

## As Climate Change Worsens, So Will Human Violence

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Ever notice how easily tempers flare when it's especially hot and humid? Or when it hasn't rained for days on end?

Apparently, humans have reacted negatively to extreme weather for centuries, with even minor departures from normal temperatures or rainfall levels directly linked to higher incidence of human violence, according to researchers at the University of California, Berkeley, and Princeton University.

And, we should get ready for things to get worse, as [climate change](#) accelerates, warn the researchers.

The analysis draws on dozens of previous studies into civilizations dating back as far as 10,000 B.C.; 78% of the studies were published since 2009.

"What was lacking was a clear picture of what this body of research as a whole was telling us," says Solomon Hsiang, the study's lead author, who was a postdoctoral fellow in Science, Technology, and Environmental Policy at Princeton during the research and is now an assistant professor of public policy at UC Berkeley's Goldman School of Public Policy. "We collected 60 existing studies containing 45 different data sets and we re-analyzed their data and findings using a common statistical framework. The results were striking."

The researchers studied three specific types of human conflict:

- Personal violence and crime such as murder, assault, rape and domestic violence;
- Intergroup violence and political instability, like civil wars, riots, ethnic violence, and land invasions;
- Institutional breakdowns, such as abrupt and major changes in governing institutions or the collapse of entire civilizations.

All three types of violence demonstrated systematic responses to changes in the local climate, with the impact on intergroup conflict particularly pronounced, say the researchers.

Examples cited by the researchers include spikes in domestic violence in India and Australia; increased assaults and murders in the US and Tanzania; ethnic violence in Europe and South Asia; land invasions in Brazil; and civil conflicts throughout the tropics. Reaching even farther back for evidence, the researchers note that the Mayan civilization appears to have collapsed during long periods of drought. In China, most dynasties have collapsed during dry spells.



In order to evaluate the impact across multiple regions, the researchers converted the climate change variables into units of standard deviation. "We found that a 1 standard deviation shift towards hotter conditions causes the likelihood of personal

violence to rise 4% and intergroup conflict to rise 14%," says Marshall Burke, the study's co-lead author and a doctoral candidate at UC Berkeley's Department of Agricultural and Resource Economics.

With climate models projecting global temperature increases of at almost 4 degrees Fahrenheit over the next 50 years, the findings suggest that the rate of intergroup conflicts such as civil wars could increase by more than 50% in many parts of the world.

"We often think of modern society as largely independent of the environment, due to technological advances, but our findings challenge that notion," notes study coauthor Edward Miguel, UC Berkeley's Oxfam Professor of Environmental and Resource Economics and director of the Center for Effective Global Action (CEGA) based at UC Berkeley.

"Our results shed new light on how the future climate will shape human societies," adds Burke.

For more details on this groundbreaking research, watch this interview with one of the researchers: