

Model suggests Indian Ocean Dipole changes are reducing wheat yields in Australia

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A team of researchers affiliated with multiple institutions in China and Australia attributes reduced rainfall on Australian wheat fields to disruptions to the Indian Ocean Dipole due to climate change. The study is published in *Nature Food*.

Prior research has shown that the Indian Ocean Dipole (IOD) has a major impact on the amount of rainfall in Australia. In years with a positive IOD, warm sea surface water is pushed by winds toward Africa, leaving cooler water near Indonesia and parts of Australia. This results in less rainfall in both areas. During years of negative IOD, the reverse occurs, and more rain falls on Australia. In neutral years, the IOD has no impact on rain in Australia. Prior research has also shown that wet La Niña and dry El Niño events also have an impact on the amount of rainfall in Australia. In this new effort, the researchers studied these events as the region grows warmer due to [climate change](#) using [machine learning](#).

The work involved studying rainfall patterns over Australia going back to the 1800s. They trained a machine-learning application to recognize impacts of changes to the IOD and/or La Niña and El Niño events using the data they compiled. They used data from the machine learning app to create a model depicting [weather conditions](#) for the region over the past several years and predicting what might occur in the future. They also added data regarding wheat yields, crop management changes, sowing and reaping times and the kinds of wheat that have been planted.

The model showed that as the climate has grown warmer, there have been more frequent positive IOD events, leading to less rainfall, which has led to slowly decreasing [crop yields](#)—a finding that matches reports from wheat farmers. They also found that during times when positive IOD events coincided with El Niño events, Australia experienced extremely dry conditions.

More information: Puyu Feng et al, Increasing dominance of Indian Ocean variability impacts Australian wheat yields, *Nature Food* (2022). [DOI: 10.1038/s43016-022-00613-9](https://doi.org/10.1038/s43016-022-00613-9)

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