

research highlights

CLIMATE CHANGE

Variance in crop yields

Proc. Natl Acad. Sci. USA **114**, E2285–E2292 (2017)

GETTY IMAGES/STOCKPHOTO
THINKSTOCK IMAGES \ MARCOPHOTO



Accurate projections of climate impacts on agricultural production need to take account of local factors as not all geographic regions are affected equally by climate events. Xin-Zhong Liang at the University of Maryland and colleagues have established a model that links climate variability with agriculture production by studying changes in productivity and variance in US Department of Agriculture figures over the past 60 years.

Total factor productivity (TFP) is a measure of yields per unit of input. In US agriculture, TFP had relatively stable growth from 1951–1981, while after that period both TFP and the change in annual rate became highly variable with many regional climatic events, such as floods, droughts and cold spells, affecting agricultural output. By using models that compare climate variability to TFP change on a yearly basis, the researchers found that while climate correlated with 50% of the variance in TFP from 1951–1981, over 70% of the variance from 1981 onwards was due to climate instability.

Exogenous and economic factors play a role in agricultural output, and technological advancement has continued to boost productivity, but such growth is hampered by climate instability and reduces the resilience and sustainability of regional and national agriculture. The authors predict that TFP will continue to show a downward trend as warmer seasons and reduced precipitation in five major agricultural regions of the United States are connected to the general trend of climate warming. In fact, climate change could eventually overwhelm all gains achieved in US agricultural productivity since 1981, a major blow for food security both domestically and globally.

Ryan Scarrow