Moving the Sustainability Needle - Workshop Findings

Prepared by: MaryGrace Erickson[1]; **Contributors:** Mahmoud Sharara[2], Bridgett Hilshey[3], Marguerite Tan[4], Erin Cortus[1]; **Reviewed by:** Becky Spearman[5]

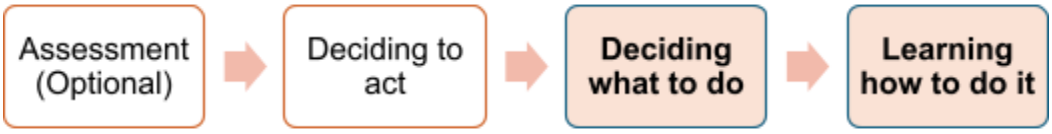
[1]Bioproducts & Biosystems Engineering, University of Minnesota
[2]Biological & Agricultural Engineering, North Carolina State University
[3]Dairy Management, Inc.
[4]National Pork Board
[5]North Carolina State Extension

Livestock & Poultry Environmental Learning Community

Overview

In this workshop at the 2025 Waste to Worth meeting, we discussed how advisors could support farms in "moving the needle" on environmental stewardship metrics. We viewed "moving the needle" as a long process (**Figure 1**), in which an environmental stewardship assessment often prompts stakeholder to decide to act. Then, on-farm decision-makers must consider the pros and cons of available options and decide what to do. Finally, to implement a practice, on-farm decision-makers must learn how to do it. This stage includes customizing the practice to a specific context and troubleshooting challenges throughout its use.

Figure 1. Stages in "moving the needle" on environmental stewardship metrics.



The stages deciding what to do and learning how to do it were the focus of our workshop. We assumed on-farm decision-makers had already decided to act. Additionally, we focused on implementation of existing tools and technologies rather than innovation. In our discussion, we emphasized that farm decisions are influenced by complex social, economic, and environmental factors. The role of advisors is to provide the best available data to support on-farm decision-making. However, advisors do not make final decisions.

Participants and Procedure

We solicited feedback through a semi-structured discussion during a 100-minute workshop with n = 8 advisors at the 2025 Waste-to-Worth Conference.

Identification of Tools & Resources Supporting Decision-Making

In an open-ended discussion, participants generated a list of information resources supporting environmental on-farm decision-making for specific sectors, regions, and areas of production.

Information Resources

Information resources / tools	Sector	Geographic scope	Focus
Air Management Practices Assessment Tool (AMPAT) https://www.extension.iastate.edu/ampat/	Swine or other	U.S. Midwest	Air quality
Cornell Climate Smart Farming http://climatesmartfarming.org	All	Northeast U.S.	Agronomic
Dairy Conservation Navigator https://www.dairyconservation.org	Dairy	National	Across all
Livestock and Poultry Environmental Learning Community (LPELC) https://lpelc.org	Across all	National	Across all
ManureTech Decision Support Tool for Dairy https://lpelc.org/decision-support-resources/#ProjectTool	Dairy	National	Manure management
ManureDB http://manuredb.umn.edu	All	National; Regional; State	Agronomic; manure management
ManureTech Decision Support Tool for Swine https://lpelc.org/decision-support-resources/#ProjectTool	Swine	National	Manure management
Newtrient Solutions Catalog https://www.newtrient.com/newtrient-solutions-catalog/	Across	National	Manure management
NRCS Field Office Technical Guide (eFOTG) https://catalog.data.gov/dataset/efotg	Across	National; regional	Agronomic, manure management, facility design
Pork Cares Impact Reports https://porkcheckoff.org/pork-production-management/sustainability/	Swine	National	Across all
Pork Information Gateway https://porkgateway.org	Swine	National	Animal management; facilities; manure management
Washington Nutrient Management Planning https://www.wadairyplan.org	Dairy	Washington	Agronomic, manure management
Western Cover Crop Selection Tool https://westerncovercrops.org/cover-crop-selection-tool/	All	Western U.S.	Agronomic

Human Resources

Human resources	Sector	Geographic scope	Focus
Conservation Districts	All	Local	Agronomic, manure, facility design
Farmers Assuring Responsible Management (FARM) Evaluators	Dairy	National	Across all
Farmer-led groups	Dairy	Regional	Various
Natural Resources Conservation Service (NRCS)	All	Local / National	Agronomic, manure, facility design
Private Technical Service Providers	All	Various	Various
State Extension Services	All	State	Across all
State Ag Departments	All	State	Across all

Successes, Challenges, and Emerging Opportunities

We asked participants to list roses (successes), thorns (challenges), and buds (emerging opportunities) they perceived in advising on environmental stewardship.

Successes

Widely-used practices have excellent data on environmental and financial impacts, and there is strong industry buy-in to improving environmental performance in the livestock sector.

- Certain practices such as covered manure storages and anaerobic digestion have ample information available on environmental impacts and mitigation effectiveness. For these practices, various financial estimates are available detailing capital and operating costs.
- Practices such as cover cropping and no- or reduced-tillage have substantial available research in certain regions (e.g., the U.S. Midwest) but information is lacking for other regions (e.g., the U.S.High Plains and U.S. Northwest).
- Practices such as manure land application have substantial guidance on regulatory compliance, and a lot of resources are dedicated to ensuring the guidance effectively reaches producers. There are fewer resources for manure exported from a farm.
- Overall, there is strong industry buy-in in improving environmental performance, which increases the availability of funding and resources.

Challenges

There are limited options for technical services for certain practices, and applying practices in new regions can pose challenges.

- In certain cases, there are limited options available for a particular practice or technology. To illustrate, there may be only one company providing technical support related to an environmental management technology. This can pose difficulties when advisors recommend service providers to farms.
- There are not always region-specific examples illustrating implementation of changes in management practices or use of technologies. Additionally, there are few resources showing regionalized estimates of operating and maintenance costs.
- Because grant reviewers favor novelty, it can be difficult to obtain funding to research widely-used practices in specific contexts (e.g., to characterize cover cropping in a High Plains ecoregion).
- When a practice moves into a new region, there can be issues with determining how to regulate and inspect its use.

Maintaining continuity and centralizing information on environmental stewardship and financial resources is complex.

- Information about financial assistance programs can be complex and difficult to interpret. There are few centralized hubs collecting information about available funding sources. Efforts to centralize information about funding sources would require regular updates, as programs change every year.
- Maintaining continuity of expert knowledge and technical information has proven difficult. There are often information gaps created when experts retire, when grant-funded information resources lose funding, or due to administrative changes.

It is difficult to obtain funding for important research, sensible on-farm changes, and continual maintenance/upkeep of environmental stewardship projects.

- Although regulators and farmers demand that practices are justified by a strong evidence base (e.g., multiple peer-reviewed publications), a bias toward novelty makes it difficult to obtain funding to replicate research. Important research is not necessarily novel, and vice versa.
- Often, funding is available to install or implement new technologies but not to maintain or ensure continuity of projects. In some cases, this makes it easier to build new rather than to repair equipment/facilities. Additionally, it can be difficult to secure funding for routine maintenance (e.g., repairing gutters, moving a barn) compared with utilizing novel practices, although routine maintenance may be equally or more effective at improving environmental performance.

There is a need for unbiased on-farm research and extension services.

- Farmers favor on-farm research that is relatable to their management conditions, rather than laboratory-scale research or models. However, on-farm research is expensive, posing a barrier to investigating environmental stewardship.
- Many private parties derive value from university extension and research. However, these services rely on public support and cannot recoup the benefits of their work to obtain additional funding.

Emerging Opportunities

There are emerging models for cooperation among stakeholders to advance environmental stewardship by sharing information and resources.

- Online databases of manure haulers hosted on extension portals illustrate how extension personnel can crowdsource information to maintain helpful resources, adopting the role of curator rather than creator.
- New cooperation models such as the manure hub and spoke model may enable greater use of technologies with high capital costs, such as drying and anaerobic digestion.
- There is growing collaboration among commodity groups, and between private and public organizations.

New funding mechanisms are emerging, as well as new support systems for grant preparation.

- There is growing support for producers in preparing applications to grants, via artificial intelligence and private and public consultants.
- State funding has supported greater use of manure to offset synthetic fertilizer use and implementation of various mitigation strategies on concentrated animal feeding operations (CAFO; e.g., Idaho CAFO improvement project).

As research advances, there are opportunities not only to highlight best practices, but also to share when practices have no or negative effects on environmental performance. There is an opportunity to develop platforms for sharing local and anecdotal knowledge.

- Peer-reviewed publications are subject to publication bias, in which significant findings are more likely to be published than non-significant results. There are opportunities to highlight “Lessons Learned” when a particular practice does not work well within a context.
- As environmental stewardship practices are more widely-adopted, there is an opportunity to develop platforms for sharing anecdotal findings and regional/local knowledge.

Recommendations for Practice

First, there is a need to go beyond peer-reviewed publications to expand sharing of case studies, anecdotal evidence, null results, and realistic caveats and cautions. These reports could be shared as “Lessons Learned” on a secure and stable website accessible to the LPELC community or other similar groups.

Second, there is a need for succession and continuity planning in environmental stewardship organizations and projects. To this end, there are opportunities to expand involvement of new people, share expertise, and create stable platforms to archive and pass on information.