: How policy can respond

Marshall Burke, Solomon Hsiang, Edward Miguel / 14 Dec 2024

Conflict is tragically common, particularly in low- and middle-income countries. This column reviews the rapidly growing literature linking changes in climate to various types of human conflict and finds that climate change is projected to cause an increase in numerous forms of violent human behaviour. Policies like a robust social safety net and political inclusion can help ensure a more peaceful future.

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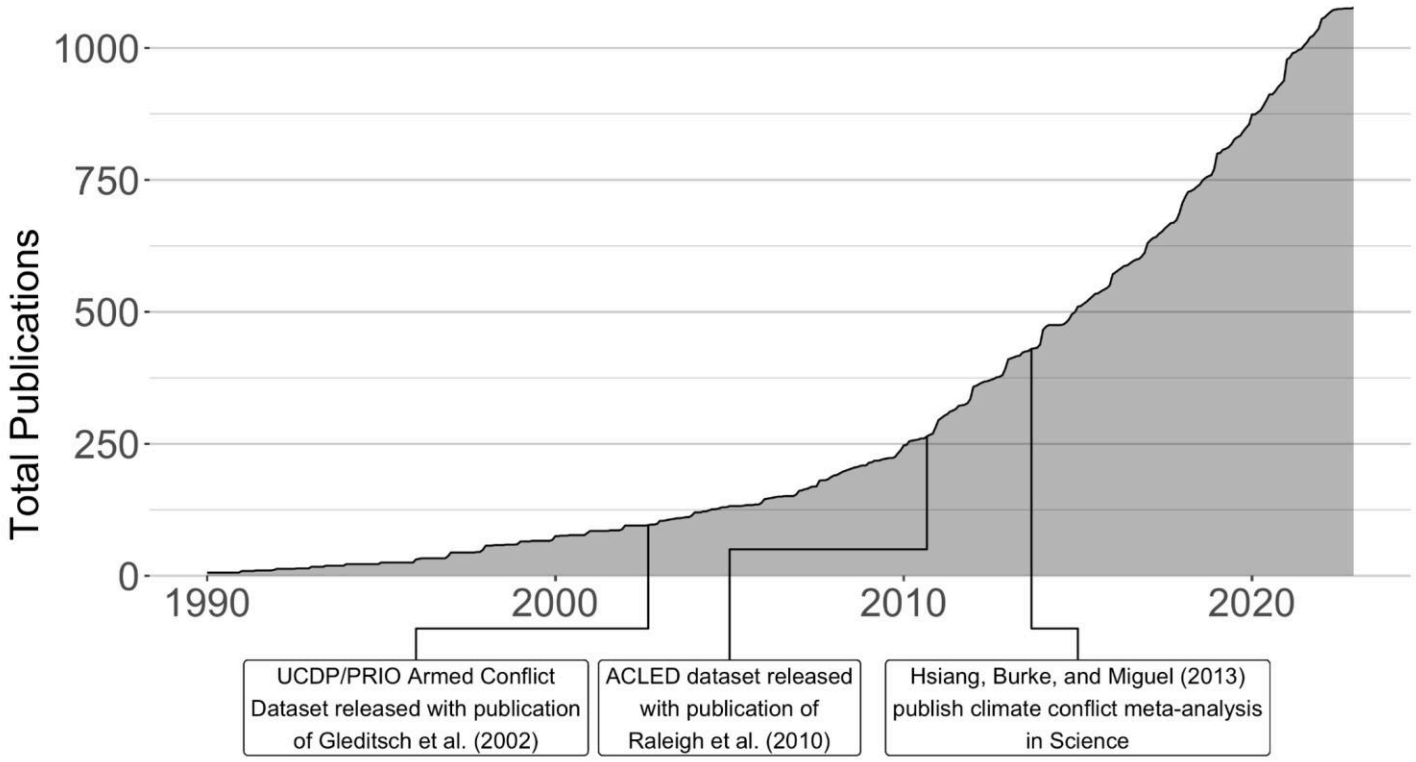
Conflict and violence are antithetical to economic development. The typical civil war reduces the total size of the economy by 15% and causes an additional 500,000 disability-affected life years (Collier and Hoeffler 2007). In addition to direct health consequences, other forms of human capital suffer as well. Education falls by nearly a third of a year on average in cohorts exposed to conflict (Léon 2012) and children exposed to conflict in-utero have lower height and weight (Sardoschau 2024) and higher mortality for nearly a decade after the conflict concludes (Wagner et al. 2018). Less extreme forms of violence have similar negative consequences. For example, gender-based violence in schools leads to disparities in educational attainment between boys and girls (Amaral et al. 2024). There is a wide array of outcomes that are negatively affected by conflict and violence, leading to correspondingly massive social and economic costs (Blattman and Miguel 2010).

which state forces fight a rebel actor (Palik et al. 2022). There are myriad reasons for this increase in conflict worldwide, with one increasingly well-supported hypothesis being that climate change is increasing human violence in many forms. Under this view, limiting the suffering caused by conflict will require, in part, bolstering policies that can reduce climate impacts on violent behaviour.

There is a growing body of research on the climate-conflict relationship

In a recent article (Burke et al. 2024), we conducted a review of the rapidly growing research area linking changes in climate to various types of human conflict (see Figure 1). Our meta-analysis includes 80 empirical studies that linked a climate variable to a conflict outcome, more than double the number included in previous analyses (Hsiang et al. 2013, Burke et al. 2015). We find impacts of temperature on group conflict and interpersonal violence that are somewhat smaller than the previous meta-analysis estimates, though still very large in economic terms. Our main estimates imply an approximately 4.9% to 9.8% increase in group conflict and 3.8% to 7.6% increase in interpersonal conflict due to the average changes in climate expected by 2050. This analysis also includes eight studies linking temperature anomalies to self-harm, similarly, finding a 4.3% to 8.6% increase by 2050.

Figure 1 The number of publications exploring the climate-conflict relationship has grown rapidly over the past two decades



***Notes*: This count was carried out as follows. We accessed the Elsevier Search API, accessing SCOPUS, across all journals, on June 4 2022 and used the following keywords: (Conflict OR War OR Crime OR Suicide OR Self-harm) AND (Climate OR Weather OR Temperature OR Heat OR Precipitation OR Rainfall). Not all of these studies are relevant for the quantitative meta-analysis that follows but they provide an indication of the growth in research on this topic overall across various academic fields and methodologies.**

We also identify a number of studies that explore why climate shocks lead to increased conflict and what can be done to reduce their impact on violent behaviour. We again focus on empirical studies which could credibly estimate these mediating and moderating effects. This review of the literature identifies five main channels: (1) economic conditions, (2) socio-demographics, (3) migration and transportation, (4) politics and institutions, and (5) psychology and physiology. Each of these areas suggests potential policies to reduce the violent consequences of climate change.

The role of the social safety net in buffering the effects of climate shock on conflict

One of the most consistent findings across studies from various contexts is the ability of robust social safety nets to limit the impact of climate shocks on various forms of violence. Three studies in particular use a similar research design in different LMIC contexts, comparing the strength of the relationship between a climate shock and a form of violent conflict before and after the expansion of a safety net programme across locations that either do and do not benefit from the expansion. Fetzer (2020) studies the role of India's rule employment guarantee, NREGA, in moderating the effects of monsoon rainfall on Naxalite rebellion conflict. Garg et al. (2024) study how the relationship between temperature anomalies and homicide in Mexico is affected by the arrival of the landmark cash transfer programme Progresa. Christian et al. (2019) analyse the effects of the Program Keluarga Harapan, a large cash transfer programme in Indonesia, on the relationship between rainfall and suicide. All three of these studies find a weaker climate-conflict relationship in locations that received enhanced programme benefits, though in the case of Progresa the effect of temperature on homicides returns to its original level over the following five years.

Taken together, the three studies suggest that social safety net programmes can help reduce rates of conflict, in a wide variety of forms, by

employment guarantees, other safety net programmes may have similar impacts. For instance, index-based livestock insurance (Chantarat et al. 2012) and other forms of insurance may be particularly effective at smoothing income in the face of climate shocks.

How can individuals smooth their income in response to climate shocks

If social safety nets are effective at reducing the impact of climate shocks on violent outcomes because of their income-protective effects, other policies that also decouple weather and income could lead to similar benefits. Indeed, in our review of recent research this appears to be the case.

For instance, Gatti et al. (2020) study the relationship between rainfall and various forms of violence in Indonesia, similar to Christian et al. (2019). Rather than studying the moderating effect of a cash transfer, however, Gatti et al. analyse how the presence of irrigation alters this relationship. Irrigation helps decouple the link between weather and agricultural productivity, as crops no longer rely on current rainfall for water availability. They find that breaking this link between weather and productivity also substantially weakens the association between weather and conflict.

While Gatti et al. focus on irrigation as an agricultural income smoothing mechanism, it is plausible that other technologies which similarly weaken the relationship between weather and productivity – such as drought or flood tolerant crop varieties, climate-smart agricultural practices, and the cultivation of more resilient crops – may have similar effects. In line with this reasoning, Jia (2014) finds that the adoption of the drought-resistant sweet potato in China over the period 1470-1900 led to a weaker relationship between droughts and peasant revolts.

Political inclusion facilitates alternative forms of resolution

Another policy area that may help dampen the impacts of climate change on conflict is political inclusion. There is some evidence that when marginalised groups are included in political decision-making, the relationship between weather shocks and violent behaviour is weakened.

One piece of evidence supporting this comes from Almås et al. (2019), who study the effects of temperature on human behaviour in labs in Nairobi, Kenya and Berkeley, California. By experimentally varying temperature in the lab when participants were playing various games related to economic behaviour and interpersonal decision making, they cleanly identify causal effects of heat on different forms of decision-making. Notably, they find that participants from politically-disadvantaged ethnic groups in Nairobi reacted more negatively in the Joy of Destruction game – which mimics aggressive behaviour that harms other players – when playing at a hotter temperature. While indirect due to the lab nature of the behaviour, this is at least suggestive that politically excluded individuals react more violently to weather shocks.

Similar findings have been found outside of the lab. Guariso and Rogall (2021) explore the role of rainfall inequality on ethnic conflict in Africa, studying whether variation in the amount of rainfall received across ethnic homelands can exacerbate conflict. Importantly, they find that conflict is especially more likely when a politically disadvantaged ethnicity receives less rainfall than their more advantaged neighbour. Again, this finding suggests that balancing political power and access across social groups may help mitigate the most violent consequences of weather shocks.

Nunn and McGuirk (2021) also come to a similar conclusion in their study of farmer-pastoralist conflict in the Sahel. They find that rainfall shocks force transhumant pastoralists to graze their herds on agricultural land and that these encounters lead to a greater likelihood of conflict outcomes. Importantly, these effects are weaker when pastoralists are better represented in the national government, again suggesting that political inclusion makes conflict a less attractive mode of resolving inter-group disputes.

Key takeaways for navigating the intersection of climate change and conflict

There is by now a very large and robust body of empirical evidence spanning multiple academic disciplines – including economics, political science, international relations, and history – on the relationship between climate and conflict, along with a number of channels credibly linking them. Our new meta-analysis estimates suggest large damages from various forms of violence under projected warming, but by necessity these projected impacts do not incorporate potential future adaptations, such as additional policy interventions not observed historically.

The strongest available evidence suggests that increasing the effectiveness of the social safety net, particularly for populations whose income is most sensitive to weather fluctuations, is one policy area that can mitigate the effects of those fluctuations on violent outcomes. Other policies which decouple income from weather, particularly the promotion of climate-smart agricultural technologies appear promising for similar reasons. Finally, political inclusion appears to be key to providing alternative forms of resource allocation and decision-making when climate conditions worsen. Continuing to make progress in these policy areas in low- and middle-income countries and beyond will be crucial to avoid some of the damages likely to result from climate change in the coming decades.

Editors' note: This column also appeared on VoxDev.org.

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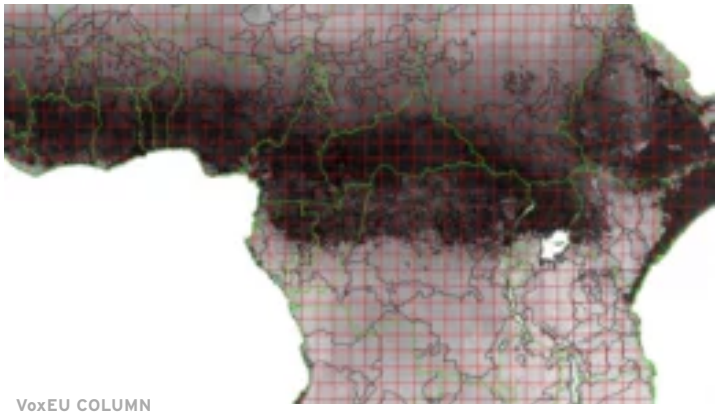

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