

Extreme heat and droughts -- a recipe for world food woes

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(CNN) -- With extreme heat and the worst drought in half a century continuing to plague the farm states, there are important lessons to be learned for all of us -- farmers, consumers and the world's poorest populations alike -- about the effect of climate change.

The Agriculture Department announced this season's first major crop yield forecasts, and they weren't pretty: a nationwide average of 123.4 bushels of corn per acre, the lowest level since 1995. Soybean yield is expected to be low too, though not as bad as corn.

The United States, which is the world's largest producer and exporter of staple grains, is grappling with the biggest surprise in production shortfalls since the Dust Bowl of the 1930s.

Certainly, this July surpassed July 1936 as the hottest month on record.



NASA scientist links climate change, extreme weather

What do the 2010 heat wave in Russia, last year's Texas drought, and the 2003 heat wave in Europe have in common?

All are examples of extreme weather caused by climate change, according to a new study from NASA scientist James Hansen.

"This is not a climate model or a prediction but actual observations of weather events and temperatures that have happened,"

Our analysis shows that it is no longer enough to say that global warming will increase the likelihood of extreme weather and to repeat the caveat that no individual weather event can be directly linked to climate change. To the contrary, our analysis shows that, for the extreme hot weather of the recent past, there is virtually no explanation other than climate change."

Since mid-June, corn prices have risen about 60%, more than twice the projected decline in yield. This means that farm revenue will go up. About 90% of the corn acreage is backed by a generously subsidized federal insurance program, described by Steven Colbert as "Obamacare for the corn," so

crop farmers will be just fine. Livestock farmers who use corn to feed their animals could see higher costs, but most have contracts with processors who provide their feed grains.

The crop losses will have the most effect on the world's poorest populations. About 2 billion people still live on \$2 a day or less. Many of them live in urban areas of developing countries. Often, they must spend half or more of their income on food, the bulk coming from staple grains like corn, wheat and rice. For these people, a huge rise in grain prices is more than noticeable -- it can literally break their budget.

In 2008 and 2011, when corn prices went up to levels nearly as high as today's, the world saw a sharp rise in food riots. Many pointed to wheat prices as a catalyst for revolutions in the Middle East, including Egypt, Tunisia and Libya. It is not hard to see that food-related security problems overseas could cost us far more than the extra pennies we'll pay at the grocery store.

The U.S. can ease price pains somewhat by suspending government rules that mandate biofuel production. In 2011, about 40% of U.S. corn crops were diverted to ethanol (a quarter, if we take into account that nutritional content is recycled back into feeds for animals in the form of distiller grains). But this seems untenable politically.

The larger and more important issue is whether this year's bad crop yield is an omen of what we should expect going forward.

Record high temperatures are occurring with far greater frequency than in decades past, and crop yields decline sharply in extreme heat. In research that Wolfram Schlenker and I have conducted using the Hadley III climate model, we project yield declines of about 20% over the next 20 years, holding all else the same. This summer's extreme heat may just become typical in 15 years.

Some have criticized these projections as too pessimistic, and they just might be. An atmosphere richer in carbon dioxide concentrations may allow plants to transpire less water during photosynthesis, and thus, improve drought tolerance. Farmers can adjust to earlier planting times, perhaps avoiding some extreme temperatures during the sensitive flowering period, and lengthening the growing season. And new drought-tolerant crop varieties have been developed.

This season was a good test of these adaptive strategies. It appears they didn't work. Carbon dioxide concentrations are much higher than they were in 1983 and 1988, when it was nearly as hot as this summer. And farmers planted much earlier than usual, many using new drought-tolerant varieties.