

Climate and Corn-based Cropping Systems CAP: Overview and Flowchart

Lois Wright Morton and Lori J. Abendroth

BACKGROUND

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

Domestic and global demand for corn continues to rise. Yet, there is increasing uncertainty about the impact changing US climate trends will have on agricultural systems and investments. In response, farmers are seeking new ways to ensure continued crop productivity while minimizing environmental impact.

PROJECT GOAL

Through research, education, outreach, and partnerships, our transdisciplinary team¹ ("CSCAP") seeks to identify and advance farmer practices and public policies that increase Midwestern crop resilience and adaptability, while minimizing environmental impact, in response to increasingly more erratic and extreme weather patterns.

OBJECTIVES (ALSO SEE FIGURE 1)

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.



The University of Wisconsin's long-term rotation field sites at the Arlington Agricultural Research Station (above).

Fig. 1 (below) - The CSCAP flowchart conceptualizes the multi-directional connections among project objectives. Numbers displayed correspond with the objectives in the left column.



APPROACH

- This five-year project assesses the environmental, economic and social impacts of long-term climate variability on corn-based cropping systems.
- Ten Midwestern land grant universities and a USDA Agricultural Research Service laboratory are partnering with the USDA - National Institute of Food and Agriculture.¹
- Research data is collected from nearly 30 field test sites in 8 Midwestern states.
- Carbon, nitrogen, greenhouse gas and water footprints are measured from a suite of management practices, including:
 - 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
- A diverse team of researchers are sharing data in a central comprehensive database.
- The knowledge and insight gained from research are used in creating extension and education programs for farmers, teachers and students.

CONTACTS

Lori J. Abendroth, Project Manager
labend@iastate.edu

Lynn Laws, Communications Specialist
lynnlaws@iastate.edu

Lois Wright Morton, Project Director
lwmorton@iastate.edu

¹The 11 institutional-members include the following Land Grant Universities and USDA Agricultural Research Services (ARS): 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; and USDA Agricultural Research Service – Columbus, Ohio.

WEB SITE

sustainablecorn.org



This research is part of a regional collaborative project supported by the USDA-NIFA, Award No. 2011-68002-30190,

"Cropping Systems Coordinated Agricultural Project: Climate Change, Mitigation, and Adaptation in Corn-based Cropping Systems," August 2012