



AFREC Research Impacts: Nitrogen management and water quality

AFREC, the Agricultural Fertilizer Research and Education Council, has been funding Minnesota soil science research since 2008. AFREC funding has helped turn the University of Minnesota's team of soil science researchers and educators working on crop nutrient management into one of the top groups in the country. Without AFREC, significantly less important Minnesota-specific research would be conducted.

AFREC research projects

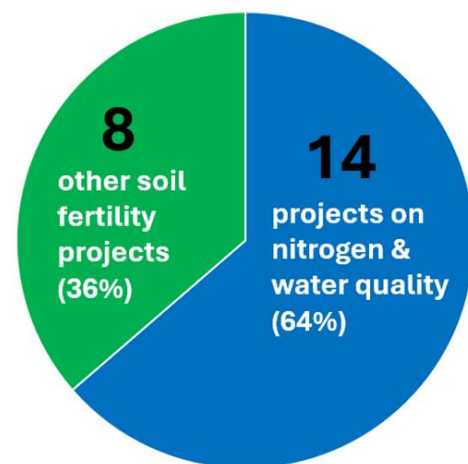
In 2023, 64% of the research projects AFREC funded dealt with nitrogen and water quality. These projects looked at issues such as:

- Cover crops
- Soil health
- Manure management
- Nitrogen-fixing biological products
- Nitrogen inhibitors
- Irrigation and nitrogen
- Variable rate technologies



Agricultural Fertilizer Research & Education Council

2023 AFREC-funded research projects



Long-Term Impact of Nitrogen Fertilization on Corn Production, Soils and Nitrogen Cycling Processes in Minnesota

This long-term project studies how nitrogen behaves at six locations around Minnesota, from the southeast's Karst topography to the central sands and beyond. Researchers look at each of the 4Rs of nutrient stewardship (fertilizer source, application rate, application timing, and application placement) to determine how different nitrogen management practices impact crop yield, water quality, greenhouse gas emissions, and soil health over time.

Effects of Cover Crop and Nitrogen Rate on Corn Grain and Silage Yield, Nitrogen Loss in Tile Drainage and Soil Health

Cover crops are a promising way to reduce nitrate levels in water, improve soil health, and sequester carbon. However, Minnesota’s cold climate makes growing cover crops after grain corn and soybeans challenging. This project in south-central Minnesota looks at how growing cover crops after harvesting corn silage impacts soil health and water quality in fields with tile drainage.



Updating Nitrogen and Phosphorus Credits from Manure to Maximize Fertilizer Use Efficiency in Row Crops

For Minnesota farmers who apply manure, it can be difficult to know how much nitrogen is in the manure they’re applying and when it is available to the crop. This makes it hard to make decisions about how much additional fertilizer to apply. This project studied six different types of manure over several years, yielding interesting results on how bedding impacts nitrogen availability, the soil health benefits of manure, and more.

Effect of Variable Rate Irrigation and Nitrogen Fertilizer Rates on Crop Productivity and Water Quality

In Minnesota’s central sands region, water use and nitrogen loss are top concerns. This project is looking at how a “deficit irrigation strategy” affects both. So far, results indicate that applying less water more frequently can help farmers save on irrigation costs while also keeping more nitrogen in the soil and out of groundwater.



Learn more about AFREC at [MNsoilFertility.com](https://mnsoilfertility.com)
