

# Gerry and Barb Deguara

Two year fallow with soy and chickpeas

REGION: Mackay Whitsundays | Eton

**Second generation Mackay cane farmers Gerry and Barb Deguara have long been leaders in the Mackay sugar industry. The family has led the way in innovative farming practices, offering others the opportunity to learn from their experiences.**

It all started in the early 1980's with major changes to their water infrastructure and the successful use of centre pivots for irrigation. More changes happened with the adoption of a two metre controlled traffic farming system with rotational legume fallow crops.

This meant many hours in the shed modifying farm equipment and harvesting gear over 10 years to get the desired results. The farm is now entirely converted to a 2m controlled traffic farming system with Gerry singing the praises of the wide rows which allow him to maximise the growing area of his paddocks.

In 2009 the controlled traffic system was improved through a major change to his harvesting operations, moving to reverse filling of haul-outs on GPS.

They have integrated other crops into their farming system; growing chickpea, soybean, peanut, mung bean and other legumes during their fallow season. This will be improved with the Project Catalyst two year fallow research project.

Gerry and Barb like to look locally for their farm nutrients with mill mud and a Bio-dunder (a by-product of molasses fermentation) mixed with urea providing most of the farms nutrients. "I believe that everything that can be recycled should be and the by-products of our Mackay harvest should be returned to our paddocks for nutrient," explained Gerry, who uses no dried fertiliser in his farming system.

The Deguara's have a history of working closely with industry bodies to investigate new technologies and farming practices. This helps them incorporate the changes on their own farm and gives them the opportunity to learn new ways of reducing their impact on natural resource condition.

### Issues being addressed

Prolonged farming of one crop leads to a decrease in soil nutrients and can create a build up of pathogens and pests related to the crop. Traditionally cane farmers will leave a block fallow for a year after four to five years of sugarcane production to break this trend. Recently growers, such as Gerry, have planted legumes in the fallow as a rotational crop.

Legumes are a green manure that fix nitrogen and improve soil structure. While legumes can be harvested they are often used only for their nitrogen contribution. Other benefits of a fallow crop are good soil cover to prevent sediment loss and improved weed control. Gerry and Barb are seeking to get all of these benefits with minimal cost penalty.

### Solution being tested

They are trialling a two year fallow system (Soybean – Chick Pea – Soybean Rotation) in their sugarcane operation. Currently the Deguara's break their sugarcane crop with a single soybean fallow crop. Fallow crops provide a range of benefits to cropping systems and a number of trials have indicated that extending the fallow period will provide additional agronomic benefits.

Extending the length of the fallow system is designed to improve soil health in treated areas and increase the yield of subsequent plant cane crops. In addition the Deguara's are also likely to observe benefits through reduced nitrogen fertiliser requirement of plant cane which will lead to improved water quality benefits, reduced risk and extra income generated from harvesting the three fallow crops.

### Trial outline

- Cane is harvested in August
- The soybean crop is planted in November/December and harvested in May and is the start of the two year fallow period.
- The chickpea crop is planted immediately after the soybeans are harvested in May.
- The chickpeas are then planted in May and harvested in October and the final soybean crop planted in November/December and harvested in May to complete the two year fallow.
- Cane is planted into the paddock

For more information regarding this trial contact:

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## Grower Case Studies

Jul/Oct	Nov/Dec	Mar	May	Jun	Oct	Nov/Dec	Mar	May	Jul
Harvest Cane	Plant Soy	Soybeans Growing	Harvest Soy Plant Chick	Chickpeas Growing	Harvest Chick	Plant Soy	Soybeans Growing	Harvest Soy	Plant cane

### Economic Analysis

Determining the implications of transitioning to the two year fallow system an investment analysis was undertaken. Gross margins (GM) for the "before" (single soybean fallow) and "after" (two year soybean-chickpea-soybean fallow) production systems were estimated. The GM were used to estimate the change in profitability or cash flow that results from the specified change in individual production system.

The marginal change in cash flow was substituted into a Net Present Value (NPV) analysis. The sum of the change over a 10 year period is discounted at 7% to convert the benefits of the management practices change into today's dollar terms.

### Key economic drivers of change

- Increased plant cane yield following extended fallow
- Reduced fertiliser required in plant cane due to nitrogen fixation by fallow crops
- Extra income generated from harvested fallow crops
- Reduced area under cane
- Reduced exposure to risk

### Key assumptions:

- No capital was required as Gerry is already equipped for the change
- Analysis assumes that change takes place across whole farm
- 19% increase in plant cane following the two year fallow
- Inputs, CCS and yield were assumed at a steady state to capture the change in costs affecting Gerry's production system

### Outcome and change

It is expected that changing to a soybean – chick Pea – soybean rotation system will increase the property gross margin by \$28/ha. The improvement in gross margin is driven primarily by an increase in plant cane yield following the extended fallow. This is coupled with a reduction in the rate of applied fertiliser during plant cane and extra income generated from the two year fallow crops. However, these effects are offset by the reduced area under cane on the farm that results from lengthening the crop cycle.

Benefits for the Deguara's of adopting this management practice change are unlikely to be known until the first plant cane crop is harvested in 2015. However, an investment analysis estimated that transitioning to the two year fallow system would return a positive Net Present Value of \$223/ha. The annual change in GM is discounted at 7% over a 10 years investment period. The positive NPV result demonstrates that the stream of future benefits from the management practice change is likely to be in excess of the cost incurred to undertake the investment. This result indicates that transitioning to a two year fallow system is likely to be a viable economic investment.

Year	0	1	2	3	4	5	6	7	8	9	10
Change in GM (\$/ha)	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00

Investment Analysis Indicator	
Change in GM (\$/ha)	\$28
NPV (\$/ha)	\$223

### Water quality outcomes

The reduction in nutrient application under the extended fallow system offers significant water quality benefits for the Sandy Creek region. Source data shows water quality has improved over the last four years. **Graph 1 (following page)** shows the decrease in Dissolved Inorganic Nitrogen (DIN) and Total Suspended Solids (TSS) that have occurred in the Sandy Creek catchment.





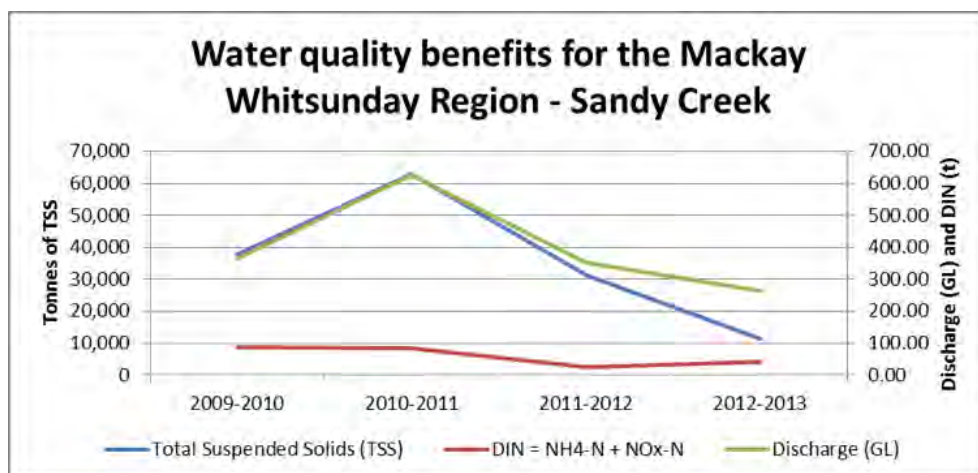
**Above:**  
Gerry Deguara and Natalie Fiocco (Farmacist) in a chickpea strip on Gerry's cane property in Eton.



**Above:**  
**Left:** A mill mud spreader on the trial site

**Right:** Gerry Deguara with son, Sam.

**Left GRAPH 1:**  
Water quality benefit trial results



# Project Catalyst: Good for Farmers, Good for the Reef

*“Because we are on the borders of the Great Barrier Reef, there has to be a co-existence between what the Reef is about and its living beings and what we do out here on the property.”*

— Joe Muscat, Farmer, Mackay Region, Queensland

WWF believes in sustainable agriculture. We believe it is both possible and profitable to feed, clothe and fuel a growing global population, without harming wildlife or sensitive ecosystems on which we all depend. That's why WWF supports Project Catalyst.

Sugar cane production generates significant benefits for Australia, but it also affects sensitive ecosystems, like the Great Barrier Reef. Farm run-off contains fertiliser, pesticides and soil, some of which ends up on the Reef. The impact on corals and seagrass, and the species that rely on them for food and shelter, is significant.<sup>1</sup>

Since 1985, total Reef coral cover has halved.<sup>2</sup> Over 40 per cent of this loss has been attributed to outbreaks of the coral-eating crown of thorns starfish, which are fuelled by nutrients in run-off from farms.

Many farmers are now acting to change this.

## A CATALYST FOR CHANGE

As part of Project Catalyst, leading cane farmers are working with WWF-Australia, the Coca-Cola Foundation, Natural Resource Management Groups, the Australian Government and others to develop practical, cost-effective solutions to improve water quality on the Reef.

Project Catalyst provides funding, extension support and a forum for growers to share their experiences, while trialling more sustainable and efficient practices.

Watch this video to see first-hand how Project Catalyst farmers are making a difference.

[www.wwf.org.au/connectedbywater](http://www.wwf.org.au/connectedbywater)

### References:

1. Brodie, J., Waterhouse, J., *et al*, Land use impacts on Great Barrier Reef water quality and ecosystem condition. Reef Water Quality Protection Plan Secretariat. 2013 Scientific Consensus Statement
2. De'ath, G., Fabricius, K. E., *et al*, 2012. The 27-year decline of coral cover on the Great Barrier Reef and its causes. Proceedings of the National Academy of Sciences.
3. <http://bonsucro.com/site/in-numbers>

## Project results

Project Catalyst has successfully trialled more precise methods for applying fertiliser, which can reduce nutrient pollution by up to 60%. Herbicide pollution on the trial farms has been reduced by as much as 95%, while satellite-controlled machinery has reduced pollution run-off from heavy clay soils by up to 20%.

*“As a farmer I feel we all should be doing our bit for this planet. I think if everybody does their bit it will make a difference. And we're looking after the land we want to make a living off.”*

— Tony Bugeja, Farmer, Mackay Region, Queensland

## WHAT NEXT?

WWF works with some of the world's biggest buyers of sugar to promote Bonsucro, the international standard for sustainable sugar production. Our aim is to help consumers choose products that don't cost the earth, while also helping farmers who produce more sustainably to differentiate their products in the market place.

Over the past five years, around 900,000 hectares of land worldwide has been certified to the Bonsucro standard, equivalent to 59 million tonnes of certified sustainable sugar cane and 2.7m3 of certified sustainable ethanol.<sup>3</sup>

WWF is committed to the future of Project Catalyst and supporting a sustainable sugar industry in Australia. Our aim is to see that the practices proven by Catalyst farmers are widely adopted throughout Australia, and are reflected in the Bonsucro global standard for sustainable sugar.

We also hope to replicate the outstanding success of Project Catalyst within the Australian beef industry. As with Project Catalyst, our new Project Pioneer brings together leading beef producers in Australia to share their knowledge and promote a more sustainable beef industry that operates in harmony with nature.

For more information about WWF's work on sugar, beef and other commodities, visit [www.wwf.org.au/markets](http://www.wwf.org.au/markets)