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Australia's GRDC announces project worth $17M to unlock fertilizer's potential in grains industry

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Australian grain growers could unlock tools to improve nitrogen use efficiency and reduce on-farm greenhouse gas (GHG) emissions through a national research project examining enhanced efficiency fertilisers (EEFs).

EEFs use chemical or physical approaches to regulate the release of nitrogen and its availability to plants. They aim to reduce the risk of nitrogen loss by better synchronising the supply of fertiliser to the demands of the crop.

The four-year, $17.33M project is a co-investment of the Grains Research and Development Corporation (GRDC) and will be led by the University of Melbourne alongside several research organisations and industry partners. The projectÂ*Enhanced efficiency nitrogen fertilisers in the grains industry: an opportunity to reduce GHG emissions and increase Nitrogen Use Efficiency (NUE)*Â will run for four years, with results anticipated to be available to growers from 2028.

GRDC Managing Director Nigel Hart says the strategic investment had been developed in response to grain grower needs with managing input costs and sustainability front of mind for the industry.

â??As an organisation investing on behalf of Australian grain growers, we are keenly aware of the pressures our sector is facing from high input costs, particularly for nitrogen. There is a very real need to ensure we are using the most efficient fertilisers in the most efficient way,â?• Mr Hart says.

Project lead Associate Professor Helen Suter from the University of Melbourne says a number of EEF technologies are commercially available but relatively little is known about their efficacy in different climates and agroecosystems, and their economic and environmental benefits to the grains industry.

â??Growers are looking for recommendations of what technologies work where, when, why and how, to make informed decisions about their nitrogen management strategies. The project will establish a network of field trials across Australia in representative soils and cropping systems, where commercially available EEF technologies will be evaluated alongside conventional nitrogen fertilisers. These technologies include urease inhibitors (to reduce ammonia loss), nitrification inhibitors (to reduce nitrous oxide, nitrogen and leaching loss), dual (urease and nitrification) inhibitors and controlled release fertilisers (both targeting all loss pathways)" A/Prof Suter says.

Controlled-environment studies will complement the field-based activities, allowing a mechanistic understanding of soil nitrogen cycling and loss pathways, and will support modelling activities aimed at quantifying the environmental impact and potential nitrogen use efficiency gains associated with the use of EEFs across the grains industry. The EEFs trialled will target key nitrogen loss mechanisms (denitrification, nitrate leaching, volatilisation) in different cropping regions and quantify crop nitrogen uptake to determine nitrogen use efficiency and return on investment. The fate of nitrogen will be tracked in soils and plants using nitrogen-15 stable isotope labelled fertilisers.

Project research partners include the University of Melbourne, Department of Primary Industries and Regional Development Western Australia, University of Queensland, New South Wales Department of Primary Industries, CSIRO, Queensland Department of Environment, Science and Innovation, Queensland University of Technology, La Trobe University, Birchip Cropping Group and Hart Field Site Group. Industry partners include CSBP Limited, Incitec Pivot Fertilisers, Nutrien Ag Solutions, N-Shield and Fertiliser Australia.