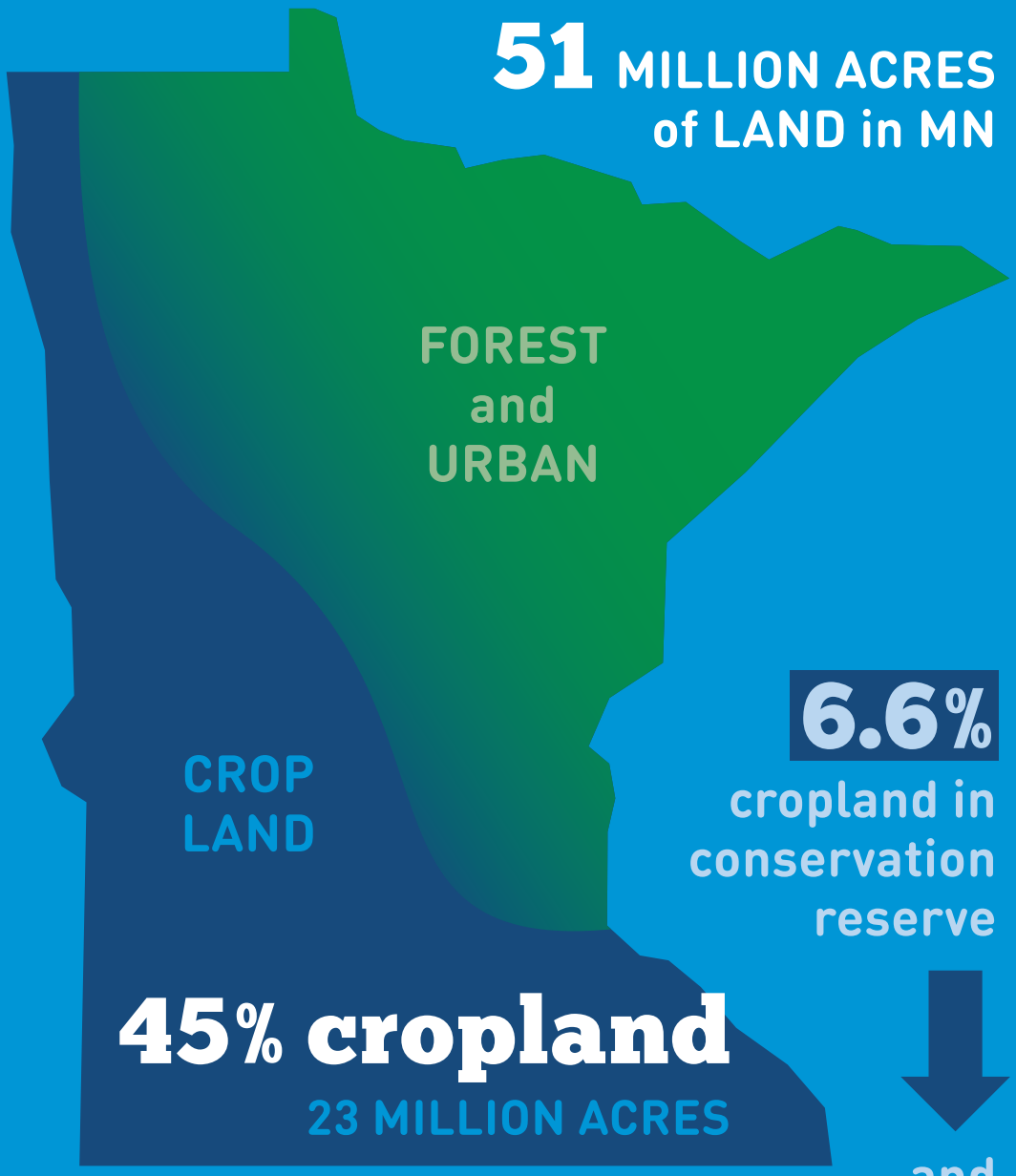
Farm to Stream

Recommendations for Accelerating Soil and Water Stewardship

Freshwater Society

every drop matters



6.6%
cropland in
conservation
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and
dropping
100,000
ACRES per YEAR

The scale of the challenges Minnesota faces to reduce agriculture's impact on water quality is enormous.

Nearly half of the land in the state is cropland. Recent studies conducted by the Minnesota Pollution Control agency (MPCA) have identified cropland as the source of over 70% of nitrogen pollution in state surface waters.[1] Addressing this challenge will involve more than just technical expertise and innovation. There is currently a mismatch between the scale of efforts and the scale of the water quality problem. Reducing row crop agriculture's impact on water quality will require investments in the expertise needed to address difficult social dimensions in the complex arenas of civic engagement and environmental decisionmaking. Organizations involved in agriculture and water quality that offer technical conservation assistance are typically found useful by farmers. These organizations, however, often lack expertise in social sciences that would allow them to more effectively reach more farmers — especially those farmers who are not proactively visiting agency offices.

The Freshwater Society, in partnership with the National Park Service Mississippi National River and Recreation Area, focused the on-the-ground work of their recent FarmWise program in the Rice Creek, Belle Creek and Little Cannon subwatersheds. The findings of the FarmWise program, coupled with additional research[2] and collected evidence, have helped the Freshwater Society identify insights that could contribute to increased success of addressing agriculture-related water pollution issues in a voluntary framework.

Minnesota's voluntary approach to reducing pollution from row crop agriculture has not resulted in water quality improvements at the pace and scale hoped for from that sector. As Minnesota continues to pursue a voluntary approach to water pollution from row crop agriculture, the lessons learned by the FarmWise program and others like it will be important to consider as a wide range of agricultural, natural resource, and governmental interests work together for cleaner water. The recommendations coming out of the FarmWise program will require a significant shift in "business as usual" by state agencies, natural resource-based organizations, the legislature, and agricultural representatives alike. The scale of the challenges requires solutions of a similar scale.

As the state continues to pursue a voluntary approach to water pollution from row crop agriculture, a wide range of agricultural, natural resource, and governmental interests must work together for cleaner water.

There are real barriers that prevent farmers from participating to the fullest extent in conservation programs. These policy, skill, and programmatic barriers exist at multiple levels, from the local landowner to the federal level. Minnesota will need to refine systems and equip all players to lead to healthier water. What follows is a short summary of background and context of the challenges of working in partnership to address agriculture-related water quality issues, a summary of the findings of the FarmWise program, recommendations for steps Minnesota can undertake to revise existing systems, the rationale behind the recommendations, and a listing of key players and partnerships in the work of change.

Background and Context

The federal Clean Water Act, passed in 1972, has helped Minnesota to substantially reduce pollution in our lakes, rivers, and streams. Industries, cities, wastewater treatment providers, and large animal feedlot operations have had to make significant improvements to their practices. Most agricultural practices, however, are exempt from Clean Water Act regulations. Reductions by other sectors together with land use changes over the past 40 years has resulted in agriculture now being the top source of water pollution in Minnesota.[3]

Cities and other regulated entities have been cited in recent reports as the source of approximately 10% of nitrogen in surface waters.[1] Regulated entities are sensitive to making expensive investments that reduce their small contribution (relative to agricultural sources) to Minnesota's overall nutrient pollution loading.

Minnesota depends on a largely voluntary approach to reduce water pollution associated with agriculture. Programs designed to increase voluntary participation in conservation farming strategies rely heavily on incentives and personal relationships between agricultural interests and federal, state, and local government staff. State agencies, environmental non-profits, and private foundations recognize the practical limits of meeting clean water standards without a more direct approach to reducing the impacts of agricultural practices. Examples of recent and current attempts to increase the voluntary adoption of conservation farming practices include the Minnesota Agricultural Water Quality Certification Program (MDA), Minnesota Nitrogen Fertilizer Management Plan (MDA), the Green Star Farms Initiative (MN Agricultural Water Resources Center), and the Farmer-led Council Pilot Project (Whitewater River Watershed Project) as well as state and federal conservation incentive programs like Conservation Reserve Enhancement Program (CREP), Environmental Quality Incentives Program (eQUiP), Agricultural Risk Coverage (ARC), Price Loss Coverage (PLC), and Reinvest In Minnesota (RIM). Participation in these programs is both voluntary and optional. Minnesota has also proposed a new statewide, interagency program for technical training and certification for conservation technical assistance.

There are a number of social and economic factors that contribute to the challenge of promoting voluntary adoption of water-friendly farming practices. The realities of agricultural economics mean row crop producers are driven to maximize yield from every acre, and neighboring farms are increasingly seen as competitors for market advantage. Information-sharing between producers (around which the original FarmWise model was built) is becoming more constrained within this context. Record yields, crop prices and federal policies have driven agricultural land prices to new highs in Minnesota, leading to more landowners deciding to rent their land rather than farm it themselves. Concurrent research indicates that owner-operator farmers are more likely to adopt conservation practices than renters. This increase in rental farm operations also means that farmers are beginning to experience intense — and often bitter — competition amongst themselves for access to rental land, and the best land prices. One research participant acknowledged, "the economics force you to kind of make up your mind, saying we'll either get bigger, better or quit. It's kind of the three options."[2]

At the same time, the average age of Minnesota's farmers is 57. Many of our farmers can picture a day in the not-too-distant future when they will retire. Making substantial changes to how they farm so late in their career (e.g., embracing greater conservation practices) does not seem likely or appealing to many. It is unclear what the

ultimate, long-term impact of this demography will be on Minnesota's water resources, but it is clear that Minnesota will experience substantial changes in agricultural land management in the near term.

Leadership

It has been difficult to identify, cultivate, or motivate farmers to take leadership roles in promoting conservation farming. For many reasons, players in this crowded field come to the table to protect different priorities. All participants readily acknowledge the high value they place on clean water and healthy soil, but we have largely failed to develop processes, programs, policies, and successful ways to ensure those shared values are protected. Common ground quickly crumbles as stakeholders begin to discuss how to get cleaner water and healthier soil.

First and foremost, farmers are business people who must make decisions that result in sound fiscal outcomes. Many care about the environment and natural resources, but understandably make decisions that minimize their financial risk and maximize their financial gain. Natural resource sector participants tend not to be farmers (though some come from farming backgrounds), and come to these conversations interested primarily in minimizing the negative environmental impacts of farming. Farmers are naturally surprised and defensive when people who are not intimately aware of the complexities of their livelihood tell them how to do their jobs. Natural resource and environmental professionals logically put the health of natural systems as their highest priority. As one participant bluntly stated, "I get a little tired of city people telling me I'm the cause of pollution when they play on a fancy golf course that uses tremendous amounts of fertilizer. They have a well-manicured lawn they fertilize three or four times a year. I'm not lilywhite, neither are they."[2]

The farmer-to-farmer program model (the model used in the FarmWise program) has been thought to have great potential to influence farmers through interactions with conservation-minded peers. Disappointingly, in Minnesota, farmers have participated in relationship-based and farmer-led programs, but have not taken on leadership roles. There are several possible reasons for this. Farmers regularly talk to other farmers about farming, but they do not talk regularly to each other about conservation. Farmer-led programs, as currently designed and implemented, ask farmers to discuss issues and strategies that they simply are not disposed to discuss.

Farmers do not regularly have conservation conversations with agronomists or certified crop retailers, two important partners in decisionmaking on farms. Crop advisors and agronomists have the potential to play an important role influencing farmers to consider water quality outcomes as part of whole-farm planning. However, agronomists and certified crop retailers are in the business of selling products and services to row crop producers. Water quality outcomes are generally not considered in farm planning processes. Crop advisers report being reluctant to introduce ideas about conservation into a conversation with a farmer unless that farmer has already expressed interest in participating in conservation.

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With some notable exceptions, Soil and Water Conservation District (SWCD) and watershed district staff members have not filled leadership roles. Budget constraints have led to a drop in staffing levels, and created backlogs of projects and paperwork. Staff members have only enough time to serve farmers who walk through the door. Narrowly focused agricultural programs also restrict the options SWCD staff members have to offer farmers.

In the absence of leadership from farmers or agricultural specialists, natural resource and environmental professionals have stepped in to try to promote conservation programs and develop leadership among local farmers. This approach, also, has failed to develop stable, committed leadership among farmers. Gradually, programs begun by non-farmers have lost momentum with row crop producer participants — if momentum ever existed.

Local Capacity

Farmers work closely with a number of partners to maximize profits, minimize effort, and make best use of new and emerging trends and technologies. Working with agriculture-related businesses and non-profits is an essential component of all programming intended to increase voluntary participation in conservation farming practices. In general, farmers report they prefer to work with one person, and develop a relationship over time with someone who knows the farmer, knows the farm, and can tailor advice to the specific field or farm in question.

In the FarmWise program, this gradually emerged as The Guy Theory. If a relationship-based program was to succeed, and attract an d retain farmer participants, it had to have The Guy. This is the trusted person to whom farmers can talk and who will knock on farmers' doors to engage them in conversations about conservation practices appropriate for each farmer's operation.

The Guy Theory also creates The Guy Paradox. The unfortunate corollary to The Guy Theory is that when The Guy leaves an organization for whatever reason, the program — which is based on personal relationships between farmers and The Guy — starts over from the ground up. Relationships have to be rebuilt over time when the new Guy, or Gal, comes on. Sustainable efforts to increase voluntary adoption of conservation practices, will require stable funding over the long-term to build local capacity, with a deep enough bench at the local partner organization that the departure of one staff person does not disable a program.

Education and outreach about conservation and the effects of row crop agriculture on water quality for all parties involved in relationship-based efforts has been identified as a critical component for influencing producers to adopt conservation farming practices. Trusted education partners include agency staff and researchers, university researchers, SWCD staff, University of Minnesota Extension educators, and seed, equipment and agricultural services vendors.

It is worth noting that, despite the prominence individuals place on strong relationships when working on row crop agricultural water issues, relationships can also present a significant obstacle in this arena. The importance and difficulty of relationships are demonstrated effectively by The Guy Theory and The Guy Paradox.

Although all parties report the importance of relationships to this work, it is critical to acknowledge that all good relationships are built on trust. Trust among individuals in the agricultural sector has frayed as competition has increased. For example, producers are reticent to share data

with agricultural corporations, or government, fearing they are giving away too much. Trust between agricultural and non-agricultural sectors appears to be nearly non-existent and difficult to establish, especially given the short-term nature of many partnership endeavors. This lack of trust, and the difficulty with which trust is established, seems to be one of the most significant hurdles to increasing farmers' voluntary adoption of conservation practices. Leadership in relationship-based conservation programming has emerged from the natural resource and environmental sectors; trust between agricultural interests and these sectors has not followed. As one producer declared during an interview with researchers, "The things farmers hate the most is 'We're here to help', to hear that. Well, we know what the hell we're doing. We know we can do stuff better, and we'll try it, but the whole, 'I'm from the government and we're here to help,' or 'I'm from this group and I'm here to help' doesn't fly."[2]

Trust, however, does exist between farmers and their agricultural advisors (certified crop advisors, financial advisors, etc.). A more effective role for those who wish to work with farmers on row crop agriculture's water impacts will likely be to develop and implement ways to harness those existing trust-based relationships into the service of conservation conversations and adoption.

Funding and Incentive Cycles

Funding cycles as they currently exist are misaligned with farming cycles and the pace at which farmers make changes in their practices. Farmers may be making decisions on how to farm their fields several years in advance, but, programs that work with farmers to promote conservation farming are funded for much shorter timeframes. Farmers also report wishing that they had immediate access to funds to implement a new practice mid-season, but inflexible funding processes make timely access impossible.

The full costs and benefits of conservation Best Management Practices (BMPs) have not been completely explored or communicated to farmers. Many farmers are reluctant to adopt new practices without a better understanding of what a BMP will cost them over time, what the return will be, and who will benefit. Any BMP that takes acreage out of production comes at a cost to the farmer. Any BMP that carries the potential to affect yield increases a farmer's risk. BMPs that require the farmer to change how they farm have the potential to alter cultural traditions. All of these "costs" make conservation a tough sell, especially for those practices that mainly provide environmental benefits, with no corresponding economic benefit to the farmer.

Efforts to work with farmers, and increase voluntary adoption of conservation practices, will require stable funding over the long-term to build local capacity, so that the departure of one staff person does not disable a program.

Cost share programs offered through government agencies are strictly prescribed, with specific BMPs targeted at specific types of land, for specific purposes. While farmers want more flexibility in the kinds of BMPs they can implement, government agencies want assurances that the funds used for conservation programs are being used on proven strategies. The need for government to provide oversight of conservation funds has created policies perceived by many farmers as overly onerous and unable to respond nimbly to changing land, weather, and other realities. Bureaucracy has emerged as a major barrier to participation in conservation programs. One participant in the FarmWise research program who utilized financial assistance, said, "Unfortunately, a lot of the time it depends on what kinds of strings are attached. A lot of cases, it seems like, there's

enough red tape involved it isn't worth the hassle."[2] Greater flexibility in conservation funding programs to encourage innovation could help involve producers in the development of new technologies to reduce row crop agriculture's impact on water.

Agency staff need time and training to develop skills to conduct effective outreach to farmers who don't typically interact with government programs — and they need training to enhance their own technical knowledge to offer the type of assistance needed by farmers. A lack of understanding of, or appreciation for, the importance of civic engagement has led to a corresponding lack of funding to support outreach activities. If relationships remain critical to the success of these efforts, and if agencies continue to be involved in attempts to increase the voluntary adoption of conservation practices, this lack of support for effective civic engagement support will need to be addressed.

Reliable, local, relevant, data informs the decisions farmers make on their land. Such data could also influence farmers to undertake more extensive, or more precise, measures to reduce the farm's impact on water quality.

While education has been identified as a necessary aspect of programs intended to increase participation in conservation farming practices, there is a lack of sufficient dedicated funding available to support this work. Education is included as an aspect of many state and federal agricultural programs, but there is no dedicated funding source that provides the long-term, stable, and consistent cash flow that allows local partner organizations to increase their staff capacities, relationships to develop, trust to grow, and improvements in water quality to mature. An example might be found in the Clean Water Council's *Clean Water Fund Recommendations*. They recommend that the State require maintained vegetative buffers along public waters and ditches, including private ditches that drain to public waters and that the State has an important role to play in developing model ordinances, overseeing implementation and reporting. The work of reaching out to producers and influencing them to install buffers falls to the local partner. True block grants that are predictable, systematic and broadly available should be available for the longterm work of educating and influencing farmers to protect waterways. Block grants should include standards of accountability, minimum performance criteria, and a clear, transparent process of enforcement.

Research

Farmers are committed consumers of data. To be useful, however, the data must be from their fields or from farms with characteristics very similar to their own. Reliable, local, relevant data informs the decisions farmers make on their land. Such data could also influence farmers to undertake more extensive, or more precise, measures to reduce the farm's impact on water quality. Improved data could help farmers make the connection between tile drainage and runoff, between tillage and soil health, and between individual farming decisions and the cumulative impacts of row crop agricultural land use in their watershed.

It is critical that all parties trust the data and collection methods as accurate, defensible, and legitimate. It will be important to develop research that appeals to farmers, verifies and quantifies the value and return on investment of conservation practices, and comes from trusted sources. The question of what role indicators play in making

farming decisions (beyond bushels per acre and dollars per bushel) will be important in framing research parameters and funding priorities.

Farmers want data that shows how BMPs perform when installed as recommended, in order to evaluate the expected outcomes of conservation BMPs, as well as convenience to the farmer, risk management, fuel costs, and other effects on the producer's business model. There is a clear need for tools or research to provide a causal link between BMPs installed on farm fields and improvements in water quality. It will be critical to build better mechanisms for funding on-farm research, as well as increase the capacity of staff to interpret data and help farmers understand how to refine their practices in response to their own farms' data.

Row crop producers see themselves as tinkerers and problem-solvers, while some conservation programs are perceived as so inflexible that they discourage farmers from adopting conservation BMPs. Setting aside research funds to develop and test innovative conservation practices would send a powerful signal to the agricultural community that the state of Minnesota is willing and able to be a partner in achieving water quality outcomes.

Conclusion

In recent years, a number of studies and reports have focused attention on the significant role row crop agriculture plays in the health of Minnesota's waters. These studies have identified row crop agriculture as the land use activity primarily responsible for nitrogen in surface waters, and a contributor to the contamination and depletion of groundwater. Addressing these complex issues will require unprecedented cooperation between row crop agricultural producers and agriculture-related organizations, and natural resource and environmental professionals.

This report includes a set of recommendations that help remove barriers to greater participation in conservation farming, and respond to specific systemic problems identified by row crop agricultural producers, and agriculture-related organizations.

The Freshwater Society welcomes the opportunity to provide leadership in seeking changes to existing policies and systems that are inclusive of the concerns of both natural resource professionals and agricultural groups, given our reputation as conveners and fair brokers of information. There is widespread concern for the health of Minnesota's lakes, rivers, and groundwater and we must move Minnesota closer to achieving water quality outcomes.

Recommendations

The following pages contain the recommendations that the Freshwater Society believes will remove barriers and accelerate soil and water stewardship as the State pursues a voluntary approach to meeting its water quality goals.

- Table 1 contains the recommendations and findings from the FarmWise report.
- Appendix 1 gives a short summary of the social, economic and cultural features that weigh on producers' decisions.
- Appendix 2 contains the recommendations and a list of potential partners who should be involved in conversations about how to implement each recommendation.

1. Adjust Funding Structures

Recommendation	Background/Discussion
A. Reflect evolving nature of local water plans by appropriating fewer and larger categories of implementation funding to allow more flexibility to address watershed–specific priorities identified in Watershed Restoration and Protection Strategies (WRAPS) and water resource plans.	• Grant and funding cycles are not well aligned with agricultural cycles. • Limited financial resources are a universally-experienced barrier in this work. Logistics and timing around the availability of financial resources exacerbate this barrier. • Funding programs are perceived to have excessive red tape, making them hard to sell and administer. The onerous nature of funding programs for conservation practices represent a hurdle for both farmers and the agencies that deliver the funding. • Working with farmers requires innovation and flexibility — and reinforces the need for funding streams that are flexible and reward innovation. • Funding resources tend to be attached to strict frameworks, programs, and/or requirements that often do not work for farmers. • Farmers are business owners who are making business decisions with the goal of making a profit. • Soaring land prices have made it difficult for smaller farmers to compete for land, giving large-scale producers control of more and more land. • Larger farms require larger and larger equipment, and economics are the driving force in most on-farm decisions. That has left less room for decisions that have primarily environmental benefits. • Recent high commodity prices for corn and soy, and the lack of a robust market for perennial crops, motivate farmers to plant corn and soybeans, even on lands that are less-than-profitable, vulnerable or sensitive. • A marked increase in the amount of rented farmland in Minnesota, rather than held by a family for generations, has made the trend toward short-term profit-seeking over long-term stewardship more pronounced. • It is often more productive to talk with farmers about how they can do their work more efficiently, more profitably, and more easily, rather than trying to sell conservation as a benefit in and of itself. • Once a farmer decides to install conservation BMPs, having resources that they want and can use when they want and can use them has been critical to successful efforts • Offering incentives, even small incentives, can move farmers to try new ways to learn more about the performance of their fields, if incentives are not coupled with onerous requirements
B. Lengthen funding cycles to increase availability of funds at the time a farmer gets the data they need on performance of their fields and makes a decision to install a conservation practice.	
C. Provide funding to jump start stable teams of education and outreach staff around the state at local level (non-profit organizations, watershed districts, Soil and Water Conservations Districts (SWCDs) and other local partners).	
D. Expand utilization of true block grants to achieve local water quality goals. Block grants should include standards of accountability, minimum performance criteria and a clear, transparent process of enforcement.	
E. Provide stable and well-timed funding at state or local level for both technical projects and professional development in the social dimensions of water quality — community engagement, social networking and marketing/communication skills.	
F. Develop the inter-organizational support structure necessary to ensure that partner organizations have the resources required to maintain stable staffing for agricultural conservation outreach and implementation.	

2. Invest in Local Capacity

Recommendation	Background/Discussion
A. Increase the ratio of landowner contact staff to administrative staff. Efforts should be made to create a deep "bench" so that the departure of one key staff member does not derail an entire program or outreach effort.	• There is a deficit of training and institutional flexibility within agencies and organizations working with farmers. • Natural resource partners often lack agronomic knowledge that would help them be better partners and resources to farmers. • Ability varies widely in natural resource partners' ability to "sell" conservation. Individuals and organizations are not communicating effective messages about conservation, nor do they have a focused, consistent way of communicating. • Agencies and organizations that work with farmers often lack sufficient understanding of the relationship-building techniques necessary to do outreach successfully. • Outreach staff at SWCDs and other agricultural agencies neither receive adequate training nor get adequate experience in how to conduct effective outreach and civic engagement with farmers, specifically. Opportunities are lost to reach out beyond the farmers who walk through the agency door. • Lack of understanding or appreciation for the importance of civic engagement has led to a corresponding lack of funding to support such outreach activities. • Budget cutbacks are diminishing the number of local staff and offices available, leading to backlogs of projects, and paperwork. • Successful outreach strategies by SWCD staff to engage farmers can more effectively target key acres for conservation than is possible when working with only those who proactively come through their doors. • Agency staff need to know more about how farmers make decisions, and what concerns drive their decision-making process. • Agency staff at all levels need to understand how to better "sell" conservation to farmers, using contexts that makes sense to farmers, and language that resonates with their concerns and priorities. • Education about conservation farming, and both new and proven best management practices that reduce agriculture's impact on water quality, is a critical factor in successful efforts to work with farmers. • Successful education happens in a variety of settings, within a range of partnerships, and across generations. • Making connections to issues and ideas "beyond the farm gate" has been a successful strategy in working with landowners and producers.
B. Increase the number of trained and knowledgeable staff locally available to implement true block grants for programs and projects that meet local priorities. Block grants should include standards of accountability, minimum performance criteria and a clear, transparent process of enforcement to create a level playing field.	
C. Provide targeted funding to develop, and disseminate professional development services and resources in social sciences for civic engagement techniques such as Community Capacity studies, civic engagement strategies, UMN Watershed Specialist training or other tools in the social dimensions of water quality. Provide professional development opportunities for both technical staff and education and outreach staff.	
D. Target funding for local agency and partner staff (incl. shared staff) for message development in farmer outreach. Messages should focus on effects of conservation practices on farmers' time, effort, input costs, profit, and long-term risk. The communication of these messages should be through trusted agricultural partners including agronomists and co-ops, SWCDs and other local partnerships.	

3. Invest in Relationships/Partnerships

Recommendation	Background/Discussion
A. Increase the role of commodity, agricultural cooperative, and agricultural interest groups in discussing the benefits, costs, and expectations of conservation to landowners/operators and to improve awareness of the importance of conservation strategies as a part of farm planning.	• Farmer-to-farmer networking and education is perceived as a powerful, effective model to influence farmers' decisions about conservation. It is essential, however, to recognize the limitations of a farmer-to-farmer approach, and to be ready and willing to utilize other strategies that support farmers' decisions about conservation. • Existing social networks and institutions offer a way to identify "local champions" for conservation. • We need to improve the adversarial and emotionally charged relationships between farmers and "others" (urban residents, environmentalists). • MN needs to have a cohesive effort, with collaboration among environmental and agency programs working with farmers, rather than the existing "shotgun" approach, with multiple individual programs that confuse farmers. SWCDs, agricultural interest groups, state agencies and local co-ops are all possible partners to promote a new paradigm of farming for clean water. • State agencies charged with involvement in these matters are not always the most trusted partners, nor can they always offer the type of consistent, local presence and flexible assistance required. State agencies should support local partner organizations to help them achieve agency goals and mandates, including leadership development, and strategies for authentic, meaningful civic engagement processes. • Environmental organization staff members need to know more about the decisions farmers make, how they make those decisions, and how to talk with farmers about conservation practices in ways that resonate with farmers' values. • Local SWCD staff members would benefit from working with agronomists on how to talk with farmers about conservation. • Agronomists would benefit from knowing more about how agricultural practices affect water, how farmers can best protect local waters from these impacts, and how to encourage such protection as a factor in farm planning and decision-making. • The influence of commodity groups is perceived as insufficient or negative, though they are recognized as a critical element to consider in finding ways to move forward.
B. Establish an executive branch agency partnership with U of M Agricultural Economics staff to develop and provide intensive training to state and local technical staff on agriculture input costs and case studies — including the Nitrogen calculator and enhanced drainage management (storage).	

4. Invest in Research

Recommendation	Background/Discussion
A. Invest in the development of on-farm research technologies that measure the effects farming practices have on water quality in order to make them available at lower cost to farmers.	• There is not enough data on the economic costs and benefits of conservation for farmers to risk changes to how they farm. For many farmers, BMPs do not have a clear economic benefit, especially for those farmers who have short-term rental agreements and may not have time to wait to see what the benefits of conservation will be. • Better access to high quality, highly localized research, and the resulting data, could advance work on conservation. • Better collection of, and access to, near-real-time, in-field data will help inform farm planning. • It is critical that all parties trust the data and collection methods as accurate, defensible and legitimate. • The question of what indicators would matter to, and influence, farmers (beyond bushels per acre and dollars per bushel) should play an important part in framing research parameters and funding priorities. • There is a need for tools or research that ties BMPs installed on farm fields to changes in water quality parameters. Farmers want data that show how BMPs perform when installed as recommended, in order to evaluate the expected outcomes of conservation BMPs, as well as convenience to the farmer, risk management, fuel costs, and other effects on the producer's business. • It will be critical to build better funding mechanisms for on-farm research, increase the capacity of staff to interpret data, and help farmers understand how to refine their practices in response to their own farms' data. • Reports to farmers need to meaningfully communicate the findings of research in ways that help them implement recommended changes.
B. Invest in research that quantifies the economic benefits and costs of conservation in terms of yield, soil health, and efficiency of time, money, and effort.	
C. Fund research into new and promising conservation BMPs which have water quality benefits. Agency funding should encourage and reward innovation in conservation practices.	
D. Prioritize the research and development of economically viable crops to diversify the farm economy while improving water quality and soil health.	
E. Increase incentives and reduce barriers for the development of markets that diversify the farm economy while improving water quality and soil health.	

Making voluntary conservation more effective

Context of these recommendations

Social and cultural factors weigh heavily in agricultural producers' decisions.

Discussion

- Farming is a business which looks to maximize profit in the face of external market and policy pressure while managing risk. Many of the market and policy signals incentivize farming practices that threaten water resources, soil health and local communities.
- Social context plays a large role in farmers' attitudes and behaviors regarding both working with natural resource partners and conservation farming practices. Farm culture is distinct, diverse, and somewhat isolated from other cultures in the state. Farmers tend to listen to other farmers. Involving farmers in efforts to frame the problem is as important as engaging farmers in finding solutions.
- Cultural norms in some agricultural subcultures pose barriers to relationships and/or the greater adoption of conservation practices.
- Wanting to continue to farm in ways that their families have "always done," makes some farmers resistant to new strategies or practices.
- Humans, in general, tend to make easy decisions — we either do things the same way as usual or only make small incremental changes. We avoid changes that increase risk or uncertainty, or require more effort than the status quo.
- Urban communities and agricultural producers are perceived as having different values, norms and priorities, leading to finger-pointing and blame which hinder collaborative problem-solving.
- Discussion about agricultural impacts on water has often led to criticism and defensiveness among all involved parties, and may lead stakeholders to believe it is easier or more effective to continue doing things the way they have always been done.
- There is a perception among education and outreach professionals of an overall lack of concern about agricultural impacts on water quality, both within and outside the agricultural community.
- Individual farmers tend to resist taking on high profile, proactive leadership on conservation in a widespread and sustained manner. There are instances of farmers taking leadership roles to encourage greater conservation within their local communities, but there is no evidence to demonstrate that farmers will band together to increase adoption of conservation practices. The challenge will be to maintain such engagement over the long-term at the level needed to resolve the scale of Minnesota's agricultural-related water pollution.
- Farmers receive significantly different messages from agencies than they do from agricultural commodity groups, commercial businesses, or agronomists. These groups, who are in general trusted partners to farmers, may give different messages than those promoting conservation programs. This can lead to farmers receiving a confusing mix of messages, priorities, and marketing information agricultural producers receive about conservation.
- Farmers' trusted agricultural partners (e.g., SWCDs, agronomists, NRCS, Extension, local agronomy co-ops) can — but don't always — play an important role in working with farmers on the connections between their land management activities and the health of water.
- We need to educate and incentivize the agricultural community and its support organizations to increase their sense of ownership of agricultural water pollution issues, assume leadership, and adopt their own expectations, and begin developing real solutions to address threats to water resources.

1. Adjust Funding Structures

Recommendation	Who should be working on this
A. Reflect evolving nature of local water plans by appropriating fewer and larger categories of implementation funding to allow more flexibility to address watershed–specific priorities identified in Watershed Restoration and Protection Strategies (WRAPS) and water resource plans.	• MN Board of Water and Soil Resources • MN Legislature • USDA Natural Resource Conservation Service (NRCS) • MN Association of Soil and Water Conservation Districts • MN Association of Watershed Districts • Association of MN Counties
B. Lengthen funding cycles to increase availability of funds at the time a farmer gets the data they need on performance of their fields and makes a decision to install a conservation practice.	• MN Board of Water and Soil Resources • National Resource Conservation Service • MN Association of Soil and Water Conservation Districts
C. Provide funding to jump start stable teams of education and outreach staff around the state at local level (non-profit organizations, watershed districts, Soil and Water Conservation Districts (SWCDs) and other local partners).	• MN Board of Water and Soil Resources • MN Association of Soil and Water Conservation Districts • Association of MN Counties • Watershed districts • Interagency Coordination Team • LCCMR (initial funding only)
D. Expand utilization of true block grants to achieve local water quality goals. Block grants should include standards of accountability, minimum performance criteria and a clear, transparent process of enforcement.	• MN Board of Water and Soil Resources • Association of MN Counties
E. Provide stable and well-timed funding at state or local levels for both technical projects and professional development in the social dimensions of water quality — community engagement, social networking and marketing/ communication skills.	• Interagency Coordination Team • U of MN • LCCMR (initial funding only) • MN Association of Soil and Water Conservation Districts • Association of MN Counties
F. Develop the inter-organizational support structure necessary to ensure that partner organizations have the resources required to maintain stable staffing for agricultural conservation outreach and implementation.	• UMN Extension • MN Association of Soil and Water Conservation Districts • Association of MN Counties • Interagency Coordination Team

2. Invest in Local Capacity

Recommendation	Who should be working on this
A. Increase the ratio of landowner contact staff to administrative staff. Efforts should be made to create a deep "bench" so that the departure of one key staff member does not derail an entire program or outreach effort.	• MN Board of Water and Soil Resources • Soil and Water Conservation Districts • Watershed Districts • University of Minnesota Extension • Non-profit organizations
B. Increase the number of trained and knowledgeable staff locally available to implement true block grants for programs and projects that meet local priorities. Block grants should include standards of accountability, minimum performance criteria and a clear, transparent process of enforcement to create a level playing field.	• MN Board of Water and Soil Resources • MN Pollution Control Agency • MN Association of Soil and Water Conservation Districts • MN Association of Watershed Districts • University of Minnesota Extension • Association of MN Counties
C. Provide targeted funding to develop, and disseminate professional development services and resources in social sciences for civic engagement techniques such as Community Capacity studies, civic engagement strategies, UMN Watershed Specialist training or other tools in the social dimensions of water quality. Provide professional development opportunities for both technical staff and education and outreach staff.	• University of Minnesota Extension • MN Association of Soil and Water Conservation Districts • MN Association of Watershed Districts • University of Minnesota Water Resources Center • Interagency Coordination Team • Association of MN Counties • Non-profit organizations
D. Target funding for local agency and partner staff (incl. shared staff) for message development in farmer outreach. Messages should focus on the effects of conservation practices on farmers' time, effort, input costs, profit, and long-term risk. The communication of these messages should be through trusted agricultural partners including agronomists and co-ops, SWCDs and other local partnerships.	• UMN Extension • UMN Water Resources Center • MN Department of Agriculture • MN Pollution Control Agency • Interagency Coordination Team • Agricultural Co-ops • SWCDs • Non-profit organizations

3. Invest in Relationships/Partnerships

Recommendation	Who should be working on this
A. Increase the role of commodity, agricultural cooperative, and agricultural interest groups in discussing the benefits, costs, and expectations of conservation to landowners/operators and to improve awareness of the importance of conservation strategies as a part of farm planning.	• Commodity organizations • Agricultural cooperatives • Agricultural interest groups • MN Department of Agriculture • MN Pollution Control Agency • Interagency Coordination Team
B. Establish an executive branch agency partnership with U of M Agricultural Economics staff to develop and provide intensive training to state and local technical staff on agriculture input costs and case studies — including the Nitrogen calculator and enhanced drainage management (storage).	• MN Department of Agriculture • UMN Department of Applied Economics • MN Pollution Control Agency • UMN Extension • UMN Water Resources Center • Non-profit organizations

4. Invest in Research

Recommendation	Who should be working on this
A. Invest in the development of on-farm research technologies that measure the effects farming practices have on water quality in order to make them available at lower cost to farmers.	• University of Minnesota • MN Department of Agriculture • MN Pollution Control Agency • USDA NRCS • MN Legislature • Legislative – Citizen Commission on Minnesota Resources (LCCMR)
B. Invest in research that quantifies the economic benefits and costs of conservation in terms of yield, soil health, and efficiency of time, money, and effort.	• University of Minnesota • MN Department of Agriculture • NRCS • LCCMR • MN Legislature
C. Fund research into new and promising conservation BMPs which have water quality benefits. Agency funding should encourage and reward innovation in conservation practices.	• University of Minnesota • MN Department of Agriculture • MN Board of Water and Soil Resources • USDA NRCS • LCCMR • MN Legislature
D. Prioritize the research and development of economically viable crops to diversify the farm economy while improving water quality and soil health.	• University of Minnesota • NRCS • MN Department of Agriculture • Commodity groups • Non-profit organizations • Agricultural interest groups
E. Increase incentives and reduce barriers for the development of markets that diversify the farm economy while improving water quality and soil health.	• MN Department of Agriculture • MN Department of Commerce • University of Minnesota • NRCS • Non-profit organizations • Commodity, Co-op and Agricultural interest organizations

Farm to Stream: Recommendations for Accelerating Soil and Water Stewardship was written by Peggy Knapp, EdD, and Darrell Gerber.

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The FarmWise Advisory Board

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Freshwater Society Board of Directors

END NOTES

1 *Nitrogen in Minnesota Surface Waters: Conditions, trends, sources, and reductions*, Minnesota Pollution Control Agency, June 2013

2 Pradhananga, A. & Davenport, M.A. (2014). *An assessment of agricultural conservation practices and Minnesota FarmWise in the Cannon River Watershed*. St. Paul, MN: Department of Forest Resources, University of Minnesota. Staff Paper #234. 46 pp. Retrieved from http://z.umn.edu/cannonagcons

3 *Minnesota's Impaired Waters: Report to the Legislature*, Minnesota Pollution Control Agency, March 2003

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