

## AGRICULTURE

# Disaster reduction

Extreme weather events, in the form of droughts, floods and heatwaves, have significantly impaired regional crop production in recent decades. How these events have played out at a global scale to influence agricultural production has remained unclear, however.

Corey Lesk of McGill University, Canada, and colleagues address just this question. They examine the effect of extreme weather disasters — extreme weather events classified as having a substantial human impact — on global cereal crop production between 1964 and 2007 (*Nature* **529**, 84–87; 2016). Analysing data from around 2,800 extreme weather events, together with national crop production data, they find that drought and extreme heat reduced national cereal production by around 9–10% over this period.

Production losses under drought were underpinned by a reduction in yields and the area harvested. In contrast, losses under extreme heat — which had little effect on area harvested — were largely driven by a reduction in yields. The differential impact of these events on harvest area may stem from the fact that extreme heat events were typically shorter in duration, lasting no longer than one year, whereas one-third of the droughts studied lasted several years.

Breaking the data down by region, Lesk *et al.* find that developed countries



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were the worst hit when it came to drought. North America, Europe and Australasia combined lost nearly one-fifth of their production to drought, whereas Asia lost 12%, Africa 9.2%, and Latin America and the Caribbean saw no effect. The greater sensitivity of developed nations to drought may stem from their reliance on monocultures and yield-maximizing strategies, the researchers note.

Finally, more recent droughts seem to have had a more deleterious impact on crop production than earlier droughts. Whether this result has some physical basis, in the form of more intense droughts or greater vulnerability or exposure to drought, or whether it simply stems from improvements in reporting, remains to be seen.

Whereas drought and extreme heat have clearly taken their toll on agricultural production over the past five decades, Lesk *et al.* found no effect of flooding or extreme cold within the confines of their analysis. This lack of effect may be due to the fact that susceptibility to cold, and the risk of flooding (at least in temperate regions), tends to be highest outside of the main growing season. In addition, floods tend to be highly localized, so any effects on crop production may be missed at a national scale.

It is clear that the global consequences of extreme weather disasters for cereal crop production are severe. Given the projected rise in the probability and intensity of extreme weather events over the coming decades, adaptation measures — be they in the form of technology, infrastructure, management or insurance — must be implemented if vulnerable populations are to be protected and global food security ensured. □

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