

A field research network to address looming grain failures

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Across the United States, record quantities of corn and soybeans have been harvested in recent years. However, according to a *BioScience* article by David Gustafson of the International Life Sciences Institute Research Foundation and his colleagues, this trend may soon change. "By midcentury," the interdisciplinary team reports, "temperatures in Illinois will likely be closer to those of today's mid-South, and precipitation will range somewhere between that of today's East Texas and that of the Carolinas." Likewise, vapor-pressure deficits, which are a measure of the atmosphere's drying power, will also increase, potentially further stressing crop yields.

Declining [crop production](#) in the US Midwest could have global-scale implications, warn the authors: "What happens to Midwest farmers affects the world. Midwest farmers produce the dominant share of US contributions to the global corn (35%) and soybean (30%) traded volumes."

To address these rising threats more efficiently and cost effectively, the authors propose a new, coordinated network of field research sites at which precise data on the performance of current and future crops, cropping systems, and farm-level management practices in the US Midwest would be gathered. The authors also highlight the necessity of field research as opposed to its growth-chamber counterpart, arguing that recent evidence has "demonstrated our inability to extrapolate growth-chamber and greenhouse results to field situations."

In addition, the authors believe that any such research network must cast a wider net than current data-gathering practices, "because existing empirical data provide only a very limited basis for understanding the impacts of future weather, carbon dioxide, ozone, and biotic stressors on crop production, nutritional makeup, socioeconomic factors (e.g., farm incomes, prices, and land values), and sustainability outcomes (e.g., greenhouse gas emissions, soil degradation, and water quality)."

The authors hope that their proposal could be used as a model for similar networks around the world, and that the lessons learned in the Midwest could provide useful guidance for geographically diverse farmer-providers. But the need to act is urgent, they say: "Merely expanding existing research networks and doing things the way we've always done them will be insufficient. Only by having an integrated interdisciplinary network in place will we be able to address with agility the complex interactions between climate science, biology, information technology, and human behavior that will inform both better decisions and more beneficial ultimate outcomes."

More information: *BioScience* , [dx.doi.org/10.1093/biosci/biv164](https://doi.org/10.1093/biosci/biv164)

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