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FEATURE

Increasing agricultural conservation outreach through social science

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While agriculture is necessary for global food and fiber production, many farming practices can contribute to environmental degradation, including nutrient pollution, greenhouse gas emissions, and degraded soil quality (Davidson et al. 2015; Swinton et al. 2007). Achieving agricultural sustainability goals in the United States relies in large part on voluntary conservation efforts by farmers (Claassen et al. 2013; Reimer 2015). Federal taxpayers have funded over US$40 billion since 1995 in agricultural conservation programs, and an increasing number of farmers are looking to sustainable agriculture methods in light of the environmental impacts of intensive agriculture (EWG 2015; Prokopy et al. 2019). Recent efforts have focused on in-field practices that improve soil structure and function, framed as soil health. These practices include no-till, cover crops, rotational grazing, and diverse crop rotations, among others. While these practices have environmental benefits individually, benefits can be magnified through their combined use (Lal 2015).

To support the voluntary uptake of conservation practices by landowners and agricultural producers, public, private, and civil society institutions have provided ongoing conservation outreach and technical support for many decades. For example, the USDA alone, through the Natural Resources Conservation Service (NRCS), invested US$750 million in conservation technical assistance in 2018 (USDA 2019). The traditional conservation outreach model is largely based in post-Dust Bowl efforts to improve soil management practices. This includes ongoing communications through print and digital media, one-on-one conservation planning, field days and demonstrations, networking events, and conferences (Pape and Prokopy 2017). This traditional outreach model relies heavily on research and technical expertise generated at public institutions, such as federal and state agricultural agencies, locally based soil and water conservation districts, land grant universities, and cooperative extension, to provide guidance to farmers on new technologies and practices.

Traditional outreach efforts, including group-based approaches such as field days and winter meetings, as well as one-on-one interactions, have resulted in some significant successes. The most recent US Census of Agriculture indicates that over half of cropland acres use reduced tillage methods (USDA 2019). While conservation gains have been made, resource concerns stemming from agricultural landscapes still abound, and in some cases are increasing (Rabalais and Turner 2019). Adoption rates of key conservation practices still lag; for example, cover crops are currently only used on less than 10% of US cropland acres (USDA 2019). Moreover, while adoption rates for cover crops have increased overall, the rate of increase has slowed, indicating a leveling off of interest in many areas.

Taken together, these trends indicate that the traditional outreach model may no longer be meeting the needs of agriculture in the 21st century. The traditional model, based in public institution-generated expertise, worked well in the post-World War II era, when agricultural technologies and practices improved rapidly. Many of these technological improvements were made through significant public investment in research (Paarlberg and Paarlberg 2000).

The sustainability challenges facing US agriculture now are more complex and challenging than the technological and productivity challenges of the previous century (Batie 2009). Addressing these challenges requires a different approach to conservation outreach. In this paper, we outline a new approach that leverages the social sciences and an understanding of human decision making to increase the effectiveness of outreach efforts and improve the sustainability of US agriculture.

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THE CHALLENGE OF INFLUENCING FARMER DECISIONS

The insight that farmer conservation choices are complex is not novel. Significant scholarship has been devoted over recent decades to investigating farmer adoption of new technologies and conservation practices. Recent reviews of this research demonstrate a significant increase in the past decade in studies exploring conservation decision making. These reviews of 35 years of research have revealed a wide range of factors that motivate and limit conservation practice adoption. While factors including farmer education, financial capacity, technical knowledge and capacity, and land tenure can limit adoption in some instances, these factors do not consistently explain the lack of widespread adoption of key practices (Prokopy et al. 2019). Rather, cultural and social factors, including environmental attitudes and connections with conservation professionals and other conservation-oriented farmers, appear to play a large role in spurring uptake (Prokopy et al. 2019; Ranjan et al. 2019).

Several theoretical and empirical frameworks have guided much of the research on farmer conservation decisions. The Reasoned Action Approach, and preceding models (Theory of Reasoned Action and the Theory of Planned Behavior) posit that behavior is primarily the result of intentional decisions by individuals, with intentions determined by three primary psychological antecedents: (1) attitudes toward the particular behavior; (2) perceived social norms toward the behavior; and (3) perceived self-efficacy (skills, abilities, personal agency) to perform the behavior (Ajzen 1991; Fishbein 1979; Fishbein and Ajzen 2011). The role that each of these factors plays in determining farmer willingness to adopt practices varies depending

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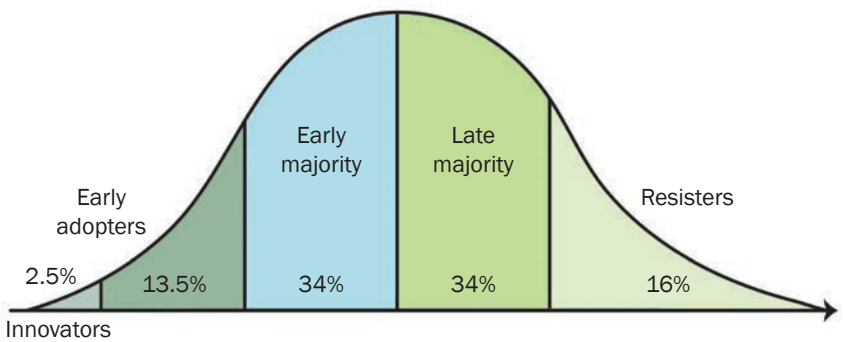
on the individual and situation, but research has demonstrated the importance of considering these psychological factors when pursuing behavior changes (Prokopy et al. 2019; Ranjan et al. 2019).

Another set of studies relies more on population-level characteristics to understand conservation decisions. Researchers have long observed that farmer decision making with regard to new practices and technologies follows a regular pattern. First observed by Everett Rogers in the 1950s, the diffusion of innovation curve is a model of behavior change that has been frequently applied in agricultural settings (both in technology and conservation practice adoption), as well as public health and technology adoption (figure 1) (Borges et al. 2015; Chavas and Nauges 2020; Rogers 2003; Sattler and Nagel 2010). Applied to farming, this model indicates that innovators (2% to 3% of the population) are quick to adopt a new practice. Early adopters (10% to 12%) take a calculated approach to risk and will adopt new practices at the first sign they could work. The middle and late majority adopters (nearly 70% of the population) are risk averse, wait for a practice to be proven by innovators and early adopters before attempting, and are highly dependent on social cues. They need to feel a practice is socially acceptable before they try it. Finally, the resisters, roughly 15% of the population, will avoid adoption at all costs.

Both of these theoretical frameworks, and empirical research on farmer conservation decisions, emphasize the importance of social influences. Recent research has demonstrated that social network position, frequency of contacts with conservation agencies, and socially reinforced norms of behavior all have a significant impact on adoption of conservation practices (Osmond et al. 2015; Reimer et al. 2012; Roesch-McNally et al. 2018). It is important to note that individuals do not all respond similarly to these social influences. The key factor is the difference in need for social cues. Innovators willingly counter social pressure, and early adopters require little to no social support. The middle majority, however, require strong signals from peers and institutions that a practice fits their decision-making model to adopt a practice. The adoption decision must be obvious and easy, conditions that improve with social and cultural support. Although middle adopters look to early adopters for cues, adoption by early adopters does not guarantee middle and late adopters will follow.

If sustainable agriculture practices such as cover crops and more diverse crop rotations are to achieve the level of adoption needed to ensure environmental health, new approaches are needed to alter how conservation information is communicated to farmers. While field events such as demonstrations are an important outreach tool, the structure and information conveyed at these events influences farmer participation and engagement (MacGowen et al. 2018). Technical information given in a conservation framework is unlikely to reach the motivations of the nonadopter group whose behavior is the target of change. The role of conservation professionals, including those at cooperative extension and government agencies, is indeed beginning to shift as farmers' preferences for information change (Norton and Alwang 2020; Prokopy and Power 2015; Stuart et al. 2018). Alternatively, grounding conservation outreach approaches in social science will craft outreach communications and efforts to meet the motivations and mental models of these middle adopters to expand the impact of conservation outreach.

Figure 1
Diffusion of innovation curve describing how new practices or technologies move through a population (adapted from Rogers [2003]).



THE GROW MORE APPROACH

Since agricultural and resource professionals are the people communicating and working with farmers on a daily basis, they are a vital source of conservation information. These professionals are often trained in the agricultural sciences and go through rigorous trainings on conservation programs and implementation. However, many lack training in communications or approaches with social science insights, skills which are useful in inspiring behavior change. In addition to providing technical guidance to farmers, outreach needs to successfully frame conservation as a critical part of good farm management and build social norms that encourage adoption of sustainable agriculture practices.

The National Wildlife Federation (NWF) has developed a training curriculum to fill this gap in many conservation professionals' skill sets. Titled "Grow More," this training approach is based on NWF's experiences working with leading conservation farmers and outreach professionals across the country. The central goal of this program is to ground conservation outreach in an understanding of decision making and behavior change science. By basing outreach strategies in proven methods that influence conservation decisions, and the myriad factors that influence these behaviors, NWF aims to increase the impact of outreach efforts across the country. The focus then is to grow more: both more conservation and more leaders in the conservation outreach space.

This flexible training approach, focused on instilling behavior change principles, is targeted at professionals and leading farmers who seek to increase the impact

of their conservation outreach. Structured as a workshop, trainees come together to learn from experts and from each other. NWF provides basic training modules that introduce participants to the basics of behavior change, outreach messaging and framing, and outreach planning tools. These workshops can be crafted to meet the specific needs of trainees, including the resource and geographic context as well as time and venue constraints. Most often, these workshops are run over two half-days to allow time for reflection and processing, and encourage participants to apply the early lessons into practice. Key lessons include the following:

1. Basics of behavior change: This lesson introduces basic principles of decision making from current social science, including the role of beliefs, attitudes, and personality. The goal of this module is to familiarize participants in how their audiences perceive information and what types of information and messages have the most influence over their decisions. A key component of this lesson is understanding how people might perceive the same behavior in very different ways, with significant implications for how to best conduct outreach.
2. Culture and social norms: Humans are highly social creatures, so appreciating the role of culture and norms is critically important for understanding how people make decisions. In this module, NWF introduces key concepts for how to appeal to shared values, attitudes, and norms, while also understanding how to speak to different audiences. One important point in this lesson is learning how to leverage existing social networks and cultural influences to promote conservation.
3. Outreach messaging: Building on the foundation of the previous lessons, this module begins to introduce the role of the outreach professional in conservation promotion. Outreach professionals have a powerful ability to shape the way audiences perceive conservation practices, so in this lesson NWF applies key social science concepts to outreach messaging. In this session, trainers begin to offer more specific examples of successful outreach approaches that participants can apply to their own setting, such as the use of metaphors, stories, and motivation identification.
4. Framing your outreach: The majority of current agricultural events consist of traditional message frames such as economics or specific practices how-to guides. If a key objective is to reach new audiences, especially middle adopters, outreach professionals must be more innovative in the framing approaches they use. This session involves more application and interaction, offering participants the ability to learn from each other about the types of message frames that have been successful in the past.
5. Outreach planning and preparing speakers: This nuts and bolts session focuses on how to design, promote, and run outreach events that reach new audiences. While outreach professionals play a key role in setting the stage for outreach, they are not the only stakeholders with influence on the audience's outreach seeks to reach. A key component of this lesson is how to leverage the influence of others as speakers at events.
6. Planning and evaluation tools: Successful outreach often hinges on the ability to plan, manage, and evaluate an outreach program. This module introduces participants to planning tools they can use to more effectively build and manage an outreach strategy designed to reach new audiences. In addition, trainers introduce basic evaluation concepts so participants can gather feedback on their events and communications. The key here is to be innovators ourselves by learning from our successes and mistakes through effective evaluation.

The core training modules build on each other, beginning with basic social science principles, then progressing through more specific examples, and ending with participants being able to reflect and apply the lessons in their own outreach needs. Throughout the program, significant time is built in for real world applications, reflection, discussion, and feedback from peers and trainers. A key aim of this training approach is to empower outreach professionals and leading farmers with the knowledge, skills, and tools to expand the reach of their efforts. Since 2018, NWF has trained over 800 outreach professionals ranging from local to federal organizations, including local, state, and federal agencies, not-for-profit conservation groups, and farmer-led organizations.

Evaluation is a critical component of program design, both for demonstrating impact and providing valuable feedback on program implementation to outreach staff. Assessing impact is a key challenge in any outreach or behavior change program, and is a particularly acute challenge in the agricultural conservation context given the complexities of farmer decisions regarding conservation practices. The goals of the Grow More program are two-fold: (1) to change outreach behaviors of individuals and organizations interacting with farmers; and (2) to increase adoption of conservation practices among those farmers. Our evaluation approach thus far has focused primarily on assessing outcomes for the first goal. Using a social indicators approach (Genskow and Prokopy 2009), which recognizes that changes in behavior must be preceded by changes in the determinants of behavior, NWF staff have conducted evaluation surveys of program participants following workshops. These surveys assess changes in multiple areas, including knowledge of key concepts, self-efficacy to implement new strategies, and supporting attitudes and norms for changing approaches, as well as changes in outreach behavior. Surveys are typically conducted six to eight weeks following workshops, to allow time for participant reflection and implementation of new strategies. Analysis of this evaluation data is currently underway, though preliminary data indicate positive impacts on participants.

While NWF equips professionals with the necessary skills and tools to improve outreach through the Grow More program, changing the basic model of conservation outreach requires more than a single workshop. Similar to changing the behaviors of farmers, conservation professionals require ongoing training and support that meets their motivations and needs. Grow More is best implemented as part of an organization's ongoing effort

to build core outreach competencies and evaluate their outreach efforts.

CONCLUSION

Persuading farmers to adopt soil health and other sustainable agriculture practices requires accounting for not only the economic, technical, and knowledge barriers to practice adoption, but also the significant social and behavioral barriers. Conservation outreach should be grounded in a complete understanding of the wide range of factors influencing farmer decisions. Without a change in the basic structure of agricultural outreach, conservation practice adoption will continue to stagnate. Increasing basic social science skill sets in outreach professionals is just as important, if not more vital than increasing technical expertise. The Grow More model outlined here seeks to build these necessary skill sets to improve outreach and engage the majority of nonadopting farmers. Equipping conservation professionals with a foundation in social science and effective communication methods has the potential to improve the impact of their outreach efforts by more directly addressing the social and behavioral motivations of nonadopters. Conservation professionals must continue to innovate messaging and outreach strategies to achieve improved conservation outcomes in agricultural landscapes.

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