Project Catalyst

2015 PROJECT CATALYST GROWER FORUM

WITH THANKS TO OUR PROJECT PARTNERS AND SPONSORS:

The Coca-Cola Foundation
WWF
Australian Government
Catchment Solutions
terrain NATURAL RESOURCE MANAGEMENT
NQ DRY TROPICS
BAYER
syngenta
CASE IH AGRICULTURE
NETAFIM
wilmar
SUNCORP BANK Agribusiness
Inkerman Lime & Gypsum
FARMACIST
Queensland Government
REEF CATCHMENTS

Agenda

Catalyst Forum 'Leading Farmers Show the Way'

Townsville 1-3 March 2015

Day One - Sunday 1 March 2015	Time
Welcome Function and registration (Poolside) **Drinks and nibbles** | *Sponsored by Suncorp and Farmacist*	**18:30 - 20:00**
Welcome by NQ Dry Tropics; Scott Crawford	
Suncorp; Troy Constance	
Farmacist; John Markley	
How the community values reductions in agricultural run off to the Great Barrier Reef; Meg Star, QDAFF	
Relax and catch up *(Delegates to make own dinner arrangements)*	

Day Two - Monday 2 March 2015 (Ballroom 1)	Time
Introduction; Belinda Billing and Rob Eccles, Reef Catchments and Catchment Solutions	
Global Perspectives | *Sponsored by Case IH*	**8:30 - 10:00**
The Brazilian Sugar Industry Case; John Pearce, Case IH	
Same Game - Different Country; Robert Quirk and Bruno Rangel	
Local farmer - World Perspective; Joe Muscat, 2013 Nuffield Scholarship Winner	
Morning Tea (Ballroom Foyer)	**10:00-10:30**
National Perspectives | *Sponsored by Syngenta*	**10:30 - 12:00**
Introduction - Belinda Billing and Rob Eccles	
Syngenta and Project Catalyst; Darren Browne	
2014 Young Farmer of the Year Finalist; Chris Condon	
Next Gen Farmers; Gerard Puglisi and Phil Deguara	
Open floor for discussion and questions	
Lunch (Ballroom Foyer)	**12:00 - 13:00**
Local Farming Session | *Sponsored by Netafim*	**13:00 - 14:15**
Introduction; Belinda Billing and Rob Eccles	
Netafim and Project Catalyst; Jeremy Evans and Andrew Huth	
Virtual field tour Burdekin region: Anthony Curro, NQDT	
Burdekin Grower open panel	
Break	**5 minutes**

Agenda (continued)

Catalyst Forum 'Leading Farmers Show the Way'

Townsville 1-3 March 2015

Day Two (continued) - Monday 2 March 2015 (Ballroom 1)	Time
Virtual Field Tour Wet Tropics - Michael Waring, Terrain | *Sponsored by Netafim*	**14:20 - 15:20**
Wet Tropics Grower open panel	
Afternoon Tea (Ballroom Foyer)	**15:20 - 15:50**
Virtual Field Tour Mackay Whitsunday - Rob Eccles, Catchment Solutions | *Sponsored by Netafim*	**15:50 - 16:50**
Mackay Whitsunday Grower open panel session	
Wrap-up; Belinda Billing	**16:50 - 17:00**
End	**17:00**
Forum Dinner (outside pavilion) | *Sponsored by Bayer*	
- Pre-dinner drinks	**18:00 - 18:45**
- Seated for Dinner	**18:45**
Bayer CropScience and Project Catalyst; Richard Dickmann	
Keynote speaker – Robert Watkins; Natural Evolution Foods	
Catalyst Farmer Awards Presentation	
Formality End	**22:15**

Day Three - Tuesday 3 March 2015	Time
Friends of Catalyst Forum Breakfast (Ballroom 1) | *Sponsored by Wilmar*	**08:00 - 10:45**
Introduction	
Breakfast	
Speakers	
Forum End	
Tea & Coffee (Ballroom 1 Foyer)	10:45-11:00
Telling our Story - *Registered guests only* (Ballroom 1) | *Sponsored by Inkerman Lime & Gypsum*	**11:00 - 13:00**
Inkerman Gypsum and Lime - Joe Tama	
Telling our story media workshop - Kim Kleidon, ABC Rural	
Lunch - Aqua Restaurant *(Pls wear your name badge as ID for Lunch)*	**13:00 - 14:00**
Ends	**14:00**

With thanks to partners, supporters and sponsors of the Project Catalyst Forum 2015:
The Coca Cola Foundation, WWF-Australia, Bayer CropScience, Syngenta, Case IH, Netafim, Wilmar, Suncorp, Inkerman Lime & Gypsum, Farmacist, Catchment Solutions, Reef Catchments, NQ Dry Tropics and Terrain NRM with support from the Australian and Queensland Governments.

Welcome

Project Catalyst Grower Forum 2015

Rob Cocco CEO Reef Catchments | Catchment Solutions (Project Catalyst co-ordinating group)

"A warm welcome to the growers, partners, sponsors and supporters of the Project Catalyst Growers Forum 2015 in Townsville."

The forum continues to provide a vital opportunity for those involved in Project Catalyst to come together to network, share learnings and discuss both outcomes and ideas for innovation into the future.

This year's forum showcases serious action being taken by our sugar growers across the state. Undoubtedly, Project Catalyst continues to be a leading program stimulating and pioneering on-farm practice change in the Australian sugar sector.

Results from trials are proof that farmers involved in Project Catalyst are making a real difference when it comes to reducing the impact of agriculture on water quality, the environment and the Great Barrier Reef.

Now in its sixth year, the commitment and forward-thinking approach of growers is yielding significant outcomes.

To date, Project Catalyst farmers have improved runoff and drainage water quality of an estimated 102,000 megalitres - the same amount it would take to fill around 40,000 Olympic sized swimming pools.

Trials have focused on improved soil, nutrient, pesticide, irrigation and storm water management across 20,345 ha of land.

And perhaps most critically, work done by our Catalyst growers over the 2013/14 cane season was estimated to cut pollutant loads to the reef by about 183 tonnes each year. This includes notable reductions in particulate phosphorus, dissolved inorganic nitrogen, filterable reactive phosphorus and pesticides.

I would like to take this opportunity to congratulate all growers involved for their commitment to a brighter future for the sugar industry that takes a more sustainable approach to the natural resources the sector relies on.

I would also like to recognise and thank major project partners and sponsors, including The Coca-Cola Foundation, WWF, Catchment Solutions, our regional NRM Groups, and Bayer and Syngenta for your ongoing support to such a valuable initiative. This month, the Coco-Cola Foundation announced a further $500,000 grant to Project Catalyst Australia, which brings its total investment into the Project to $3.25 million over the past six years.

At its heart, Project Catalyst is concerned with grower-led innovation and supporting our farmers to look forward. This unique partnership continues to connect sugar producers with leading organisations nationally and around the world.

We hope you enjoy the forum and look forwarding to working together to drive new leads for long-term and more sustainable sugar production moving forward.

Rob Cocco

CEO, Reef Catchments

Welcome

Project Catalyst Grower Forum 2015

Dr Scott Crawford CEO NQ Dry Tropics (2015 Forum Host region)

"I am pleased to welcome you all to the 2015 Project Catalyst Forum, now celebrating its sixth year. "

NQ Dry Tropics is proud to be hosting this year's forum, which brings together project partners, collaborators and, of course, the many sugar growers who are rising to the challenge of implementing sustainable practices to protect our beautiful natural environment.

Past forums have celebrated Project Catalyst and the achievements of the farmers involved, strengthened networks between growers, and fostered innovative thinking – and this year promises to be no different. Over the next three days there will be a strong focus on innovative practices both in Australia and around the world, and I am sure that the excellent speakers we have lined up will inspire as well as inform.

We have seen some outstanding results over the past year in the Burdekin Dry Tropics Region. Burdekin Catalyst growers implemented new trials aimed at minimising nitrogen losses by matching nitrogen use to crop requirements, and improving irrigation efficiency to significantly reduce run-off leaving farms.

In October 2014 we were also pleased to welcome 40 growers and 36 support staff to the two-day Burdekin Catalyst Field Tour, which showcased five current and past Catalyst trials.

I hope you enjoy hearing about these and many other innovative Project Catalyst initiatives over the next few days.

Scott Crawford

CEO, NQ Dry Tropics

Welcome to Project Catalyst 2015 Growers Forum - Leading farmers show the way.

NQ DRY TROPICS

Delivering Project Catalyst in the Burdekin since 2010

NQ Dry Tropics works closely with land managers in the Burdekin Dry Tropics NRM region to encourage best management practices for water quality, production and environmental outcomes. As the leading natural resource management body for the region, NQ Dry Tropics believes that innovation is crucial to the future of the agriculture sector.

With a thriving cane industry and more than 650 canegrowers in the region, NQ Dry Tropics sees innovation as key to enabling large-scale, high-impact, positive change.

NQ Dry Tropics' Sustainable Agriculture projects have contributed to a significant shift in management practices across the region's agriculture sector. NQ Dry Tropics, its partners and industry have significantly reduced the impacts of agriculture on the Great Barrier Reef by focusing on minimising nutrient, sediment and pesticide losses off-farm.

To continue these achievements, the NQ Dry Tropics Sugarcane Innovations Program identifies and investigates potential practices which could contribute to these outcomes while also addressing economic and environmental challenges faced by farmers.

NQ Dry Tropics has been delivering Project Catalyst in the Burdekin since 2010, providing a valuable opportunity to promote better farming practices that deliver positive environmental, water quality and production outcomes. These outcomes would not be possible without the commitment of Burdekin farmers and the support of project partners Farmacist and the Department of Agriculture, Fisheries and Forestry.

There are many forward-thinking farmers in the Burdekin Dry Tropics region who actively trial innovative practices. Project Catalyst offers these innovators the opportunity to work with technical experts, collaborate with like-minded farmers, share ideas and experiences and, most importantly, effect change.

Project Catalyst is so powerful because it fosters local collaboration, while offering pioneering farmers from other regions the opportunity to share their ideas and experiences with innovation on their farm.

The Burdekin is the largest sugar-producing region in Australia, with annual production of around 1.3 million tonnes of raw sugar, and about one-quarter of Australia's total annual cane supply.

Being involved with Project Catalyst enhances NQ Dry Tropics' capacity to provide technical advice and guidance to landholders. It also allows trials to be measured and replicated in order to spread innovation beyond individual farms. This benefits the entire industry.

Overall, Project Catalyst has the potential to drive industry-scale changes through tried and tested practices. This is critical to the health of the Great Barrier Reef and the cane industry as a whole.

Catalyst Farmer Joe Tama showcases his low cost drip irrigation trial to 40 growers and 36 support staff at the NQ Dry Tropics Burdekin Project Catalyst Field Tour in October 2014.

REEF CATCHMENTS

SUPPORTING GROWER-LED INNOVATION IN MACKAY WHITSUNDAY ISAAC FOR MORE THAN TEN YEARS.

Evolving from the Mackay Whitsunday NRM Group, Reef Catchments has been working with sugarcane producers in the Mackay Whitsunday Isaac (MWI) region to improve the quality of water leaving sugar cane crops for over a decade.

PHOTO: DEPARTMENT OF ENVIRONMENT

In 2015, working alongside Catchment Solutions, Reef Catchments remains strongly connected to the Project Catalyst program, extending and amplifying the good work being done by Catalyst growers through a wide range of sustainable agriculture programs.

In MWI, Reef Catchments administers the Australian Government Reef Programme Water Quality Improvement Grants program that underpins Project Catalyst through the provision of funds for farm planning and equipment grants.

Currently Reef Catchments works with more than 140 farmers in total through Project Catalyst and aligned agricultural programs, including the Australian Government Game Changer program.

PROJECT CATALYST

Project Catalyst works with a network of forward-thinking cane farmers to progress the use of A-class or aspirational management practices for a more sustainable, productive farming future.

Project Catalyst sugarcane grower innovation trials in Mackay and the Whitsundays are managed by independent agronomists from Farmacist, with economic analysis undertaken by Queensland Department of Agriculture Forestry and Fisheries.

The trials focus on the interests of growers and are run over a number of years with data updated and shared annually. Each trial investigates a practice that has the potential for sustainability and water quality benefits along with economic and productivity improvements.

Not all trials will be successful, however learnings are documented and shared, as understanding what does not work can be just as important to growers and industry as knowing what does.

Trials being implemented by Project Catalyst for 2014 include:

- Development of herbicide strategies based on the spatial location of different weed pressures
- Variable rate application of balance for different soil types with support from Vanderfield
- Identifying the benefits of extended fallow in farming operations
- Evaluation of controlled release urea
- Variable rate nutrient applications based on yield zones
- Evaluate Variable rate overhead low-pressure irrigation based upon distribution of soil properties

AUSTRALIAN GOVERNMENT GAME CHANGER PROGRAM

Fast Tracking the Adoption of Game Changing Sugarcane Nutrient and Pesticide Management (Game Changer) is an Australian Government Reef Programme project designed to push advanced management practices for nutrient and chemicals forward; ushering in change to deliver environmental and economic benefits to the Great Barrier Reef regions.

The project is being rolled out across four regions, with 70 on-farm demonstration trials currently being implemented on farms in the Wet Tropics, Dry Tropics and Mackay Whitsunday.

Game Changer is administered by Reef Catchments who work closely with Terrain NRM in the Wet Tropics and NQ Dry Tropics in the Dry Tropics.

A group of experts from across the sugar industry review the program's demonstration trials and have input in the communications and engagement strategies implemented to ensure quality and provide a link into key organisations such as Sugar Research Australia, CSIRO, QDAFF and a cross-section of sugarcane productivity boards from across the Great Barrier Reef.

In the first 12 months of the program farmers have been identified to work closely with agronomists for whole-of-farm planning support and to run on-farm demonstration trials showcasing practices that have the potential to dramatically cut farm runoff of nutrients (particularly nitrogen) and residual herbicides.

There is a focus on managing farms at a finer scale and identifying and matching crop needs to inputs.

For more information on how you can be involved in a wide range of sustainable agriculture initiatives, or to inquire about current funding available to growers, contact Reef Catchments:

Scott Underdown
M: 0437 344 851 | E: scott.underdown@reefcatchments.com
Chris Dench
M: 0407 538 724 E: chris.dench@reefcatchments.com

Joe and Christine Muscat

Use of Controlled Release Urea in Sugarcane Production

REGION: Mackay Whitsundays | Oakenden

Joe and Christine Muscat have a long history of bringing innovation to the Mackay Whitsunday region. The couple grow sugarcane with rotational fibre crops on 130 Ha in the Oakenden area within the Sandy Creek catchment, South-West of Mackay.

The Muscat's farm was fully converted to 1.8m rows with controlled traffic in 2008. They get the most out of the controlled traffic system by using RTK GPS guidance.

Upgrades to the Muscat's farm, such as a change to zonal tillage and EC mapping for soil and nutrient management, have been funded through the Australian Government's Reef Rescue/Reef Programme Water Quality Improvement Grants.

Through Project Catalyst Joe receives agronomic advice for on farm management which he says in invaluable. His farms have been EC mapped and soil tests are taken to guide his nutrient management. Nutrients are typically applied with Liquid One Shot and rates are varied by paddock. All fertilisers are applied under the stool using a variable rate stool splitter.

Herbicide management on the property is done early in the season with a mix of old and new pre-emergent sprays such as Flame and Velpar. "The majority of my weed control comes through double cropping with the rotational crops. The weeds are never out of control as they would be if I had a true fallow which means I use a lot less chemicals over all," explained Joe.

Joe has been experimenting with rotational crops for more than fifteen years and in this time has brought new crops to the region and founded markets for legume, fibre, seed and oil crops. Some of the rotational crops that Joe grows include maize, peanuts, soy, kenaf, sun hemp (a legume) and industrial hemp (which was grown for grain with the oil used in cosmetics).

Issues being addressed

The Muscats' farm has a significant proportion of sandy soils, which, along with the tropical wet season rainfall means there is a significant risk of nutrient loss from the cane system. These losses contribute to poor water quality and reduced productivty through dissolved inorganic nitrogen (DIN) losses and poor nitrogen use efficiency.

Solution being tested

Controlled Release Urea offers the opportunity to better match nutrient supply to the plant growth needs resulting in improved nitrogen use efficiency and better water quality leaving Joe and Christine's farm. In this trial Joe will try a combination of 25% CR-Urea and 75% urea blend.

Understanding the economic implications of a practice change is a vital step in the Project Catalyst trial process. If a practice has good economic outcomes it is worth investigating further and promoting to the wider community. If the economics do not stack up the team needs to go back to drawing board.

In order to evaluate the economic implications of CR-Urea on Joe's farm an analysis estimating the profitability of the trial termed a Net Present Value (NPV) was completed. A gross margin (GM) was calculated before and after the trial to capture the changes in this production system. A NPV evaluates the future benefits in today's dollar terms, this allows the capital costs incurred at the beginning of an investment period to be compared to the stream of benefits accrued across the investment period, and bought back into todays dollars terms.

Key economic drivers for change

- Increased nitrogen use efficiency
- Improved water quality
- Potential yield increases

Key assumptions

- Existing capital was able to be utilised
- Analysis assumes that change takes place across the whole farm
- 25% CR Urea and 75% Urea blend was used
- Inputs, CCS and yield were assumed to be the same over the 10 year

Results to date

It is expected that the change in farming practices will result in a negative change in gross margin and net present value. The results indicate that employing the proposed Agrocote/ Urea blend on ratooning blocks is unlikely to be an economically viable investment. This result is driven primarily by the higher price of the CR-Urea product, which ranges in terms of relative costs from between 1.75 to 10 times the cost of granular urea.

Left:
Joe Muscat on his property in Oakenden. Joe has been experimenting with rotational crops for more than fifteen years and in this time has brought new crops to the region and founded markets for legume, fibre, seed and oil crops.

Left:
Joe in his crop.

Below:
In 2013, Joe received the Nuffield Scholarship supported by the Sugar Research and Development Corporation to support his research into best practice in production, manufacturing and marketing of fibre crops. The scholarship allowed Joe to take a six week tour of six countries to see numerous examples of how fibre crops are transformed into new products through secondary manufacturing.

Year	0	1	2	3	4	5	6	7	8	9	10
Change in GM ($/ha)	0	-76	-76	-76	-76	-76	-76	-76	-76	-76	-76

Water quality benefits

It is estimated that the Mackay Whitsunday community value a one per cent reduction in Dissolved Inorganic Nitrogen (DIN) at $1,038,995. The CR-Urea application has the potential for water quality benefits for the Sandy Creek catchment, although this is not directly quantified as yet. The table below shows the variance in DIN that has occurred in the past four years in the whole Sandy Creek catchment due to a mix of wet and drier years. It will take a whole crop rotation to have observed monitored load change in DIN.

DIN monitored discharge from the Sandy Creek Catchment

Time Period (Yr)	2009-2010	2010-2011	2011-2012	2012-2013
DIN (T)	85.9	85.0	23.7	41.6
Discharge GL	364.6	627.0	351.6	264.9

Conclusion

The Muscat's trial highlights the negative economic consequences of CR-Urea given the high price of the product. The trial is still in the early stages and the potential benefits of the product are not fully understood nor are the water quality outcomes. The trial will continue to be monitored to improve the assumptions used in this analysis. All values used in this analysis are specific to the Muscat's and if you are seeking to adopt this practice seek individual economic advice.

Thanks to QDAFF and Farmacist for support with this case study.

Contacts

Rob Eccles, Catchment Solutions
M: 0439 308 179
E: reccles@catchmentsolutions.com.au

Andrew Law QLD Department of Agriculture, Fisheries and Forestry
Ph: (07) 4923 6210
E: andrew.law@daff.qld.gov.au

Megan Star QLD Department of Agriculture, Fisheries and Forestry
Ph: (07) 4923 6225
E: megan.star@daff.qld.gov.au

PHOTO: Denis Pozzebon standing in a new herbicide trial in 3rd ratoons, 8 weeks after spraying.

Bayer CropScience is proud to partner with the Project Catalyst Group, working with some of the most progressive growers in the Australian sugarcane industry. Together, Bayer CropScience and Project Catalyst growers are highlighting changes in the management practices of weeds, diseases and insects in the sugarcane industry.

BAYER

"Working towards similar goals with growers and like-minded people involved with Project Catalyst is extremely rewarding." - **Tim Murphy, Territory Sales Manager Bayer CropScience**

"Together, we're identifying solutions for more effective farming through innovative application techniques and trials," said Tim.

Throughout the partnership, Bayer has assisted Project Catalyst growers, analysing how they can use pesticides across a more strategic program. This includes looking for a more practical way of controlling weeds with highly effective herbicides, and setting up necessary equipment for the management of cane grubs.

Part of Bayer's continued commitment to providing the latest information to Project Catalyst growers, Sue Cross, Head of Development for Bayer CropScience Australia will present to the group on some of the changes and challenges that the AgChem industry is facing. Sue has been involved in product development in the crop protection industry for over 25 years, both in Australia and internationally and brings a perspective on a number of issues of local and global relevance, particularly in the area of company investment, research and development and regulatory topics.

As global trends change and technology becomes increasingly accessible, growers continue to look for the next advancement in pesticide use. In conjunction with the Project Catalyst team, Bayer CropScience is working closely with a number of growers to establish trial sites that assess the use of Balance® as a Variable Rate application.

The application and control gained from Balance is dependent on soil type. It is hoped that this research will demonstrate that as soil types change, the application rate of Balance can also be adjusted. This will result in a more efficient use of herbicides as growers will have the ability to alter the Balance rates for different blocks based on soil type. Tailoring the application rate of Balance to the soil will also reduce the possibility of underdosing in heavy soils, and overdosing in light or low CEC soils where transient bleaching is sometimes seen.

A number of factors now make Variable Rate Balance possible in the sugarcane industry. The use of EM mapping, which identifies changing soil types within blocks, will help determine an appropriate rate of Balance through soil testing. Application equipment is also readily available, enabling spray rates to accurately change whilst moving across the block.

In addition to this, Bayer CropScience gained registration of a rate range for Balance of 100 to 200 g/ha.

Whilst trials are still in their infancy, results to date indicate that the level of weed control across a block where Balance has been applied as a variable rate according to soil type is equal to, if not better than, a block with the standard Balance rate. In this trial, the Balance rate per block is reduced in all blocks treated to date. This not only provides savings to the grower but also has the potential to reduce the environmental impact where appropriate run-off mitigation measures have not been carried out. Further results will become available as trials continue.

Part of Bayer CropScience's broader commitment to Project Catalyst growers is to ensure they have access to the latest innovation and new technology. In December 2014, a trial for a new sugarcane knockdown herbicide was applied in one of Denis Pozzebon's ratoon blocks. This was the first large area where a grower applied trial was established in the Australian sugarcane industry.

This new, knockdown herbicide is being compared to the traditional paraquat and 2,4-D knockdown mixes this season. Preliminary results indicate the new herbicide offers effective control of existing vines and broadleaf weeds, as well as picking up any grasses in the block.

The herbicide also offers an outstanding rotation partner to glyphosate in a shielded sprayer system, removing the potential for broadleaf weeds and vines to become the dominate weed in any system.

Please take the time to come and talk to any of the Bayer people at this year's forum ■

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:

Rob Eccles, Catchment Solutions
M: 0439 308 179
E: reccles@catchmentsolutions.com.au

Megan Star QDAFF
Ph: (07) 4923 6225
E: megan.star@daff.qld.gov.au

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.

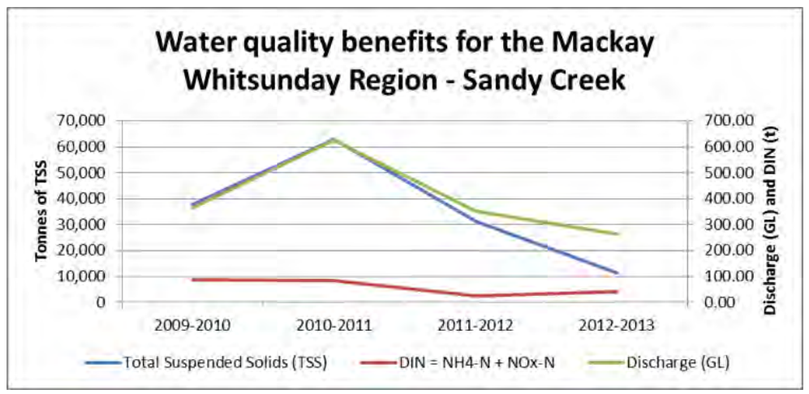
Year	0	1	2	3	4	5	6	7	8	9	10
Change in GM ($/ha)	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00

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

UNDER WATER CORAL, GREAT BARRIER REEF © TROY MAYNE

"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.[1]

Since 1985, total Reef coral cover has halved.[2] 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

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.[3]

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.

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

For more information about WWF's work on sugar, beef and other commodities, visit wwf.org.au/markets

WWF

Rob Sluggett

Adoption of precision agriculture

REGION: Mackay Whitsundays | Koumala

Robert, with an agricultural degree, worked as an extension officer for 15 years with BSES (now SRA) and became interested in controlled traffic farming systems. He worked closely with local growers to develop machinery and refine techniques. In 2001, Rob and his wife Maree managed a sugarcane farm near Koumala and in 2006 purchased their own small farm. Rob still works off farm and plays a lead role in Farmacist independent agronomy service.

Rob's new farm was ex-cane land that was abandoned during the sugar industry downturn in the early 2000's. Rob established the new crop on a best practices footing. All fields were soil mapped and targeted soil sampling undertaken. A farm nutrition plan was developed and a new crop was established on controlled traffic with GPS marking out service.

Rob believes the adoption of improved farming practices has been an important contributor to the farms achievement of highest tonnes sugar per hectare productivity award for 2008 for Koumala and Bollingbroke districts of the Plane Creek Mill area.

The farm straddles Cherry Tree Creek, which runs into Rocky Dam Creek, a very important coastal catchment. Parts of the creek through the Slugget's property retains remnant vegetation while other parts are degraded. Hundreds of trees have been planted to improve habitat linkages, stabilise creek banks and enhance the aesthetics of the creek

Issues being addressed

A major focus in improving sugarcane management in recent years has aimed at reducing the level of pesticides and herbicides entering local waterways and the Great Barrier Reef. The adoption of precision agriculture techniques: specifically Variable Rate Application (VRA) is seen by many as a viable mechanism through which pesticides can be reduced. Rob's past trials with Catalyst include variable rate application of pesticide for control of cane grubs.

This trial looks at mapping areas where herbicides are required and only applying in those locations.

Solution being tested

Variable rate strategies utilising canopy sensors

This trial works to determine spatial variability at an intra-block level on his property using biomass sensor technologies. The trial itself is a multi-stage process that includes the recording of spatial distributions of weeds and cane yields via crop biomass sensors. The spatial data will then be validated by ground-truth mapping and the formulation of VRA of herbicide and nutrients. Precision agriculture techniques to analyse intra-block variability of weed pressures and biomass crop values will be mapped, with the aim of identifying and matching nutrition and herbicide rates to the mapped areas.

Rob is interested in better understanding the economic costs and benefits of undertaking the management practice change, as well as understanding how the management change will affect his farms exposure to risk. By transitioning to a variable rate system Rob hopes to make significant cost savings by reducing the total amount of nitrogen used on his property, as well as improving water quality.

Economic analysis

The economic implications of implementing a VRA system can be captured by undertaking partial budget and investment analyses. The gross margins were calculated for both the "before" (conventional SES herbicide and nutrient application regimes) and "after" (VRA systems) production systems. The gross margins were then used to estimate the change in annual profitability generated under the VRA system. This change in annual profitability is then incorporated into an investment analysis by calculating the net present value (NPV) of the management practice change. The project's NPV is calculated by comparing the capital costs incurred as part of the management practice change to the discounted (annually at a rate of 7%) stream of future benefits estimated to be yielded. This provides an indicator as to the viability of the investment as it compares the costs and benefits of the management practice change over the expect lifetime of the investment.

Key economic drivers of change for this trial:

- Reduce total herbicide applied
- Reduce total nitrogen applied
- Reduced risk of restricting CCS
- Optimise a growers return on investment in nitrogen inputs
- Improve the quality of water leaving farms by not exceeding a crop's capacity to utilise nitrogen inputs Use technology to improve accuracy and manage farm practices at the intra block scale

Economic analysis (continued)

Key assumptions:

- Capital cost for the biomass sensors $29,500 (6 biomass sensors)
- VRA does not result in reduced total rate of applied herbicide or nutrient.
- There is no yield bump due to the management change.
- Analysis is conducted on plant cane and fallow.
- IInputs, CCS and yield were assumed at a steady state to capture the change in costs affecting Rob's production system

Right:
Rob Sluggett on the Project Catalyst trial site in Koumala. This trial works to determine spatial variability at an intra-block level on his property using biomass sensor technologies. The trial itself is a multi-stage process that includes the recording of spatial distributions of weeds and cane yields via crop biomass sensors.

Outcome and change

Due to the change in management practices, the change in gross margin (GM) from the before to the after scenario results in a decrease of $3/ha (Table 1). The annual change in GM is discounted at 7% over a 10 year investment period, the negative change results in a Net Present Value (NPV) estimation of -$835/ha. This result reflects the relatively large capital costs incurred from purchasing the crop biomass sensor has a negative effect on the viability of this trial.

This economic analysis indicates that based on Rob's machinery, implements and production system, utilising crop biomass sensors to implement VRA nutrient and herbicide systems is unlikely to be viable economic investment. However, this analysis includes a number of case specific assumptions that are likely to affect the result, including the number of crop sensors utilised in the management practice change. In addition without an observable yield increase or reduction in the total product utilised on the farm (as mentioned in the assumptions) the high capital costs are likely to outstrip any potential benefits. If a positive yield and a reduction of inputs occurred, than a more favourable GM and NPV are likely to be seen.

Table 1: Investment analysis results

Change in gross margin ($/ha)	-3
Net Present Value ($/ha)	-835

Water quality improvements

The proposed reduction in nutrient and pesticide loads by using variable rate application offers significant water quality benefits for the Plane Creek catchment and the Mackay Whitsunday region. Limited source data for the sub-catchments surrounding Koumala hinders more precise reporting of the actual water quantity benefits of this exact region. Additionally, pesticide loads have reduced in the Mackay Whitsunday region by 42% from when monitoring began in 2009.

Thanks to QDAFF and Farmacist for support with this case study.

Contacts

Rob Eccles, Catchment Solutions
M: 0439 308 179
E: reccles@catchmentsolutions.com.au

Andrew Law QLD Department of Agriculture, Fisheries and Forestry
Ph: (07) 4923 6210
E: andrew.law@daff.qld.gov.au

Megan Star QLD Department of Agriculture, Fisheries and Forestry
Ph: (07) 4923 6225
E: megan.star@daff.qld.gov.au

John and Phil Deguara

Assessment of appropriate nitrogen rates for a paddock with two distinct management zones

REGION: Mackay Whitsundays | North Eton

Action on the Ground - Carbon Farming Futures

John and Phil Deguara farm sugarcane at North Eton. On their farm they have a number of paddocks badly impacted by sodic soils. This results in varied yields within some individual blocks; with high yielding zones of above 85 tonnes per ha and low yielding zones of below 60 tonnes per ha.

Traditional nutrient management practice is to apply the same rate of nitrogen across the entire block. Clearly the low yielding zones will not be able to utilise the nitrogen at the same rate as the high yielding zones, resulting in a nutrient surplus unable to be used by the crop, which leads to a potential water quality risk and a poor economic outcome.

Trial overview

With funding from the Federal Government's Action on the Ground Carbon Farming Futures program John and Phil have worked with Reef Catchments and agronomists from Farmacist to trial a variable rate nitrogen application program on one of their sodic blocks.

The trial seeks to learn whether applying high or low rates of nitrogen to sodic/low yielding soils will impact yield and conversely whether applying high or low nitrogen rates to high yielding zones will impact on yield.

This is tested through strip trials set out on a block that has been EM Mapped, with soil tests completed for each delineated zone. Replicated strips of high, low and medium nitrogen rates have been set out across the yield zones as well as strips with variable rate nitrogen application targeting the specific zones.

Table 1:
John and Phil Deguara site Treatments and descriptions

Treatments	Descriptions
T1	N rate of 90kg/ha
T2	N rate of 160kg/ha
T3	N rate of 230kg/ha
T4	Variable rate - N at rates of 90kg/ha in low yield potential zone and 150 kg/ha in the high yield potential zone

Trial outcomes to date

This trial has run for two years with results indicating the potential to reduce nitrogen rates through a variable rate program where yield potential is impacted through sodic conditions without compromising yield.

Soil test results from locations in the high and low potential yield zones validated that the high sodium levels (ESP) are the primary driver for the low yield potential of the western section of the trial block.

High ESP levels also coincide with lower soil organic carbon levels on the western side of the block.(Figure 2)

Yield results for each treatment in the low yielding zone showed no significant difference in cane productivity across the four nitrogen treatments, indicating that applying higher rates will not improve crop growth in these zones. (Figure 3)

In the high yielding zone the 90 kg N treatment yielded approximately 12 ton/ha of cane lower than the average yields of the other N rate treatments (8 tonne in 2013). (Figure 3) This indicates that on known high yielding zones a higher rate of nitrogen can be used by the crop to produce a higher yield.

- The results indicate the potential to reduce N rates in a variable rate program where yield potential is impacted through sodic conditions.

Maintaining yield with reduced N rates in sodic zones of paddocks significantly improves nitrogen use efficiency (Figure 4).

Selecting a reduced nitrogen rate that will maintain the realistic yield potential of sodic zones within paddocks significantly improves nitrogen use efficiency and has the potential to reduce nitrogen loads in runoff and N20 emissions.

Reef Catchments is supporting further applied research to refine nitrogen rates based on the long term yield potential of soil profile groups with specific physical properties with defined soil chemical restraints i.e. sodic soils.

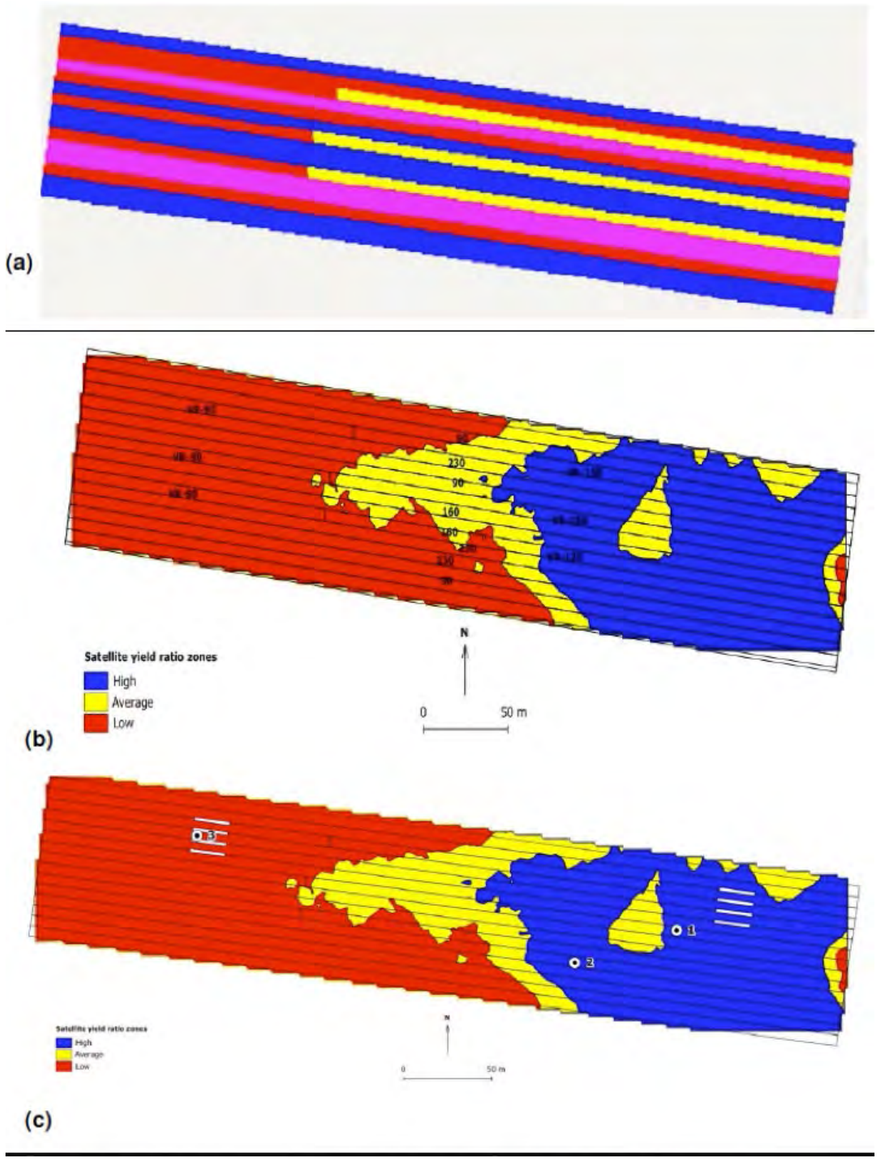


Figure 1: John and Phil Deguara site (a) Variable rate program for application of nitrogen treatments (kg N/ha):

Red=90, blue= 160, pink= 230 and the variable rate treatment- red= 90, yellow= 150, and (b) Replicated nitrogen

treatments over a satellite yield map showing relative yield zones and (c) location of soil samples in relation to yield potential zones.

Below: Phil Deguara (below) and John Deguara have also built on standard industry farming techniques to trial deep sub-surface application of mill ash, mill mud and bagasse to improve the physical and chemical structure of their soil.

Table 2: John and Phil Deguara site cane and sugar yield comparisons between nitrogen treatments and yield zone.

Yield zone	N rate (kg/ha)	Cane yield (tns/ha)	Sugar yield (tns/ha)
Low	90	59.2	9.2
	VR 90	58.2	8.3
	160	58.9	7.9
	230	60.0	8.2
Average		***59.1***	***8.4***
High	90	73.2	11.8
	VR 150	82.6	13.9
	160	76.1	13.0
	230	85	13.8
Average		***79.2***	***13.1***

Below: John and Phil Deguara are trialling a variable rate nitrogen application program on one of their sodic blocks.

Grower Case Studies

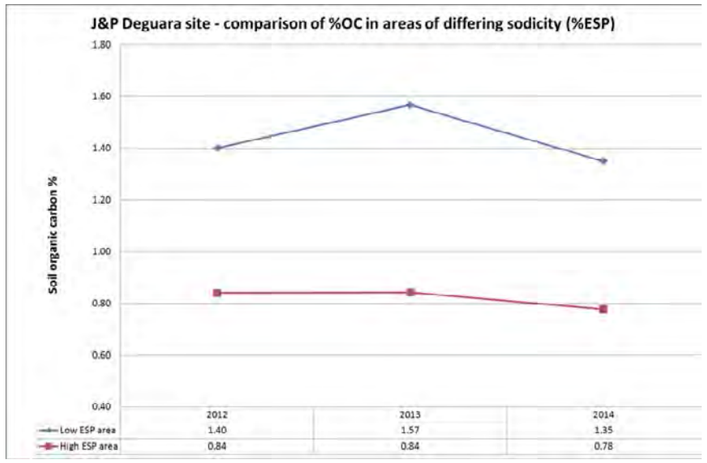


Figure 2: John and Phil Deguara site – difference in soil %OC in locations of differing levels of soil sodicity (%ESP).

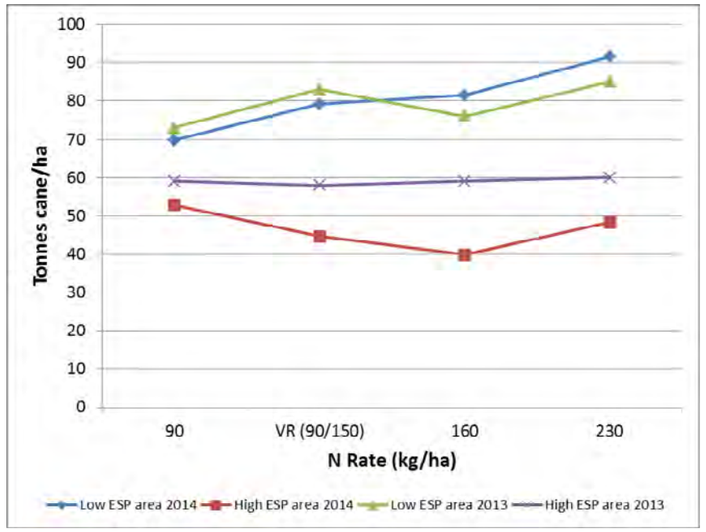


Figure 3: Cane yields across 4 treatments achieved in locations with high ESP (low yielding zone) and low ESP (higher yielding zone).

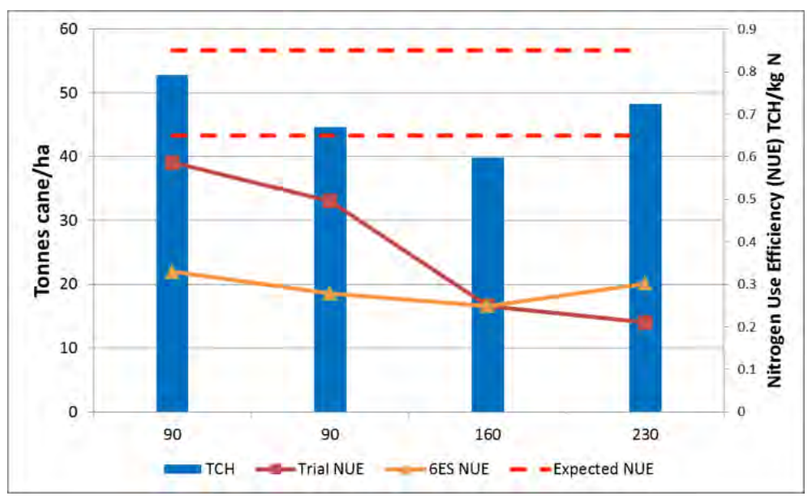


Figure 4: John and Phil Deguara site Reduced nitrogen rates in low yielding zones has not impacted on yield and has significantly improved N use efficiency.

This trial is supported by Reef Catchments Sustainable Agriculture Program, through funding from the Australian Government's Action on the Ground Carbon Farming Futures.

Scott and Maria Simpson

Skip row cane planting

REGION: Mackay Whitsundays | Bloomsbury

Scott and Maria Simpson live on a farm near Bloomsbury, around 90km north-west of Mackay. It is bordered by the beautiful O'Connell River, which is home to big Barramundi and the rare Jungle Perch, and flows into Repulse Bay and the Whitsundays. Scott helps to manage around 620 hectares of cane which is a mix of self-owned, family and partnership farms.

The partnership is called O'Connell Catchment Precision Services (OCPS) and was formed in the early 2000's bringing together the equipment and services of the Jeppesen, Considine and Simpson farming entities (all involved in Project Catalyst). The partnership helps overcome the economic challenges and deficiencies of adopting new management practices individually.

OCPS settled on a dual row 1.9 metre controlled traffic farming system using 2cm RTK GPS guidance. Scott's cane is grown in mounded beds following a legume fallow. "The legumes are sprayed out and we go through with a bed renovator and sometimes we use a trowel implement to smooth the beds to make sure the soil is all the same height for uniform set depth," explained Scott. Scott also lightly cultivates his wheel tracks as, while the controlled traffic system leaves his cane bed in great shape with excellent infiltration, the compacted wheel tracks can channel water off the blocks.

Nutrient management is done with Project Catalyst precision planning support. "A prescription nutrient blend is made for our property based on soil tests and EM mapping, the rates are changed by paddock," said Scott, who is trialling variable rate within paddock with his lime application, but feels it is still very complicated.

Scott and OCPS have utilised Reef Rescue (now Reef Programme) to help complete the transition to their GPS controlled traffic system, to help modify their high clearance spray equipment, to purchased a 6-row shielded sprayer unit to change their chemical management strategy and utilise more knockdowns and a bean planter to plant legumes in fallow blocks.

Issues being addressed

While Scott has been able to adopt new management practices that have helped to break the monoculture of cane and in time improve soil health, there are still issues around input management that he and OCPS are keen improve from both an environmental and economic view point. This includes maximising water use over a large area for the best return and reducing the costs of big operations such as planting, fertilising and harvesting by reducing inputs and improving efficiency.

Solution being tested

Project Catalyst supports OCPS to trial six hectares of a skip row farming system. This involves planting (dual row) the first 1.9m row of cane and then leaving out one "fallow" row (still 1.9m) before planting the next one. The fallow rows are retained for the entire crop cycle and if possible will be planted with a legume crop each year after harvest. Scott says he hopes this system will end the need for a whole block fallow; instead he will plant straight into the skipped rows, and plant legumes into the old cane rows. Simply put, each crop cycle the cane and fallow rows will alternate but the majority of land preparation happens during the first cycle.

Project results

Scott established his first plot in 2008 and after a successful harvest added another 5 hectare plot in 2009. He is happy with the trial and hopes that the skip row will yield an extra ratoon in the second cycle as the larger cane requires a low harvester speed which reduces stool damage. Other advantages are a reduction in cultivation required before planting reducing costs and soil losses.

It is expected that the legumes in the fallow rows will fix nitrogen in the soil benefiting the current crop and potentially reducing nitrogen required in the plant cane and first ratoon of the second cycle.

With only half the area planted, Scott is has noticed a big reduction in farm inputs and improved efficiency in harvesting, nutrient and chemical application. This gives water quality benefits, with only half of the fertiliser and herbicide applied compared to conventional block.

While only 50 % of the block is planted the cane grows larger than conventional blocks with reduced competition for nutrients, water and sunlight. Scott feels that there is no significant impact on economic returns

to the farming entity. "When the price of fertiliser goes up we do especially well, as the big advantage with the skip is the savings on inputs. This gives us economic and environmental advantage" he said.

Grower Case Studies

Left and below: On the Simpson's property in Bloomsbury, Project Catalyst supports OCPS to trial six hectares of a skip row farming system. The fallow rows are retained for the entire crop cycle and if possible will be planted with a legume crop each year after harvest. Scott says he hopes this system will end the need for a whole block fallow; instead he will plant straight into the skipped rows, and plant legumes into the old cane rows.

Thanks to QDAFF and Farmacist for support with this case study.

Project results (continued)

In the second and subsequent skip row crop cycles, no land preparation is expected before replanting into the fallow rows.

The three harvests from the trial incorporated into this case study indicate that the tonnes of cane per row are higher than in conventionally planted cane as the stalks are able to grow taller and thicker due to greater access to water and sunlight. However, the tonnes of cane per hectare have been lower than when planted conventionally. Skip row yield for the remaining ratoons have been estimated.

The skip row planted cane is easier to harvest as the row is clearly defined, and the harvester speed is slower with a higher pour rate. The slower harvester speed reduces stool damage, and as a result Scott expects to retain skip row blocks for an additional ratoon than conventionally planted cane. This will allow one extra year of income from the crop before requiring replanting

Economic analysis by DAFF QLD shows that so long as the yield of the skip row does not drop more than 21 % below what can be reasonably expected from a conventional block Scott will reach break-even.

Grower Case Studies

Economic results

This economic analysis has been created by QDAFF economists and the grower, using individual grower information and standardised input prices in the Farm Economic Analysis Tool (FEAT). The change in gross margin "before" and "after" was used along with capital costs to conduct an investment analysis. This analysis is case specific, in regard to soil type, scale, and production system. Therefore, growers seeking to uptake similar changes should seek individual advice.

Key assumptions

- Conventional planting: land fallowed before replanting
- Skip row planting: no fallow blocks, mulch crop planted in fallow rows each year
- In 2nd crop cycle, no land preparation before planting into fallow rows
- Additional ratoon expected due to reduced stool damage
- First 3 skip row yields are actual, remaining ratoon yields have been estimated
- In 2nd crop cycle, no yield increase included (although it is potential – similar to new ground)

Capital investment and salvage values

	Capital investment	Salvage value in Year 10
Purchase quad bike	$11,000	$0
Purchase single row legume planter	$6,000	$1,800

Yield data and expectations (t/ha)

	Plant	1st ratoon	2nd ratoon	3rd ratoon	4th ratoon	5th ratoon	6th ratoon
Conventional yield expectation	120	105	88	78	67	67	-
Skip row yield data/ expectation	101*	80.6*	68.1*	60.1	51.6	51.6	51.6
% difference	-16%	-23%	-23%	-23%	-23%	-23%	100%

* Data based on seasonal conditions in 2009, 2010 and 2011

Results

- Gross margin decreases by $1/ha from conventional to skip row planting in 2nd crop cycle
- Plant cane and ratoon costs decrease (reduced plant cane, fertiliser & chemicals used)
- Reduction in costs insufficient to offset lower yield (despite no fallow blocks & extra ratoon)
- The annual change in gross margin is discounted at 7% over a 14 year investment period, resulting in a net present value (NPV) of -$31,373 or -$270 per hectare over 14 years
- Risk analysis indicates this property has a 0.3% chance of receiving a negative gross margin in any year with conventional planting. This chance is 0% with skip row planting.

	1st crop cycle	2nd crop cycle
Change in gross margin ($/ha)	-$29/ha	-$1/ha
Net Present Value ($)	-$31,373	
Net Present Value ($/ha)	-$270	

Breakeven Analysis

- What reduction in yield can be sustained before the skip row system ceases to be viable?
- For this property, if tonnes cut from the property do not reduce more than 21%, the project will be viable

Conclusions

- Based on data obtained so far, skip row does not improve the property gross margin
- However, skip row yields are "actual", conventional yields are "expectations"
- Currently this does not appear to be a good investment at a property scale
- However, further work is needed (ideally proper replicated trials)
- Other benefits include: more leisure time for grower, less harvester wear, etc
- Potential problems if fallow rows do not break nematode and pachymetra populations

Note: Scott has planted soybeans into his skipped area and will plant sugarcane into those rows in 2015. This case study will be updated following this event.

Michael and Peter Ottone

Compost tea and bio fert in sugarcane

REGION: Wet Tropics | Bilyana

With their father Joe having retired, third generation sugarcane growers Michael and brother Peter now run the Ottone and Sons' 194 hectare family farm at Bilyana, south of Tully.

Since purchasing the property in 1968, Ottone and Sons has grown pineapples, and bananas were produced up until 2003. Michael and Peter started work on the farm in 1980.

The Ottone's have also received funding through the federal government's Reef Rescue program to improve their farming practices.

Michael's investigation for Project Catalyst stems from this background in tropical fruit.

Having used compost tea to control phytophthora fungus on their pineapple crop with great success, Michael is interested in testing the potential benefit of using it and Bio Fert on their cane crop.

Issues being addressed

The Ottone's use of compost tea to control phytophthora fungus in their pineapple crop has been a great success, reducing costs and making them far less reliant on fungicides.

They believed that compost tea did more than control fungus, also improving soil health. They are investigating the question of what the benefit would be from using compost tea on their cane crop.

Solutions being tested

In order to sufficiently test the use of compost tea in sugar cane production, the Ottone's are trialling replacing their use of topdress fertiliser in plant cane with compost tea, bio fert and molasses. In 1st ratoon the nitrogen was reduced to 33kg/ha and the brew applied. Plant cane and 1st ratoon harvest results have now been collected, economic analysis has not yet been completed.

The Ottone's are also interested in doing more trials in the future, whereby they will test the suitability of using compost tea to replace the use of fungicide at planting.

In order to sufficiently test the use of compost tea in sugar cane production, the Ottone's are trialling replacing their use of topdress fertiliser in plant cane with compost tea, bio fert and molasses.

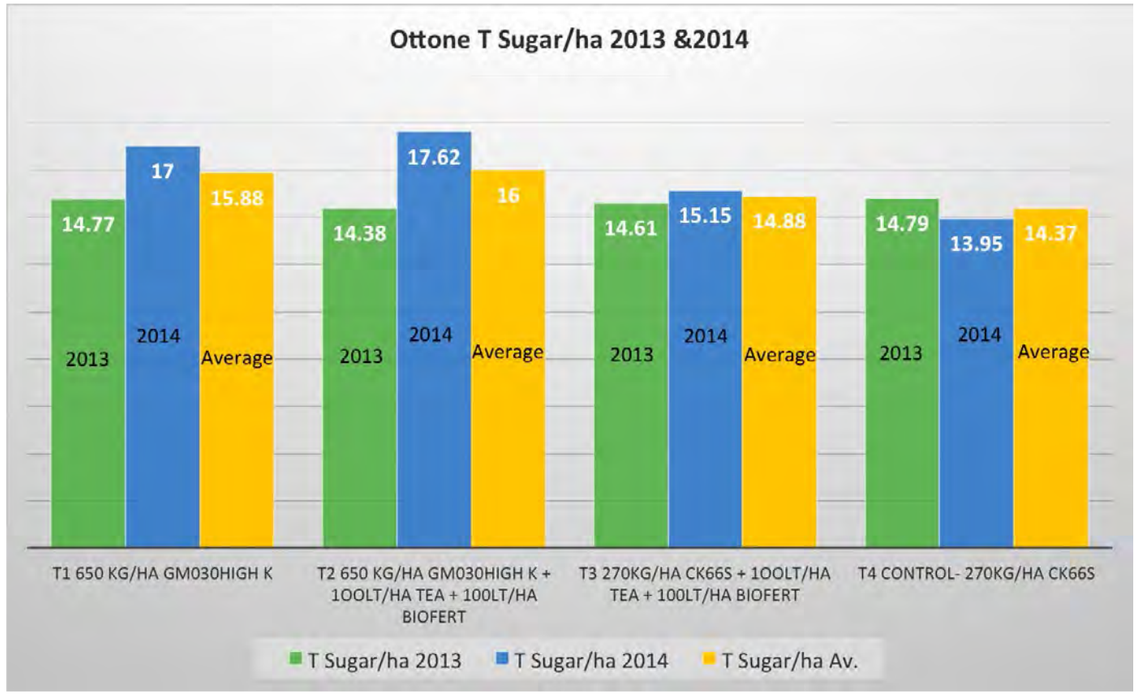
Below:
Michael adding the Micro-Booster concentrate.

Grower Case Studies

Right:
The Catalyst team along with brothers Peter and Michael Ottone (far right) on their property at Bilyana with Rob Cairns (formerly WWF) and Michelle Allen from The Coca-Cola Foundation.

Photo:
J. Reghenzani

Below:
Ottone Trial Results - Graph



Reinaudo Family

Variable rate nutrient application within block

REGION: Wet Tropics | Ingham, Lannercost and Bambaroo

Michael Reinaudo, along with his brother Darren, father Nelson and uncle Victor, farm 750 ha in the Ingham, Lannercost and Bambaroo areas.

The Reinaudo family have a harvesting contract and they do a small amount of contract planting on neighbouring properties and within their local community.

Current farming practices include planting with a Mizzi mound planter on 1.83m wide rows using a controlled traffic system.

The Reinaudo family have received funding through the federal government's Reef Programme (formerly Reef Rescue) program to help improve their farming practices.

They have made changes to their controlled traffic and mound planting system, widened their high rise spray tractor and also purchased a stool-splitter fertiliser applicator which is capable of variable rate application with the help of this funding.

Issues being addressed

For Michael Reinaudo and his family, farming over such a wide area of the Herbert Valley means that their blocks can have different soil types, and in most cases, there are even different soil types within the same block.

As such, the Reinaudo's believe that they shouldn't be putting the same level of nutrients on their blocks as the differing soil types across their farmland means blocks have different requirements, not one uniform requirement. Therefore, the Reinaudo's are investigating opportunities to vary the nutrient rate within blocks.

Solutions being tested

Develop nutrient plans using BPS001 Guidelines. These guidelines include: Veris mapping ; soil sampling each EC zone with GPS location; yield maps to identify zones in paddock; topography (effect of water); Satellite imagery and grower's knowledge of the block. These factors were used in developing 2 yield potential zones within the block and the nutrient plan was developed using the yield potential of each zone.

Variable and fixed rate replicated strip trials have been established. The control strip fertiliser rate is based on "six easy steps" recommendations.

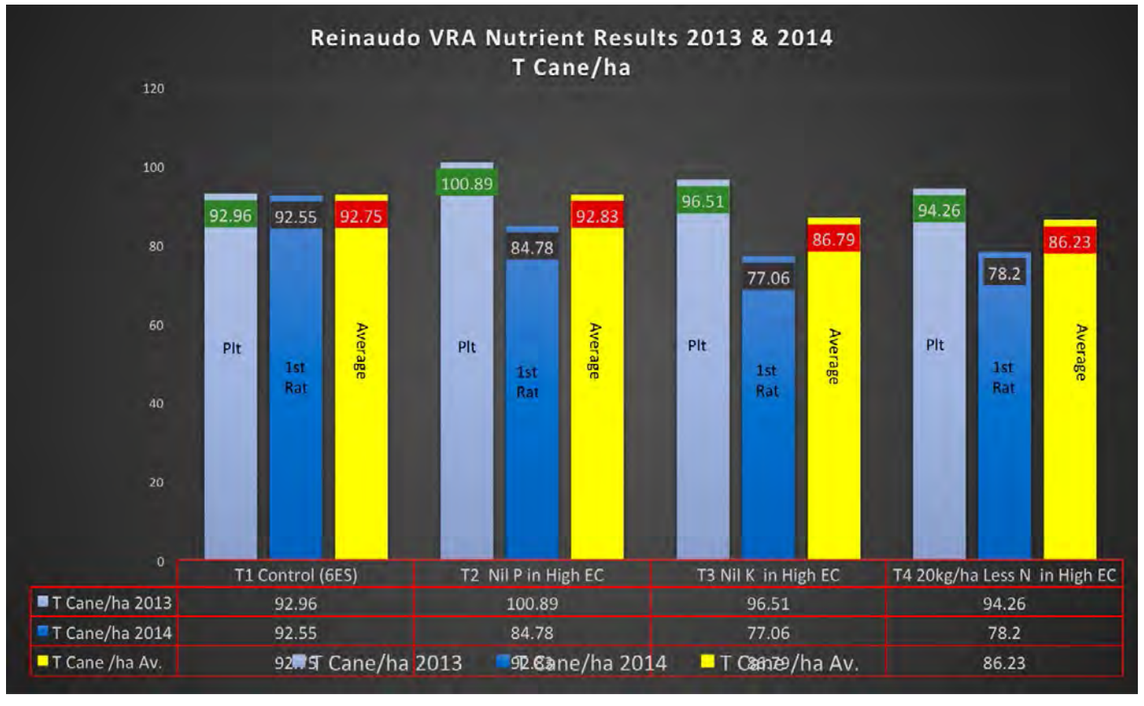
The trial was harvested as plant cane in 2013 & 1st ratoon in2014. Economic analysis has not yet been completed.

With the help of Reef Programme funding (formerly Reef Rescued) the Reinaudo family have made changes to their controlled traffic and mound planting system, widened their high rise spray tractor and also purchased a stool-splitter fertiliser applicator which is capable of variable rate application.

Below:
A GPS unit inside the Reinaudo family's tractor.

Right:
Darren, Michael, Nelson and Victor Reinaudo, on their property at Ingham.

Below:
Reinaudo Trial Results - Graph



Norm Reid

Evaluating methods of preparing existing 1.9m controlled traffic beds for planting, using double disc opener.

REGION: Wet Tropics | Pinnacle Hill

Norm, Linda and Peter Reid farm 210 ha at Pinnacle Hill, which is part of the Cattle and Trebonne Creek sub-catchments, south of Ingham.

The farm was originally a cattle property and changed to cane in 1995. The soils on Norm's farm vary from nutrient-rich heavy clay, to nearly pure sand with very low nutrient value. Norm is very interested in soil health and soil biology as he feels that improving both of these soil traits will improve his poorer soils' fertility, moisture holding capacity and yield.

In 1999 Norm moved out to 1.85m row spacings, but in 2001 decided to change again to his current 1.9m dual row controlled traffic system that he plants with a GPS controlled minimum tillage double disc opener planter.

Norm likes to have a legume crop during his fallow to help break the monoculture of cane and to provide nitrogen to the following plant cane crop. Norm has also received funding to improve his farming practices through the federal government's Reef Programme (formerly Reef Rescue) program.

For nutrient management, Norm has a regular soil sampling strategy and uses 6 Easy Steps (latest industry recommendation)to determine his application rate and uses a 3-row stool splitter to apply.

Issues being addressed

With his new system, Norm has seen positive changes but would still like to be able to improve his economic performance through reduced input costs and possible yield gains. With the whole farm now converted to the 1.9m controlled traffic, dual row bed system, the Reid's are keen to identify the most efficient way to re-plant as the farm passes into the second crop cycle of permanent beds.

Solutions being tested

Norm, Linda and Peter Reid have opted to trial various tillage methods on their farm to determine the most efficient means of working up for planting, as part of Project Catalyst.

The tillage trial was undertaken with replicated strips of the following variations:

1. Disc bedformer with ripper, and rotary hoeing
2. Disc bedformer with ripper, no rotary hoeing
3. Wavy disc cultivator, no rippper, no rotary hoeing

Where cultivation method 1 is currently used by Norm methods 2 & 3 are alternate tillage options being investigated.

During the fallow, Norm utilises a legume crop to help break the monoculture of cane and to provide nitrogen to the following plant cane crop.

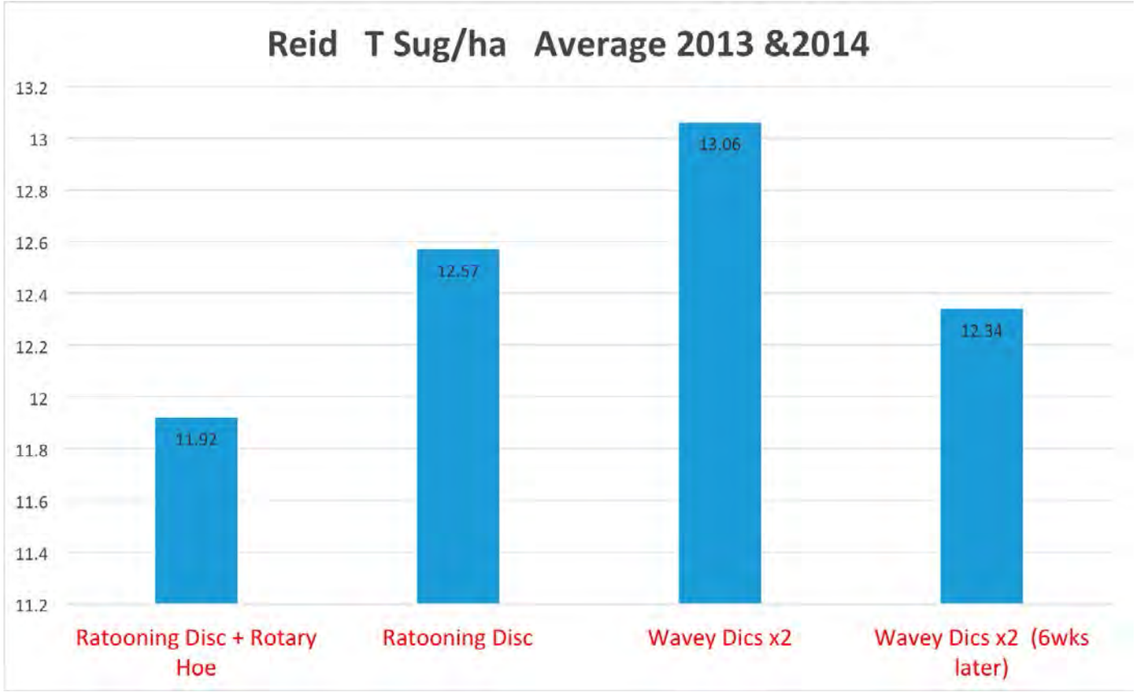
Below:
Utilising a legume fallow at Norm's farm to help improve soil health and provide nitrogen.

Grower Case Studies

Below:
A 3-row wavy disc cultivator that will be used as part of Norm's trial.

Above:
The Reid property at Pinnacle Hill,south of Ingham. Trial site not long after planting.

Below:
Reid Trial Results - Graph



Agriculture and Innovation in the Wet Tropics

Terrain NRM supports farmers in agriculture and innovation across the Wet Tropics region by facilitating partnerships, funding, grants, technical support, and research links. Terrain's agriculture program is moving increasingly toward innovation, driven by a demand from industry and a critical need to support practices that improve water quality entering the Great Barrier Reef. Terrain works closely with industry to ensure that adopting new practices can also help maintain and improve farm profitability.

terrain

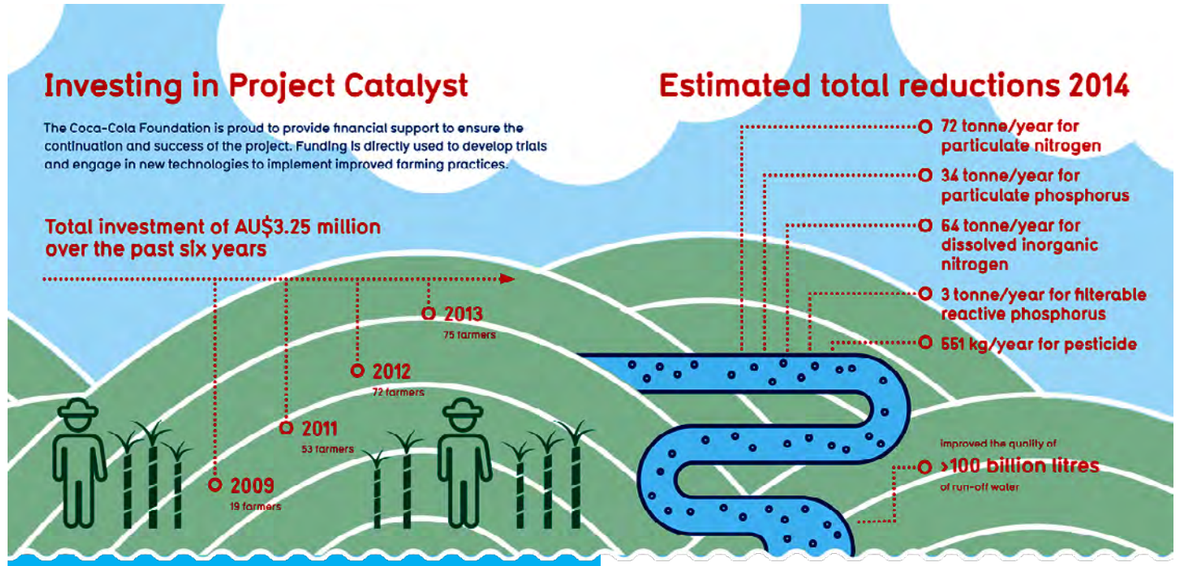
NATURAL RESOURCE MANAGEMENT

Digging Deeper – linking healthy soils with healthy water

Funded through the Queensland government's regional NRM Program, Terrain NRM has launched its second year of Digging Deeper, a five-month extension program of intensive practical on-farm workshops focusing on soil health and its relationship with water quality. The program helps farmers to explore soil issues through promoting a much greater understanding of the physical, chemical and biological aspects of the soil and how they influence each other and contribute to the quality of the water that flows to the Great Barrier Reef.

For more visit www.terrain.org.au

Program	Summary
Reef Water Quality Grants (Reef Programme) (Funded by Australian Government)	To help farmers improve land management practices and contribute to the reduction of nutrients, sediments and pesticides running into the Great Barrier Reef lagoon. The grants also include innovative projects for trialling and testing processes and practices that have the potential to significantly improve water quality for the long term. The programme is now in its eighth year. Partners: Industry bodies
Paddock to Reef Integrated Monitoring, Modelling and Reporting Program (Funded by Australian and Queensland Governments)	To integrate data and information on management practices, catchment indicators, catchment loads and the health of the Great Barrier Reef to model pollutant load outcomes using a highly innovative approach. Partners: Governments, industry bodies, regional natural resource management bodies, landholders and research organisations
Reef Trust Tender – Wet Tropics (Funded by Australian Government)	To help improve Nitrogen Use Efficiency (NUE) on cane farms in the Wet Tropics natural resource management region. It is a four year programme based on a tender process that offers financial incentives to farmers to improve their NUE and farm sustainability. Partners: Australian Government and Industry
Project Catalyst (Funded by the Coca-Cola Foundation in partnership with WWF)	To reduce the environmental footprint that sugarcane production has on freshwater quality and the Great Barrier Reef. Partners: Sugar Cane growers, Reef Catchments, Terrain Natural Resource Management, NQ Dry Tropics, the Australian Government, WWF and The Coca-Cola Foundation
Game Changer (Funded by Australian Government)	To support sugarcane farmers across three regions (Wet Tropics, Burdekin and Mackay/Whitsunday) to develop and test 'next generation' practices to reduce residual nutrient and herbicide loads running off farm. These practices aim to meet Reef Plan targets that affect water quality flowing into the Great Barrier Reef, while improving economic outcomes to growers.
James Cook University (JCU) Combi Van Project (Funded by Australian Government)	To investigate the impact on nitrous oxide emissions through utilization of bio-char in combination with compost. Terrain has an additional partnership with Griffith University who are sampling to look at phosphorus cycling and availability. Partners: James Cook University
Variable rate technology (Funded by QDAFF)	To trial variable rate technology to evaluate in-paddock spatial variability in vegetable production systems. Partners: Queensland Government
Regional Funding (Funded by Australian and Queensland Governments)	To provide technical advice, capacity building and incentives support to farmers to improve practice and trial innovation, as well as build region-wide partnerships for progressing innovation in the region. Partners: Australian and Queensland Governments



This February the Coca-Cola Foundation announced a further $500,000 grant to Project Catalyst Australia, which will bring their total investment into the Project to $3.25 million over the past six years.

The Project aims to reduce the environmental impacts of sugarcane production on the Great Barrier Reef by providing funding for technical expertise, economic analysis and opportunities for learning and networking to innovative farmers in the Queensland region.

To date, Coca-Cola Foundation investments in Project Catalyst have enabled farmers to significantly improve the quality of more than 100 billion litres of water, reducing the level of sediment and chemical run-off from their farms into river catchments that connect to the Great Barrier Reef.

Reef Catchments CEO Robert Cocco said, "Project Catalyst growers actively seek to do things differently they are constantly coming to us with innovative ideas. It's our local farmers who are championing this sustainability initiative - investing their time and efforts in finding new ways to improve water quality and preserve the Great Barrier Reef while making their own business more profitable though innovation."

WWF-Australia CEO Dermot O'Gorman said, "Containing more than 10 per cent of the world's total fish species, over 600 species of hard and soft corals, and attracting over 2 million visitors per year, the Reef is an Australian and global treasure which needs to be protected.

"What we are seeing with Project Catalyst is cutting edge innovation. It is a model for working together that we hope to replicate in other place and with other commodities. Project Catalyst is having an impact not only in Australia, but around the world."

The grant also comes at a time when the Australian Government has released its Reef 2050 plan, further emphasising the importance of protecting the Reef.

The Hon Greg Hunt MP, Minister for the Environment, said, "Nitrogen runoff from farms is a major factor affecting the health of the Great Barrier Reef and is linked to outbreaks of the damaging crown-of-thorns starfish. The important work as part of Project Catalyst complements the work being undertaken by the Government to support improvements to farming practices."

Since the Project's inception in 2009, the number of sugarcane producers involved has increased to more than 75 growers, managing over 40,000 hectares of farmland.

"The rise in the number of growers involved is a testament to the passion and commitment of our farmers. The Project started in the Mackay region and now includes farms all the way to Mossman in the Wet Tropics. This means new innovations are being implemented across catchments that cover almost the entire length of the Great Barrier Reef," Mr O'Gorman added.

Michelle Allen, Coca-Cola South Pacific said The Coca-Cola Foundation was proud to be working with Project Catalyst farmers.

"Australian sugarcane growers involved in the Project Catalyst are leading the industry through their innovation. This new grant will not only ensure the continuation of the Project, but also help put our Australian growers on the world map," Ms Allen said.

"Project Catalyst is one of many water projects supported globally by The Coca-Cola Foundation; and we are really proud of what our local farmers have achieved.

"Project Catalyst marked the first extension of The Coca-Cola Foundation's global partnership with WWF into the South-Pacific, and an example of the Foundation displaying leadership through innovation in the key environmental impact area of sustainable agriculture."

The Coca-Cola Foundation

www.coca-colacompany.com/our-company/the-coca-cola-foundation

Stephen Accornero

Profitability of corn as a rotation crop

REGION: Wet Tropics | Foresthome

Stephen Accornero farms 485 hectares of cane land in three areas around Ingham; at Foresthome, Abergowrie and Bambaroo.

It's a family business for Stephen, with his father growing cane in the Ingham region before him and Stephen's son Brenden now working alongside him. Stephen also employs one full timer to work across these three properties.

Previously, Stephen fallowed his land from cane for 18 months growing instead, a crop of corn which ended up turning a profit.

Growing corn as a rotation to his sugarcane is the basis of Steven's project for Project Catalyst.

Stephen has also improved his farming practice through the federal government's Reef Programme (formerly Reef Rescue).

Issues being addressed

Not only was Stephen's corn crop turning a profit but Stephen believes he was also getting an improvement in his cane yield after growing the corn. However, this perception was by observation only, as Stephen never actually properly measured the gain in cane yield.

The questions Stephen wanted to answer were - was the gain he believes he observed because of the corn or because of the 18 month without cane? Furthermore, was growing corn economically beneficial or would he have been better off just growing cane?

Issues being addressed

Stephen has set up his trial on a block that was fallowed in November 2011. On this 3.3 hectare block, in May 2012, Stephen planted three strips of corn and left three strips fallow. Corn was harvested in late 2012 & cane planted across the block in 2013.

In 2014 cane was harvested from each strip to supply data for an initial economic analysis which has not yet been completed. Cane yield from this trial will be measured for a full crop cycle.

Although Stephen has some early data, he will not have complete results for a full crop cycle.

Stephen Accornero is trialling corn as a rotation crop in sugarcane - as well as his corn crop turning a profit, Stephen believes he has observed an improvement in his cane yield.

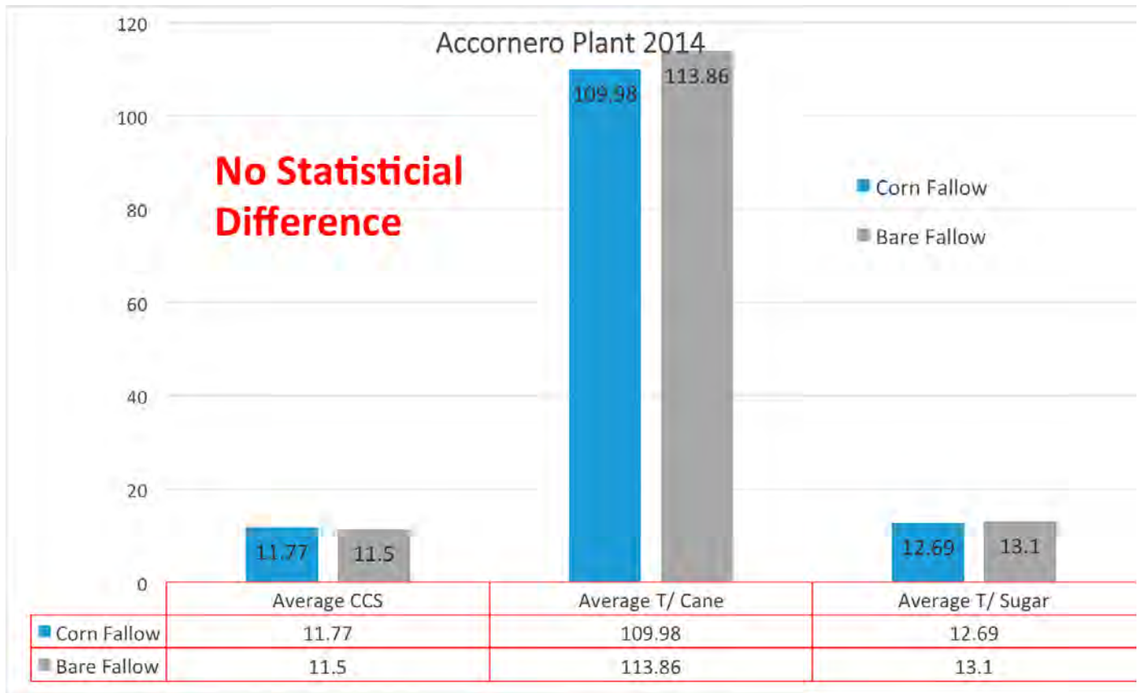
Below: Stephen's trial site for Project Catalyst.

Below: Stephen's corn trial, ready to harvest at his property at Abergowrie.

Grower Case Studies

Right:
Stephen and his son Brenden on their property at Foresthome.

Below:
Accornero Plant Cane Harvest Results - Graph



	Average CCS	Average T/ Cane	Average T/ Sugar
Corn Fallow	11.77	109.98	12.69
Bare Fallow	11.5	113.86	13.1

PROVIDING EXPERT ECONOMIC AND AGRONOMIC EXTENSION SUPPORT TO PROJECT CATALYST.

Queensland Government FARMACIST

Megan Star, Queensland Department of Agriculture, Fisheries and Forestry
Ph: (07) 4923 6225
E: megan.star@daff.qld.gov.au

Life's a trade-off

Economic Support to Project Catalyst

To ensure sustainability of individual growers and the sugar industry, long term profitability and economic viability is critical. Completing an economic analysis allows growers to understand if their Project Catalyst innovation or technology improves their profitability, business resilience and management.

Economics allows us to assess the different trade-offs of decisions we make regarding adoption of new management practices, altering equipment or new technology. To quantify these trade-offs we want to understand

- **How it will affect the production system?**
- **What will change and by how much?**
- **What is the cost of the capital required to make the change?**
- **Where in the block will we see these changes?**

We then like to use dollar values to quantify the trade-off and how it will impact your wallet at the end of the day.

We also know that innovation and industry adoption is not a straight line process and there are sometimes a few things to sort out along the way or modify further. It is also important to consider how technologies or innovations impact production over the whole crop cycle.

We have looked at what the community values improvements in water quality from the hard work and management changes being made by Catalyst growers. This is about assessing their trade-offs and quantifying them in dollar terms too. The community has a vested interest in supporting the work of growers to make sure they can use the reef and so can future generations.

Growers comments

"If we get to the stage where everyone is happy the environmentalists, and we're happy and profitable then that is the main aim...and we can keep farming forever then" **- Gerry Deguara**

"This is very exciting, I can't wait to see how it progresses…"
- Tony Jeppesen

"We have no desire to push practices that send people broke, the trick is how do we do it in a way that is economic? Sustainable? And good for everyone?"

Right:

Helen and John Pastega, Project Catalyst Growers (Mackay Whitsunday region)

John Markley Project Manager Farmacist
M: 0408 185 083
E: johnm@farmacist.com.au

Farmacist

Agronomic Support to Project Catalyst

Farmacist is an agricultural consulting company that specialises in developing and extending innovation to our agricultural clients. We have been involved with Project Catalyst since its inception providing agronomic support and data to the participating growers. Our business seeks to encourage and foster knowledge sharing between our dedicated staff and the many innovative and likeminded growers that contribute to the success of Project Catalyst. As Project Catalyst expanded into the other regions, Farmacist has been proud to expand our role to work with the innovative sugar industry growers from the Wet Tropics through to the Burdekin and the Central cane growing regions.

For the sugarcane industry to remain viable, innovation in production techniques to improve yield, reduce costs and improve environmental sustainability is essential. Project Catalyst has helped deliver valuable investment into a program that not only provides R&D but has also fostered and encouraged growers to help bring their ideas and skills to develop innovative practices.

Left:

Natalie Fiocco (Farmacist) and Project Catalyst grower, Gerry Deguara.

Farmacist has been involved in numerous Project Catalyst activities that have achieved valuable outcomes for the industry, both economically and environmentally. Many of these activities have been the springboard to the widespread adoption of innovative new farming techniques into the wider industry growing community. The direct outcomes of this adoption have seen a significant reduction of environmentally sensitive herbicide and fertilizer inputs which has led to improved water quality benefits. However, far greater legacy of the project has been a greater appreciation of the impact that some farming practices have on the environment, particularly the Great Barrier Reef. The project has been an invaluable learning experience for all involved but there is also an appreciation that with support from the project more can be achieved.

www.farmacist.com.au | www. daff.qld.gov.au

Suncorp Bank

As Australia's leading regional bank, Suncorp Bank has been supporting regional and rural communities since it commenced operations as the Queensland Agriculture Bank in 1902.

Today, with more than 110 years experience and a part of the top 15 ASX listed Suncorp Group, Suncorp Bank is well positioned to continue its support of regional communities and agribusinesses across the country.

Suncorp Bank is proud to be part of this year's Project Catalyst and be aligned with a group of forward thinking farmers committed to preserving the future of the sugar industry.

Suncorp Bank Regional Manager for North Queensland, Troy Constance, said Suncorp Bank has a long history of working with sugar producers and our team remain 100 per cent committed to the industry.

"As Australia's leading regional bank, Suncorp Bank is proud to support initiatives that contribute long-lasting benefits to regional and rural communities," Mr Constance said.

"Ensuring the needs of our customers are achieved is important to us and Project Catalyst is the perfect platform to discuss how we can support innovative farming practices now, and into the future."

Suncorp Bank is proud of the role it plays as a major provider of business services in the agriculture sector, and is committed to helping its clients build their wealth and leave a legacy for the future.

Suncorp Bank's local agribusiness specialists are dedicated to understanding the needs of their customers. They understand the critical role a bank plays in supporting regional communities and they are committed to building in-depth relationships with customers to support them on their journey.

To find out more about how Suncorp Bank can help your business, visit www.suncorpbank.com.au/agribusiness or call your local banking specialist

Suncorp Bank
Ayr Branch
David Harding
0407 579 831

Suncorp Bank
Mackay Branch
Stuart Mitchell
07 4969 1564

Suncorp Bank
Ingham Branch
Rob Mitchell
0408 451 412

SUNCORP BANK
Agribusiness

Suncorp-Metway Ltd ABN 66 010 831 722
27945 12/02/15 A

Chris Lyne (Manager, Ayr Farming)

Enhanced Efficiency Fertiliser Trial

REGION: Burdekin Dry Tropics | Plantation Creek

Annual average rainfall: 956.7 mm
Property size: 420 ha
Farming since: 2003

Family History

In 2003 Chris completed a Bachelor in Applied Science - (Applied Agriculture in irrigation) and began working in 2003 at Hillston in NSW for Westgate Irrigation. Chris then made a change to AUSCOTT as an irrigation supervisor for four and a half years, before moving to the Burdekin in 2008 with his wife Kate. This was so Chris could take on the role of Farm Manager on Ayr Farming's property. "The attraction of farming in the Burdekin was its unique irrigation scheme," Chris said.

Practices

Ayr Farming uses a 1.5m single row conventional (billet) planted system on it's sandy loam soil and fallow management involves legume rotational crops which are harvested when possible, otherwise utilised as a green manure. Standard furrow irrigation is undertaken across the farm and tail-water (approximately half) is captured in two recycle pits which is then re-used on farm.

Chemical practices

As cane grubs are currently an issue on the farm, Confidor is applied to all ratoons. Knockdown herbicides are predominantly used in spray programs, utilising residuals only in problematic areas and unexpected weather events.

Nutrient practices

Under the guidance of local agronomist, nutrients are applied via side dressing fertiliser box using custom granular blends as a single application done before the second irrigation.

A majority of the farm is EM mapped, and there have been two major soil types identified and soil tested accordingly, with variety and class also being taken into account. Ayr Farming now uses four different fertiliser blends across the farm to address the individual soil types.

Motivators to change

Chris has brought a wealth of knowledge from his experience with irrigation practices in grains and cotton. This has enabled him to bring a different perspective to the table when evaluating farm practices in Sugar Cane. Positive experiences in cotton with split nutrient application through the crop cycle and the resulting increased yields has led him to investigate strategies for split applications in sugarcane.

Challenge

The window of opportunity to apply nutrients in a furrow irrigated system is finite and the cost of running machinery to apply two applications is not viable. The commercially available alternative enhanced efficiency fertilisers may provide an alternative within the sugarcane production system.

Chris is working to determine the appropriate cost, product/ blend for the soil type and application rate required to maintain or increase yield.

Variety: Q183
Class: 2R
Treatments:
T1: Urea @ 220N
T2: Urea @ 180N
T3: Entec 2 180N
T4: CR25% @ 180N
T5: CR50% @ 180N

Monitoring

The full cycle of nitrogen (what's going on and off) is being measured in the Enhanced Efficiency Fertiliser trials. Inputs being recorded include:

- The amount nitrogen applied in fertiliser blends and through irrigation water to the trial
- Losses through irrigation is being measured using auto-flumes catching the first 20 runoff events from the trial areas
- Both irrigation and rainfall (comparing both wetting mechanisms) are being monitored to track the loss of nutrients from the full set of treatments (1 in 3 replicates)
- Lysimeters and gas chambers have been installed in the soil profile measuring nitrogen losses through soil leaching and volatilisation

All samples are being sent for analysis by the Department of Science, Information, Technology, Innovations and Arts (DSITIA) to identify the rate of release of nitrogen from applied fertiliser

Grower Case Studies

Right:
Chris Lyne is working to determine the appropriate cost, product/ blend of fertiliser for the soil type, as well as the application rate required to maintain or increase yield.

Below:
Chris Lyne presents at a Field tour at Ayr Farming.

Economic Analysis

The economic analysis will compare the profitability of each enhanced efficiency fertiliser treatment on Chris's farm. Key factors in the investigation include crop growing expenses such as fertiliser product costs and fertiliser application expenses. In addition, yields and commercial cane sugar will be examined to compare the overall profitability of each treatment.

The graph below examines the crop nutrition expenses for each treatment in the trial. Comparing each of the treatments finds that the Urea treatment with 180kg/ha of nitrogen has the lowest cost, while the controlled release treatment with a 50% blend has the highest cost. Interestingly, the 220kg/ha of nitrogen (N) treatment and the ENTEC treatment, which delivers 40kg/ha less nitrogen, both have similar costs.

To put these cost differences into context, the next graph examines the yield change required for each treatment to maintain the same profitability as the 220kg/ha of nitrogen (base scenario) treatment, assuming a constant CCS level for each treatment.

As the Urea treatment with 180kg/ha of nitrogen has the lowest cost, it can afford to take a hit to yield of almost 2 tonnes of cane per hectare before it becomes less profitable than the 220kg of nitrogen treatment. On the other hand, the controlled release treatment with a 50% blend would require a yield increase to maintain profitability.

Importantly, this analysis of cost only tells some of the story; the inclusion of production results from the trial will provide a better understanding of the relative profitability of each treatment.

Immediate water quality benefits are expected by both enhanced efficiency fertilisers as the delayed release in both forms would expect to reduce loss of nitrogen through run-off, leaching and volatilisation. Additionally lower rates of these new fertilisers would be able to be used to maintain, if not increase crop yield.

Figure 1: Crop nutrition expenses for each treatment per hectare

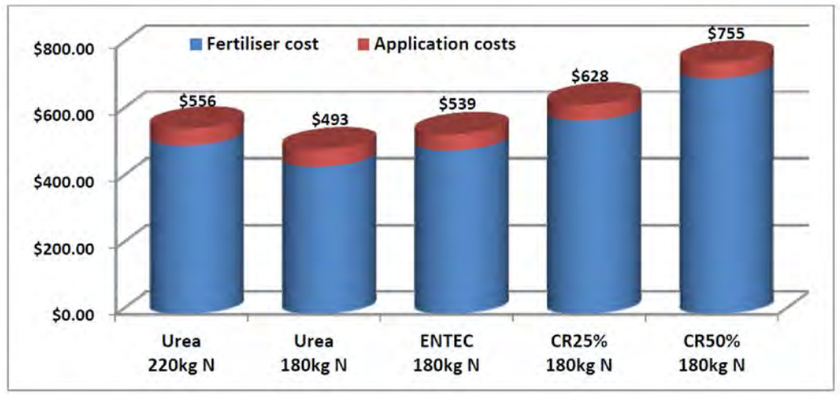
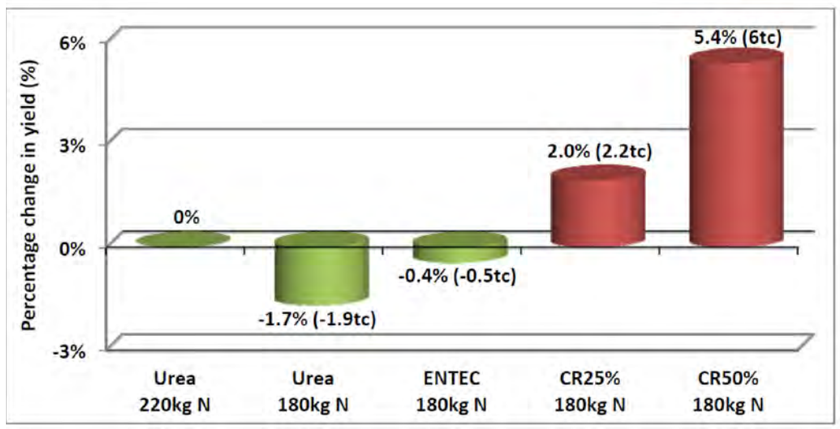


Figure 2: Yield change required for each treatment to maintain the same profitability as the 220kg/ha of N (base) treatment



Showcasing to broader community

Ayr Farming is a new member of Project Catalyst and Chris also represents the company as an active members in the NQ Dry Tropics Sugar innovations program. Ayr farming has readily opened the farm and current Catalyst trial to the wider sugar industry during a recent field tour. Chris is aware of the quality of water draining from the farm into Plantation Creek and is always motivated to learn about new practices which can improve farming management.

About NQ Dry Tropics

NQ Dry Tropics is a community run, not-for-profit company that is a leading delivery agent of land and water management change across the Burdekin Dry Tropics region (approximately 146,000 square kilometres) since 2005. As the leading Natural Resource Management body for the region, NQ Dry Tropics places a very high importance on innovation to the future of the agriculture sector.

Willy Lucas

Irrigation Automation and Telemetry

REGION: Burdekin Dry Tropics | Osborne (Home Hill)

Annual average rainfall: 867.4 mm
Property size: 194 ha
Farming since: 1998 (15 years)

Family History

Willy Lucas is a 4th generation sugarcane farmer currently farming 194 hectares in the Osborne area, south of the Burdekin River. After finishing school Willy attended the Burdekin Agriculture College for two years before purchasing a cane haulout business that he expanded after 3 years to include herbicide spraying locally for the next 10 years. During this period, Willy was actively involved in the family farm until he bought it out in 1998.

Practices

GPS guidance with 1.52m single rows is used in a minimum tillage system with cultivation only used when necessary to overcome compaction issues associated with harvesting or weather. Fallow management includes planting legumes of which, dependant on weather, 50% is harvested and 50% incorporated as green mulch.

The entire farm is furrow irrigated with 30% water supplied from channel systems and the remainder coming from underground bores. Approximately a quarter of the irrigation run-off is caught in a recycle pit system and re-used on the farm.

Chemical practices

Predominantly knockdown herbicides are used in weed management programs, occasionally PSII residuals are strategically used dependant on weather patterns. Willy has set up three separate spraying configurations to be used, broadacre, irvin and dropper legs. A broadacre boom is used in fallow and legume management and irvin legs for standard control in ratoons. A dropper boom configuration is used with a high clearance tractor carrying twin tanks, so that duel chemical applications can be applied in the one pass for problematic weed pressures.

Nutrient practices

With highly variable soils, soil testing data and EM mapping has been gathered to identify three soil zones (good, average and poor). Combined with mill yield data, this information was used to develop a nutrient management plan to match yield potential and fertiliser (granular mix) application.

The farm is being progressively EM mapped over a full 5 year crop cycle and will be re-mapped in the following crop cycle to allow for continual improvement in soil health. For this to be economically viable, there will need to be an increase in the profit margin.

Motivators to change

Due to the extremely labour intensive irrigation system currently in place, lifestyle was the main driver when developing new and innovative management systems on this farm. This combined with increasing electricity costs and issues with deep drainage of irrigation water on the farm have led to the need for a fully automated irrigation system.

Challenge

Sourcing suitable base stations, end of row sensors and automatic valves that can handle a high density crop like sugarcane, at a cost effective price has been the main hurdle when designing and implementing the new system. Outside industry innovative technology companies have provided prototypes for the componentry, which then leads into issues around support and maintenance for the system once established. The goal is to develop a reliable and cost effective system that will be commercially available to farmers in the wider sugar industry.

Variety: Q240
Class: Plant
Treatments:
T1: Telemetry and Automation
T2: Conventional Irrigation

Monitoring

Comparison between a fully automated and a standard irrigation system will be undertaken to measure the impact of this practice change in regard to the environmental (water quality), economical, productivity and social outcomes. This will be measured through total water volume applied; total power used; total yield; and labour.

Economic analysis

The economic analysis will compare the profitability of a cane block using irrigation telemetry and automation with a similar block without telemetry and automation. Important factors that may affect crop growing expenses include:

- Electricity costs – expected decrease in irrigation run

Grower Case Studies

Economic analysis (continued)

time and the potential for tariff optimisation from greater night-time irrigation efficacy

- Irrigation labour requirements from automation
- Reduced vehicle usage to monitor irrigation progression.

In addition, any variation in yield or commercial cane sugar between the treatments will be scrutinised in the gross margin analysis to take account of potential application efficiencies and improved utilisation of irrigation infrastructure. The initial capital outlay will be subject to an investment analysis to determine the overall viability of the telemetry and automation investment.

Expected results

The water quality benefit is expected to be immediate with the implementation of the automated system. Precision within irrigation will significantly reduce irrigation run-off from the farm and subsequently reduce nutrient and chemical losses.

Showcasing to broader community

Willy Lucas has been involved in Project Catalyst since 2010, during this time Willy has presented on his trials at a number of Forums and opened his farm to farmers and support staff to share his management practices and the innovation on his farm.

Right (from top):
Willy Lucas, a fourth generation grower, presents at a field day on his Home Hill property.

Middle: With a demonstration valve.

Bottom: Trial site.

Chris Hesp

Mill Mud Application Trial

REGION: Burdekin Dry Tropics | Mulgrave - Burdekin River Irrigation Area (BRIA)

Annual average rainfall: 882.3 mm
Property size: 606 ha

Family History

Chris completed his trade as a fitter and turner and spent time working at Mulgrave mill before moving onto the family farm in Gordonvale. Chris and his wife Sonya then moved to their farm in Clare.

Originally from the Gordonvale district, the Hesp family were attracted by the opportunity to acquire affordable land when the Burdekin irrigation area opened up and purchased a scrub block and water allocation in 1991 and now have four adjoining farms in the Mulgrave area in the BRIA.

Moving from the Wet to Dry Tropics was a steep learning curve, but 23 years on, Burdekin farmers Chris and Sonya Hesp have no regrets. Innovative by nature. "The shift has taken me out of my comfort zone and challenged me to adapt to new and very different surroundings," Chris said.

Practices

The family partnership now has 606 ha in cane production with about 120 ha normally fallowed at any one time and has grown more than 60,000 tonnes of crops supplied on tramline to Invicta mill.

Typically in the past approximately 30% of the farm was under green trash blanket and every second row was raked clear of trash to improve efficiency in furrow irrigation. As a result of a number of wet harvesting years, Chris has chosen to return to cultivation to address soil compaction from harvesting. Once compaction is resolved, Chris wants to return and potentially expand on his green trash system.

All irrigation water is captured on farm and recycled. Farming in the heavy cracking clays of the Mulgrave area, and trying to balancing irrigation to meet the crop requirements is a constant challenge. Water-logging and subsequent loss of nutrients from the green trash system is a concern when managed poorly.

The opportunity arose for Chris to purchase his own harvester which allows him to manage both his own harvest schedule and performance. Apart from his own Chris also harvests hid neighbor's crop which combines to a group tonnage of approximately 70,000 tonne. "Since we have had our own harvester, speed has not been an issue and the quality of the job is pleasing," Chris said.

Chemical practices

Knockdown herbicides are predominantly used in ratoons and bare fallow management. A high clearance spray tractor allows extended time to access the crop, minimising the need to use residual PSII's herbicides. When using the green trash blanketing system a significant reduction in herbicide applications and rates has been achieved, as only every second row is sprayed with an irvin boom. Broad acre herbicide application is use for any vine pressure in the trash blanket.

Nutrient practices

A one shot fertiliser is predominantly applied with a stool splitter after the first watering across the majority of the property. However the 'Overhead' irrigation blocks have Phosphorous, Potassium and Sulphur applied with the stool splitter and the application of Nitrogen applied through fertigation. Soils test are done after every crop cycle and these results form the basis of future nutrient plans.

Motivators to change

Chris and his wife Sonya have a reputation for trialling innovative practices on their farm and their problem solving approach combined with incentive funding when appropriate has ensured consistent practice change. "Funding stimulates growers to undertake change sooner and to try something new, or higher risk," said Chris.

Challenge

Mill mud typically has not been economical to apply to the Mulgrave farm, purely on the basis of distance to Invicta mill. Chris can see the potential benefits of improvement in crop yields, soil health from mill mud applications and the potential to place the product on the hill may improve water quality outcomes if proven to be viable.

Distance from Invicta Mill is the biggest challenge as this significantly increases the cost to have the mud transported to the farm. To address economics, the rate/ha of the mill mud is needed to be reduced and an alternative method of placement of the mill mud in the furrow irrigated system.

Local mill mud contractors typically didn't have suitable machinery to apply the mud strategically and needed to be

Right (from top):
Sonia and Chris Hesp have chosen to return to cultivation to address soil compaction from harvesting.

Middle: Water quality monitoring.

Bottom: Trial site - banded mill mud.

NQ Dry Tropics Sustainable Agriculture

The NQ Dry Tropics Sustainable Agriculture program offers information, training and support to agricultural producers in the use of best management practices for resilient landscapes and productive enterprises. Within this program, the Sugarcane Innovations Program delivers a number of projects that support innovative farmers with opportunities to trial their practice ideas with the assistance of technical experts.

engaged to be able to provide the service. Nutrient rates and management for the new system also needed to be addressed to maintain and not decrease crop yield.

Variety: KQ228
Class: 2R
Treatments:
T1- CONTROL @ 0t/ha
T2 - CONVENTIONAL @200T/HA
T3 - CONVENTIONAL @100T/HA
T4 - BANDED @65T/HA

Monitoring

Water quality is being measured using auto-flumes catching the first 10 runoff events from the trial areas. Both irrigation and rainfall (comparing both wetting mechanisms) are being monitored to track the loss of nutrients from the full set of treatments (1 in 3 replicates).

All samples are being sent for analysis by the Department of Science, Information, Technology, Innovations and Arts (DSITIA) to identify the rate of release of nitrogen from applied fertiliser and flux of phosphorus from the varied application rates of mill mud.

Economic Analysis

The economic analysis will compare the profitability of various mill mud treatments on Chris's farm. Key factors to examine include crop growing expenses such as fertiliser costs, mill mud expenses and machinery operation costs over a crop cycle. In addition, yields and commercial cane sugar will be examined to compare the overall profitability of each treatment. The graph below examines the cost for mill mud, fertiliser and cultivation for each treatment in Chris's second ratoon cane crop. The total cost is located above each bar. A comparison of the treatments highlights a substantial difference in costs. The conventional treatment with 200 tonnes of mill mud applied per hectare (t/ha) has almost double the cost of the banded treatment.

Notably, an analysis of cost only tells part of the story, the inclusion of yield results from the trial will better articulate the relative profitability of each treatment.

Expected results

Using the banded mill mud on the hill is expected to improve soil health and yield when compared to the control.

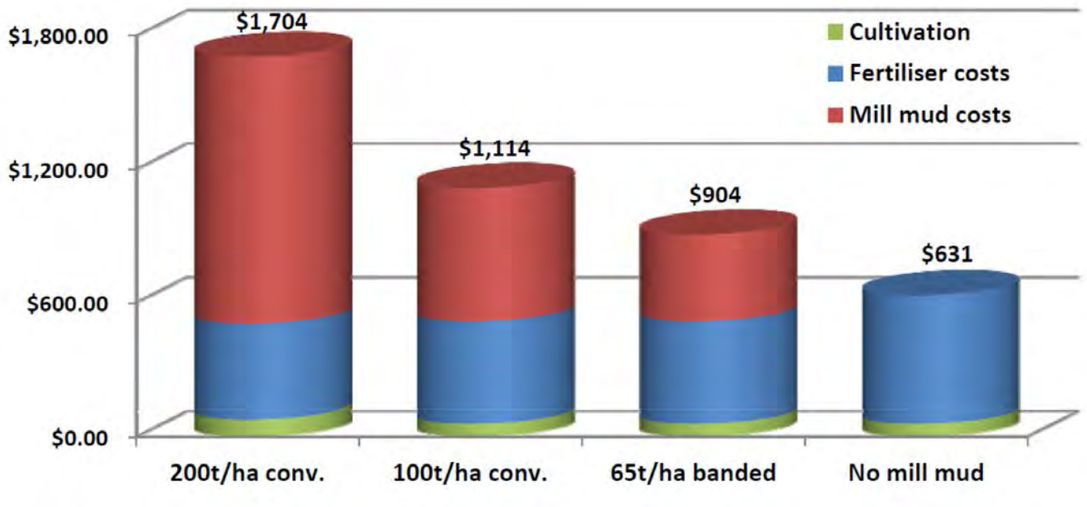
Using the banded mill mud is expected to improve water quality leaving the farm when compared to the conventional application methods as well as improve economic returns through reduced application rates.

When combining these factors, a positive outcome for water quality and production could be expected when comparing the banded mill mud application method to the current alternative practices.

Showcasing to broader community

Chris is a member of the award winning Mulgrave Area Farmers Innovative Action (MAFIA) group. In 2007 Chris was part of a team that won the 'Sugar Research Development Corporation Excellence in Regional Innovation Award' for the Burdekin. Evaluating alternative irrigation for a greener future, by comparing furrow, overhead low pressure (OHLP) and trickle irrigation.

Figure 1: Comparison of mill mud, fertiliser and cultivation expenses



SUGAR GROWING TRENDING TO DRIP FOR HIGHER YIELDS, WATER SAVINGS

The increasing area of drip irrigated sugar in the Burdekin region is part of a global trend in this method of growing sugar, according to Yoram Krontal, agronomist in charge of sugar cane crops for Netafim globally.

"I believe that the rate of growth for drip irrigated sugar cane globally is about 20,000 Ha per year. Some of the larger projects are in South America – Peru and Brazil. Also there is a very nice project in Swaziland, in Southern Africa" he said.

In the Burdekin, one of the major drip irrigated sugar projects is the 350 Ha Oaky farm, owned by Davco farming. Evan Shannon, who has worked closely with Davco since the installation of their drip system, said there was more potential for drip irrigation in sugar in the region, particularly in newer developments or farms that needed reworking.

"In this area there are certainly blocks that are under furrow irrigation which are having problems now – some of them need levelling. If you have got an alluvial soil in the delta of the Burdekin and you have got to open up top soil and level sub soil you could spend $6,000/Ha -7,000/Ha easily. In a situation like this (drip irrigation) you are going to spend about that – so it's the same cost but you can do things in a very precise manner".

Mr Shannon is a grower with an eye to sustainable production.

"As our environmental stewardship is going to be looked at more and more closely, and I think we can move drip irrigation into some examples where we shouldn't be using our current irrigation systems"

Aaron Linton is another grower who feels that there is much potential for drip irrigated sugar in the Burdekin. He converted a 40 Ha furrow irrigated block at Home Hill to drip irrigation last year.

"This whole farm was 5 blocks flood irrigated through plastic fluming. It was very inefficient" he explained, looking over his drip irrigated sugar crop. "The whole farm drained to the middle. I thought that this was unmanageable - I had to do something. We did a few calculations of different ways we could laser the block for furrow irrigation with infrastructure for pipelines and recycle pits, and it didn't come out too much less expensive than drip, if at all. By the time I lasered the ground properly for the right grade for the proper soakage it would probably work out a lot more expensive".

For Mr Linton, there are other significant benefits to his irrigation system. "I can run the system on my phone from wherever I am– just the other day I was sailing – we had a minute so I started my pump and checked all my moisture probes while I was out on the water."

One of the pioneers of sugar on drip in the Burdekin area was Paul Villis. With a background in vegetable growing, Mr Villis was no stranger to drip irrigation. Mr Villis' first drip irrigated block was installed in 2008. He has compared the furrow and drip irrigated blocks on his farm, and found with drip a consistent yield increase of around 25% more cane, and 21% more sugar. In addition, the amount of nitrogen fertiliser applied has been cut back from 188 kg/ Ha to 84 kg/ Ha with no reduction in yield.

"We are still progressing the with the drip, but we have had some very positive results so far with around 30 tonnes/ha increase in cane yield over the flood irrigated blocks; this has been consistently replicated over 4 years" Mr Villis said

Yoram Krontal has been impressed with the Burdekin region, and he has pointed out that the Burdekin growers are not alone in their results.

"We find that, around the world that with drip irrigation we can save about 30-40% of the water that is applied and that the yield is increased by approximately 20-30%. Another benefit is the extended ratoon life. When carrying out feasibility studies for drip irrigated sugar cane, we allow for 8 ratoons. I think these three reasons; saving water, increasing the yields and saving the re-establishment in the field are very good reasons to go for drip".

Joe Tama

Low Cost Alternative Irrigation

REGION: Burdekin Dry Tropics | Iyah

Annual average rainfall: 876.4 mm
Property size: 228 haa
Farming since: Since 1971

Family History

A second generation farmer, Joe immigrated from Sicily as a child with his family in 1961. Joe's Father started working cutting sugar cane and his Mother grew small crops on 6 acres of leased land. In 1967 the family purchased their first small cane farm. The family venture has since expanded to include sugar cane, horticulture farms and a variety of off farm investments giving Joe a sound background in farming and business.

Maintaining diversity within his income streams, Joe bought his own 228 ha sugarcane farm in 2006 and has since purchased the Inkerman Gypsum and Lime Company. Joe has recently harvested the first of his agroforestry crops, which is a long term investment in marginal soils which were unsuitable for regular crop cycles e.g. horticulture and sugarcane.

Practices

Joe utilises a range of crops as part of his rotational fallow system including horticulture, legumes and is now trialing rice. A 1.52m single row zonal tillage system with GPS guidance is used on the farm.

The majority of the 228 ha farm is irrigated by flood, with 25 ha under trickle irrigation. Joe is currently designing a recycle system with the view of capturing 100% of the his and neighbouring farm's irrigation tail-water.

Chemical practices

An Irvin boom and high clearance tricycle spray rig is used for herbicide and pesticide program applications and technology is being sought to apply herbicide at a variable rate to coincide with specific weed pressures on the farm.

Nutrient practices

Joe has recently purchased zonal tillage equipment to address compaction issues and has built a variable rate stool splitter which will be guided by EM mapping and regular soil testing data.

Motivators to change

Joe acknowledges a need to progress and is very aware of the environmental impact of his farming practices. Issues of marginal soil types, water salinity and declining yields have been addressed since purchasing the farm. This has influenced the direction of farming practice changes, especially in regards to water usage.

Challenge

Salinity in underground irrigation water affecting soil health and causing marginal yields has led to investigation of alternative irrigation methods for more precision within nutrient application, irrigation and reduce total water usage. While drip irrigation has proven to be a viable option with favourable yield results, the costs of installing the standard drip systems was prohibitive, this has led to the trial of low cost alternative systems.

Variety: Q183
Class: 1R
Treatments:
T1: Drip Irrigation
T2: Furrow Irrigation.

Monitoring

Total irrigation water usage, chemical and nutrient application rates will be the main factors in addressing the water quality benefit for the use of the low cost drip irrigation. As run-off within this system is negligible, all irrigation water inputs will be metered and nutrient application amounts logged.

Economics for management of the the system will be monitored and taken into account to validate the cost of implementing the low cost alternative irrigation system.

Economic analysis

The economic analysis will examine the economic implications of Joe shifting to drip irrigation. This requires a thorough investigation of crop growing expenses such as:

- Energy costs – consuming more electricity per mega litre due to a higher pressure requirement, but irrigating with less water
- Irrigation labour requirements
- Irrigation repairs and maintenance costs
- Crop nutrition expenses – fertigation impacts the cost of fertiliser and requires no machinery operations to apply

Economic analysis (continued)

Under furrow irrigation, the trial block yielded poorly in ratoons, prompting Joe to plough-out after the first ratoon. Improvements in ratoon performance may prove to be the key for Joe to recover his initial investment.

Expected results

Immediate improvement in water quality runoff will be expected in comparison to furrow irrigation through a significant reduction in water applied and available runoff, and a reduction in nutrient and herbicide rates applied through the closed system.

The low cost drip system is expected to perform comparably to a more expensive drip irrigation systems within water quality gains and only need minor increases in management. This is expected to provide an overall economic gain in reduction of installation costs.

Showcasing to broader community

Joe is an active advocate of the burdekin sugar industry and always willing to trial new practices and share results to farmers (Local and other regions) and industry representatives. Joe has been involved with project catalyst for several years and also a member of the NQ Dry Tropics Sugar Innovations Program.

Joe is a proud advocate of the accomplishments of Project Catalyst. "We need to be proactive, but still address economics of keeping agriculture viable,.

Right (from top):
Joe presenting his trial to recent field tour

Middle: Joe on his trial site with plant on drip.

Bottom: Putting in drip tape.

JOE MUSCAT
SUGARCANE PRODUCER AND NUFFIELD AGRICULTURAL SCHOLAR

Seven principles of a successful agribusiness

As seen in the Sydney Morning Herald, February 19, 2015

Managing a 445-hectare, family-run farm in Queensland is a highly challenging and rewarding occupation. We grow a range of crops, from sugar cane, soybeans, mungbeans, peanuts, to fibre-crops such as industrial hemp, kenaf and sunn hemp. We work long hours doing all kinds of activities essential to the health and productivity of the crop, like nutrition, weed management, irrigation, planting and harvesting.

Most small business owners wouldn't automatically relate to the business of farming. But over the years of building a successful agribusiness I've come to believe the business of farming is no different to any other small business. Here are my seven principles of a successful agribusiness.

1. Hard graft

It sounds obvious but the first and most important factor in running a successful business of any kind is putting in the hours. Set the bar high, commit to achieving your goals and go for it. Without effort you are unlikely to reap rewards.

2. Stay across international best practice

As a Nuffield Farming Scholar, I have been lucky enough to study farming practices all over the world. By looking at what's worked historically and what kind of technology and systems are being implemented successfully in other parts of the globe, we have been able to incorporate these best practices into our farming system, which has helped us improve productivity and efficiency across all aspects of our farm.

3. Mitigate risk

Managing risk is imperative to success and farming is no different. Climate change is a big one. It can cause floods, drought and other threats to the crop over which we have no control. We can't fight climate change but we can put measures in place to protect the crop. For example drainage systems, water storage, scheduling equipment for irrigation programs. My advice to any small business owner would be understand what the risks are to the business and put measure in place to mitigate that risk as far a possible. But

Right:
Joe Muscat in the São Martinho's sugar growing region, Brazil. Joe plans on establishing the first Amuza trial in Australia on his Oakenden farm in the Mackay region.

don't loose sleep over the factors you can't control.

5. Peer-to-peer learning

While at times, as a business owner it may seem like it's you against the world, one of the most important things I have learned during my years as a farmer is collaborating with others can help to achieve your goals.

A good example of this is an initiative I'm involved in with other Queensland cane growers. Project Catalyst seeks to help farmers implement innovative farming practices to reduce soil degradation and improve the water quality running off the cane farms and damaging the Great Barrier Reef. Individually farmers were not able to solve this problem. But together, with the support from organisations like Reef Catchments, WWF and The Coca-Cola Foundation, the lines of communication are now open and a whole range of strategies have been implemented as a result, from better irrigation methods, better nutrition programs and more. It's a winning formula.

5. Innovate

Having an understanding of what others are doing successfully in your area will give you direction. But unless you can be creative and at times summon the bravery to try something completely different you'll fail when it comes to setting yourself apart from the crowd. It takes bravery to step outside your comfort zone. Be informed by what others are doing but don't be afraid to lead when it counts.

6. Consider vertical integration

Something I have seen done brilliantly by some peers in the farming sector, but can also be applied to other industries, is the vertical integration of a business; essentially adapting your business model to take ownership of your own supply chain.

There is a wonderful example of a cattle producer I know who did this in Canada. Fifteen years ago he had a graze-fed system, a small fed lot and the business was struggling. After taking a step back and analysing the business model they started processing and retailing their own meat.

Today they are producers of grain cattle and feed lot cattle. They've got a processing system in a retail outlet which not only sells their meat, but other feed lot's meat too. Also, they've introduced pork, chicken and cured meats through their retail outlets. They've added value to every area of the business and avoid the fees and supply chain hold ups that we so costly in the past.

7. Love what you do

Running any business can be entirely consuming at times. You've got to be 100 per cent passionate about what you do come through the challenging times. Otherwise you may as well just hang up your hat.

Joe Muscat and his son Stephen own a 445-hectare sugar-cane farm in Oakenden, Mackay region, Queensland.

Project Catalyst is a pioneering partnership aimed at reducing the environmental impacts of sugar production on the Great Barrier Reef through innovative farming practices. As a result of the initiative, 78 farmers are working to improve soil, nutrient, pesticide, irrigation and storm water management on over 24,000 hectares of farmland. Project Catalyst is made possible by natural resource management groups Reef Catchments, Catchment Solutions, NQ Dry Tropics and Terrain Natural Resource Management and support from the Australian Government, WWF and The Coca-Cola Foundation, which has contributed $3.25 million to the Project over the past six years.

Right:
Joe is a generational farmer, whose family have been growing sugarcane for almost 50 years in the Mackay region. He currently produces sugarcane and rotational crops, which include soybeans, mung beans, peanuts, maise and fibre crops such as industrial hemp, kenaf and sunn hemp on his 325 hectare property in the Oakenden area within the Sandy Creek catchment, South-West of Mackay.

As part of his Nuffield Agricultural Scholarship, Joe is investigating the topic: Can Fibre crops such as Kenaf, Sunn Hemp and Industrial Hemp add value to the Australian sugar industry?

Grower Contacts | Project Catalyst 2015

Mackay Whitsundays

Serg Berardi	0407 033 529	serg_berardi@bigpond.com
Chris Blackburn	0413 581 042	madchris@easynet.net.au
Lee Blackburn	0405 140 322	blacky@easynet.com.au
Bill Blair	0402 832 625	billandshira@bigpond.com
Mark Blair	0429 629 337	msbls@bigpond.com
Justin Blair	0429 629 337	msbls@bigpond.com
Tony Bugeja	0417 711 468	marg_tonybug@hotmail.com
John Bugeja	07 4959 7115	marg_tonybug@hotmail.com
Mark Bugeja	07 4959 7115	marg_tonybug@hotmail.com
Shane Butler	0413 111 601	faustfarming@gmail.com
Gary Considine	0410 588 634	gconsi@tpg.com.au
Ian Considine	0410 664 890	consi1@bigpond.com
Gerry Deguara	0427 541 254	deguarag@bigpond.com
Joe Deguara	0408 780 958	joe_deguara@bigpond.com
John Deguara	0419 784 945	pfdeguara@bigpond.com
Phil Deguara	0417 796 468	pfdeguara@bigpond.com
Sam Deguara	0400 495 412	samdeguara@gdh.net.au
David Ellwood	0427 166 412	ellwood.5@bigpond.com
Peter W Faust	0418 757 978	peterfaust@optusnet.com.au
John Fox	0408 772 666	jjfox@activ8.net.au
Andrew Guy	0428 772 254	andyguy03@gmail.com
Tony Jeppesen	0414 322 729	tonyjep@bigpond.com
Norm Large	0417 158 656	enlarge@tpg.com.au
Tony Large	0427 472 541	tanel@tpg.com.au
Michael Muller	0411 403 372	mc01231@bigpond.net.au
Joe Muscat	0429 377 162	josephm@jcsenterprises.com.au
Stephen Muscat	0438 597 270	stephen.muscat@bigpond.com
Mark Orr	0418 196 170	mor27835@bigpond.net.au
John Pastega	0407 165 661	pastegaholdings@bigpond.com
Lou Raiteri	0427 188 079	warabud@bigpond.com
John Simpson	0417 618 437	jwctsimpson@bigpond.com
Scott Simpson	0429 686 667	whithair@bigpond.net.au
Rob Sluggett	0459 688 844	robert.john7@bigpond.com
John Stevens	0437 827 391	jndstevo@bigpond.com
Neil Walpole	0419 645 888	shell-pole@bigpond.com

Project Catalyst Grower Contact Resource

Grower Contacts | Project Catalyst 2015

Wet Tropics

Stephen Accornero	0409 343 487	accospa@itnq.com.au
Rob Bonassi	0410 320 233	rlbonassi@bigpond.com
Robert Brooks	0408 181 641	rnk94@bigpond.net.au
Ken Clarke	0400 877 311	
Sergio Fighera	0402 902 887	sfighera@bigpond.com
Richard Gherardi	0417 645 124	srgherardi@bigpond.com
Robert Gherardi	0418 787 791	rlgherardi@itnq.com.au
Tom Gilbert	0417 615 286	tjbgilbert@bigpond.com
Joe Girgenti	0429 708 130	grcgirgenti2@bigpond.com
Anthony Marino	0417 647 712	akmarino@bigpond.com
Orazio Marino	0417 629 351	oamarino@bigpond.com
David Morselli	0417 765 044	davo0@bigpond.com
Michael Ottone	0429 340 113	mickjen88@bigpond.com
Peter Ottone	na	mickjen88@bigpond.com
Mario Raccanello	0417 180 378	marfrac1@bigpond.com
Norm Reid	0427 772 132	reidatmasters1@bigpond.com.au
Peter Reid	0427 042 522	reidatmasters@bigpond.com.au
Darren Reinaudo		reinaudofarming@bigpond.com
Michael Reinaudo	0408 010 588	reinaudofarming@bigpond.com
Nelson Reinaudo		reinaudofarming@bigpond.com
Victor Reinaudo	0418 796 766	reinaudofarming@bigpond.com
Ray Zamora	0428 302 486	ray.debzamora@activ8.net.au

Grower Contacts | Project Catalyst 2015

Burdekin		
Rob Ahern	0428 835 200	ahernrk@bigpond.com
Jeff Brotto	0418 885 957	lbrotto@bigpond.net.au
Charlie Cacciola	0407 743 350	cgcac@bigpond.com
Mark Castelanelli	0419 654 469	the-castars@bigpond.com
David Cox	0428 757 575	david.cox@davcofarming.com
Peter Fiamingo	0427 827 219	pfiamingo@bigpond.com
Ian Haigh	0418 181 335	idhaigh@bigpond.com
Mark Hatch	0427 827 277	hatchearth@bigpond.com
Paul Hatch	0428 827 350	hatchfarming@bigpond.com
Chris Hesp	0429 827 330	cs_hesp@activ8.net.au
Gavin Jones	0427 193 622	gjones@activ8.net.au
Ryan Jones	0427 111 176	glenis.jones@bigpond.com
Russell Jordan	0427 768 479	jorfar@exemail.com.au
Aaron Linton	0407 826 270	aalinton@bigpond.com
Joe Linton	0409 635 434	j.linton33@bigpond.com
William Lucas	0429 980 056	wjlucas@activ8.net.au
Chris Lyne	0400 306 754	clyne.01@hotmail.com
David MacDonald	0418 778 430	davemac@nqhardfacing.com
Joe Magatelli	0428 540 138	joseph.deb@iinet.net.au
Jeffery Marson	0428 827 187	jeffery.marson@bigpond.com
Aaron Moore	0429 494 416	aaron.moore@cjact.com.au
Frank Mugica	0428 840 122	mugies@bigpond.com
David Nielson		davidnielson75@bigpond.com
Ben Nielson	0428 832 540	bennielson77@bigpond.com
Dave Paine	0427 167 159	dpaine@bps.net.au
Denis Pozzebon	0427 961 794	pozzo07@bigpond.com
Paul Roncato	0419 990 209	ps@roncato.com.au
Mark Rossato	0418 821158	markrossato@skymesh.com
Ian Shepherdson	0427 822 668	ianliz3@bigpond.com
Robert Stockham	0418 778 836	stockhamcons@bigpond.com
Brian Strathdee	0419 826 749	stiger59@bigpond.com
Joe Tama	0417 194 185	gtama@bigpond.com
Paul Villis	0427 854 335	paulandfionavillis@westnet.com.au

NOTES| Project Catalyst 2015

Leading farmers show the way.

Project Catalyst

For more information contact:
REEF CATCHMENTS (MACKAY WHITSUNDAY ISAAC) LIMITED
PHONE (07) 4968 4200
EMAIL info@reefcatchments.com
WEB www.reefcatchments.com