



# Case Study

## Improving Nitrogen Use Efficiency (NUE) by Matching Fertiliser Application to Crop and Soil Properties



<b>LANDHOLDER</b>	Tony Jeppesen
<b>LOCATION</b>	Bloomsbury
<b>CATCHMENT</b>	O'Connell River
<b>RAINFALL</b>	Mean 1380mm, Median 1200mm
<b>PROPERTY SIZE</b>	168ha
<b>ON-GROUND PROVIDER</b>	Farmacist Pty Ltd Author: John Turner

**Project Catalyst** is a grower led, sugar cane innovation and adoption project that explores, develops and validates farm management practice change to improve the enduring water quality of the Great Barrier Reef.

### **BROADER ADOPTION VALIDATION & GROWER SUPPORT**

Founded in 2009, the project operates in the Mackay Whitsunday, Burdekin and Wet Tropic regions to deliver valued practice change outcomes and develop methods for industry adoption. Under the Broader Adoption and Grower Support program, professional on-ground service providers assist selected growers to adopt and validate appropriate change practices. Service providers continue to monitor implementation benefits and derived environmental performance improvements. Through targeted extension activities, the program seeks to accelerate the uptake and broader adoption of improved farming practices at local, regional and industry levels.



Fig.1 Tony Jeppesen operates a large scale sugarcane farm



Fig.2 Harvesting on Tony's farm



Great Barrier  
Reef Foundation



## ●●●● Goal

To adopt N management practices that better match N application to soil properties and sugarcane yield potential, resulting in improved N use efficiency (NUE) and regulation compliance.

## ●●●● Overview

The Reef protection regulations are Queensland laws that address land-based sources of water pollution to the Great Barrier Reef.

All sugarcane producers must implement a farm nitrogen and phosphorus budget in the Wet Tropics, Burdekin, and Mackay Whitsunday regions from 2021.

This provides an opportunity to distribute N and phosphorus (P) between paddocks based on potential crop yield and calculated crop N requirements.

Tony's overall aim was to increase yield across all management areas of the farm.



Fig.4 Conducting harvester trials on Tony's farm



Fig.3 Farm fertiliser application budget developed by Farmacist (2020)

## ●●●● Action

Farmacist supported Tony in developing his fertiliser budget based upon paddock yield history, overlaid with soil type and crop stage. This information was used to determine the actual yield potential of different areas of the farm and therefore predicted crop N requirements.

An excel decision support tool was used to assess the outcome of relocating N and P between blocks. N rates were both increased and reduced between blocks.

Three paddocks were selected to have an increased N rate of 20 kgN/ha. Older ratoons and historically poor producing paddocks, had N application rates reduced.

N fertiliser not applied to lower yield potential paddocks was allocated to calculated higher yielding paddocks.

## ●●●● Outcome

Paddocks for N & P relocation were selected after consultation with Tony and matched to total nutrient budget in accordance with the Reef protection regulations.

Tony determined that the poor soils where N & P inputs were reduced did not experience yield impacts. Conversely, paddocks with higher calculated yield potential and increased N & P inputs received additional irrigation and improved yield.

By better matching inputs to yield potential, synchronisation between N application rates and N plant uptake is improved and NUE increases. N loss to the water catchment is greatly reduced when NUE is optimised. Tony has confidence that overall farm yield will increase by adopting a nutrient budget that reallocates nutrients based upon regular reassessment of seasonal yield potential. For further information contact John Turner (Farmacist) Mb. 0437 581 921.