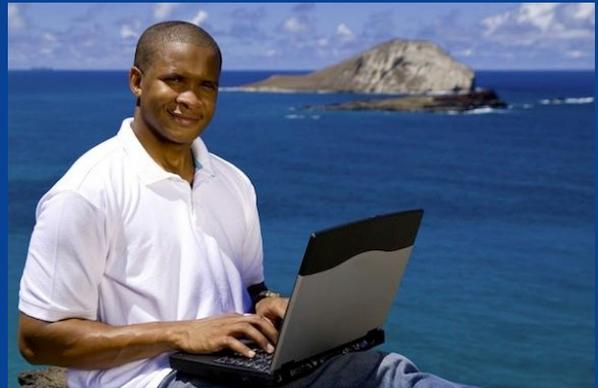
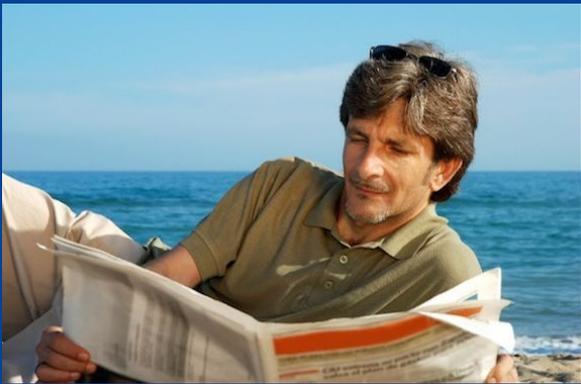




**WATER WORDS
THAT WORK**



**Farmer Outreach Literature Review
Prepared For MACD
April 2017**

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Overview

Western Lake Erie has long been plagued by toxic algal blooms, and the phosphorous in agricultural runoff from area farms contributes to this. To address this problem, the Michigan Association of Conservation Districts and its partners seek to accelerate enrollment in the the Michigan Agriculture Environmental Assurance Program (MAEAP). The program is already in place and nearly 99,000 acres of agricultural land are now covered by one or more Best Management Practices.

Seeking insights into how to build on this success, WWTW prepared this review of relevant research and project reports, case studies, and articles. Before commencing with the research, agreed to the follow research scope:

1. Question #1: What demographic traits suggest a farmer may be more inclined to participate in voluntary programs like MAEAP?
2. Question #2: What are the benefits and barriers that may incentivize or prevent farmers from participating in voluntary programs like MAEAP (e.g. legislated certainties)?
3. Question #3: How do fluctuating commodity prices influence which practices a farmer might be more or less willing to adopt?
4. Question #4: What changes in a farmer's life might make them more inclined to participate in in voluntary programs like MAEAP?
5. Question #5: What are the most successful farm outreach programs that are out there and how do they work?

Conclusions

Conclusion #1: Predictors for adoption of conservation practices are highly local and highly variable

There is little no agreement in the literature on what types of information can or should be used to predict whether a farmer is likely to adopt BMPs. Ultimately, each farmer’s individual situation will drive their decision to participate in voluntary programs such as MAEAP. “There are no silver bullets for BMP adoption so it is important to survey farmers beforehand to find out more about what might work” (American Farmland Trust, 2013).

For professional farmers, income generation is a major objective and their understanding of how their income is impacted by changes in the land will drive their decisions (Swinton et al., 2015). Multiple factors including age, education, family situations, social networks, finances, farm ownership, incentives, rules, perceptions, personal values, social norms, and many other factors all shape how they manage agricultural ecosystems (Swinton et al., 2015; Carlisle, 2016; Lambert et al., 2006a; 2006b).

Although we did not find a definitive list of predictive traits, here are some factors that may influence farmers’ receptivity to enrolling in MAEAP:

More Receptive	Less Receptive
Perceive a conservation practice to be effective	Do not perceive a practice to be effective
Highly Educated/Knowledgeable	Less Educated/Knowledgeable
Full time farmer	Part time/hobby farmer
Female	Male
Younger	Older
Own the land they farm, farm the land they own	Rent the land they farm, or lease it out
More acreage	Less acreage
Cash crop	Commodity crop
Well capitalized and/or profitable	Financially struggling

Conclusion #2: Farm Profitability is a Primary Concern

In focus group interviews and a statewide survey, Michigan farmers made it clear that maintaining profitability is a primary consideration for deciding which crop management technologies to adopt (Swinton et al., 2015). Farmers are more likely to adopt profitable

BMPs, and believed they should be compensated to undertake practices that benefited the public over the farm.

This sentiment was repeated in throughout the literature. As farms are a business, and farmers are business owners, this a necessary stance for farmers who wish to maintain their business over the long term. Time is money, and that includes time spent participating in a voluntary program like MAEAP.

Here are some quotes from farmers on this topic:

- *I always try to choose practices that have environmental benefits but if it's going to cause me to lose money then I can't take that choice.* - Focus group farmer from Michigan, Swinton et al. (2015)
- *Conservation is important, but it has to be cost effective* - Hoag et al. (2012)
- *Conservation competes with the time a farmer could be using to make money.* - Hoag et al. (2012)

This attitude towards profitability also applies to the perceived value of the land. Farmers who are considering selling their land in the near future may be reluctant to invest time and money into BMPs when they may see little or no return on their investment. They may also be concerned that BMPs may negatively impact the number of potential buyers, as would-be-land owners may not want to use the land in the same way and will not want limits imposed by conservation easements, for example.

Commodity prices also influence willingness to adopt, or maintain, agricultural conservation practices. For example, when corn or soy prices are high, lands once taken out of use for conservation purposes, are often re-planted (Lambert et al., 2006a; 2006b).

In the end, each farm and farmer are unique, and the truth is that "some farmers were simply not interested in conservation practices, even with cost share" (Hoag et al., 2012).

Conclusion #3: Farmers want flexibility, convenience, and confidentiality

Several studies highlighted farmers' concerns with existing technical and financial assistance programs. Three factors stood out as important barriers for voluntary programs like MAEAP to address if they want to be attractive to farmers:

- Flexibility
- Convenience
- Confidentiality

Farmers want conservation programs to be flexible, with standards that can be tailored to their conservation goals and take into consideration the dynamic nature of farming

Farmers want programs to fit their work schedule, are easy to understand and participate in, and offer assistance (e.g. technical assistance, training, funds).

Farmers are especially concerned about confidentiality. When considering enrollment in a voluntary program like MAEAP farmers may be discouraged from participating for fear of getting in trouble if violations are found. Therefore, extra effort should be put into reassuring farmers that their participation is completely confidential and all information and documentation stays on the farm. In light of this, Habron (2004) recommends use of a peer- approach to disseminate information because the trust-level between landowners may reduce fear associated with government involvement.

Conclusion #4: Successful voluntary programs are strategic in their approach to outreach efforts

Outreach projects and programs are most successful when they follow a plan, and the literature shows that outreach to farmers is no exception. What it does reveal are the specific preferences farmers have when being invited to participate in programs like MAEAP and strategies to consider when making your plan.

Napier and Bridges (2002) conclude that the most cost effective way to get BMPs on the ground may be to spend time identifying local champions and/or plugging into local social networks and using those connections to spread information and advocate for change because “disseminating information presents a logical way to combine and extend the reach of factors found to have a significant effect on BMP adoption” (Baumgart-Getz et al., 2012), leaving program dollars available to spend on costs associated with BMP installation and other conservation efforts (Habron, 2004; Prokopy et al., 2008; Coughenour, 2003).

Warwick Township, PA learned the hard way that farmers are not chomping at the bit to write conservation plans. Their program to get 100% of their 91 farmers in compliance with an ordinance requiring a conservation plan flopped until they got the city’s zoning officer involved. In fact, “nothing matched the success of his face-to-face visits” (Lutz, 2010).

An analysis of Michigan's groundwater outreach efforts to farmers concluded that all farmer outreach plans should include goals for knowledge, attitudes and behavior (Holsman & Krueger, 2002). Claiming that, “Long-term behavior change, whether for groundwater stewardship or other health and safety issues, is likely a complex process that requires interventions designed to affect multiple determinants of an individual's decision-making process.”

Work by Lempke et al. (2010) suggests that more intensive outreach efforts, such as one-on-one landowner visits and localized workshops and tours, can increase adoption of conservation practices associated with cost-share programs. This is supported by a simple strategy offered by Baumgart-Getz et al. (2012). They propose a two-tiered approach to BMP installation.

- Tier 1: Start with an implementation focus by targeting farmers most likely to adopt conservation practices.

- Tier 2: Increase individual capacity and awareness by using networks to inform other farmers about the benefits of adoption.

Based on recommendations and lessons learned in the literature, here are some questions to consider when developing a farmer outreach plan:

- Who in the community do farmers trust?
- Are the farmers in the target area owners or renters?
- Who in the community is most likely to adopt BMPs?
- What types of farms are in the target area?
- What types of BMPs are best suited for the farms in the target area?
- What are the environmental goals for in the target area?
- Which BMPs will help the program reach its environmental goals?
- What are the financial incentives/benefits for participation?
- What are the benefits to farm yield for participation?
- What are the environmental benefits for participation?
- Which farms are contributing the most pollution in the target area?

Remember, farmers want clean water, too!

- *Farmers have shown a great willingness to embrace conservation practices and are playing an important role in improving water quality. Our experience is that farmers whose fields and pastures are contributing the bulk of phosphorus into waterways can be approached and are willing to change practices.* - Steve Richter, the Nature Conservancy's Director of Conservation for Agricultural Landscapes in Wisconsin.

Research Results

Question #1: What demographic traits suggest a farmer may be more inclined to participate in voluntary programs like MAEAP?

We did not find a definitive answer to this question in the literature, but there are some clues. Ryan, Erickson and De Young (2003) looked into the use of conservation practices in riparian areas within a southeastern Michigan watershed. The top two factors found to influence the adoption of riparian conservation practices were the % of income received from farming, and the size of the farm. A related observation was that full-time farmers tended to have larger farms and were more likely than part-time farmers to adopt no-till farming, use grass buffer strips alongside streams and drains, and use a range of more permanent structural tactics (e.g., drain tiles, retention basins). They also found that "part-timers preferred the use of woody vegetative cover."

In their review of the literature on soil health practices, Carlisle (2016) identified three demographic factors in that seem to have some influence on adoption of soil health practices: college education, farmer age, and gender. Their review of the literature indicates a relatively consistent correlation between college education and "adoption of conservation tillage." They also found that "younger farmers adopt soil health practices at

higher rates.” Finally, their research revealed that while female farmers were more interested in conservation practices, many felt they lacked the knowledge and skill to implement them on their farms.

In their literature review, Baumgart-Getz et al. (2012) reached similar conclusions about age and knowledge/education, with extension training having a consistently positive impact on farmer adoption of BMPs. They also concluded that capital is the best financial predictor of adoption, the % of income from farming was important and female farmers show the most interest in BMPs but often lack the resources to follow-through.

In a review of 170 variables, the American Farmland Trust (2013) found that “education, farm size, income, rainfall, technical assistance, program participation and awareness of environmental threats correlate positively with BMP adoption.” Similarly, Prokopy (2011) concluded that farmers who are younger, have larger acreages, higher education levels, more income and capital, more diverse operations and more access to labor more likely to adopt BMPs.

On the other hand, Tosakana et al. (2010) found that many socio-demographic variables (education, management experience, full-time farming status, heritage commitment) were not useful in predicting adoption of conservation practices (i.e., gully plugs and buffer zones). **These authors found that the primary predictor of use was perception of effectiveness.** However, regulation and maintenance were seen as disincentives. Previous work by Camboni and Napier (1993) found variables related to farm structure to be the best predictors of adoption while personal characteristics of farmers were not useful predictors.

Question #2: What are the benefits and barriers that may incentivize or prevent farmers from participating in voluntary programs like MAEAP (e.g. legislated certainties)?

Higher education, outside expertise, a conservation plan and incentive payments help overcome the barriers for the adoption of more complex BMPs (American Farmland Trust, 2013). BMPs that are cheap, easy to manage, and have clear benefits are most likely to be adopted, while BMPs that are more challenging to manage, take time and cost money are less likely to be adopted.

The table below provides a summary of the most frequently cited benefits and barriers farmers perceive related to agricultural conservation practices and participation in the voluntary programs that promote them:

Benefits Farmers Perceive	Barriers Farmers Perceive
Soil Health	Less land in production
Aesthetics (the farm looks nice)	Hassle/red tape

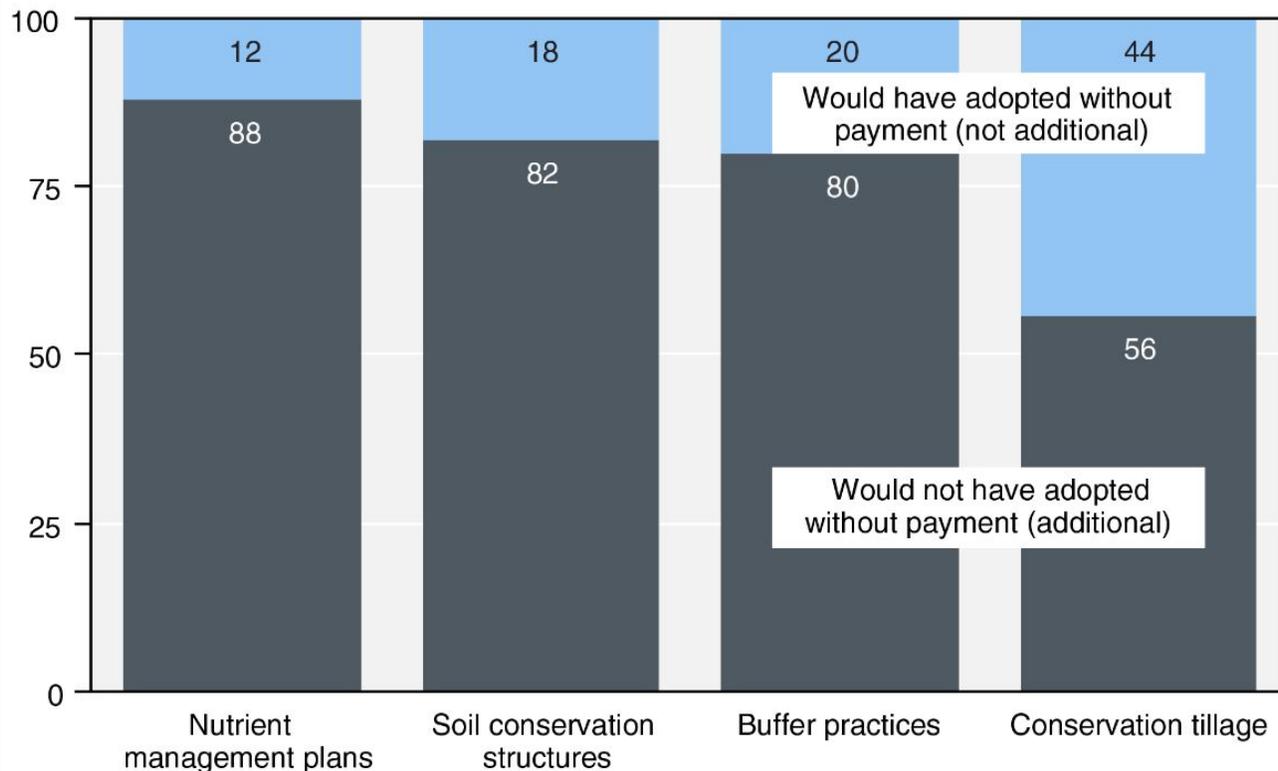
Financial Incentives	Costs of BMP
Improved Yield	Loss of Profit (e.g. land no longer in production)
Technical Assistance	Learning curve
Easily observable farm benefit (e.g. reduced erosion from conservation tillage)	Farm benefits that are hard to observe (e.g. nutrient management)
Improved Soil Health	Farmers Work Cycles
Aesthetics	Family Obligations
Practices with Positive Outcomes in Addition to Conservation	Lack of Trust/Perceived Loss of Control

Recent research indicates that farmers’ motivations to plant cover crops are directly related to their perceived benefits (SARE/CTIC, 2016). Hoag et al. (2012) argue that “the most important factor in conservation practice adoption is that a practice makes the farmer money, directly or indirectly.” Similarly, an evaluation of the Farm*A*Syst program in MI found that use of groundwater stewardship practices may be driven by short-term financial incentives (Holsman & Krueger, 2002). Farmers frequently report that technical and financial help “provided in a timely manner that did not interfere with planting and harvesting were major incentives...to participate in cost-share conservation programs.” (Lempke, et al., 2010; Hoag et al., 2012)

Figure 1: Graph comparing how payment influenced the adoption of common conservation practices.

Additionality in adoption of common conservation practices, 2009-11

Percent of farms receiving conservation payments



Source: USDA, Economic Research Service analysis of ERS and National Agricultural Statistics Service, Agricultural Resource Management Survey data.

Source: No Till Farmer, 2015

Benefits and Barriers Case Studies

Benefits reported by farmers in SE MI:

- A study in a southeastern Michigan watershed looked at the adoption of conservation practices by farmers with land in riparian areas (Ryan, Erickson and De Young, 2003). They identified six categories of motivations including:
 - a) intrinsic/attachments to the land,
 - b) reduction of soil erosion,
 - c) visual quality of the conservation practices adopted,
 - d) downstream costs (negative effects of soil erosion and stream pollution on neighbors),
 - e) removal of marginally productive fields from production, and
 - f) an economic motivation (compensation for adoption of a practice).

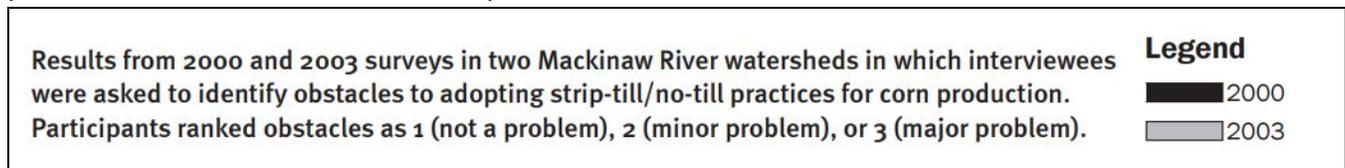
Benefits and Barriers specific to use of cover crops:

- The top three benefits of cover crops perceived by farmers were all soil related (SARE/CTIC, 2016):
 - 1) increased soil health;
 - 2) increased soil organic matter and
 - 3) reduced soil erosion.
- The top three major challenges to the use of cover crops perceived by farmers were (SARE/CTIC, 2016):
 - 1) cover crop establishment;
 - 2) time and labor required to manage cover crops and
 - 3) seeding the right species for my operation.

Barriers specific to livestock producers:

- Barriers among livestock producers were reported to include (Brant, 2002):
 - perceived excessive costs for installation and maintenance of fencing;
 - reluctance to change stream bank practices, even in view of damage;
 - historical precedence;
 - desire to maintain livestock access to streams and other traditional sources of water;
 - fear that woody vegetation will attract beavers resulting in increased flooding;
 - and that use of shelterbelts, living snow fences and windbreaks will reduce grazing area.

Figure 2: Survey results showing perceived obstacles to adopting particular conservation practices on fields used for corn production.



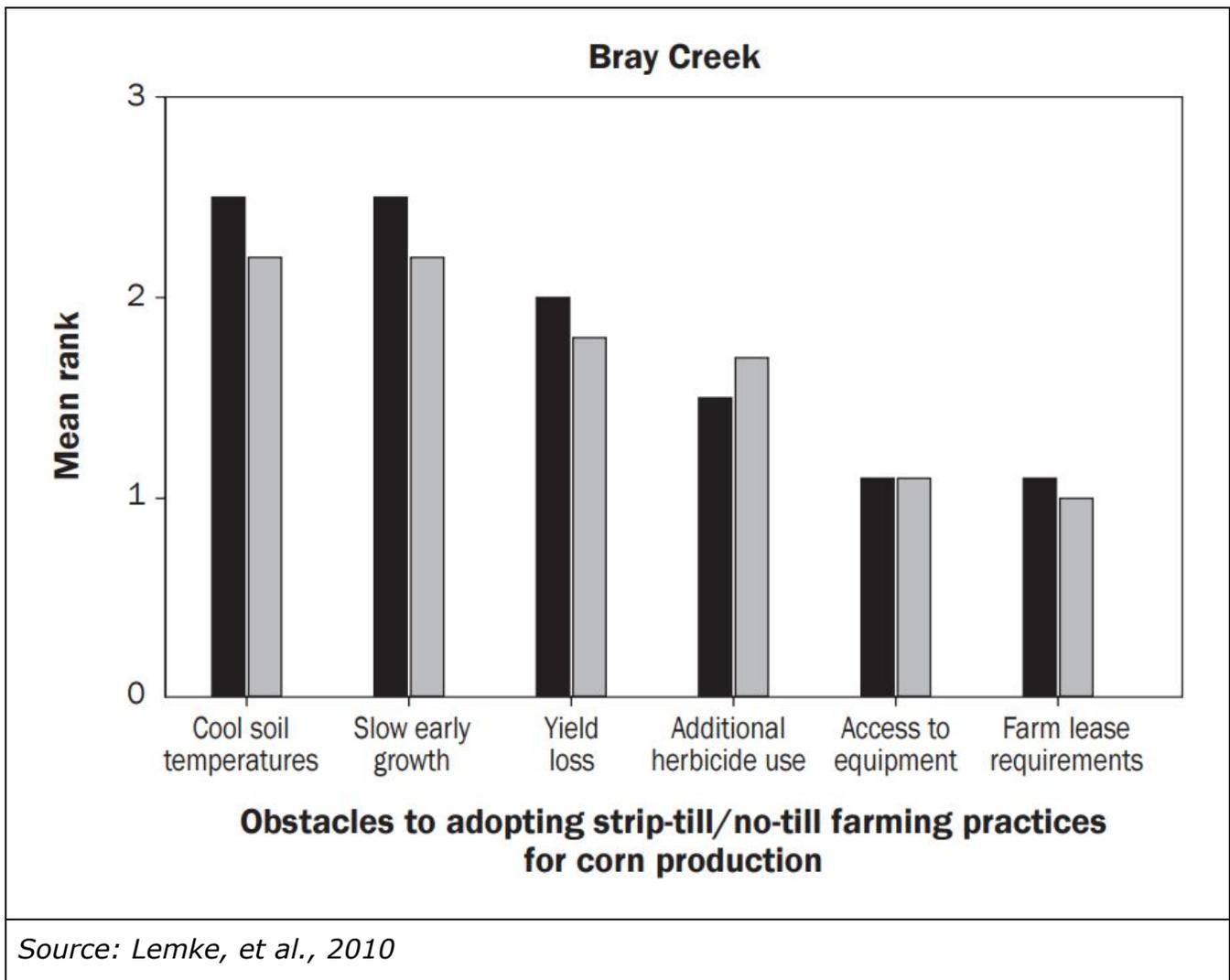
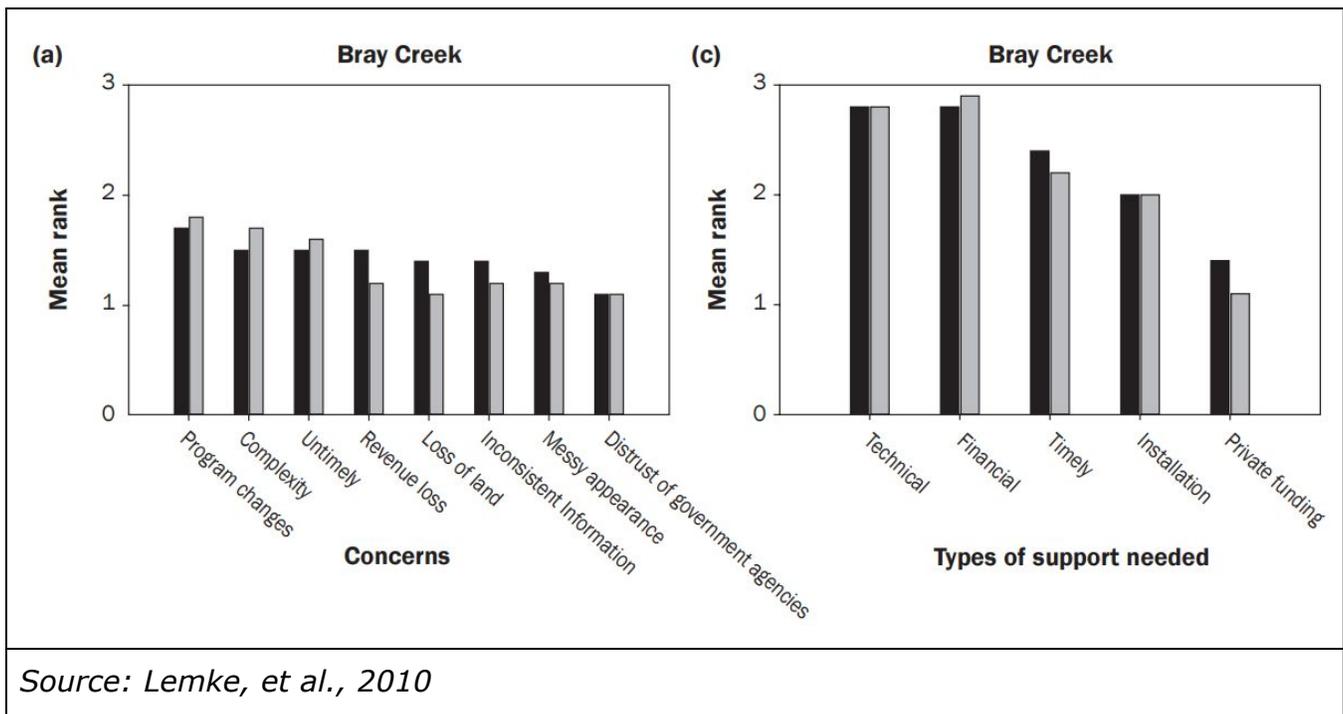


Figure 3: Responses to survey questions about farmer’s concerns with using cost-share programs and the types of support they would require to participate in such programs.

Results from 2000 and 2003 surveys conducted in two Mackinaw River watersheds in which interviewees were asked their concern with using cost-share programs in (a) Bray Creek, (b) Henline Creek and what types of support they would require to enroll in cost-share programs in (c) Bray Creek and (d) Henline Creek. Participants ranked concern level and amount of needed support as 1 (not important), 2 (somewhat important), or 3 (very important).



Question #3: How do fluctuating commodity prices influence which practices a farmer might be more or less willing to adopt?

Not surprisingly, the literature reveals that commodity prices do influence a farmer's decision to adopt or abandon agricultural conservation practices. According to Ogburn (2011):

When crop prices rise, farmers plant fencerow to fencerow, even on marginal land where the soil washes off or blows away. When prices inevitably drop, many farmers enroll some of their less-valuable land in federal conservation programs, removing it from production. The largest and most successful of these land-retirement schemes, the Conservation Reserve Program, or CRP, pays farmers about \$1.7 billion yearly in exchange for a 10- or 15-year promise to idle land with the highest risk of erosion. Doing this also protects a lot of wildlife habitat, particularly for declining grassland birds, and reduces soil erosion by an estimated 450 million tons a year.

High commodity prices clearly reduce farmer's appetite for taking land out of production, but the literature is less conclusive about whether this affects their interest in other practices.

Use of cover crops does appear to be impacted by cash crop prices. A 2016 survey by SARE/CTIC asked farmers to rate their agreement with the statement, "Commodity prices do not impact my use of cover crops," where "1" denoted strongly agree and "5" strongly disagree. The averaged result was 2.23, indicating more agreement than not that cover crops adoption would not be discouraged by low commodity prices.

Are farmers more willing to invest in storage sheds, no-till drills, and other practices when commodity prices and profits are high? We found no answers to that question in the literature we reviewed.

Question #4: What changes in a farmer’s life might make them more inclined to participate in in voluntary programs like MAEAP?

There was no direct answer to the question of what changes in a farmer’s life might make them more inclined to participate in voluntary programs like MAEAP.

That said, we can infer from the literature a few scenarios to look for:

- Generational transfer of the farm: Younger farmers are more receptive to installing BMPS, and the generational transfer may be a moment of opportunity.
- Establishment of a female head of the farm: Female farmers are more likely than male farmers to install BMps.
- Switch to more profitable farming practices: Farmers whose land is highly profitable are more likely to install BMPs.

Question #5: What are the most successful farm outreach programs that are out there and how do they work?

Our review of the literature found there are many successful farm outreach programs out there. While they are all unique to the location they serve and the goals they hope to achieve, there are lessons to be learned from each.

Highlights from several examples are included in the table below. Each was selected based on the relevance of the program goals, the quality of the program report, and the reliability of the source. For each example we highlight the location where the program took place, the type of program, the approach they took, and the key takeaways.

Location	Program	Approach	Key Takeaway(s)
Lancaster County, PA	Conservation Plans for Farmland	The county requires farmers to have conservation plans, and offers assistance to develop them	Personal outreach to farmers outperforms direct mail Regulatory requirements are helpful
Bradford County, PA	Nutrient Management Outreach	The project included a soil health conference, two farm best management	Farm tours are a good way to show BMPs in action Farm tours are also a good way to show

		practices tours, and a grazing walk.	that problems really exist and why they are problems
Michigan, USA	Groundwater Stewardship	Educate farmers about the risk pesticides and fertilizers pose to groundwater supplies and offer cost share assistance for BMPs.	Cost share assistance is very motivating Without cost share, participation may drop Increasing knowledge of why environmental protection is important is key for long term BMP use
Pecatonica River, WI	Nutrient Management Outreach	Identify farms on the Petcatonica River contributing the most polluted runoff and work with those farmers to reduce pollution.	Efforts should be targeted to fix the worst problems Measuring pollution is essential to targeting efforts and in showing program effectiveness Evaluate the programs on measurable improvements
Colorado River Basin	Water Conservation	Encourage farmers to use water conservation practices and comply with water use restrictions in drought stricken Colorado River Basin.	Use trusted member or org in community Getting the first agreement with a grower is critical; once others see the projects benefit the environment without adversely affecting crop or animal production, it is easier to sign up others

			Having a knowledgeable project proponent is critical
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Tips for Success

- **Intensive and tailored outreach is best:** Survey results suggest that more intensive outreach efforts, such as one-on-one landowner visits, localized workshops, and tours, can increase adoption of conservation practices associated with cost-share programs. (Lempke, et al., 2010)
- **Help build or tap into a strong network of support:** Farmers with strong links in social networks to farmers who have adopted conservation practices increases the likelihood that they too will adopt conservation practices (Carlisle, 2016). Farmers involved in conservation projects like having peers they can discuss problems with. They also want access to financial or technical help when they needed it (Hoag et al., 2012).
- **Target conservation minded farmers:** Farmers that have strong stewardship or conservation ethics are easy targets. For example, farmers in the NIFA-CEAP projects often adopted conservation on their own, either for religious or spiritual reasons, or because they believed they had a responsibility to protect the environment. (Hoag et al., 2012)
- **Use clear and consistent messaging:** Agricultural conservation programs often include many partners. Such programs are more successful when all groups involved have the same goal and deliver the same message. (Hoag et al., 2012)
- **Spread the word about environmentally friendly farming innovations:** Farmers are open to considering adopting conservation practices when trusted agribusinesses develop a new technology or machinery, the product (e.g. seeds) provides superior results, or both occur. (Hoag et al., 2012)
- **Help farmers get recognition from consumers for BMP use:** Farmers want others to know they care about the environment too. Wider recognition of their efforts can incentivize program participation. In PA they are considering adding a label to food produced on farms with environmentally friendly practices. (Penn State College of Agricultural Sciences, 2016)

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