

Rising temperatures threaten a food crisis

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Credit: David Spencer

A recent study reports that the geographical range of some agricultural crops -- such as corn and beans -- may be greatly reduced if temperatures continue to rise. While some farmers may be able to readjust what they grow, others may have to give up, producing a disaster.

Food prices have been rising, and climate change is likely to have a larger effect on [food](#) production in the future. These issues might be expected in southern Asia and Africa, but if temperatures keep rising, even places now reasonably secure such as China and Latin America could face a [food crisis](#) within two generations.

The study was published by the CGIAR Research Program on Climate

Change, Agriculture and Food Security, a non-governmental research organization.

The researchers used current [climate models](#) to produce the maps which match "climate hotspots," places where [climate change](#) is expected to be at its most extreme, and indicators of future food problems. One map shows "climate thresholds," where rising temperatures would make growing certain crops untenable. Another shows densely agricultural areas that may be sensitive to temperature changes, and a third shows areas where producing food always has been problematical.

"When you put these maps together they reveal places around the world where the arrival of stressful growing conditions could be especially disastrous," wrote the study's lead author Polly Ericksen, a senior scientist at the CGIAR's International Livestock Research Institute in Nairobi, Kenya. "These are areas highly exposed to climate shifts, where survival is strongly linked to the fate of regional crop and livestock yields, and where chronic food problems indicate that farmers are already struggling and they lack the capacity to adapt to new [weather patterns](#)."

Currently, there are 56 million people who are "food insecure," who live in areas where sustained maximum daily temperatures are expected to rise above 86 degrees F, a temperature at which beans are no longer a viable crop and maize and rice suffer, the report said. These areas include West Africa, India and China.

In India and sub-Saharan Africa, where farmers now are living on the edge, it is possible that the growing season could shrink by five percent. Some 396 million people depend on local agriculture in those zones.

By 2050, the prime growing season is likely to fall below 120 days in intensively farmed regions of northeast Brazil and Mexico, a number

crucial to many crops.

According to press reports, the effects are already showing in Mexico. A combination of heavy rains and high temperatures has stunted the mango crop for the second year in a row in the area around the Mexican state of Chiapas. The fruit being produced is inedible and the size of the crop has fallen 60 percent. Most of Mexico's mango crop is eaten by consumers in the U.S.

Even ocean aquaculture can be affected. In the Pacific Northwest, rising acidity in the ocean is threatening the abalone, an already endangered sea snail coveted by dinners as a delicacy. Northern fisheries were closed in 1990 to protect the endangered animal but wild populations are still declining, according to Canadian researchers.

Increased acidity would affect not just coastal economics but any prospect of saving the abalone through aquaculture, according to Christopher Harley, an associate zoology professor at the University of British Columbia in Vancouver. Scientists there took northern abalone larvae and subjected them in the lab to increased carbon dioxide in sea water. When the CO₂ increased from 400 to 1,800 parts per million, 40 percent of the larvae died and those that survived produced snails with shell abnormalities.

The levels were chosen for the study because they represented "future predicted levels of CO₂," according to Ryan Crim, a graduate student who participated in the research and now teaches at Northwest Indian College in Bellingham, Wash. The current models predict levels will reach between 590-1,000 parts per million by the end of the century.

"Eighteen hundred parts per million is ecologically relevant in the sense that the atmosphere is expected to reach that level, but not for another several hundred years," said Crim. "It is likely that levels as high as

1,800 parts per million CO₂ can occur during isolated, short-term events."

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