BUILDING CAPACITY FOR REGENERATIVE AGRICULTURE:

Technical Assistance Recommendations for Minnesota



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ABOUT THIS REPORT

PROBLEM STATEMENT

Farmers across Minnesota are facing increasingly complex production challenges, including soil erosion and compaction, input cost pressures, variable spring conditions, water management concerns, and the need to maintain profitability under changing weather and market conditions. Practices that build soil health, improve nutrient management, reduce erosion, increase living cover, and improve water retention can help address these farm-level challenges while also contributing to Minnesota's broader climate resilience and nutrient reduction goals. Stakeholders across Minnesota—including government agencies, agricultural companies, farmer groups, conservation organizations, and technical assistance providers—have set ambitious goals that cannot be met through individual action alone. A stronger, more coordinated technical assistance network is needed to help farmers identify practical solutions, manage risk, and successfully adopt and maintain regenerative agriculture practices over time.

MINNESOTA AGRICULTURE RESILIENCE INITIATIVE

The Minnesota Agriculture Resilience Initiative (MARI) is a coalition of stakeholders from the public sector, private sector, and civil society working together to increase coordination and collaboration across the agricultural landscape in Minnesota. This coalition aims to improve soil health, water quality, farm profitability, climate resilience, and rural vitality across the state.

One of MARI's objectives is to collectively develop recommendations to scale and improve public and private technical assistance (TA) to accelerate the adoption of regenerative agricultural practices that improve soil health, water quality, farm profitability, and climate resilience in support of Minnesota's water and climate goals. Since September 2025, the MARI Technical Assistance working group has conducted interviews, stakeholder meetings, and a literature review to develop the recommendations in this report.

REPORT SCOPE

Farmers face a multitude of barriers in transitioning to regenerative agriculture, including farm economics, market access, policy challenges, and cultural and educational barriers. In this report, we will focus specifically on building a workforce of TA providers with the knowledge and skills necessary to help farmers adopt regenerative agriculture practices. While expanding and improving TA is only one solution to this complex problem, it will play a critical role in reaching the agricultural acres needed to meet the state goals. The purpose of the report is to make recommendations to enhance and expand TA to meet the needs of farmers and contribute to Minnesota's climate and nutrient reduction goals.

Agricultural landscapes across Minnesota play a critical role in supporting farm productivity, communities and natural resources. (Aerial view of a Minnesota farm © Fauna Creative)

Minnesota climate and nutrient reduction goals

Both the Climate Action Framework (CAF) and the Nutrient Reduction Strategy (NRS) documents for Minnesota identify management of croplands as key to achieving the state's goals. Agriculture covers 26 million acres in Minnesota, which is 51% of the state (Agricultural Lands | MN Board of Water, Soil Resources). Agriculture is the second largest source of GHG emissions in Minnesota, accounting for 25% of total emissions. Agriculture is responsible for 72% of the total nitrogen (TN) and 53% of total phosphorus (TP) loads to rivers. With so much of the state's climate and nutrient impacts coming from agriculture, it is critical to address farming practices in order to reach these goals. Beyond the CAF and NRS goals, there are corporate, commodity group, and civil society goals for regenerative agriculture that also need to be advanced through increased TA.

Both the CAF and NRS recommend implementing practices that aim to increase soil organic carbon, reduce erosion, use precision in fertilizer and manure application, increase water retention, reduce nutrient runoff, reduce tillage, diversify crop rotations, and increase living cover on working lands. In this report, we will refer to these practices as *regenerative agriculture practices.* By this we mean farming systems and practices that improve long-term soil health, water quality, farm profitability, and climate resilience. The intention is not for this definition to be prescriptive, but rather it is to narrow the scope of agricultural practices down to those which will lead to the desired climate and nutrient management outcomes of the CAF and NRS. Similar practices are sometimes referred to as conservation agriculture, sustainable agriculture, precision agriculture, and best management practices.



The Mississippi River watershed is central to Minnesota's efforts to reduce nutrient runoff, improve water quality, and strengthen ecosystem health. (Mississippi River in Minnesota's Northwoods © 2012 Richard Hamilton Smith)

Why focus on technical assistance?

For many farmers, the entry point for technical assistance or adoption of regenerative agriculture practices is often a concrete production or business problem, such as spring wind erosion, delayed field access, declining soil structure, or herbicide-resistant weeds. Effective TA providers can help address these farm-level concerns by identifying practices that help solve the problem. Farmers, operators, and landowners have an important opportunity to address environmental and production challenges through regenerative agriculture, which can improve soil health, water quality, biodiversity, and climate resilience while supporting long-term farm viability. Making this transition, however, is rarely something producers can do alone: regenerative systems are complex, highly context specific, and often require years of experimentation, learning, and adjustment. Because every operation differs in soils, cropping systems, financial constraints, and farmer goals, effective approaches must be tailored to an operation and supported by advisors who understand both local conditions and producer priorities.

According to the 2021 Purdue University Large Producer Survey, 26% of respondents indicated that they chose not to adopt a conservation practice because of technical requirements of adoption. Another 12% identified lack of technical support as a reason (Purdue University Center for Food and Agricultural Business 2021). Farmers already rely on a wide network of agronomic, financial, and peer advisors, and trust within these relationships strongly shapes whether new practices are considered or adopted. Yet technical assistance capacity—across both public agencies and private service providers—is critical to providing knowledgeable guidance to producers on regenerative practices, underscoring the need to invest in well-trained, trusted technical assistance providers who can help farmers navigate the transition to regenerative agriculture.

DEMAND FOR TECHNICAL ASSISTANCE

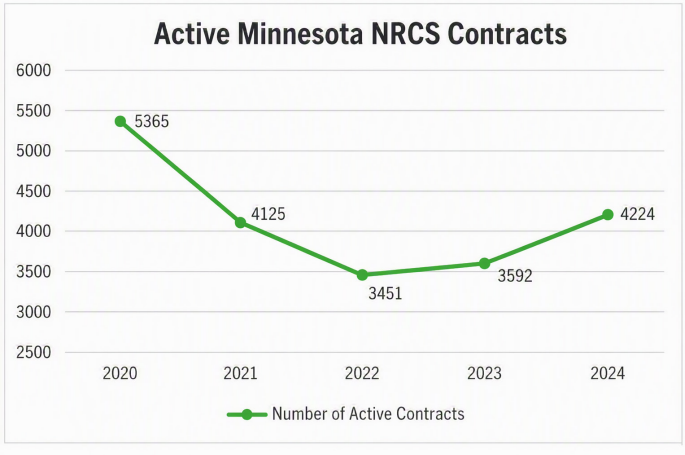
Some figures from the Natural Resource Conservation Service (NRCS) suggest that demand for regenerative agriculture TA outstrips supply. A central component of NRCS TA programs is the resource assessment and planning process in which USDA employees work with producers and landowners to identify and then address resource concerns using conservation practices.

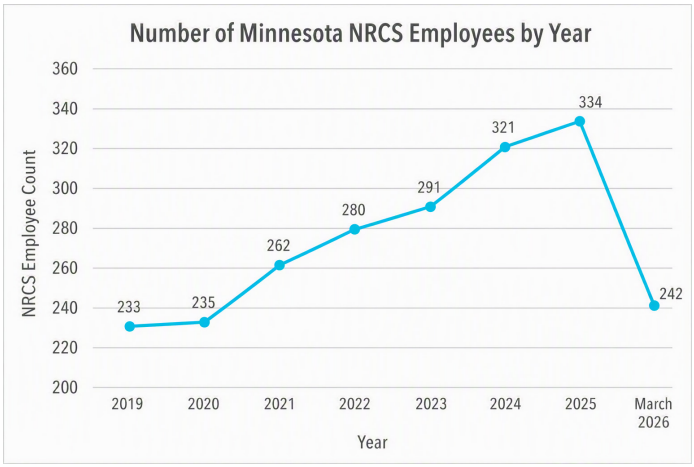
National research suggests that many farmers with identified conservation resource concerns are not receiving technical assistance. A 2022 USDA analysis found that technical assistance had been provided on only about one-quarter of fields with at least one reported, untreated resource concern, while more than one-third of fields with reported concerns had not yet received assistance (Rosenberg and Wallander 2022). These findings highlight the ongoing need for additional conservation technical assistance capacity to help producers address resource concerns and adopt conservation practices.

To achieve Minnesota's cropland-related targets for climate and nutrient reduction, regenerative agriculture will need to be implemented much more broadly – not just on fields with resource concerns. To increase adoption of regenerative agriculture, efforts must be made to provide technical assistance proactively to farmers at the planning and decision-making stages, not just when resource concerns appear.

Technical assistance from NRCS was insufficient to keep up with demand in 2022, and it has continued to decline. Changing political priorities in the current administration led to significant staffing cuts in 2025 and 2026. NRCS has not been given the authority to staff the agency to the level it recommends. In January 2023, the NRCS chief projected that the agency would need to hire between 3,000 and 4,000 employees over the following two years to implement USDA conservation programs. The USDA was only given the authority to staff a fraction of that with 1,500 new employees and retention of 500 others (Ecklekamp 2023). The USDA's proposed fiscal year 2027 budget shows an 86% cut to funding for the Conservation Technical Assistance program from $850 million in 2026 to $111.5 million in 2027 (Johnson 2026).

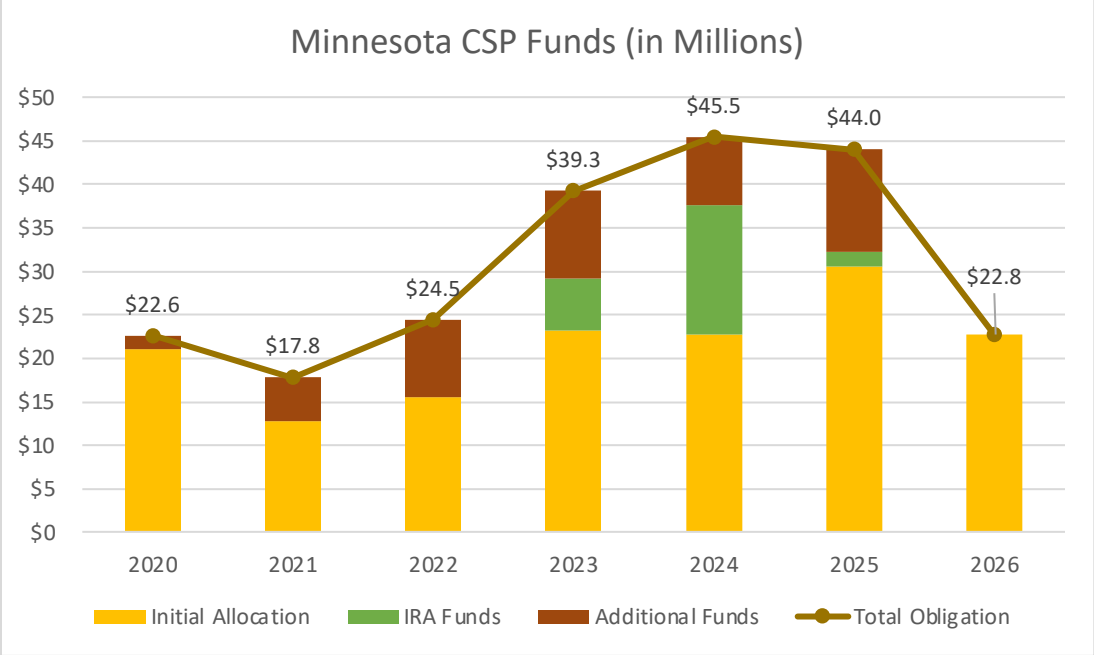
The decline in NRCS funding and staffing is represented at the state level in Minnesota as well.





Data: Natural Resources Conservation Service 2026

The workload, represented by the number of contracts, increased from 2022 to 2024, while the number of staff decreased. Minnesota NRCS staffing rose from 233 in 2019 to 334 in 2025 but in 2026 dropped by 92 employees (27%) down to 242. Minnesota NRCS sets its optimal staffing at 356 full-time employees, meaning they currently only have 68% of the staff they need (Natural Resources Conservation Service 2026).



Data: Natural Resources Conservation Service 2026

The Conservation Stewardship Program (CSP) is an NRCS program in which NRCS staff work directly with producers to develop conservation plans for their land (NRCS-CSP). Funding for CSP in Minnesota increased from 2021 to 2024, due in part to funding from the Inflation Reduction Act (IRA). However, with the rollbacks to the IRA, this and other funding for agricultural conservation programs are in jeopardy (National Sustainable Agriculture Coalition 2026).

Another USDA program that supports farmers in implementing conservation approaches to address resource challenges on their land is the Regional Conservation Partnership Program (RCPP). In a presentation from March 2026, NRCS indicated that Minnesota would need to prioritize RCPP projects where partners will deliver much, if not all, of the required technical assistance, suggesting that the federal government currently has limited capacity to supply technical assistance themselves (Natural Resources Conservation Service 2026).

NRCS is the largest and best-funded provider of technical assistance nationally. As a public sector agency, NRCS also has the most data regarding TA availability and funding. Quantifying the availability of other forms of technical assistance is more difficult, but MARI stakeholders agree there is a need to increase the availability and capacity of TA across the board. The Minnesota Nutrient Reduction Strategy also identifies the limited capacity of organizations to provide technical assistance and outreach to farmers as a significant barrier to the adoption of conservation strategies at landscape-level scales. With the cuts to regenerative agriculture TA at the federal level, it may fall to other groups such as state agencies, NGOs, private businesses, etc. to help equip farmers with the knowledge to implement new practices and access financial support to do so. This will require additional financial investment to ensure that these organizations have the resources to fill the gap.

DEFINING TECHNICAL ASSISTANCE

The Natural Resource Conservation Service (NRCS) defines technical assistance as "the process of equipping farmers, ranchers, and forestland owners with the knowledge and tools they need to conserve, maintain, and restore the natural resources on their lands and improve the health of their operations for the future." Technical assistance can help farmers access the tools and programs as TA providers stay abreast of funding opportunities and incentive programs that might help farmers implement new practices or expand their operations. Some technical assistance involves one-on-one planning to help farmers optimize their operations for long-term environmental health and profitability. This can include an inventory and evaluation of soil, water, and other resources to help landowners plan and make informed land-use decisions, including implementing and maintaining conservation or regenerative agriculture practices. In this report, we are focused on technical assistance that supports farmers in implementing the regenerative agriculture practices that lead to reduced nutrient runoff and climate impacts.

WHO PROVIDES TECHNICAL ASSISTANCE?

Technical assistance for the implementation of regenerative agriculture is carried out by a diverse network of organizations and individuals. These can include public and private sector actors formally certified by the federal government or professional bodies, as well as private firms, NGOs, place-based organizations, and peer-to-peer networks (JG Research and Evaluation 2024).

The Meridian Institute classified these actors by their proximity and ability to receive public funds to provide TA to producers (see their report: "Technical Assistance for Conservation: Landscape Report and Synthesis"). Entities with direct access to public funds include federal and state agencies, conservation districts, cooperative extension, individuals with certain certifications, and some private and non-profit organizations. For this assessment, TA is characterized following the Meridian Institute framework of formal, semi-formal, and informal TA providers.

Below is an overview of technical assistance within the formal, semi-formal, and informal categories within Minnesota. We do not intend this list to be comprehensive of all technical assistance available in Minnesota, but rather representative of the major types of technical assistance farmers can access.

FORMAL

Natural Resource Conservation Service (NRCS)

The Natural Resource Conservation Service (NRCS) is the USDA's primary private lands conservation agency. They work with producers and provide them with financial and technical assistance to meet their conservation and business goals. As of March 2026, NRCS had 242 employees in Minnesota.

Soil and Water Conservation Districts (SWCDs)

Soil and Water Conservation Districts are local units of government that manage and direct natural resource management programs for the conservation of soil and water (Minnesota SWCDs | MN Board of Water, Soil Resources). SWCD staff offer technical assistance on regenerative agriculture practices like cover crops, erosion prevention, soil health, water quality, and nutrient management. Minnesota has 88 SWCDs, with approximately 500 employees providing both administrative services and technical assistance.

Technical Service Providers (TSPs)

Technical Service Providers are individuals or organizations certified by NRCS to provide technical assistance to farmers participating in the various NRCS programs. TSPs offer support in the form of planning, design, and implementation, for conservation practices. TSPs guide farmers to help ensure they meet NRCS criteria of specific practices that require a higher level of review. There are 106 TSPs certified to practice in Minnesota, 59 of whom are located in the state.

Minnesota Agricultural Water Quality Certification Program (MAWQCP)

MAWQCP is a program administered by the Minnesota Department of Agriculture that helps farmers adopt conservation practices that contribute to the long-term environmental stewardship of the state's water (Minnesota Agricultural Water Quality Certification Program | Minnesota Department of Agriculture). Farmers work with a MAWQCP-certifier who is co-staffed in a local Soil and Water Conservation District. With certification, farmers gain access to specialized technical and financial assistance to implement practices that improve soil and water quality. Officially launched in 2016, MAWQCP has certified 1,833 producers and enrolled 1,289,152 acres. The program reports preventing 78,176 pounds of phosphorus and 1,259,535 pounds of nitrogen from entering waterways annually (Minnesota Agricultural Water Quality Certification Program | Minnesota Department of Agriculture). Funding for the program increased from $1.5M in fiscal year 2014 to $3.5M in 2026 (MN Ag Water Quality Certification Program Background).

SEMI-FORMAL

University of Minnesota Extension

University of Minnesota Extension helps connect farmers to science-based knowledge, expertise, and training. Some are research specialists serving the whole state, while others are local and regional educators. They sometimes advise individual farmers, but more often present information to groups (e.g. at field days), and help train farmer advisors such as private agronomists or local government staff.

Agronomists and Crop Advisors Certified by the American Society of Agronomy

The Certified Crop Adviser (CCA) and Certified Professional Agronomist (CPAg) certifications are programs through the American Society of Agronomy. Certifications provide a voluntary

professional enhancement for people advising farmers on agronomic practices.

Certified Crop Advisors (CCAs)
CCAs provide a connection between scientific research on agronomic practices and the practical expertise of farmers implementing practices on the ground. There are currently 421 CCAs certified in Minnesota (Find A Professional | Search | Science Societies). Approximately 85% of certificate holders nationwide are employed in the private sector (American Society of Agronomy, 2020).

Certified Professional Agronomists (CPAg)
CPAgs must hold a current CCA certification to apply for the supplementary CPAg certification, which connotes specific expertise in agronomy as defined by the American Society of Agronomy. There are currently 15 CPAgs certified in Minnesota (Find A Professional | Search | Science Societies).

**It is possible there is overlap in the CCAs, CPAgs, and TSPs in Minnesota. The numbers provided could be counting some individuals more than once.*

Northern Plains Trusted Advisor Partnership (TAP)
The Trusted Advisor Partnership (TAP) provides training for CCAs on agronomic practices for soil health, equipping them with the tools to advise farmers on the implementation of soil health practices (Soil Health Training | ND Trusted Advisor Partnership | Home). TAP is based in North Dakota, but some of their CCAs consult on Minnesota acres in the Red River Basin.

Retail sales and services

Ag retailers are known to be among the most trusted sources of agronomic information for farmers (Houser et al. 2019; Petersen et al. 2026). There are approximately 130 agriculture retail establishments in Minnesota, and, as mentioned above, about 85% of CCAs are employed in the private sector. Ag retailers have not been a primary partner in delivering regenerative ag TA, but some retailers are beginning to see the opportunity. For example, Centra Sota Co-op in central Minnesota has a conservation agronomy team and provides technical assistance to their members on cover crops, crop diversification, nutrient management and more.

INFORMAL

Minnesota Soil Health Coalition (MSHC)

Minnesota Soil Health Coalition (MSHC) is a farmer-led, peer-to-peer, non-profit organization that seeks to promote large-scale adoption of soil health practices through farmer-driven education, outreach, networking, and technical information exchange (About Us - MN Soil Health Coalition). The organization maintains an active farmer-to-farmer mentoring program and hosts 40-60 field days a year. They have over 1,000 members.

Sustainable Farming Association – Farmer-to-farmer support

The Sustainable Farming Association offers a farmer-to-farmer, on-farm consulting program for its members. Farmers receive support from fellow farmer-practitioners with hands-on experience and expertise who guide them toward more profitable and sustainable choices (Farmer Support - Sustainable Farming Association). They offer farmer-led education through workshops and field days.

Progress Toward State Goals

The 2025 Nutrient Reduction Strategy discusses the progress that has been made thus far toward the nutrient reduction goals. The key message is that while improvement has been observed overall, much more work is needed to reach the goals. Cropland runoff was identified as the top source of both phosphorus and nitrogen in the Mississippi River Basin and the Lake Winnipeg Basin. Minnesota has set a load reduction goal of 45% for both total nitrogen (TN) and total phosphorus (TP) flow into the Mississippi River, relative to a baseline established from 1980–1996. The most recent estimates indicate that, as of 2025, TP has decreased by 32% and TN has decreased by 6%.

The progress toward Minnesota's climate goals is similar. According to Minnesota's 2026 Climate Action Framework, "Minnesota is making progress, but we must accelerate our actions to meet our state's climate goals." The framework estimates that full implementation of Minnesota's current policies would result in a 39% reduction of GHG emissions by 2050 compared to the 2005 baseline. This falls short of the state's goal of a 50% reduction by 2030 and net-zero emissions by 2050, indicating the necessity of increasing the pace and scale of the state's climate actions.



Conservation practices such as riparian buffers help reduce nutrient losses from row crop fields while supporting Minnesota's water quality objectives. (Aerial view of a Minnesota farm with riparian buffers © Fauna Creative)

Recommendations

Minnesota will not reach its goals without increasing regenerative agriculture practices, and it will not increase regenerative agriculture practices without sufficient technical assistance. The Minnesota Agriculture Resilience Initiative has developed the following categories of recommendations to not only restore, but increase the amount of technical assistance available, to support promising innovative approaches to bring them to scale, and to enhance the capacity of technical assistance providers to deliver regenerative agriculture guidance and build the professional pipeline to increase and sustain technical assistance capacity.

Category 1: Restore and expand public sector TA to effectively deliver conservation title funding and other public cost-share to farmers

Public sector TA is the biggest provider of regenerative agriculture TA. In order to reach the state climate and nutrient reduction goals, public sector TA needs to be restored to the funding levels of 2024 and increased. Even if cost-share remains available for producers to adopt regenerative agriculture practices, sustained technical assistance is needed to support the implementation and persistence of new practices. TA support is crucial to navigate the different funding and programs available and to help farmers choose the best plan for their farm.

1. Advocate for restored and increased NRCS staffing levels to deliver conservation title funding to farmers.
2. Ensure that incentive programs for regenerative agriculture include funding for TA support for implementation of programs.

CATEGORY 2: SUPPORT EMERGING, INNOVATIVE, AND HOLISTIC TA PROGRAMS AND PRACTICES

Though limited by funding and other barriers, there are promising emerging, innovative and holistic TA programs and practices in Minnesota that could make a significant impact if given proper support. Federal technical assistance is often oriented towards compliance with specific practice standards, while these examples of innovative models can be more proactive, holistic, long-term, relationship-based, and context-specific.

1. Leverage existing relationships and trusted information sources by bringing conservation agronomists to where farmers already seek technical support
    a. Example 1: Partnership agreements between MDA or NGOs and agriculture retailers to support housing a conservation agronomist in an agriculture retail location
    b. Example 2: 4R Nutrient Management certification for agriculture retailers and other agronomic service providers.
    c. Example 3: Flexible program models such as Minnesota Agricultural Water Quality Certification Program (MAWQCP), where farmers can become MAWQCP-certified with technical support from MDA, their local SWCD, or a participating agriculture retailer.
    d. Example 4: Programs which equip CCAs with skills and knowledge on soil health, such as the Trusted Advisor Partnership (TAP). See “Who Provides Technical Assistance” section for additional information.
2. Increase funding for cost-share opportunities and grants for MAWQCP participants

Partnerships between MDA and Agriculture Retailers

The Centra Sota team runs MN Ag Water Quality Certification assessments and provides technical assistance to producers who wish to pursue Certification. Centra Sota staff work efficiently through the assessment process because of existing trusted relationships with their clientele, access to farm agronomic information and skill sets that facilitate interpretation of that data. Centra Sota also assists producers in accessing financial assistance. Financial resources facilitate practices needed to obtain Certification and continuously improve conservation on the farm. This partnership formally started in 2023, but collaboration started before this date. Centra Sota provided technical assistance to over 95 producers through the Minnesota Agricultural Water Quality Certification Program.

CATEGORY 3: EXPAND AND ENHANCE EDUCATION, TRAINING, AND RESOURCES FOR TA PROVIDERS

To build a workforce of TA providers with the knowledge and skills to assist farmers in adopting regenerative ag practices and solve resource concerns on their farms, Minnesota must both expand training for advisors and ensure there are employment and market opportunities for those pursuing this work. Building connections among TA providers will also allow for continuous learning, support, and problem-solving.

1. Develop programming to facilitate an improved educational to professional pipeline for new agronomy staff which emphasizes regenerative agriculture
    a. Integrate regenerative agriculture into core education and training pathways (e.g. the Sustainability Specialty within the Certified Crop Advisor program)
    b. Increase awareness and positive perceptions of agricultural careers (e.g. Minnesota Youth Institute's World Food Prize and leadership development programs through Minnesota Farmers Union, 4-H, and FFA)
    c. Expand internships and early career job placements in public or private sector retail
    d. Support entrepreneurship and business start-ups, including small business grants, incubator programs, or risk-sharing arrangements for entrepreneurs focused on regenerative agriculture practices
2. Foster connections and learning among TA providers
    a. Support and build on existing precompetitive, peer-to-peer networks for conservation agronomists and other TA providers (e.g. Northern Plains TAP) and contribute support to wider network infrastructure that connects peer to peer networks across states and regions (e.g. the Iowa Soybean Association Conservation Agronomist Network)
    b. Leverage and enhance farmer-to-farmer support networks, such as the Minnesota Soil Health Coalition and Wisconsin Producer Led Watershed Protection Grants
    c. Establish mechanisms for ongoing peer learning, case-sharing, and problem solving among TA providers across regions and roles, such as the Minnesota Office for Soil Health's forum and the Minnesota Soil Health Coalition's Premier Soil Health Event
    d. Strengthen coordination and awareness of existing resources through an integrated information structure (e.g. CTIC's Conservation Connector)

The Path Forward

Minnesota has established ambitious climate and nutrient reduction goals, but achieving those goals will require significant expansion of regenerative agriculture. Technical assistance is a critical enabling factor in that transition. Farmers need trusted advisors and sustained support to successfully adopt and maintain regenerative practices, so expanding TA capacity and expertise in Minnesota to meet existing or growing demand is critical. Reductions in federal funding and staffing have exacerbated this challenge. While no single organization can solve this problem alone, Minnesota has an opportunity to strengthen and diversify its technical assistance network by investing in public-sector capacity, supporting innovative delivery models, and expanding education and training opportunities for current and future advisors. Through coordinated action across government, academia, industry, conservation organizations, and farmer-led networks, Minnesota can build the technical assistance infrastructure needed to accelerate practice adoption, improve water quality, increase climate resilience, support farm profitability, and achieve the state's long-term agricultural and environmental goals.



Technical assistance providers and farmer advisors help producers evaluate, implement, and scale conservation and regenerative agriculture practices on working lands. (Minnesota farm © Fauna Creative)

Appendix

MINNESOTA CLIMATE AND NUTRIENT REDUCTION GOALS

Minnesota has ambitious goals for climate and nutrient reduction. These are described in Minnesota's Climate Action Framework and Minnesota's Nutrient Reduction Strategy. Both of these documents identify management of croplands as key to achieving their goals because croplands are major sources of greenhouse gases and nutrient runoff. Agriculture covers 26 million acres in Minnesota, which is 51% of the state (Agricultural Lands | MN Board of Water, Soil Resources). Croplands are the second largest source of emissions in Minnesota, accounting for 25% of total emissions (Climate Action Framework 2026 page 17). Agriculture is responsible for 72% of the total nitrogen (TN) and 53% of total phosphorus (TP) loads to rivers (2025 MN Nutrient Reduction Strategy p. 16).

- Minnesota has 26 million acres of agricultural land which is 51% of the state's land area. (Agricultural Lands | MN Board of Water, Soil Resources).
- Croplands account for 25% of Minnesota's emissions, making them the second largest source of GHG emissions in the state (Climate Action Framework 2026 page 17).
- "Across the state, agriculture contributes an estimated 72% of the total nitrogen (TN) loads to rivers…" (2025 MN Nutrient Reduction Strategy p. 16)
- "Statewide, agricultural cropland runoff contributes about 53% of total phosphorus (TP) load to rivers" (2025 MN Nutrient Reduction Strategy p. 16)

Minnesota Climate Action Framework

Minnesota launched the first Climate Action Framework (CAF) in 2022. The framework is the state's plan to reduce greenhouse gas emissions and prepare for climate change to achieve a vision of a carbon neutral, resilient, and equitable future for the state. It was updated in 2026 and now has 7 goals around clean transportation, climate-smart natural and working lands, resilient communities, clean energy, healthy lives and communities, clean economy, and efficient and resilient buildings. Each goal lists the challenges, opportunities, context, actions, targets and key desired results, and tribal perspectives associated with it.

In this report we will focus on Goal 2: Climate-smart natural and working lands. The working lands related targets and key desired results for Goal 2 are as follows. The targets most relevant to the croplands work are circled in red:

Targets: Climate-smart natural and working lands

Achieving Minnesota's climate vision requires large-scale, collective climate action around the state.

Initiative/Pillar	Target	Key desired result
Pillar: Carbon neutrality	Reduce GHG emissions from the agriculture sector 40% by 2050.	Minnesota reduces annual net GHG emissions from the agriculture sector.
	Maintain levels of GHG sequestration within the land use, land-use change, and forestry sector through 2050.	Minnesota maintains or increases annual net GHG sequestration in the land use, land-use change, and forestry sector.
Pillar: Resiliency	Maintain or increase abundance of key bird species in grassland, wetland, and forest habitats.	Forests, wetlands, and grasslands are healthy ecosystems resilient to climate change.
	Increase the share of cropland acres in Minnesota managed with conservation tillage, no-till, cover crops, and/or perennial crops to 60% by 2030 and 80% by 2050.	Producers implement actions to increase soil carbon and reduce erosion.
Pillar: Equity	Increase the share of farms operated by historically underserved farmers.	All Minnesotans share in the benefits provided by natural lands and a diverse and sustainable agricultural economy.
	Maintain or improve water quality in each major river basin, meeting the goals of the 2025 Nutrient Reduction Strategy.	

Minnesota Nutrient Reduction Strategy

The Minnesota Nutrient Reduction Strategy is a document from the Minnesota Pollution Control Agency that gathers science, research, and data to form recommendations to improve water quality and protect ecosystems within the state and downstream. Elevated concentrations of nutrients (nitrogen and phosphorus) can have adverse effects on the quality of water used for drinking and recreation, and by aquatic life. The original strategy was released in 2014, and an updated and revised strategy was published in 2025. The strategy explains how voluntary and regulatory actions can reduce nutrient pollution and meet the state's goals.

Goals from the 2014 strategy and the updated 2025 strategy are as follows:

RECOMMENDATIONS/SOLUTIONS FROM THE CLIMATE ACTION FRAMEWORK

Initiative 2.1: Carbon sequestration and storage in forested lands, grasslands, and wetlands
Manage forests, grasslands, and wetlands for increased carbon sequestration and storage.

2.1.1 Maintain, expand, and actively manage forestlands.*
2.1.2 Protect, restore, and manage peatlands and other wetlands.*
2.1.3 Protect, restore, and manage grasslands.*
2.1.4 Encourage individual and collective actions that generate climate mitigation benefits.*

Initiative 2.2: Resilient landscapes and ecosystems
Enhance the ability of plants and wildlife to adapt to the effects of climate change.

2.2.1 Conserve and enhance biodiversity.
2.2.2 Use land management practices that enhance climate resilience.

Initiative 2.3: Healthy farmland
Accelerate soil health and nitrogen and manure management practices that reduce emissions and enhance carbon storage, water quality, and habitat.

2.3.1 Increase soil organic carbon content and reduce erosion.
2.3.2 Manage fertilizer and manure to reduce emissions.
2.3.3 Manage farmland for multiple benefits.*

Initiative 2.4: Sustainable landscapes and water management
Improve climate resiliency through multi-purpose water storage and management practices.

2.4.1 Manage agricultural landscapes to minimize nitrogen runoff and pollution.*
2.4.2 Manage natural and working lands to hold water and reduce runoff.

Initiative 2.5: Enhanced investments in emerging crops, products, and local economies
Invest in and support research in emerging agricultural and forest products, reduce waste and expand economic opportunities.

2.5.1 Increase sustainable agricultural production systems and develop markets for climate-benefitting products.
2.5.2 Promote the use of wood products and residual forest products to store carbon and reduce GHG emissions.
2.5.3 Support local food markets, urban agriculture, and emerging farmers.
2.5.4 Reduce waste and promote beneficial use of food and organic materials.*

CROPLAND STRATEGIES FROM THE NUTRIENT REDUCTION STRATEGY

Agricultural BMPs recommended for the NRS are grouped into the following four categories:

1. Increase fertilizer use efficiencies, emphasizing:

a. Nutrient management through reduction of nitrogen losses on corn following soybeans
b. Switch from fall to spring fertilizer applications (or use nitrification inhibitors)
c. Application of phosphorus in accordance with precision fertilizer and manure application techniques, including applications based on soil test results and University of Minnesota recommendations

2. Increase and target living cover, emphasizing:

a. Cover crops on fallow and short season crops such as sweet corn, corn silage, peas, small grains, and potatoes
b. Perennials in riparian zones and on marginal cropland
c. Research and development of marketable cover crops to be grown on corn and soybean fields
d. Research and development of perennial energy crop(s)

3. Field erosion control, emphasizing:

a. Tillage practices that leave more than 30 percent crop residue cover or alternative erosion control practices that provide equivalent protection
b. Grassed waterways and structural practices for runoff control

4. Tile drainage water quality treatment and storage, emphasizing:

a. Constructed and restored wetlands
b. Controlled drainage when expanding or retrofitting drainage systems
c. Water control structures
d. Research and development of bioreactors, two-stage ditches, saturated buffers and other ways to store and treat drainage waters

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