

Warmer Arctic harms crops in US, Canada: study

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Warmer-than-average years in the Arctic can lead to harsh winters in the upper reaches of Europe and North America, and diminished rainfall in the southern part of the United States

Exceptionally warm years in the Arctic have provoked extra-cold winters and springs further to the south, decreasing crop yields across central Canada and the United States, researchers said Monday.

"Our study demonstrates for the first time an apparent linkage between Arctic temperature variations and agricultural productivity in mid-latitudes," they reported in the journal *Nature Geoscience*.

Overall, global warming during the last half-century has boosted plant growth in temperate and boreal zones.

Forests and other vegetation help absorb carbon dioxide, a greenhouse gas released into the atmosphere mainly by burning fossil fuels.

But that fringe benefit in the fight against climate change can be undercut when especially hot weather hits the ice-covered Arctic, where surface temperatures have risen more than twice as fast as for the planet as a whole.

The study confirms recent research showing that warmer-than-average [years](#) in the Arctic over the last three decades can lead to harsh winters in the upper reaches of Europe and North America, and diminished rainfall in the southern part of the United States.

During these Arctic hot spells, more autumn sea ice melts than usual, affecting atmospheric circulation so that more cold air descends from the north in winter.

When this extends into spring, plants—including food crops—are vulnerable to damage and stunted growth.

Harsh winter weather also decreases the capacity to take up CO₂, which plants absorb during photosynthesis.



Photo of NASA's Operation IceBridge, which has been studying how polar ice has evolved over the past nine years in the Arctic Ocean

Silver lining

Over the last 30 years, excessively warm Arctic spells prevented [plants](#) from absorbing nearly 370 million tonnes of CO₂, about the same amount France or Australia emit in a year, the researchers estimated.

Led by Jin-Soo Kim, a team of scientists connected the dots by analysing sea-surface temperature records for the Bering Sea, which lies between Siberia and Alaska, and through computer modelling.

Years with higher Arctic temperatures correlated strongly with unusual air flow patterns over Alaska that resulted in "substantial cooling" over most of North America, as well as drier weather in the south.

In these years, the capacity of plant life in temperate zones to absorb CO₂ declined by about 14 percent, and [crop yields](#) in affected parts of North America fell by one to four percent, the study showed.

"Irrigation could be used in water-limited regions to counter the drying effects, but spring frost may be harder to manage after sowing, and may impose heavy losses," Ana Bastos, a researcher at the Climate and Environment Sciences Laboratory near Paris, said in a comment, also in *Nature Geoscience*.

The negative impact of Arctic weather did have a silver lining, she added.

"The results may allow farmers to anticipate spring [weather](#) and manage their crops accordingly."

Polar ice experts predict that the Arctic could see its first ice-free summer within a couple of decades.

More information: Jin-Soo Kim et al. Reduced North American terrestrial primary productivity linked to anomalous Arctic warming, *Nature Geoscience* (2017). [DOI: 10.1038/ngeo2986](https://doi.org/10.1038/ngeo2986)

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