Report: Corn and Soy Yields May Plummet by 30 Percent

Newswise — Increasingly harsh drought conditions in the U.S. Midwest's Corn Belt may take a serious toll on corn and soybean yields over the next half-century, according to research published today in the journal Science.

Corn yields could drop by 15 to 30 percent, according to the paper's estimates; soybean yield losses would be less severe.

North Carolina State University's Roderick Rejesus, associate professor of agricultural and resource economics and a co-author of the Science paper, says that corn and soybean yields show increasing sensitivity to drought, with yields struggling in dry conditions in Iowa, Illinois and Indiana during the 1995 to 2012 study period.

"Yield increases are getting smaller in bad conditions," Rejesus said. "Agronomic and genetic crop improvements over the years help a lot when growing conditions are good, but have little effect when growing conditions are poor, like during droughts."

U.S. corn and soybeans account for approximately 40 and 35 percent of global production, respectively, making the results important to the world's food supply.

Using field data over an 18-year period, the researchers point to the effects of vapor pressure deficit (VPD) on corn and soybean yields. VPD includes temperature and humidity measures; extremes at either end of this variable signify drought or too much water for crops. Akin to the sweet spot on a baseball bat, the best VPD condition is a value in its middle range.

Some 29 climate estimates modeled in the paper suggest that VPD will rise significantly over the next 40 years, bringing on more severe drought conditions.

The researchers ran the same tests using the Palmer Drought Severity Index, another widely used measure capturing nationwide temperature and humidity, and reported similar results. They also ran the same tests for a broader group of Corn Belt states to include South Dakota, Nebraska and Kansas. Those tests confirmed the results found in Iowa, Illinois and Indiana.

Rejesus adds that crop densities may be one reason for the problem. When plants are placed closer together, he says, it's easier for bad conditions to affect more plants. Crop simulations conducted in the study supported this notion.

Rejesus says that research into more drought-resistant seeds or other ways of combating sensitivity to drought is necessary because the findings have strong

implications throughout the food chain.

"There are a number of risk management implications for farmers," he said. "Should farmers – 80 percent of whom already purchase crop insurance – buy even higher levels of crop insurance? What kinds of safety nets should be in place for farmers, if any? What happens to meat prices when corn yields diminish? There are lots of tradeoffs involved in this issue."

Lead author of the paper is David Lobell of Stanford University. The research was funded by the National Science Foundation and the National Oceanic and Atmospheric Administration.

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