



Case Study

Reducing Inorganic Nitrogen (N) Inputs after a Legume Crop



LANDHOLDER	Andrew Deguara
LOCATION	Pinevale
CATCHMENT	Pioneer Main Channel
RAINFALL	Mean 1413mm, Median 1336mm
PROPERTY SIZE	336ha
ON-GROUND PROVIDER	Farmacist Pty Ltd Author: Laura Sluggett

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 Soybean planter modified to place 3 rows on a bed



Fig.2 Plant cane after soybeans



Great Barrier Reef Foundation



●●●● Goal

To reduce reliance on inorganic N fertiliser, improve soil health and mitigate nutrient run off by adopting legumes into the farming system.



Fig.3 Andrew with 2020-2021 soybean crop

●●●● Overview

Legume crops planted during the fallow can produce significant quantities of N. Healthy legume roots will produce nodules that form a symbiotic relationship with rhizobia. These good bacteria "fix" N, transferring it into a form that is easily taken-up by the plant.

When legume crops are terminated they break-down rapidly leaving behind concentrated N residues in the soil for use by the following plant cane crop.

Sugarcane industry soil health projects have demonstrated that N rates can be reduced in plant cane following a legume crop. They also provide a valuable alternative income stream.



Fig.4 Andrew's personal soybean harvester

●●●● Action

Andrew has adopted the practice of planting soybeans into his fallow. After growing these he confidently reduces the rate of N applied to his plant cane compared to his usual past practice of bare fallow management.

The rate of N application reduction is dependent on whether the legume is harvested as a cash crop or integrated into beds as a green manure. Harvested crops, whilst still providing other valuable soil health benefits, contribute less residue to the system, and therefore, less N.

Farmacist assists Andrew to conduct a simple nitrate strip test to determine the amount of plant available N after the soybean crop. An N fertiliser recommendation is then provided for his plant cane.

Andrew is now able to reduce his applied N by up to 100kg/ha to his plant cane.

●●●● Outcome

Reducing N after a legume crop has not impacted Andrew's cane and sugar yield outcomes.

The legume crop improves soil health resulting in a better balance of soil biology, fewer root pathogens, improved cane growth and good soil structure. These factors collectively create a strong foundation for reduced inorganic fertiliser use. Reducing inorganic N fertiliser rates lowers the risk of off-farm water quality impacts to local catchments.

A legume crop also provides options for an alternative income stream, whilst reducing input costs for the plant cane crop. Andrew alternates between growing green manure legume crops (different species) and bailing crops for his cattle enterprise or harvesting for grain (soybean). For further information contact Laura Slugget (Farmacist) Mb. 0429 474 698.

