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# **Crop insurance ratings, precision agriculture focus of Arkansas agricultural economist**

By John Lovett

U of A System Division of Agriculture

## Fast facts

* Agricultural economist developed method to estimate missing yield data
* Up to 26 percent of corn, and 40 percent of soybean yield data missing from surveys
* Researcher develops maps to improve production with precision agriculture

(920 words)

FAYETTEVILLE, Ark. — With farmers in the national spotlight amid soaring production costs, crop risk mitigation practices like crop insurance and futures options are more important than ever for the nation’s producers of food, fiber and fuel.

Agricultural economists with the Arkansas Agricultural Experiment Station, the research arm of the University of Arkansas System Division of Agriculture, work to gather and analyze data that can improve a farmer’s decisions for long-term business viability.

Eunchun Park, assistant professor in the department of agricultural economics and agribusiness, says crop insurance is the easiest way to mitigate the inherit risks in agriculture.

Crop insurance protects agricultural producers against crop losses resulting from natural causes. The program, administered by the U.S. Department of Agriculture’s Risk Management Agency, offers several different plans for crops and livestock. Availability of these crop policy plans varies by state and county.

Park works with the [Fryar Price Risk Management Center of Excellence](https://fryar-risk-center.uada.edu/about/) to provide farm, industry and government and academic leaders with research-based information and tools to assist them in making decisions. The Fryar Center is a unit of the University of Arkansas System Division of Agriculture and the University of Arkansas, Fayetteville and facilitates research, teaching and outreach focused on risk management issues.

“My personal goal is to provide better ranking for farmers that is fair to everybody,” Park said. “I want to provide fairer and more accurate methods to provide fair premium rates. That makes the participation rate in crop insurance increase. That is the key to farmers to avoid price-related risk in this era.”

Park said that having good data is required to develop actuarially sound premium rates. Seeing the potential of Bayesian Kriging — a “geostatic method” of spatial statistics commonly used in weather forecasting — Park developed a related method to overcome problems with obtaining crop yield data. Using this new method, he incorporated yield data from areas with similar geography, crops, and precipitation to fill in the missing gaps with an estimated average.

In a 2021 paper titled “Estimating Crop Yield Densities for Counties with Missing Data,” Park and his co-authors — Ardian Harri and Keith H. Coble of the Division of Agriculture, Forestry, and Veterinary Medicine at Mississippi State University — showed that 20 to 26 percent of corn yield data are missing in national surveys.

Up to 40 percent of soybean yield data are missing from surveys used by the Risk Management Agency and the National Agricultural Statistics Services, the paper added. The study was requested and funded by the Office of the Chief Economist of the USDA. His research has also been funded by several other USDA agencies.

At the Fryar Center, Park continues to research methods to measure risk in the futures and options markets. In addition to natural disasters, weeds, pests and plant diseases, agricultural producers face fluctuations in the marketplace. Futures options allow a producer to lock in a price with a buyer on their next harvest. The center can help producers make decisions with research-based information.

Park also works in the new field of precision agriculture, using data collected by harvesters to create historical yield maps. Drones and satellite imagery are also used to add layers of information.

“The more productive areas we need to input more fertilizers to maximize productivity and the less productive areas will receive less inputs for cost-effective farming,” Park said. “That kind of microlevel management is the key to precision agriculture. My interest is in suggesting site-specific input management for fertilizer and seeding rates.”

**Compounding Challenges**

The challenges for agricultural economists have compounded in recent years. In addition to global climate change, U.S.-China trade relations, the coronavirus pandemic, supply chain issues and the war in Ukraine have all created more uncertainty in the world market.

“We were worried about the climate change over the past decade, so all of our research focuses on how much climate change will impact yield in corn and soybeans,” Park said. “Now, it’s not just climate change, but all these other factors are also making impacts more localized than before, and that makes all of the prices increase.”

“Dr. Park is one of the top young agricultural economics researchers in the field of risk management,” said John Anderson, director of the Fryar Center and head of the agricultural economics and agribusiness department for the University of Arkansas System Division of Agriculture and the Dale Bumpers College of Agricultural, Food and Life Sciences. “He is helping lead the development of new analytical techniques and novel data sets to shed new light on traditional risk management problems. His work has broad application, but we are most excited to see this leading-edge research deployed on problems of interest to stakeholders right here in Arkansas.”

Park conducts his research through the Arkansas Agricultural Experiment Station and outreach activities through the Cooperative Extension Service, the research and outreach arms of the Division of Agriculture. He teaches classes through the Dale Bumpers College of Agricultural, Food and Life Sciences at the University of Arkansas.

He joined the Division of Agriculture in 2021 following four years as an associate professor at Mississippi State University. He earned his agricultural economics doctorate in 2017 from Oklahoma State University following bachelor’s and master’s degrees in food and resource economics from Korea University.

Among his many awards for research are the Outstanding Graduate Student Paper Award in 2018 and Outstanding Contribution to Applied Risk Analysis in 2020 from the Agricultural and Applied Economics Association for papers published in the American Journal of Agricultural Economics on estimating crop yield densities for counties missing yield data.

To learn more about Division of Agriculture research, visit the Arkansas Agricultural Experiment Station website: [https://aaes.uada.edu/](https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Faaes.uada.edu%2F&data=04%7C01%7Cfmiller%40uark.edu%7C5cd2aea2b12c4dfceb9c08d942da0e9d%7C79c742c4e61c4fa5be89a3cb566a80d1%7C0%7C0%7C637614326581623988%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C1000&sdata=aepGh27NgEgSYv9mb8nggzA%2BaUdOhXMw7e6sspVov8c%3D&reserved=0). Follow us on Twitter at [@ArkAgResearch](https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Ftwitter.com%2FArkAgResearch&data=04%7C01%7Cfmiller%40uark.edu%7C5cd2aea2b12c4dfceb9c08d942da0e9d%7C79c742c4e61c4fa5be89a3cb566a80d1%7C0%7C0%7C637614326581633943%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C1000&sdata=nH1djoLMIYNT7ERwtQMektp5RVjEjY1B93nJK%2BhyjJE%3D&reserved=0).

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## About the Division of Agriculture

The University of Arkansas System Division of Agriculture’s mission is to strengthen agriculture, communities, and families by connecting trusted research to the adoption of best practices. Through the Agricultural Experiment Station and the Cooperative Extension Service, the Division of Agriculture conducts research and extension work within the nation’s historic land grant education system.

The Division of Agriculture is one of 20 entities within the University of Arkansas System. It has offices in all 75 counties in Arkansas and faculty on five system campuses.

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