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Does new research explain the link between climate change and conflict, or show how hard that is to do?

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The world is likely to become a more dangerous place as global temperatures rise. That's according to a new study, which analyses a huge swathe of scientific and social research to come to its conclusions. Critics have questioned the rigour of the findings - but could the research be an important step in understanding the role environmental stresses play in conflict?

New study

Even minor shifts in temperature or rainfall "substantially increase" the risk of conflict, according to the new paper, published yesterday in the journal Science. The team examined data from 60 quantitative studies, from disciplines including economics, criminology, geography and political science, and covering 10,000 BC through to the present day.

Put rather crudely, it appears that when temperatures rise, so do tempers. Co-author Marshall Burke told the Today Programme this morning that high temperatures magnify violent behaviour:

> "If you look across society as a whole [...] on hot days we see things like assaults and rapes and murders going up pretty dramatically."

The research claims incidents such as spikes in domestic violence in India and Australia, increased assaults and murders in the US and Tanzania, and "even the collapse of the Mayan and Chinese empires" all bear the hallmarks of climatic changes such as drought or higher than average temperatures.

Of course, a hot day isn't the same as climate change. But the authors point out that we can expect more temperature and weather disruption in the future - and say governments all over the world should take notice:

> "Given the large potential changes in [rainfall] and temperature regimes projected in coming decades, our findings have important implications for the social impact of anthropogenic climate change in both low-and high-income countries."

A mixed reaction

Some academics appear unconvinced, as Climate Central reports. It quotes Halvard Buhaug at the Peace Institute in Oslo, whose work questions efforts to link climate change to conflict. He says:

> "Surprisingly, the authors provide no examples of real conflicts that plausibly were affected by climate extremes that could serve to validate their conclusion. For these and

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other reasons, this study fails to provide new insight into how and under what conditions climate might affect violent conflict."

Other researchers have been more positive about the findings. Marc Levy at Columbia University tells the website that the study is an important step in explaining how, while often not the primary driver, climate can contribute to conflict. The publication of the study, he says, reflects developing confidence in the research community over the link.

Other researchers have flagged the caveats. Thomas Homer-Dixon at the University of Waterloo in Canada said the study is careful to acknowledge that while it is able to draw some strong conclusions, further research is needed in many areas.

Jeffrey Mazo, research fellow for environmental security and science policy at the London-based International Institute of Strategic Studies tells Carbon Brief that while he has not yet read the paper, his initial reaction is cautious - even though news reports on it suggest it reflects his own views.

Mazo says this kind of quantitative analysis is only part of the picture, and cannot be taken as conclusive. While it may be possible to identify regions of risk, Mazo says, it is almost impossible to work out how big the risk is. The next Arab Spring, for example, could still surprise the world, he says.

Making sense of cacophony

Climate change's contribution to security concerns is a major subject for research by the policy and defence communities. They want to understand how climate-related shocks like food price spikes and drought might have contributed to events like the Arab Spring and the war in Syria - and to map out what may happen in the future.

Last year, the UK Ministry of Defence (MoD) published the latest report in its Global Strategic Trends series, which examined the threats and opportunities climate change - among other influences - may pose in future. As others have stressed, the report says higher temperatures and food and water shortages exacerbated by climate change could play a part in bringing tensions between different groups to a head. But it's not easy to predict where or how it might happen.

Ian Shields, a former MoD forecaster who worked on the report, told Carbon Brief that the department is specifically looking at three trends occurring as a result of climate change and how they may affect populations:

"The impacts of changing rainfall and how that will affect food production, with hunger possibly leading to instability and conflict. Desertification is another key issue that will have a profound effect on North Africa, a region that is already unstable and close to Europe. Finally, we also looked at melting Arctic ice, which has profound implications for access to resources and to shipping lanes and again may lead to disputes over borders and ownership of resources."

Blazing a trail

Past research has tended to focus on the links between climate change and what we'd conventionally call war - conflicts between states. But Shields says in the future we face a new kind of conflict - "multi-faceted and far more complex in both origin and solution."

New studies are becoming more sophisticated - both in their understanding of what conflict will look like in the future, and in identifying areas that could help scientists and policymakers pin down the relationship between climate change and conflict. And lead researcher on the new study, Solomon Hsiang is optimistic about where the research is heading:

"We're in the same position that medical researchers were in during the 1930s: they could find clear statistical evidence that smoking tobacco was a proximate cause of lung cancer, but they couldn't explain why until many years later. In the same way, we can show that climatic events cause conflict, but we can't yet say exactly why."