Sustainable Agricultural Research

Climate-Smart Research for the Farms of the Future
Briefing Series: Farm Bill in Focus
September 12, 2023

Lawson Connor
Assistant Professor of Agricultural Economics & Agribusiness, University of Arkansas
Farming Impacts and Agricultural Sustainability

- **External Concerns**
  - Nitrate pollution
  - Eutrophication
  - Dead-zones in downstream waterways

- **Internal Concerns**
  - Soil erosion
  - Nutrient leaching
  - Increased yield sensitivity to extreme weather events

- **Further exacerbated by climate change**
  - Droughts, extreme heat, excess wet conditions occur more frequently

- **Interactions with Farm Bill Programs**
  - Crop insurance effects:
  - Cover crop adoption incentives
  - Higher drought sensitivity

**Figures:** Impact of climate change on agriculture (left) and Hypoxic zones in Chesapeake bay (right). **Sources:** Crop Life International. VIMS dead-zone report
Potential for Increased Cost of Administering Farm Programs

- Increasing indemnity outlays particularly due to dry weather
  - Greater Acreage enrollment in crop insurance
  - Increased drought vulnerability

Adapted from Agri Pulse, January 25th, 2023.

**Data Source:** USDA RMA Summary of Business
Diversified Cropping Systems

1. Increase infiltration
2. Reduce evaporation
3. Increase soil water storage
4. Increase percolation for groundwater recharge
5. Create conditions favorable for root proliferation and deeper growth
6. Improve plant access to nutrients
7. Suppress diseases
8. Increase plant tolerance to drought
9. Increase transpiration relative to evaporation

Crop diversification
Livestock integration
Organic matter amendments
Minimum disturbance
Residue retention
Continuous living root

Promote plant-microbe interactions

Improve soil structure
Federal Funding For Conservation

- Federal funding for conservation has increased
- The largest chunk of the funding has gone to promote adoption and maintenance of cover cropped acres.

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Inflation-adjusted annual spending for major USDA conservation programs, 1996-2018, with projections to 2023 1/

1/ Includes these programs and predecessors: Conservation Reserve Program, Agricultural Conservation Easement Program, Environmental Quality Incentives Program, Conservation Stewardship Program, Regional Conservation Partnership Program, and Conservation Technical Assistance (CTA). CTA is funded annually through appropriations; here it is assumed constant at $769 million (nominal). Spending is adjusted to constant (2017) dollars, with assumed annual inflation of 2 percent for 2019-23.

Research Has Three Main Focuses

- Our research has focused on addressing internal concerns in row crop agriculture
- Addresses concerns regarding costs of program administration
- Understanding and mitigating unintended effects

Intended and Unintended effects of farm bill programs on practices adoption

Effects of practice adoption on farm economics: Drivers of heterogeneous effects

Alternative strategies for incentivizing practice adoption
Payments from agricultural conservation programs and cover crop adoption

Byungyul Park¹ | Roderick M. Rejesus² | Serkan Agласan³ | Yuyuan Che² | Stephen C. Hagen⁴ | William Salas⁴

Crop insurance participation and cover crop use: Evidence from Indiana county-level data

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Crop Insurance Participation Rates and Asymmetric Effects on U.S. Corn and Soybean Yield Risk

Lawson Connor and Ani L. Katchova

Understanding the effect of cover crop use on prevented planting losses

Sunjae Won¹ | Roderick M. Rejesus² | Barry K. Goodwin³ | Serkan Agласan³,⁴
AFRI and FFAR Funding

**Key Objectives**

- Develop open access Cover crop dataset
- Understand heterogeneous economic effects of Rotational complexity and cover crop adoption
- Develop tool that can inform lenders of risk profiles of practice adopting fields and farms
Thanks

Contact:
Lawson Connor
Email: lconnor@uark.edu
Phone: 479-575-2072