



Water

# Nutrient management for diversified cropping in Bangladesh (NUMAN)



## Overview

**Bangladesh's food security depends on cropping intensification. However, increased fertiliser use, decreasing arable land area (0.49% per year) and lack of crop diversity are constraints to the profitability and sustainability of current nutrient management.**

The challenge is to develop programs that maintain adequate nutrient levels but avoid deficiencies, imbalance or overuse of fertilisers. Both economic and environmental benefits will flow from better nutrient management strategies that support sustainable cropping intensification and diversification.

It has been shown that a shift from farmers' current fertiliser rates to recommended rates could increase yields by 15-40% for a range of crops including rice, wheat, maize, mustard and potato. Nutrient management practices are still to be developed for emerging cropping systems based on minimal soil disturbance and residue retention.

The challenges differ in the southern coastal region, where cropping intensification of a single, low-input rice crop to double cropping on difficult soils requires the formulation of profitable and sustainable fertiliser use practices.

Implementation of sustainable and profitable nutrient management practices for both existing intensive and emerging cropping systems would significantly benefit Bangladeshi agriculture.

## KEY FACTS

**ACIAR Project No.** LWR/2016/136

**Duration:** August 2017 to December 2022 (5 years)

**Target areas:** Bangladesh

**Budget:** A\$2,704,742

### Project Leader

Dr Richard Bell, Murdoch University

### Key partners

- Bangladesh Agricultural University
- Bangladesh Agricultural Research Council
- Bangladesh Agricultural Research Institute
- Bangladesh Rice Research Institute
- Soil Resource Development Institute
- Khulna University
- Patuakhali Science and Technology University
- International Plant Nutrition Institute (South Asia)
- Conservation Agriculture Service Providers Association

### ACIAR Research Program Manager

Dr Robyn Johnston

## Objective

**The project aims to increase the profitability and sustainability of intensive and emerging cropping systems in Bangladesh through improved nutrient management. A small, complementary activity aims to improve profitability of nutrient management in grain cropping in south-west Australia.**

The objectives are to:

- Identify differences between current and recommended fertiliser use on farms, gather evidence of nutrient imbalances and identify barriers to adoption of more profitable and sustainable nutrient management practices.
- Develop and test tools for sustainable nutrient management of intensively cropped areas of north-west Bangladesh, emerging conservation agriculture cropping systems, and for coastal zone soils of southern Bangladesh.
- Engage with women and men in farmers' groups, extension officers and the private sector to out-scale the use of tools and inform the development of fertiliser policies to achieve more efficient fertiliser use.
- Increase the knowledge of soil resources and their capability for nutrient management among women and men farmers, research partners and key stakeholders.

## Expected scientific results

- Increase common use of nutrient budgets and nutrient balance for management of crop nutrition in intensive cropping patterns.
- Transition from present single-crop approach to cropping pattern nutrient management.
- Increase scientists understanding of loss pathways that need to be taken into account when recommending fertiliser.
- Identify major loss pathways to inform additional research to increase nutrient use efficiency.
- Validate data on fertiliser requirements and rice crop responses.
- Quantify potential for re-use of farm and rural bio-waste as a nutrient input for cropping.

## Expected impact/outcomes

- Improve nutrient management and benefits from increased profitability for participating farmers.
- Ensure farmers receive current, best-practice advice on fertiliser use to optimise nutrient management and efficiency and profitability of cropping intensification.
- Implement utilisation of fertiliser recommendations throughout Bangladesh resulting in changed fertiliser application practices, which will improve profitability and livelihoods.
- Increase understanding of biophysical, socio-economic (including gender) and technical constraints to changing nutrient management practices and strategies to overcome constraints.
- More responsive policy formulation that better supports sustainable nutrient management.

