

Is rainfall a greater threat to China's agriculture than warming?

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New research into the impact of climate change on Chinese cereal crops has found rainfall has a greater impact than rising temperature. The research, published in the *Journal of the Science of Food and Agriculture* found that while maize is sensitive to warming increases in temperature from 1980 onwards correlated with both higher and lower yields of rice and wheat.

The study was carried by Dr. Tianyi Zhang, from the Institute of [Atmospheric Physics](#), and Dr. Yao Huang, from the Institute of [Botany](#), both at the [Chinese Academy of Sciences](#). The paper is part of a special collection of free articles on the links between climate change, agriculture and the function of plants.

"China has experienced significant [climate change](#) over the last century", said Zhang. "The annual mean [air temperature](#) increased by 1.1 °C from 1951 to 2001, [rainfall](#) in Western China increased by up to 15% per decade and decreased in the North."

"Projections from climate models predict that mean temperature could rise by 2.3-3.3 °C by 2050 while rainfall could increase by 5-7%," said Huang. "This could have a major impact on China's agriculture which accounts for 7% of the world's arable land but feeds about 22% of the global population."

The authors turned to China's provincial agricultural statistics and compared the data to climate information from the China

Meteorological Administration. They focused their analysis on China's main cereal crops, rice, which is grown throughout China, as well as wheat and maize, which are mainly grown in the North.

The results show a significant warming trend in China from 1980 to 2008 and that maize is particularly sensitive to warming. However, they also found that rising temperature collated with both higher and lower wheat and rice yields, refuting the thoughts that warming often results in a decline in harvests.

"Of the three cereal crops, further analysis suggested that reduction in yields with higher temperature is accompanied by lower rainfall, which mainly occurred in northern parts of China," said Zhang. "This suggests it was potentially droughts, relative to warming, that more affected harvest yields in the current climate."

"It is often claimed that the rising temperature causes a decrease in the yields of Chinese [cereal crops](#), yet our results show that warming had no significant harmful effect on cereal yields especially for rice and wheat at a national scale from 1980 to 2008," concluded Zhang and Huang.

"However, warming may still plays an indirect role, like the exacerbated drought conditions caused by the rising temperatures."

More information: Tianyi Zhang, Yao Huang, Impacts of climate change and inter-annual variability on cereal crops in China from 1980 to 2008, *Journal of the Science of Food and Agriculture*, 2011, [DOI: 10.1002/jsfa.5523](https://doi.org/10.1002/jsfa.5523)

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