Improving the Weather Odds

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Cuphea in bloom.

When farmers gamble on the weather in the year 2050, they may have advance knowledge of how the climate dice will roll, if weather scientists have any say in the matter.

By then, seasonal forecasting may be possible under certain circumstances, with forecasts issued early enough to influence planting decisions for some crops.

Preparing for that day, ARS atmospheric scientist Steven A. Mauget and soil physicist Dan R. Upchurch are studying climate mechanisms that behave predictably from season to season and are testing whether forecasts based on these mechanisms can truly give farmers an edge.

Through a search of 103 years of climate data, they found significant climate effects due to the El Niño and La Niña phases of the El Niño-Southern Oscillation (ENSO) phenomena, with the strongest effects occurring during the winter in the northern United States. Their work suggests that ENSO-based forecasts may help farmers manage winter crops, such as winter wheat.

What Mauget and Upchurch found tempts them to bet on higher winter wheat yields during El Niño's cool, wet winters and lower yields during La Niña's warm, dry winters. They also believe such forecasts could be valuable in managing other winter crops, such as citrus and winter produce.

Next, the two scientists plan to search ocean temperature and surface pressure records over the past century for clues to 12- and 20-year rainfall cycles observed over the Midwest. If they succeed in pinpointing the source of these cycles and the cycles prove predictable, they believe it might be possible to bet on climate over longer periods and to place those bets further in advance.

Finally, Mauget and Upchurch want to test whether those loaded dice will be a help or a fatal lure. They'll do this using computer simulations of a hypothetical grower's management practices over the course of two parallel farming careers.

During the farmer's first career, she/he will have access to seasonal climate information, but not during the second career. By comparing the difference in net profits between the careers, they hope to estimate the value of such forecasts.

"Seasonal climate predictions are coming, but the question is if, where, and how valuable they will be," says Mauget. "Our role is to see if these predictions actually translate into higher profits, or whether they cause so much risk-taking that profits end up lower."—By **Don Comis,** ARS.

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