



# Case Study

## Reducing Applied Inorganic Nitrogen (N) after a Legume Crop



|                           |                                         |
|---------------------------|-----------------------------------------|
| <b>LANDHOLDER</b>         | Gary Lay                                |
| <b>LOCATION</b>           | Homebush                                |
| <b>CATCHMENT</b>          | Sandy Creek                             |
| <b>RAINFALL</b>           | 1600mm                                  |
| <b>PROPERTY SIZE</b>      | 128ha                                   |
| <b>ON-GROUND PROVIDER</b> | Farmacist Pty Ltd<br>Author: Zoe Eagger |

**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 Nitrate test shows ~ 100 kg/ha increase in N after a soybean crop



Fig.2 Gary Lay's green manure Leichhardt soybean crop



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 Gary's soybean being harvested

●●●● 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 Gary Lay pictured with his mother Norma

●●●● Action

Gary Lay has adopted the practice of planting legumes into his fallow. After growing soybean crops he confidently reduces the rate of N applied to his plant cane compared to his usual past practice of bare fellow 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 Gary 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.

Gary 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 Gary'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.

Gary alternates between growing green manure legume crops (different species) and bailing crops for his cattle enterprise or harvesting for grain (soybean).

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