

Participatory Research Project Now Recruiting Farmers

Environmental and Economic Tradeoffs Associated with Integrating Livestock into Cash Grain Cropping Systems



Over the last 50 years, both crop and livestock production systems in the U.S. have become increasingly specialized and separated. Specialization of livestock and crop production has helped boost output and provide abundant, affordable food. However, separation of livestock from crop production has been linked to long-term declines in soil quality, and management of manure nutrients has become a growing challenge for specialized livestock operations. A team of interdisciplinary researchers at Ohio State is interested in working with Ohio farmers to explore how different approaches to livestock-crop integration impacts their farm's profitability, soil health, nutrient cycling, and resilience in the face of volatile weather and markets.

The focus is to gather data from working farms to better understand the economic and environmental tradeoffs and interactions associated with different types of crop-livestock mixes.

We particularly want to partner with farmers utilizing one of four types of approaches to crop-livestock production for at least the last five years. To ensure comparability, we are focusing first on the potential for integrating cash grains with manure from cattle (dairy or beef) operations.

Seeking to Partner with Four Types of Farms:

- 1. Cash Grain farms** – cash grain production with standard rotations (e.g., corn/soy/wheat) who have not utilized manure as a source of nutrients or soil amendment for at least 5 years.
- 2. Cash Grain + Manure farms** – cash grain operations with conventional rotations, who do not raise livestock but who have relied on importing cattle manure to meet all or a significant part of the crop nutrient requirements for their cash grain rotations over the last 5 years.
- 3. Diversified Crop-Livestock farms** – farms that have cattle and raise cash grains as part of a diversified crop-livestock operation, utilize more complex crop rotations (with perennial forage crops present in the rotation), and who rely on manure to meet all or a significant part of nutrient requirements in their cash grain rotations.
- 4. Livestock (no cash grain) farms** – dairy or beef operations who have relied on pasture and forage production only for at least 5 years, without a significant cash grain enterprise.

Specific Research Questions

1. What are the economic and environmental outcomes associated with different approaches to livestock-crop integration?
2. What economic, technical, and other factors influence the use of each approach?
3. How can real world data from Ohio farms improve computer models to understand economic and environmental tradeoffs?
4. What are the most promising ways for farmers to reintegrate livestock into crop operations?
5. What public and private programs could incentivize the most economically and environmentally beneficial approaches?

What Will Participating Farmers Do?

Participation begins with an **initial visit with our researchers in the fall of 2021**. During this first visit we will collaboratively identify potential study fields, collect initial soil samples, and create a digital map of the farm operation. We will also gather details about livestock inventories, land management, and crop rotations for the past 5 years.

During the 2022 and 2023 growing seasons, researchers will come to the farm to collect **samples of soil, vegetation (crops or pasture), and, where applicable, manure and feed**. We will also collect air and water samples from a smaller number of farms.

In addition to these physical samples, the project lead and manager will conduct an **annual interview** to update information about farm management practices and collect basic data to inform the economic analysis.

Farmer participants will **gather with researchers each winter** to review sampling results, plan for the upcoming year, and help craft recommendations and resources to inform farmer decision-making.

Benefits/Risks of Participating

All farm data will be treated as confidential and carefully managed to protect the privacy of participants. Farmer participants will receive a **modest monetary stipend** to compensate them for their time. Individual participants will also **receive copies of their individual sample analyses** (soil, manure, feed, etc.) and summary information on project findings. Participant data and feedback will be used to help direct extension efforts to benefit the industry.

For More Information, Contact:

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