Improved seasonal climate prediction for maize yield forecasts in Europe

A team of scientists from BSC and the JRC publishes an innovative study in Nature’s Scientific Reports.

Crops that are generally dependent on weather conditions are heavily impacted by climate variability and extremes. One of the problems in forecasting crop yields is the lack of reliable long-term forecasts of extreme events, such as the 2003 heatwave in Europe.

A team of scientists from the EC’s Joint Research Centre (JRC) and Barcelona Supercomputing Center (BSC) has developed a novel approach that integrates seasonal climate predictions to forecast maize yields for Europe. They show that seasonal climate forecast initialised with realistic land surface data (such as soil moisture content) helps better forecast the impact of seasonal climate on maize yields. This new approach can greatly help make reliable forecasts of crop yields.

The authors used a combined stress index (CSI) to estimate the impact of drought and high temperatures (two of the main stress factors that affect crop yields) on maize yields. Using their CSI model, the authors were able to accurately predict different maize yields in many European countries. They also found that the variability and intensity of extreme weather events have increased since 1990.
“We have carried out the climate simulations, prepared the meteorological variables for being used in the crop model and discussed the validation of crop predictions with our colleagues at JRC. Without the calculation capacity to perform the climate simulations and the storage to save the meteorological variables, this research could not have been done”, says Francisco J. Doblas-Reyes, one of the authors of the paper and Director of the Earth Sciences department at BSC.

These results are highly relevant, particularly in the context of climate change. Based on accurate seasonal climate predictions, agricultural producers can implement short-term adaptation measures and minimise the socio-economic impacts of significant crop losses. While greater efforts are needed to increase the reliability of seasonal CSI forecasts, this study can serve as a baseline for future analyses.

You can read the article “Land-surface initialisation improves seasonal climate prediction skill for maize yield forecast” here: https://www.nature.com/articles/s41598-018-19586-6

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