

A *nalyzing crop insurance rates*

Research offers new ways to set premiums for farmers

By Susan McGinley



THE COST OF CROP INSURANCE

"Crop insurance is the cornerstone of economic policy for U.S. agriculture," Ker says. "This is an extremely big program because it's the avenue the government has chosen to funnel money to the American farmer." The cost runs into the multiple billions of dollars per year.

Crop insurance rates depend on accurate projected yield losses and loss probabilities. Yet agricultural yields are tough to predict since so much of farming depends on a combination of weather conditions, the presence of pests, weeds, and diseases, plus catastrophic factors such as drought, flood, fire, and hail. Thus setting accurate crop insurance rates has always been difficult. Alan Ker, an econometrician in the Department of Agricultural and Resource Economics at the University of Arizona, has spent part of the last five years researching the methodology of computing the premium rates farmers pay for crop insurance.

"Life insurance companies have a pretty good idea when you'll die, but since we don't know the probability of revenue/yield downfalls, it's tough to set the premiums for crop insurance levels," he says. The USDA's Risk Management Agency (RMA) has funded research to find out better ways to use the available information in computing rates. In Ker's case, the government has adjusted some of its rating methodology based on these findings. If the rates aren't accurate a multitude of problems arise, such as low farmer participation and excess program costs.

Although the federal government sets the rates, private companies sell the policies to the farmers. Those companies have to accept the risk for some of the profits and losses of those policies. The arrangement by which these profits and losses are shared is laid out in an agreement between private insurance companies and the government. Ker is examining the details of the agreement to see where it can be renegotiated so that private insurance companies receive sufficient but not excessive amounts of funding. Ker has constructed part of the model the negotiations will be based upon.

"Money going to the insurance company is less money going to farmers," he explains. "It appears at this point that the insurance companies are making a lot more than what covers them for their risk. Hopefully the negotiation between them and the RMA will change things so that the return for their risk won't be inflated."

As an econometrician—someone who combines both economics and statistics in his work—Ker uses different sets of data for farming conditions combined with a range of

complex, precise statistical methods to find out where he can compute probabilities with the fewest mistakes and greatest accuracy. According to Ker, the entire insurance premium framework must be built on properly representing the distribution of farm yields. His series of studies have included the following:

- A hypothetical scenario where he assumed the role of a private insurance company using weather data to see if he could "beat the government out of money." Using as a case study El Niño/La Niña conditions, and winter wheat in Texas, Ker simulated reinsurance decisions during the 1978 through 1997 crop years. The simulation took into account the risk-sharing arrangement between the insurance companies and the federal government. Ker's figures showed that insurance companies could use weather-based adverse selection criteria to recover "economically and statistically significant excess rents."
- A base coverage analysis using 50 percent and 65 percent base coverage levels. Ker used the government's current formula for computing rates, and found that the higher coverage level should be maintained as the base.
- A different mathematical approach to estimating the premium rates, that was later adopted in the wheat/barley insurance program.
- A new approach to estimating farm insurance premium rates that appropriately incorporates extraneous information into that process.

"With crop insurance, people don't know the probabilities, so they have to estimate them," Ker says. "This last program (above) shows a new method that overcomes the lack of data by making better use of the data we already have." Since this method has proved to be more statistically accurate and thus more efficient than the federal government's current formula where tested, Ker's program may be adopted for calculating sugarbeet crop insurance rates.w

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