ORGANIC FARMING RESEARCH FOUNDATION

FOOD SAFETY AND CROP-LIVESTOCK INTEGRATION

Lessons from Organic Farms with Integrated Crop and Livestock Systems

In OFRF's 2022 National Organic Research Agenda (NORA), organic farmers and ranchers across North America shared a common concern about the lack of technical assistance and educational resources available for Integrated Crop-Livestock Systems (ICLS). Integrating crops and livestock results in numerous benefits, however the process can also lead to increased complexity, especially for farmers who must adhere to National Organic Program rules and regulations.

At OFRF we know farmers' #1 source of information is other farmers.

This series of resources focused on Crop-Livestock Integration is informed by interviews with four highly-experienced organic producers that shared their challenges, successes, and advice for others interested in integrating livestock and crops on their organic farms.

FROG SONG ORGANICS

Hawthorne, Florida

Mixed vegetables, flowers, herbs, pastured pork, eggs

LOCAL COLOR FARM & FIBER

Puyallup, Washington

Naturally-dyed yarns and fibers, Finnsheep lambs, vegetables

SHADY SIDE FARM

Holland, Michigan

Heirloom dry beans, open pollinated corn, small grains, hay, beef and lamb

HIDDEN HOLLOW FARM

Dayton, Virginia

Dairy, eggs, vegetables, hay, corn, and beef

Food safety is a critical concern for all farmers and food producers. Failure to control all food safety risks can make consumers sick and lead to legal and economic consequences for a farm business. Farms with crop livestock integration must take extra precaution to avoid the risks associated with raw manure and cross contamination of produce.

The National Organic Program (NOP) guidance includes soil fertility and crop nutrient management practice standard § 205.203 that requires organic producers to "manage plant and animal materials to maintain or improve soil organic matter content in a manner that does not contribute to contamination of crops, soil, or water by plant nutrients, pathogenic organisms, heavy metals, or residues of prohibited substances." This practice standard provides prudent steps towards meeting the Produce Safety Rules (PSR) under the Food and Drug Administration's Food Safety Modernization Act (FSMA), the established national standards for food-safety practices on produce farms.

When it comes to domestic animals, the main goals of the FSMA regulations are to reduce the risk of contamination from animals, and to ensure that produce contaminated by animals is not harvested. The FSMA PSR requires farmers to assess growing areas for potential contamination before and during harvest. If a reasonable probability of contamination exists, farmers will refrain from harvesting for sale.

It is important to note that the FSMA PSR does not define nor does it prescribe specific measures, procedures, or steps to further define words like "reasonable" or "likely." In short, compliance with the guideline recommendations of the PSR may provide compelling legal support for a farm's food safety practices, and keep customers safe from possible food borne pathogens.

Acronym Guide

NOP: *National Organic Program*
FSMA: *Food Safety Modernization Act*
FDA: *Food and Drug Administration*
PSR: *Produce Safety Rules*
GAP: *Good Agricultural Practices*
HACCP: *Hazard Analysis Critical Control Point*

The NOP guidance addresses practices that will aid farmers in meeting FSMA PSR compliance, including rules regarding the use of manure:

- ***The 90-Day Rule:*** ***90-day interval between raw manure application and the presence of crops that do not touch the soil, for example sweet corn, tomatoes and peppers.***

- ***The 120-Day Rule:*** ***120-day interval between raw manure application and the presence of crops that do touch the soil, such as leafy greens, cabbage, or carrots.***

- ***The Produce Safety Rule:*** ***untreated biological soil amendments of animal origin, such as raw manure, must be applied in a manner that does not contact covered produce during application and minimizes the potential for contact with covered produce after application.***

HOW DO FARMERS MANAGE THE RISKS OF MANURE?

1. Get Prepared

Anticipating how crop and animal systems will interact can help avoid food safety and other risks on farms with ICLSs.Take time before integrating your systems to read resources like these, visit and talk with other farmers, and gather information on crops, animals, your site, and the climate can help you layout fields, plan rotations, and identify protocols to ensure food safety.

"The rules for food safety require us to think ahead."

~ Mike Bronkema
Shady Side Farm

Heavy rains resulted in standing water near this field of heirloom southern peas at Shady Side Farm. Farmers with ICLSs must mitigate the risks of manure runoff resulting from rain with careful planning.

2. Carefully Design Fields and Rotations

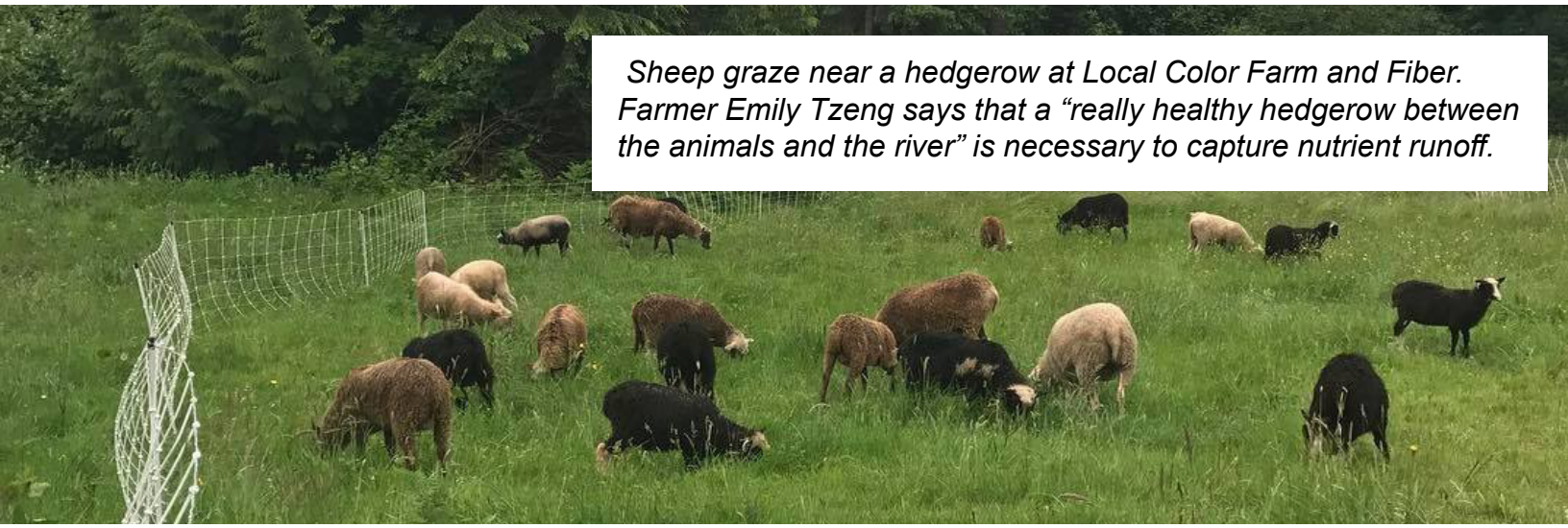
Carefully planning the layout of a field can help mitigate the risks of runoff and contamination. It is important to design your crop rotations such that the risk of manure coming into contact with food crops is reduced or eliminated. In areas where animals are being incorporated, some farmers suggest thinking about where the manure will flow from the first moments of laying out fields. And that, according to John at Frog Song Organics, means thinking about the flow of water.

"As a farmer, you need to look at 'Which way does every drop flow?', as it comes out of the sky, and hits your farm. Then you need to know where your paddocks are, and where you're going to raise your crops, and what kind of crops you are going to raise (low or high risk)."

~ John Bitter
Frog Song Organics

Pigs graze in paddocks within a cover crop at Frog Song Organics. When livestock are surrounded by cover crops and not adjacent to any fields producing marketable crops, the risk of contamination is diminished.

Areas where crops are being grown can be located at higher elevations than areas that contain livestock to minimize the risks of manure traveling into croplands. Where croplands are below areas containing livestock, adequate drainage or diversions/ditches may be necessary to prevent contamination of crops by manure. Additionally, hedgerows can prevent runoff to nearby waterways and catch nutrient runoff.



Sheep graze near a hedgerow at Local Color Farm and Fiber. Farmer Emily Tzeng says that a "really healthy hedgerow between the animals and the river" is necessary to capture nutrient runoff.

3. Have a Food Safety Plan

Developing and implementing a Food Safety Plan is essential for ensuring food safety and adhering to local, state, and Federal laws and regulations like the FSMA. This may include Good Agricultural Practices (GAP) training and audits to ensure safety of fresh fruits and vegetables, and/or developing a Hazard Analysis Critical Control Point (HACCP) plan if your operation is processing foods. Each Food Safety Plan will be different for each farm, and determined by what is being produced and in what state. A good place to start is the FDA's Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables.

Overview of a Food Safety Plan for fresh fruits and vegetables:

- **Prevention of contamination is favored over corrective actions following contamination.**
- **Prevention can be achieved through Good Agricultural Practices.**
- **The major sources of microbial contamination of fresh produce are associated with human/animal feces, which can happen at any point in the system.**
- **A major source of contamination is where water comes in contact with produce, including wash water, irrigation, or runoff.**
- **Practices using manure should be managed closely to identify and mitigate possible points of contamination.**
- **Worker hygiene and sanitation practices play a critical role in minimizing the potential for contamination.**
- **Accountability at all levels of the operation from field to transport can be achieved by having qualified personnel and by monitoring to make sure all elements are functioning properly and to help trace back produce through production channels.**

For organic farmers, your Organic System Plan (OSP) developed for organic certification will contain elements of a food safety plan. It will help mitigate food safety risks and may provide the traceability needed for a GAP audit. NOP guidance on manure/composts and requirements for traceability are two areas where an OSP will contribute to a Food Safety Plan.

4. Educate Your Team

Educate all farm staff with adequate knowledge of how to avoid food safety risks. Staff training can be based on the critical control points identified in a HACCP plan, and may include protocols for washing equipment, changing boots, and using separate sets of equipment/storage bins for crop and livestock.

While FSMA doesn't require farmers to have formal employee policies, like an employee handbook, providing employee training and documenting the occurrence of this training can help protect a farm business and keep products safe.

"Food safety training is a living document, add updates. Every time a mistake gets made, solutions to address it become a part of the protocol."

~ John Bitter
Frog Song Organics

5. Document and Record

Document your rotations and keep good records. Following the record-keeping requirements of the NOP can help document crop and animal rotations. Additionally, records at critical control points can be kept by fully-trained staff.

"It really comes down to keeping good records. And, having people keep good records [who] are working with you. We actually share our record-keeping duties at the farm, because everyone needs to write their own log and be accountable for what they do."

~ John Bitter
Frog Song Organics

Key Takeaways

Food safety on farms with ICLSs is achieved by a combination of factors ranging from farm design to how employees are trained for daily tasks. Organic farmers can work with NOP regulations, local regulators, and their own farm staff to develop and implement plans and systems to keep their products safe from contamination and their farm businesses protected.

This resource is one of several ICLS resources OFRF has created for farmers. The series includes farmer stories, a short video, and factsheets on key topics, that include: The Benefits of Crop-Livestock Integration, Infrastructure for Crop-Livestock Integration, and Crop Rotations and Crop-Livestock Integration.

Other resources for food safety on farms:

- Contact your local extension office for assistance in developing a food safety plan
- To see templates and access support tools online: On-Farm Food Safety Project
- For more help understanding the requirements of the FSMA PSR and how they might apply to your farm, check out this resource from the Produce Safety Alliance
- For more detailed information on how FMSA rules apply to ICLSs, see this publication from the Savanna Institute and Farm Commons
- To see examples of grazing cover crops in vegetable production systems, check out this video and virtual field day from The Organic Center
- For more stories from farmers with ICLS, including info sheets, and video features of farms, see this landing page from California State University-Chico

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