Bringing Farm Advisors into the Sustainability Conversation: Results from a Nitrogen Workshop in the U.S. Midwest

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Introduction

Nitrogen fertilizer is invaluable to Midwest crop production, but it is very mobile and easily lost from fields, with negative consequences for the environment (Robertson & Vitousek, 2009). University researchers and Extension program personnel have created tools to help farmers manage nitrogen efficiently (e.g., Sawyer et al., 2006). However, recent research indicates that many farmers seek information on farm decisions, including nitrogen rates, from private sector retailers and advisors outside the university (Arbuckle & Rosman, 2014; Stuart, Schewe, & McDermott, 2014). These advisors are heavily influenced by Extension (Prokopy et al., 2015). Both private sector farm advisors and Extension play a key role in the network of information for farmers (King & Rollins, 1995; Shepard, 1999), but in ways that may be changing from historical patterns of interaction.

To date, little is documented on effective ways for Extension to interact with private sector advisors who are critical actors in farm decision-making. We held a Sustainable Nitrogen Roundtable workshop to bring together important voices—private sector farm advisors, Extension educators, scientists, and farmers—to discuss challenges to and opportunities for research, education, and outreach initiatives aimed at increasing sustainable nitrogen use in Midwestern cropping systems. Roundtables can be effective for diverse groups to discuss important issues (Lev, Briggs, & Stefani-Ruff, 2007).

Methods

Central to the nitrogen roundtable was a project funded by the National Science Foundation (NSF). Led by a team of Michigan State University (MSU) social and biophysical scientists, the project focused on integrating the biophysical, sociological, and economic aspects of nitrogen fertilizer for the purpose of informing management and

policy decisions (Stuart et al., 2015). Across the Midwest, the team conducted field experiments, measured nitrogen loss, surveyed thousands of farmers, and conducted in-depth interviews with over 100 farmers about nitrogen use. We designed the roundtable to share and discuss these results with practitioners. Our goals were to:

1. Share current research on nitrogen in cropping systems and receive feedback from practitioners who work with farmers.
2. Provide an opportunity for discussions and shared learning among scientists, Extension educators, crop consultants, and farmers on sustainable nitrogen use.
3. Stimulate future research and education collaborations on nitrogen management.

We invited Extension educators and private sector farm advisors and nitrogen dealers from Illinois, Indiana, Iowa, and Michigan. The 1.5-day workshop was held June 1-2, 2016, at the Kellogg Biological Station Long-term Ecological Research site in Michigan. The workshop began with an overview of the nitrogen cycle in agroecosystems, which was followed by presentations by the MSU research team. Presentations by researchers highlighted farmer decision-making processes that may be of use for practitioners when promoting new or innovative practices. Next, invited speakers shared applied research on decision-support tools and applied nitrogen management.

Presentations were followed by question-answer sessions that allowed for meaningful discussions about agronomic and behavioral aspects of fertilizer management. During a field tour, participants saw different ways that nitrous oxide emissions are measured and viewed crop responses to variable nitrogen rates. Throughout the workshop, we held facilitated breakout sessions to foster shared learning among participants (Table 1), and we hosted a panel to hear the realities farmers are facing. Workshop content and presentations can be accessed at https://lter.kbs.msu.edu/nitrogen-roundtable-2016/.

Table 1.
Nitrogen Roundtable Breakout Session Topics and Formats

Breakout session topic	Format
What are the primary challenges to managing nitrogen efficiently for farmers, Extension, and crop consultants? What are unmet research needs?	Rotating flip-chart activity in which participants break into small groups and rotate around a series of flip charts to address questions, with each group reading the previous groups' responses and adding to the list, and then reconvene for a whole-group discussion
What are the realities of managing nitrogen on the farm?	Farmer panel[a]
How can we increase use of nitrogen decision-support tools by farmers?	Whole-group facilitated discussion

Where do we go from here: Who was not at the table for this discussion, who needs to be, and what are any potential next steps or potential collaborations?	Rotating flip charts activity followed by whole-group facilitated discussion

[a]This panel included advisors and Extension educators who also farmed.

Results

Types and Numbers of Participants

We had a diverse mix of participants, although most farmer panelists could not attend due to delayed field activities on account of an unusually wet spring (Table 2). It was relatively easy to recruit Extension educators through university and U.S. Department of Agriculture networks; nearly all invited Extension educators agreed to attend, and those who could not generally expressed enthusiasm for the event. Finding ways to tap into private sector networks was more challenging, and some private sector representatives canceled at the last minute due to pressing job duties. Participants had varied expertise in the aspects of farm management on which they provide recommendations, with the majority (96%) reporting that they advise farmers on nutrient management (Table 3).

Table 2.
Nitrogen Roundtable Participants

Participant type	Percentage of respondents[a]
Extension educator/specialist	61%
Scientist/researcher	29%
Certified/independent crop consultant	25%
Farmer advisor	21%
Nitrogen dealer	11%
Farmer/producer	4%
Other (specify)[b]	14%

[a] The percentages total more than 100% as respondents could choose more than one category.
[b]Private sector agronomist, on-farm researcher, independent crop advisor, and fertilizer biotechnologist.

Table 3.
Topics Participants Advise Farmers On

Topic	Percentage of respondents[a]
Nutrient management	96%
Pest management	76%
Crop rotation	72%
Tillage	68%
Weather/extreme events	40%
Crop/seed selection	40%
Financial planning	28%
Nitrogen fertilizer rate	20%
Other (specify)[b]	28%

[a]The percentages total more than 100% as some participants advise clients on multiple topics.
[b]In-season yield predictions, field quality, in-field variability, leasing/landlord tenant relationships, contract research, environmental compliance, disease management, other nutrient management, and cover crops.

Post-event Evaluations

Ninety-six percent of participants said that the mix of presentations and discussions was a good way to learn about nitrogen management. Ninety percent stated that they improved their understanding of varied viewpoints on nitrogen management, and there was improved knowledge and understanding of nitrogen dynamics (Table 4). Fifty-five percent reported being somewhat likely and 45% reported being very likely to connect with other workshop participants for future collaborations. Importantly, 90% said they would recommend this workshop to a colleague.

Table 4.
Post-event Evaluation Results[a]

Knowledge/skill area	Increased			Did not change	
	A little	A moderate amount	A great deal	Did not grasp concept	Already knew
Understanding of basic principles related to nitrogen cycling in agricultural systems	27%	57%	7%	0%	10%

Understanding of farmer decision-making regarding nitrogen management	23%	37%	10%	0%	27%
Knowledge of available decision-support tools for managing nitrogen efficiently	10%	50%	40%	0%	0%
Ability to address nitrogen management with science-based information for clientele or on farm	43%	27%	20%	0%	7%
Confidence to make or recommend management that leads to sustainable nitrogen management	27%	43%	10%	3%	13%
Desire for involvement in multistate Extension and outreach collaborations on nitrogen management	17%	43%	37%	3%	0%
Motivation to implement knowledge in the area of sustainable nitrogen management	20%	30%	37%	0%	10%

[a]The percentages do not always total 100% as some respondents did not answer every question.

Lessons Learned: Implications for Extension

A rising global population, climate change, and societal demands for environmentally friendly farming bring significant challenges to agriculture. Recent budget reductions in Extension exacerbate these challenges, and new partnerships are needed to meet these challenges. Through our nitrogen roundtable, we gained insights that may inform Extension programming that relates to seeking new partnerships:

- While trust in Extension remains high, farmers are looking to private sector farm advisors. How can Extension best partner with farm advisors? It was challenging to identify interested farm advisors for the nitrogen roundtable. Little is known about this important group of actors in the agricultural sector, and making better connections with them is an important next step.
- Partnership with researchers on outreach events can be valuable: Scientists need to fulfill broader impact goals, and stakeholders value learning about new and exciting research results. If collaborations start early, Extension activities can be part of grant proposals, as was the case for the nitrogen roundtable.
- The timing of an event is an important consideration, making it difficult to plan for a diverse group. For example, summer is often best for university researchers to participate, but summer can be a busy, difficult time of year for farmers or advisors to attend. Solicit input from each participant type when planning the event.
- Most Extension and private consultants in attendance had never met before. For a vibrant Extension system, forming new partnerships outside of academia is important;

these types of targeted workshops offer an important opportunity for building such partnerships.

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Abstract

Increasingly, farmers are looking to private sector advisors to inform their nitrogen decisions, but little is known about these important actors. We held a Sustainable Nitrogen Roundtable workshop to bring together important voices—private sector farm advisors, Extension educators, scientists, and farmers—to discuss new research and more sustainable use of nitrogen in Midwestern cropping systems. We gained important insights by reaching outside of academia and including private sector farm advisors as valued participants. Ninety percent of participants found that their understanding of varied viewpoints on nitrogen management were improved and would recommend such a workshop to a colleague.

Keywords List: nitrogen management, crop consultant, farm advisor, roundtable, private sector