

THE ISSUE

Corn is essential in America. The highly versatile crop is an economic powerhouse, employing millions and producing food, feed and fuel. American farmers heavily invest their time, land and money in the crop's production, planting more than 20 percent of all U.S. cropland to corn.

Global and domestic demand for corn continues to rise. However, there is increasing uncertainty about how long-term U.S. climate trends are impacting corn-based cropping systems and threatening agricultural investments. In response, farmers are seeking new ways to ensure continued crop productivity while also minimizing environmental impact.

THE PROJECT

This five-year project assesses the environmental, economic and social impacts of long-term climate variability on corn-based cropping systems. The project gathers data from 35 field test sites in 8 Midwestern states to focus on ways to best promote the system's long-term sustainability and productivity.



THE RESEARCH

Researchers from a variety of disciplines are working together to unleash groundbreaking collaborative work. In field sites across the Midwest, researchers are measuring carbon, nitrogen, greenhouse gas and water flows from crop management practices, including tillage, cover crops, corn-soybean rotation, extended crop rotations, controlled drainage water management and nitrogen management techniques. Some researchers are using models to explore how crop management practices on variable soil types and climate conditions affect carbon and nitrogen levels in the water and air. Others are surveying farmers' current management practices and their adaptation to changing weather patterns.

This diverse team is sharing data in a single comprehensive database to bring about greater knowledge and insight on the various implications of the research. Extension and education specialists are using this enhanced understanding to create programs for farmers, teachers and students, and are working to connect them with valuable project resources and analyses.

WHO

A partnership among Iowa State University; Lincoln University; Michigan State University; The Ohio State University; Purdue University; South Dakota State University; University of Illinois; University of Minnesota; University of Missouri; University of Wisconsin; USDA Agricultural Research Service – Columbus, Ohio; and USDA National Institute of Food and Agriculture (USDA-NIFA).

WHAT

This five-year project assesses the environmental, economic and social impacts of long-term climate variability on corn-based cropping systems. The project focuses on ways to encourage resilient decision-making, maintain yields and reduce environmental impact.

WHEN

2011-2016

WHERE

Thirty-five field sites; participating institutions represent nine Midwestern states.

WHY

To promote the long-term sustainability and productivity of U.S. corn-based cropping systems against recent climate trends and future uncertainty.

HOW

1. Develop standardized methodologies and perform baseline monitoring of carbon, nitrogen and water footprints, crop productivity, and pest pressure at agricultural test sites across the Midwest.
2. Evaluate how crop management practices impact carbon, nitrogen and water footprints, crop productivity, and pest pressure at test sites.
3. Apply models to research data and climate scenarios to identify impacts and outcomes that could affect the sustainability and economic vitality of corn-based cropping systems.
4. Gain knowledge of farmer beliefs and concerns about climate change, attitudes toward adaptive and mitigative strategies and practices, and decision support needs to inform the development of tools and practices that support long-term sustainability of crop production.
5. Promote extension, outreach and stakeholder learning and participation across all aspects of the program.
6. Train the next generation of scientists, develop science education curricula and promote learning opportunities for high school teachers and students.

PRINCIPAL INVESTIGATORS

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* Additional funding through the United Soybean Board

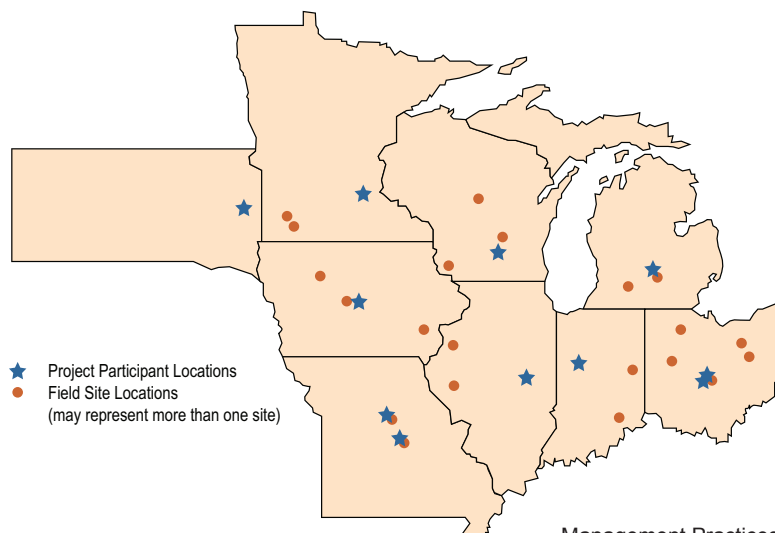


THE PARTICIPANTS

Ten Midwestern land grant universities and a USDA Agricultural Research Service laboratory are partnering with USDA - National Institute of Food and Agriculture.

Project partners are placing a strong emphasis in establishing lasting research networks, working with farmers and producers to encourage resilient decision-making, and training the next generation of scientists to work with a wide array of partners. This project directly involves farmers and local watershed groups across the region who are engaged in co-learning with the scientific team.

Project Participants and Field Sites



Management Practices:

- Corn-Soybean Rotation
- Cover Crops within a Corn-Soybean Rotation
- Extended Crop Rotations
- Organic Cropping System
- Drainage Water Management
- Nitrogen Fertilizer Management
- Tillage Management
- Landscape Position

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