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Representative Samatha Vang, Chair
Minnesota House Agriculture Finance and Policy Committee

Re: HF 3763 (Vang) AFREC Renewal - Support

The Minnesota Crop Production Retailers represents the statewide network of co-ops and ag retailers who work with farmers and producers to provide seeds, plant health, and plant protection inputs. MCPR members are the trusted crop advisors and agronomists who assist farmers with crop planning and nutrient management.

MCPR is working to advance precision agriculture, and our members continue to invest in the equipment and skill training needed to ensure soil health and advance responsible agricultural practices.

- Precision agriculture is a farming management strategy based on observing, measuring and responding to temporal and spatial variability to improve agricultural production sustainability.

MCPR is committed to advancing the internationally recognized [4R principles](#).

- The 4Rs stand for right source, right rate, right time, and right place and serve to guide farmers to the management practices that help keep nutrients on and in the field. Implementation of the 4R's helps to align the economic, environmental, and social components of nutrient management.

MCPR strongly supports renewing the Agricultural Fertilizer Research and Education Council (AFREC), extending the sunset date for ten (10) years for the council, and maintaining the associated funding as recommended by the AFREC Council.

The research supported by AFREC has led to advancements in fertilizer efficiency, a better understanding of how to deploy cover crops, and strategies to improve soil health and protect water quality. We are concerned that sunseting this valuable program and ending the peer-reviewed research would limit progress on developing and sharing innovations in farming practices. The AFREC research is actively shared with farmers, crop advisors, and agricultural sector stakeholders. For example, the Minnesota Agricultural Water Resource Center (MAWRC) sponsors [the Nutrient Management and Nitrogen Management Conferences](#), where the AFREC Research is shared with the agricultural community.

The Minnesota Office for Soil Health (MOSH) recently released the [2024 Minnesota Soil Health Action Framework](#), which captures input from a broad range of stakeholders on strategies and ideas for improving soil health and would be worth further review by the committee.

The Minnesota Board of Soil and Water recently announced that it awarded [\\$17 million in soil health grants to 39 local governments](#).

Given the activity level and funding available to support advancing soil health practices, we encourage the committee members to maintain AFREC and extend the sunset for 10 years.

Thank you for your time and thoughtful consideration.

Lee Helgen, Executive Director, Minnesota Crop Production Retailers

4Rs OF NUTRIENT STEWARDSHIP

Economically, Environmentally & Socially Sustainable Crop Nutrition

The 4Rs promote best management practices (BMPs) to achieve cropping system goals while minimizing field nutrient loss and maximizing crop uptake.

4R Principles of Nutrient Stewardship



RIGHT SOURCE
Matches fertilizer type to crop needs.



RIGHT RATE
Matches amount of fertilizer to crop needs.



RIGHT TIME
Makes nutrients available when crops need them.



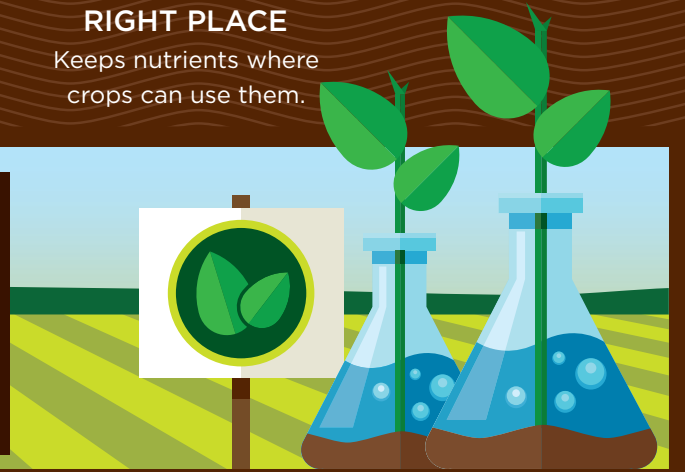
RIGHT PLACE
Keeps nutrients where crops can use them.

The 4Rs—Guided by Science, Proven by Research

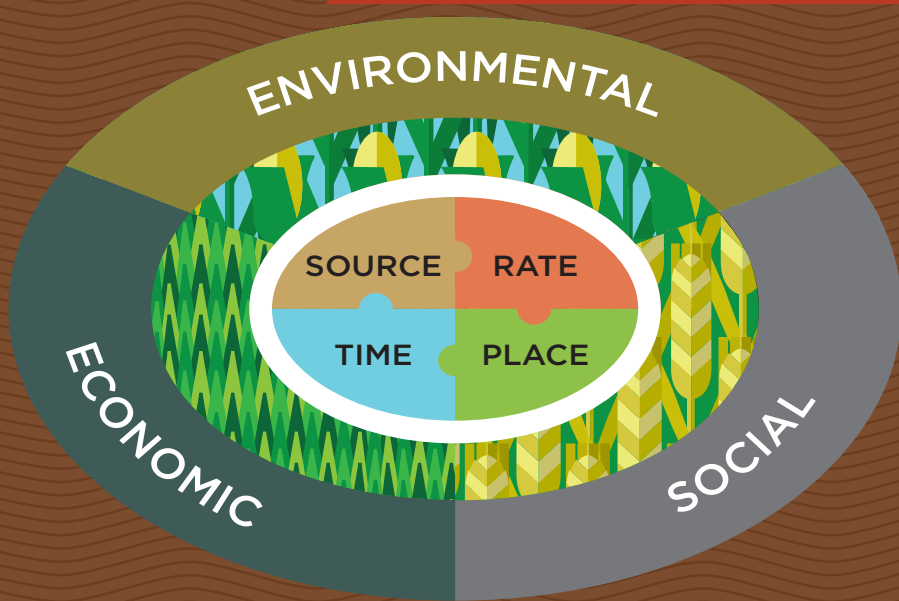
The 4R Research Fund was established by contributions from fertilizer industry members and stakeholders.

\$7,000,000 COMMITMENT

The Research Fund is an industry-funded effort committing **\$7 million** to 4R research. A portion of this money has already been raised and implemented in initial research projects.



IMPLEMENTING 4Rs ON THE FARM



STEP 1:

Identify farm-specific **economic**, **social** and **environmental** goals that the cropping system objectives should address.

STEP 2: Select BMPs that are specific to the grower's goals, soil, climate and cropping system.

STEP 3: Integrate BMPs for all goals and adjust as needed.

STEP 4: Document the 4R nutrient stewardship plan.

GOALS

Although goals will vary among farm operations and even among fields, the following are commonly identified grower goals:

Improve net farm income and regional economic development.

Improve the quality of farm family housing, diet and education.

Reduce losses of nutrients to the environment.

Nutrient Stewardship Across the Nation

4R STATE EFFORTS

Several states are helping lead the way for nutrient stewardship by developing governing methods such as certification programs, codes of practice and sustainability programs. State by state, 4R BMPs are gaining ground in local communities through demonstration and outreach efforts.

4R ADVOCATE

Each year the Nutrient Stewardship 4R Advocate program recognizes outstanding agriculture retailers and farmers dedicated to sustainable crop nutrition. These advocates travel the country educating local communities about the 4R principles as well as promoting the benefits of sustainable farming to the general public.

4R EDUCATION

Industry partners have come together to help producers learn more about sustainable farming. These partners have developed webinars, learning modules and online interactive training to provide essential information about the basic components of soil fertility and nutrient BMPs as they pertain to implementation of the 4Rs.

4Rs & THE INDUSTRY

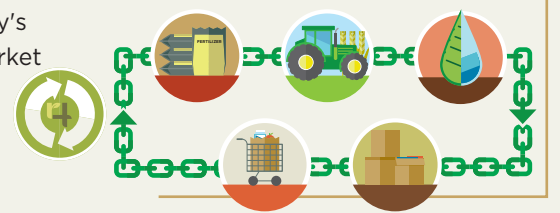
OUR PARTNERS

Over 90 U.S. organizations are embracing 4R nutrient stewardship and are working to bring you the most current information about fertilizer best management practices. These partners include conservation groups, agriculture equipment manufacturers, agriculture retail companies, fertilizer companies and other various agricultural stakeholders.



SUSTAINABILITY

The underlying aim of sustainable agriculture is to increase economically viable food production while retaining the ecological integrity of food systems. The fertilizer industry's engagement with Field to Market allows us to collaborate with stakeholders across the agricultural supply chain.



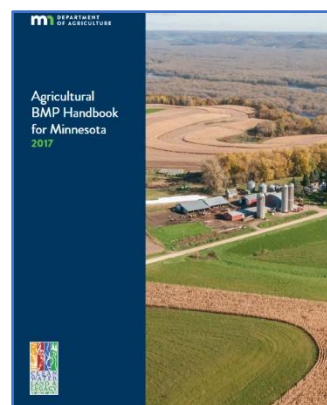
MDA - Effectiveness of Best Management Practices in Minnesota

The Minnesota Department of Agriculture (MDA) is the lead state agency for the development, promotion, and evaluation of best management practices (BMPs) for agricultural chemicals. The MDA evaluates the effectiveness of nitrogen fertilizer BMPs through research, computer modeling, and edge-of-field monitoring programs.

This document outlines examples of recent work at the MDA. They are intended to illustrate and document the type of evaluations that occurs. It is *not* intended to be a comprehensive review or report of this work. Links to additional resources and data summaries are included.

[Ag BMP Handbook for Minnesota](#)

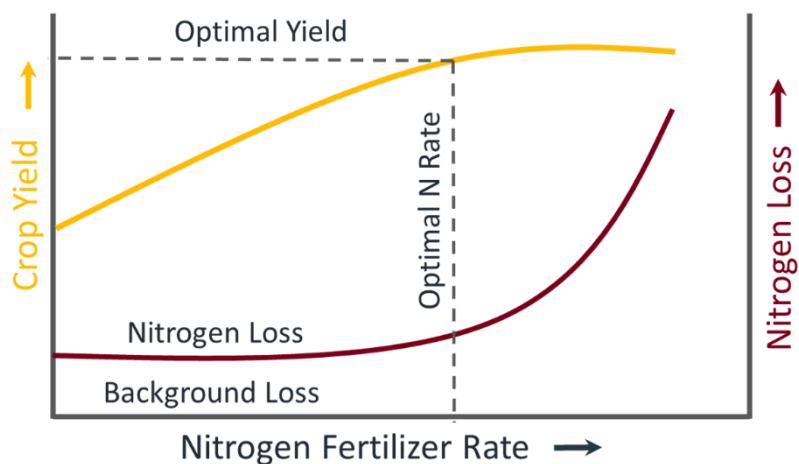
The updated handbook includes a definition for both structural and nutrient management BMPs; estimates of the effectiveness of each practice based on existing literature; costs and other economic considerations for each BMP; and potential barriers to BMP adoption. This information is critical for establishing realistic estimates of the benefits of implementation.



[Agricultural Research and Education Council \(AFREC\)](#)

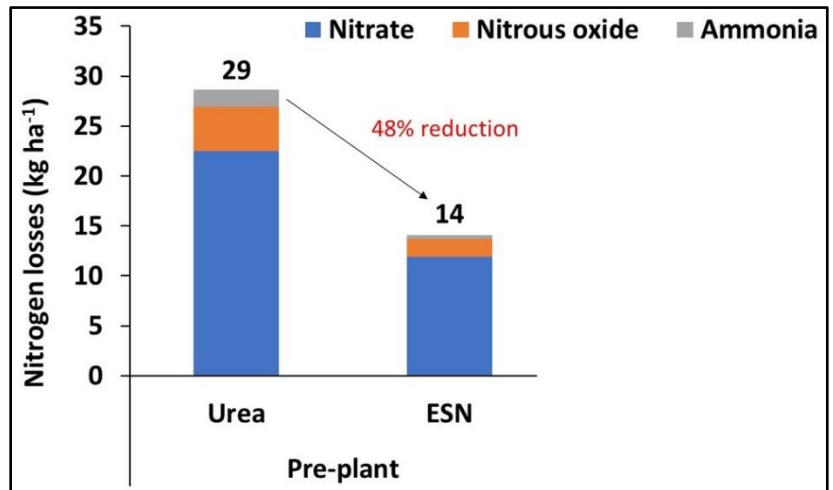
Nitrogen Rate:

- The most important nitrogen best management practice (BMP) for crop production for protecting water quality is to use the correct nitrogen (N) rate. The BMP recommendations consider agronomic, environmental, and economic outcomes of fertilizer applications.
- The N rate recommendations from the University of Minnesota are based on research. For example, for corn the N rate recommendations are based on over 225 site years of data collected across Minnesota.
- Research shows that applying below or at the recommended N rate results in the lowest N loss to groundwater or surface water.
- Applying N at rates above the recommended rates dramatically increase N losses to groundwater or surface water. This is illustrated by the maroon line in the figure. The figure summarizes data collected by the U of M over the last ten years. For example, when too much N is applied, corn yield and quality does not improve, but profit is reduced and increased nitrogen loss to groundwater or surface water are likely to occur.



Nitrogen Source:

- ESN is an enhanced efficiency fertilizer, where the nitrogen release is delayed by a polymer coating. This allows for better alignment between when nitrogen is released from the fertilizer to when the crop needs it.
- A study at the University of Minnesota showed that ESN reduced the combined nitrogen loss through nitrate leaching, nitrous oxide emissions, and ammonia volatilization by 48% compared to urea. This is shown in the figure.
- Research at the University of Minnesota has shown that ESN generally improve crop yields and, in many cases also reduces nitrate leaching losses when used pre-plant. The research also showed that while ESN not always reduces leaching losses, in no situation did ESN increase nitrate leaching losses.



Above are two examples of BMP evaluation funded by the AFREC program. Overall, 14 of the 22 (64%) research projects AFREC funded in 2023 dealt with nitrogen and water quality. These projects researched issues including:

- Cover crops
- Soil health
- Manure management
- N-fixing biological products
- Nitrogen inhibitors
- Irrigation and nitrogen
- Variable rate technologies (precision agriculture)

Root River Field to Stream Partnership- *The Root River Field to Stream Partnership (RRFSP) is a unique water monitoring and outreach project located in southeast Minnesota. This partnership combines rigorous data collection, strong personal relationships, and real conservation action.*

Three examples of BMP evaluations:

1. A twelve-year before/after study from 2012-2023 on a poorly drained 60-acre field in Mower County found that split applying nitrogen and reducing nitrogen rates by 15% reduced nitrogen loss in sub-surface tile drainage by 29%. Economic performance also generally improved using reduced rate split applications, but additional years are needed to evaluate performance. An edge-of-field prairie strip was also installed to

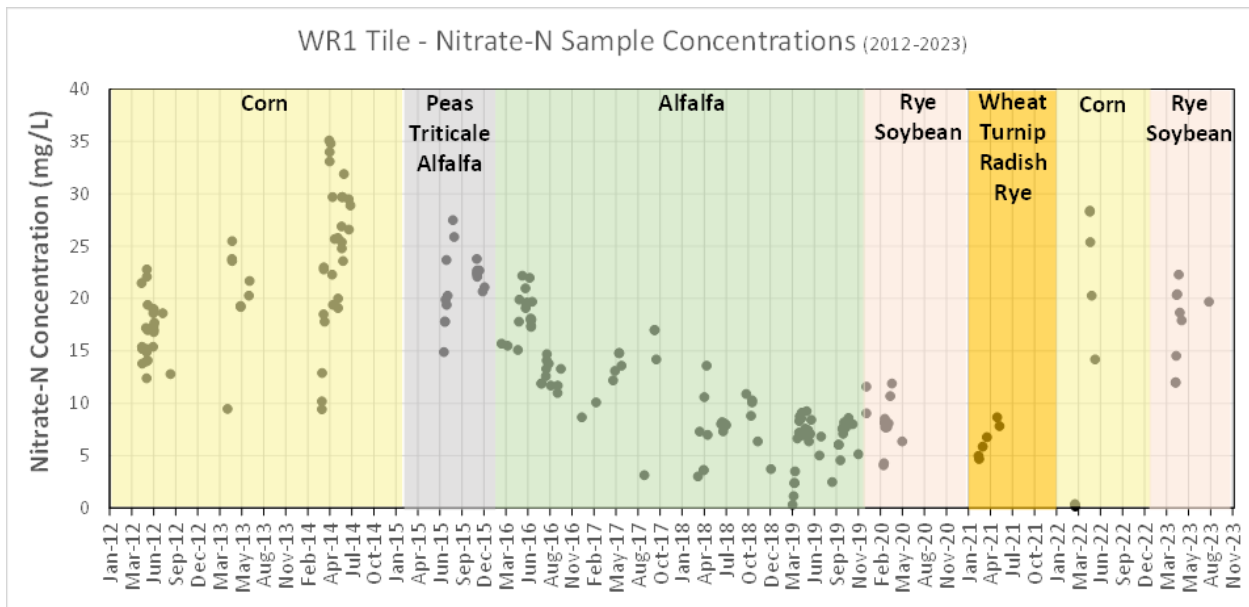
address surface runoff, sediment and attached nutrients, but additional years are needed to evaluate performance.

- Soil water nitrate monitoring has demonstrated that corn fields with alfalfa in the rotation typically have nitrate concentrations averaging 70% lower when compared to sites without perennials. (<https://wrl.mnpals.net/islandora/object/WRLrepository%3A3654>)
- Switching to a low soil disturbance manure injection system has reduced surface runoff, sediment and soil-attached nutrients and greatly improved the ability to establish cover crops in a continuous corn silage system. Cereal rye cover crop dry matter biomass was rarely above 200 lbs/ac prior to termination in April. With the new low disturbance method, winter cereal rye biomass has increased to over 2,000 lb/ac with over 100 lb/ac of nitrogen uptake.

Discovery Farms Minnesota- *Discovery Farms Minnesota is a farmer-led effort to gather field scale water quality information from different types of farming systems, in landscapes across Minnesota. The MDA is a technical partner that is responsible for establishment and operation of monitoring equipment that provides high quality, water quantity and quality data from agricultural systems.*

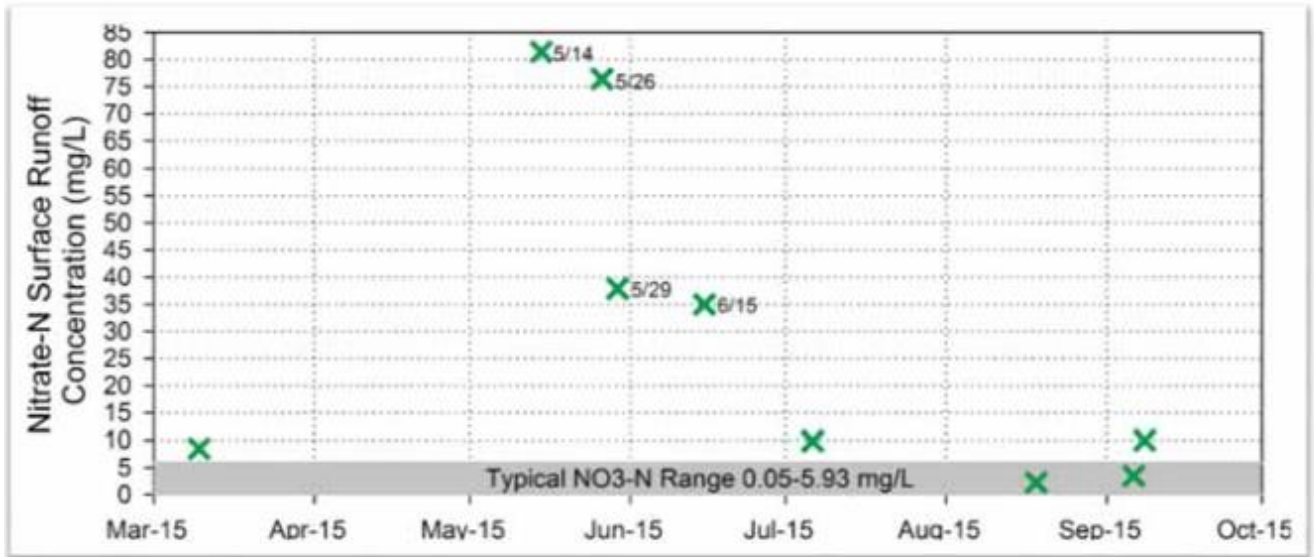
Two examples of BMP evaluations:

- Monitoring conducted at Discovery Farms Minnesota (DFM) sites have consistently shown lower nitrate-n concentrations and losses when alfalfa is included in the rotation. One example would be site WR1, located in Wright County, which has been monitored since 2012. A significant reduction in nitrate-n concentration was measured in the tile water once the alfalfa was established.



- The University of Minnesota’s Best management practices for nitrogen use in south-central Minnesota recommend spring applications of urea with incorporation to a depth greater than 3 inches. Fall applications of urea are acceptable if a nitrification inhibitor is used, urea is incorporated to a minimum depth of 3 inches, and application occurs after soil temperatures are below 50°F. Not following these practices increases the risk of nitrate-nitrogen loss with surface runoff leaving the field (illustrated by water samples collected in May 14-26 on graph below). Results from the Discovery Farms measurements confirm that

these management practices are important and necessary to reduce both economic and environmental risk. Learn more about this evaluation: <https://agwaterexchange.com/wp-content/uploads/2016/12/Importance-of-Following-Nitrogen-Best-Practices.pdf>



Nitrate-nitrogen concentrations in surface runoff at one Discovery Farm location in 2015

 **News Release****BWSR Awards more than \$17 Million in Soil Health Grants**

39 local governments selected to receive funding to support increasing capacity for soil health programs

April 9, 2024

Contact: Mary Juhl; mary.juhl@state.mn.us, 612-358-5733

ST. PAUL, Minn. — The Minnesota Board of Water and Soil Resources (BWSR) awarded more than \$17 million in grant funding to 39 soil and water conservation districts (SWCDs) to support soil health efforts throughout the state.

The grants will fund supplemental staffing to boost local expertise related to soil health initiatives.

“Soil and water conservation districts play a key role in helping landowners understand and adopt soil health practices such as no-till, cover crops and rotational grazing,” BWSR Executive Director John Jaschke said. “These grants will increase our local partners’ capacity to provide these services in their communities.”

These grants are part of a large-scale effort to work with landowners to improve soil health. BWSR received \$21 million from the state’s general fund and \$12 million from the Clean Water Fund during the 2023 legislative session to support soil health programming across the state. BWSR was also selected last year to receive \$25 million in [Regional Conservation Partnership Program \(RCPP\)](https://www.nrcs.usda.gov/programs-initiatives/rcpp-regional-conservation-partnership-program) funds from the USDA’s Natural Resources Conservation Service for soil health initiatives. Soil health is a priority identified in the Minnesota’s [Climate Action Framework](https://climate.state.mn.us/minnesotas-climate-action-framework).

BWSR plans to offer grants for soil health delivery and practices later this year. This combination of state soil health grants will help support BWSR’s \$25 million Regional Conservation Partnership Program (RCPP) that is currently in negotiation. More information about these additional soil health initiatives will be shared in the coming months.

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BWSR is the state soil and water conservation agency, and it administers programs that prevent sediment and nutrients from entering our lakes, rivers, and streams; enhance fish and wildlife habitat; and protect wetlands. The 20-member board consists of representatives of local and state government agencies and citizens. BWSR's mission is to improve and protect Minnesota's water and soil resources by working in partnership with local organizations and private landowners

Back to top