Improving agricultural nitrogen use efficiency

UKRI-funded research is working to boost agriculture across Brazil. Low-income smallholders in northern Brazil are now seeking to grow crops on land they would otherwise abandon while industrial farms in southern Brazil are using new technologies to drastically cut their use of harmful, expensive fertilisers.

Crops require nitrogen from soil to grow. When nitrogen levels are too low farmers use nitrogen fertilisers to improve yields. These fertilisers are costly and wasteful – it is estimated over half the nitrogen from synthetic fertilisers is lost from soil\(^1\), polluting water and releasing greenhouse gases. With the global population set to reach almost 10 billion by 2050\(^2\) and demand for food growing accordingly, our current use of nitrogen fertilisers in agriculture is simply not sustainable.

The research brings scientists together with farmers across Brazil, from large scale agribusiness to subsistence smallholders. The team also works with Embrapa, the research institute of the Brazilian Ministry of Agriculture, so findings can be rapidly incorporated into Brazil’s agricultural policy. This is an unprecedented collaboration which would not have happened without Newton funding.

UK lead Professor Sacha Mooney, in his new role as President of the British Society of Soil Science, will be working closely with Defra to translate the research findings into benefits for UK agriculture.

“Most tropical, weathered soils have low mineral nitrogen. NUCLEUS is exploring a range of ways to address this. One way is to introduce legumes into crop rotations to naturally increase soil nitrogen. Another is to understand which crop species are best at scavenging nitrogen from deeper in the soil and recycling it for the next crop, thus reducing the need for fertilizer inputs.”

Professor Ciro Rosolem, São Paulo State University

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\(^1\)Lasalsetta et al, 2014

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