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$34.7 Mn AgNUE Program targets one of agricultureâ??s biggest efficiency challenges

02 June 2026 | News

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In a significant bid to address one of modern agricultureâ??s most persistent productivity and sustainability challenges, the Foundation for Food & Agriculture Research (FFAR) and the Novo Nordisk Foundation have unveiled the Agricultural Nitrogen Use Efficiency Platform (AgNUE), a five-year, $34.7 million collaborative research initiative designed to transform how farmers manage nitrogen fertilizer.

The programme combines $7.5 million in funding from FFAR with $27.2 million in matching support from the Novo Nordisk Foundation, creating an international research network focused on improving nitrogen-use efficiency through extensive field experimentation, advanced monitoring systems, predictive modelling, and artificial intelligence-driven decision support.

Nitrogen fertilizer remains indispensable to modern crop production, underpinning the high yields required to feed a growing global population. Yet its management continues to pose a formidable challenge. In many farming systems, fertilizer is routinely applied in excess, driven largely by uncertainty regarding crop requirements and the absence of highly localized management recommendations. Such inefficiencies not only inflate production costs but also contribute to water-quality degradation and increased emissions of nitrous oxide, one of agricultureâ??s most potent greenhouse gases.

The AgNUE initiative seeks to address this challenge by generating an unprecedented understanding of how nitrogen behaves across different soils, climates, and cropping systems. By leveraging cutting-edge measurement technologies and scientific methodologies, researchers aim to uncover the factors that influence nitrogen uptake, movement, and loss within agricultural landscapes.

â??Farmers need science-based solutions that improve efficiency without sacrificing yields,â? said Allison Thomson, Scientific Program Director at Sustaining Vibrant Agroecosystems. â??This collaborative research effort can help generate critical data to inform science-based management strategies that strengthen U.S. agricultureâ??s competitiveness and protect farmer profitability. Ultimately, AgNUE will help ensure farmers can produce abundant food, lower input costs, and protect their land for generations to come.â?

The initiative brings together a distinguished consortium of academic institutions from both sides of the Atlantic, including North Carolina State University, the University of Illinois, Colorado State University, and Aarhus University, among others. FFARâ??s contribution will specifically support research activities across U.S.-based universities and field sites, ensuring that American growers directly benefit from the programmeâ??s findings.

A cornerstone of the project will be the establishment of a network of research locations spanning diverse agroecological environments. These sites will employ sophisticated monitoring technologies to track how nitrogen moves through agricultural systems under varying environmental conditions and management practices.

The resulting datasets will feed into next-generation predictive models capable of forecasting nitrogen losses and fertilizer performance with far greater precision than currently possible. Researchers believe that integrating field observations with advanced analytics and artificial intelligence will substantially reduce uncertainty surrounding nutrient management decisions.

The ultimate ambition is to provide farmers with more accurate, site-specific recommendations regarding fertilizer rates, application timing, and nutrient stewardship practices. Such tools could simultaneously enhance productivity, reduce costs, and improve environmental outcomes.

Beyond farm-level decision-making, the knowledge generated through AgNUE is expected to support broader policy development, stimulate innovation across the agricultural technology sector, and accelerate adoption of practices that balance economic performance with environmental responsibility.

As global agriculture faces mounting pressure to produce more with fewer resources, the AgNUE platform represents a strategic effort to redefine nitrogen management through data, science, and collaborationâ??turning one of farmingâ??s most complex variables into a more precise and sustainable instrument for growth.