

PROJECT CATALYST

PROJECT CATALYST 2024 – **LEADING REVOLUTIONARY CHANGE – SHAPING THE FUTURE**



AG TECH

*The future of smart farming,
save time and money*

DIVERSIFYING

*Embracing change from
paddock to palate*

CARBON CONFUSION

*Cutting through the noise
with science*



Image: Phil Deguara, Willy Lucas, Andrew Campbell, Tony Bugeja, Gerry Deguara and Ray Zamora in Canberra

CATALYST COLLABORATION

We're excited to be back in Mackay for our 2024 Project Catalyst Annual Forum. As many of you know, Mackay holds a special place in Project Catalyst's long history as it's where nineteen local growers joined The Coca-Cola Foundation and WWF-Australia to embark on a fifteen year long innovation and practice change adoption journey. Standing the test of time, Project Catalyst has pioneered new farming innovations and created great value for growers and stakeholders. The project has also contributed to the longevity and improved farming conditions across the wider sugarcane industry and laid the foundation for many Queensland sugarcane growers to create enduring water quality and environmental improvements that are helping rejuvenate and preserve the Great Barrier Reef.

Since Project Catalyst commenced with the trialling of innovative sugarcane farming practices to improve productivity and create environmental benefits, the project has worked with more than 300 farms and over 80,000 hectares of sugarcane crops. Along the way, Project Catalyst also became heavily involved in many emerging fields that now underpin modern sugarcane farming including recognising the importance of soil constraints, zonal application of ameliorants to provide only what the soil and crop needs, farming with nature through regenerative practices such as the planting of legume and multispecies break crops to improve soil health, build Nitrogen and replenish trace elements. It seems all too logical now that farming smarter saves time, saves money and improves productivity, but it took a bunch of dedicated growers to discover and develop the solutions to problems we didn't know we had and this pioneering spirit continues to run strong.

When I came into Project Catalyst almost five years ago, what struck me was the comradery amongst Project Catalyst growers and a shared passion to farm better and to do good, not just for their own satisfaction, but to support each other and share experiences, ideas, successes,

and the occasional failure. As I got to understand what makes Project Catalyst tick, I realised that it's a wonderful and very early example of what social scientists today call a 'Community of Practice', which is a group of people who share a common concern, problem or interest, who work together to create new knowledge, learn how to do things better and share their best practices with others. To me this describes perfectly how Project Catalyst works and why it does so well.

More recently I spent over a week meeting with growers from Mackay to Innisfail and many places in between to talk about future innovation ideas, that can be put to interested potential funding partners. We had some really great meetings where the ideas flowed and that pioneering passion again showed through very strongly. It was great to see that fire in the growers eyes and it was reassuring to know that the desire to refocus on innovation remains ingrained. Please remember that there is no such thing as a bad idea and we encourage you to work with your on-ground service provider or directly with myself so we know what ideas we have to work with and develop.

I'd like to take a moment to thank our committed funding partners, the Great Barrier Reef Foundation (GBRF) and The Coca-Cola Foundation, both of whom continue to support

Project Catalyst growers engaged in practice change adoption programs across the Mackay Whitsunday, Burdekin and Wet Tropics regions. The resilience of Project Catalyst continues to shine as we keep looking for new opportunities to maintain and build our innovation and practice change programs, to create new levels of productivity improvement and environmental performance in sugarcane and perhaps across other agricultural sectors.

As always though, the program could not exist without the generous and ongoing support from you, the growers. We have growers still involved with the program fifteen years after it began, sitting alongside others who have only joined the team in the last year. Thank you for giving your time and making your farms available to work with our on-ground service providers in researching and implementing improved farm management practices. With all your support, Project Catalyst has made real inroads in spreading best practice farming techniques for the benefit of more growers, new to the Project Catalyst fold.

I'd also like to welcome any growers who are at Project Catalyst Forum for the first time. Please make the most of the opportunity to see what other growers are up to, discuss ideas and share your stories. We hope you find the presentations and activities interesting and informative.



Ross Neivandt leading innovation discussions with Project Catalyst growers in Ingham

FEATURE



END OF AN ERA

Celebrating a 15-year innovation partnership



SPEAKERS

Sharing knowledge, inspiring change



GREAT BARRIER REEF FOUNDATION

A Bright Future: new systems, technologies, and financing



MACKAY REGIONAL COUNCIL

Reef habitat fish modules attracting fishers in Mackay

From Andrew Campbell and I at Catchment Solutions, we hope you enjoy Project Catalyst Forum 2024 and can take time to catch up with old mates and make a few new ones. As always, let us know what you think, so we can continue to provide you with information and opportunities that interest you and your fellow growers as they arise.

Ross Neivandt
Project Coordinator – Project Catalyst
Catchment Solutions



Great Barrier Reef Foundation



BROADER ADOPTION PROJECTS

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MACKAY

Steve Vella - Next generation high efficiency phosphate fertilisers.
Richard Galea - Tailored nutrient management plans.

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BURDEKIN

Dave Fowler - Trialling biostimulants in plant cane.
John Arrate - Applying molasses to feed organisms.

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WET TROPICS

Alan Lynn - Benefits of social networking
Ray Rinaudo - Calculating potential Nitrogen using biomass.
Alan Aquilina - Benefits of cowpea, lablab, and sunn hemp.



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FORUM/CONFERENCE PROGRAM

SUNDAY, FEBRUARY 18TH

WELCOME FUNCTION Thanks to Wilmar Bio Dunder & Nutrien Ag Solutions
Ocean International Hotel – 1 Bridge Road, Mackay

17:00 – 19:30	Delegates Check-in (Collect name tag) - Join us for drinks and canapes
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MONDAY, FEBRUARY 19TH

GROWER FORUM/CONFERENCE

Function Room Level 5 – Ocean International

07:30 – 08:00	Delegates Check-in (Collect name tag)
08:00 – 08:10	Housekeeping and Introductions - MC Tony George
08:10 – 08:15	Welcome - Reef Catchments - Katrina Dent
08:15 – 08:25	Great Barrier Reef Foundation - Colleen James
08:25 – 08:40	Virtual Farm Tour - Leading Revolutionary Change
08:40 – 09:10	Coca-Cola Foundation - Anna Dear and WWF-Australia - Sharelle Polack Project Catalyst - 15 Years of Innovating for Australia's Farming Future
09:15 – 09:45	Keynote Speaker - David Hardwick: Regenerating our Soils for the Future

09:50 – 10:20 MORNING TEA Thanks to LiqiaForce

10:20 – 11:30	Project Presentations Session - 3 x 20 minute presentations each Nutrien Mackay - Audra Allan, Richard Galea and Stephen Vella Burdekin Productivity Services Ayr - Jasmine Girgenti Herbert Cane Productivity Services Ltd Ingham - Bethany Donker and Megan Zahmel
11:30 – 11:45	Virtual Farm Tour - Shaping the Future
11:50 – 12:20	Keynote Speaker - Jannik Olejas: Sweet Horizons: Navigating the Sugar Industry towards 2030 and beyond

12:30 – 13:30 LUNCH

13:30 – 14:40	Breakout Session 1 Group 1: Leading Revolutionary Change presentations from: 1 - Jason Bradford - <i>Balancing Farming and Habitat on the Edge</i> 2 - Ray Zamora - <i>Diversification Paddock to Palate</i> 3 - Gino Zatta - <i>Fallow Cropping to Harvesting Hemp</i> Group 2: Shaping the Future presentations from: 1 - Professor David Rowlings - <i>Carbon and Natural Capital; cutting through the noise with science</i> 2 - Alex Olsen and Mostafa Rahimi Azghadi - <i>Smart Spot Spraying in Sugarcane</i> 3 - Paul Brady - <i>SwarmFarm Robotics - Smart Farming Futures</i>
14:40 – 15:40	Breakout Session 2 (same groups as morning) Group 1: Shaping the Future (as above) Group 2: Leading Revolutionary Change (as above)

15:40 – 16:10 AFTERNOON TEA Thanks to Reef Catchments

16:10 – 16:25	Ross Neivandt, Project Catalyst Coordinator - On the Way to the Future
16:25 – 16:30	Wrap Day 1 and Preview Day 2 - CLOSE
16:30 – 16:45	Group photo

FORUM DINNER

Thanks to Mackay Regional Council & Aglantis
Function Room – Ocean International

18:00 – 18:45	Pre-Dinner Drinks
18:45 – 23:00	Formal Dinner - three courses with drinks MC - Tony Jeppesen, Catalyst Grower and Innovator Guest speaker - Jamie Jurgens - VJK Produce Bowen 5th generation farmers who have been farming in the Bowen region since 1915, Jamie's story of sustainability and robotics will transform your thinking

FIELD TRIP / FARM TOUR PROGRAM

TUESDAY, FEBRUARY 20TH

FIELD TRIPS Thanks to Farmacist & Metagen

GROUP 1

Corals Down Under / Pioneer Valley Field Day

08:00 – 08:15	Registration check-in
08:20 – 08:40	Board buses/cars - travel to Corals Down Under <i>Martin Street, North Mackay</i>
08:40 – 09:40	Group Tour of Facilities
9:40 – 10:00	Board buses/cars - travel to Western Suburbs Leagues Club <i>10 Branscombe Road, Walkerston</i>

10:00 – 10:30 MORNING TEA - CANTEN

10:30 – 11:30	Presentations West's Clubhouse Function Room Alternative fuel sources and GPS functions Simplifying fertiliser programs, enhancing nutrient efficiency LAND Hub Mackay Water Quality Project and DIN reduction
11:30 – 12:30	Pioneer Valley Field Day free time

12:30 – 13:30 LUNCH - WESTS CLUBHOUSE

13:30 – 15:30	Group Tour of Pioneer Valley Field Day New Holland - T6.180 DCT – T7.190 AC – GPS Seat Simulator. Aerial Asset Control - Commercial Drone capability display spraying and seeding, <i>Dji T30 Agras</i> which has a payload of 30 litres. Aglantis - upgrades that enable older GPS screens to connect with the cloud, ensuring seamless integration with most farm management software and transferring data to a central platform. Farmacist - an interactive stall displaying Observant automation options. The timed actuator is currently in three trials, see the developments in its design. LiquaForce - LAND Hub digital display: soil test results, calculating a nutrient management plan and selecting the appropriate fertiliser to execute. Reef Catchments - TNQ Drought Resilience Hub, soils, testing, rotational crops, microbe interactions PLUS how to get involved in local projects like the Koala project, Sandringham Wetland Complex, Fish barrier Prioritization, Reef Trust streambank projects. AutoWeed - demonstration of an AutoWeed spot spraying unit targeting a pot plant and videos of the AutoWeed system in action.
15:30 – 16:00	Board buses/cars - travel to Ocean International <i>1 Bridge Road, Mackay</i>

GROUP 2

Pioneer Valley Field Day

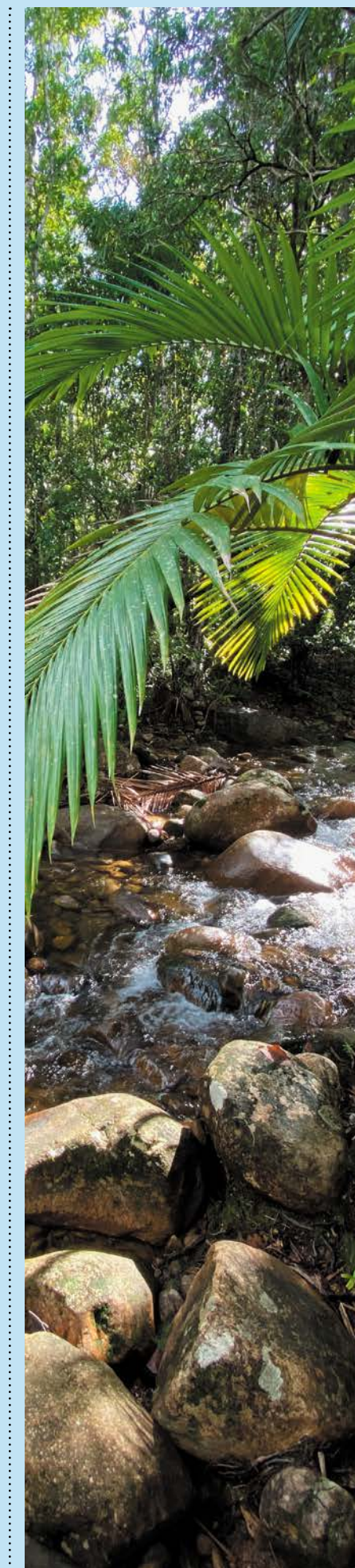
08:30 – 08:45	Registration check-in
08:50 – 09:10	Board buses/cars - travel to Western Suburbs Leagues Club <i>10 Branscombe Road, Walkerston</i>
09:10 – 10:10	Presentations West's Clubhouse Function Room (as above)

10:10 – 10:30 MORNING TEA - CANTEN

10:30 – 12:30	Group Tour of Pioneer Valley Field Day (as above)
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12:30 – 13:30 LUNCH - WESTS CLUBHOUSE

13:30 – 14:30	Board buses/cars - travel to Ocean International <i>1 Bridge Road, Mackay</i>
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Coca-Cola's global head of sustainability, Bea Perez, with grower, 2015



Fifteen years of innovating for Australia's farming future

Egrets following the harvester, 2015

Modern Australian farming relies on innovation to thrive. For more than 15 years, a visionary group of Queensland sugarcane growers brought this mindset to Project Catalyst. One of the longest running partnerships of its kind, Project Catalyst started in 2009 with an initial group of just 19 canegrowers. It brought together an unlikely alliance of farmers, The Coca-Cola Foundation, WWF Australia, NRM groups, federal and state governments with the goal of improving the health of the Great Barrier Reef. "I've said it before, we were strange bedfellows – WWF, Coca-Cola and the growers. But we couldn't have done what we did without each of the others. Being in partnership with one another opened all our minds," said Tony Bugeja, one of Project Catalyst's pioneer growers.

Highlights from 15 years of partnership with Coca-Cola and WWF

- The national [Banksia Environmental Award, 2010](#), is taken home by Project Catalyst, at an awards ceremony in Sydney Town Hall
- Documentary '[Australia's Connected by Water](#)' premieres, 2014, showcasing the work of growers and Project Catalyst
- QLD Agriculture Minister Mark Ferner pays a visit, 2014, wanting to see a Project Catalyst farm first-hand
- Farms host [The Coca-Cola Company's Chief Sustainability Officer, Bea Perez](#), 2015, travelling all the way from Atlanta to see the project's impact
- Growers [raise awareness of Project Catalyst and its innovations](#), 2017, with a flying Sydney visit
- Cyclone Debbie [wreaks havoc across Queensland](#), 2017, revealing [how soil health can mitigate damage](#)
- Celebration of ten years of [Project Catalyst](#) with a visit to Parliament House, 2019, where Gerry Deguara told a meeting of heads of department that Tony Bugeja could talk so much they'd need to 'turn the timer over.'



Gerry Deguara and Natalie Fioeco (Pharmacist) in chickpea strip planted in 2013

“The whole basis of our business is the land. Environmental benefits matter on a personal level.”
Joe Muscat



A FIRST IN FORWARD-THINKING

With [95% of Australia's sugarcane produced in Queensland](#), Project Catalyst worked with sugarcane growers to improve reef water quality.

The project gathered a forward-thinking group of sugarcane growers with the aim of developing innovative agricultural methods to sustainably reduce the agricultural runoff impacting the reef.

“Catalyst built on what we had already, but made a lot more resources available to do what we wanted to do. We’ve grown since then dramatically,” grower [Tony Jeppesen said in 2020](#).

Across more than a decade of trial and error, Project Catalyst growers created better environmental outcomes and enhanced crop production through innovations including reducing pesticides, understanding their soil health through soil analysis and creating more environmentally friendly fertiliser.

When Cyclone Debbie smashed crops, homes and infrastructure across Queensland in 2017, those innovative agricultural methods revealed some key benefits.

“One thing we’ve been doing is using a lot of that byproduct from the mill sugar press, the mill mud, to build up nucleus in the soil,” [grower Lui Raiteri told the ABC](#).

“Normally we put it on top, but now through innovation and through Catalyst and our own urge to want to do it differently, we’ve been burying it.

“That’s stood by us this time, because it’s still there. It would have got washed away, god knows where it would have landed, but it’s still there, and we’ve benefited from that.”

The annual Project Catalyst Forum has been a key way to share ideas and learnings. It eventually became the biggest sustainable sugar industry event of its kind in Australia, and an important place for growers to swap notes and catch up.

“Networking has been so important. We can ring each other and have a chat. We’re friends, not just acquaintances. The one thing I’ve learned is you can speak your mind at a Project Catalyst Forum. You can investigate,” said Tony Bugeja.

The network of like-minded innovators expanded beyond the project. Project Catalyst growers shared learnings outside their sector, organising an informal study exchange with Tasmanian farmers. Conversations on the trip focused on common issues and sharing learnings on improvements to soil health.

Successful innovations from Project Catalyst

- **Soil management and mapping** are helping restore and protect soil properties and get better yields.
- Using **variable rate application** and soil mapping means growers can more effectively target pests and reduce chemical usage.
- **Nutrient management plans** are now balancing nutrient with yield potential to reduce nutrient losses to the Reef and the wider environment.
- Improved **water management** means more efficient use of water, greater reuse of water and an improved quality of runoff.



“I’m a fourth generation cane farmer... Project Catalyst is great. Gives you new ideas, innovations.”
Gary Raiteri



“My son Mark loves farming. I want to leave the place in a better position than when I took it over.”
Tony Bugeja

THE LEGACY OF LEARNING

The legacy of sustainable agriculture means growers can maintain healthy land for future generations. Among the Project Catalyst growers are intergenerational farming families determined to keep innovating, improving, and stewarding land for the future.

“Project Catalyst made me realise we needed to broaden our thinking. We make decisions based on profit; we can make decisions based on the environment, too,” said Tony.

“We’ll keep showcasing what we’re doing. We know we’re doing good work environmentally and growing better cane.”

The legacy of Project Catalyst learnings and successes will continue to grow in importance. In 2024 and beyond the need will only increase for the agricultural sector to consider sustainability in their practices.

FROM CURIOUS GROWERS TO MEANINGFUL OUTCOMES

Over the past 15 years, The Coca-Cola Foundation has supported Project Catalyst, alongside WWF-Australia, with funding of over A\$8.5m - making it one of Coca-Cola’s longest serving philanthropic projects in the region.

Through their own innovation, by 2019 project participants had [improved the quality of 150 billion litres of water flowing into the reef and reduced runoff by 180 tonnes per year](#).

By 2023, Project Catalyst had expanded to cover 209 farmers responsible for 48,000 hectares, or approximately 13% of all sugarcane farming land in Queensland.

A recent independent report found Project Catalyst was an exceptional example of an innovation platform and program that facilitated innovation trials, enabled adoption of practice change and provided opportunities for peer-to-peer learning.

Many grower practice changes have resulted in productivity improvements that have helped growers to increase their returns against industry trends.

“I can remember talking to people from Atlanta, and they said most Coca-Cola water projects went for two to five years. To think we could start with just 19 growers and be here now, well, we should all be proud of what we’ve achieved.”

The launch of the Taskforce on Nature-related financial disclosures in 2023 means nature-related reporting on the impacts of companies on nature will follow a similar path as climate-related reporting.

Climate reporting requirements from 1 July 2024 mean larger companies and emitters will need to report on their emissions and climate impacts, with input from across the supply chain.

There are also potential future opportunities for growers to benefit from environmental stewardship. The passing of the [Nature Repair Bill in December 2023 by the Australian Parliament](#) establishes a framework for a world-first national, voluntary, legislated Nature Repair Market that will reward landholders for protecting biodiversity.



SPEAKER PROFILES



Tony George

Emcee Extrordinaire

Tony George is one of Cairns most popular entertainers and bands, providing 20+ years of high-quality musical entertainment and MC services. Born in Kyabram, Victoria, and later raised in Melbourne, Tony has lived and built his successful career in Cairns since 1994.

His career has taken him from the State Bank of Victoria, to resort Manager in the Northern Territory that also included Crocodile spotting tours! Tony, eventually became a professional entertainer fulfilling his dream of working and having fun with people like us at the Cairns Forum 23.

"I was absolutely blown away by hosting the Project Catalyst conference last year. I was so interested in seeing first-hand how engagement between all stakeholders can make a difference in innovation, efficiency, and best practice methods for agriculture."

In 1994 Tony George Entertainment launched, delivering performances as a solo singer guitarist right through to 7-piece bands. As an MC and host to a range of conferences, corporate events, Weddings, and Awards nights, Tony works for a variety of clients providing voice overs for ads, documentaries, and films.

"Since you saw me last year, I've had a massively busy year, culminating in performing for 1,200 attending the Queensland Tourism awards, and performing at the newly opened Cairns Convention Centre in September 2023."

Showing his age and experience Tony lists the highlights of his career performing as a musician for Prime Minister John Howard and other Government dignitaries, high profile film and Television actor celebrities and a host of VIP's from around the globe. Even so he recalls Ryan Donnelly and Tony Rossi leaving a lasting impression.

"Two presentations I found fascinating....one was the Reef Restoration keynote early in the morning and the other one was regeneration of land later that afternoon. Very eye opening."

When initially contacted by organiser Kim Kleidon, it was an immediate YES to fly to Mackay.

"For me, it's being involved in the process of change for the better.... groups from different industries and interests coming together to share information and data, and freely communicating their experiences and theories for future projects."



Colleen James

Great Barrier Reef Foundation

As Water Quality Program Manager at the Great Barrier Reef Foundation, Colleen (CJ) James' work focuses on protecting the Great Barrier Reef by enabling strategic partnerships, promoting the uptake of new technologies, and supporting farming and grazing management practices that reduce nutrient, sediment, and pesticide losses for improved water quality.

Her passion for sustainable agriculture came from living and working on cattle stations when she was young. Wanting to understand how agriculture systems, challenges and solutions vary globally, she traveled extensively, working on ranches in north America and eventually completed a ranch management program in Texas.

"Those early experiences developed the drive to continue learning and developing a deeper understanding of innovative, sustainable agricultural practices that lead to positive environmental outcomes, while delivering on essential global food and water security."

CJ spent many years involved in Project Catalyst through her role at NQ Dry Tropics as the Sustainable Agriculture Program Coordinator in the Burdekin. Bringing extensive program experience in natural resource management, water quality, and sustainable agriculture across grazing, sugarcane, and horticulture systems to her role as the Water Quality Program Manager for the Tully-Johnstone, Lower Herbert, Upper and East Burdekin, and Bowen, Broken and Bogie regional water quality programs.

"I'm an avid kayaker and scuba diver, so I'm passionate about the Great Barrier Reef and believe that a sustainable agricultural industry and a healthy reef is achievable."

She is keen to share some of the innovative new systems, technologies, and financing options developed through the Reef Trust Partnership Water Quality Innovation and System Change program and provide a summary of the nutrient and pesticide focused regional water quality program achievements.

CJ holds business qualifications from James Cook University and is currently undertaking postgraduate studies in Agribusiness at the University of Queensland.



David Hardwick

Agroecologist Soil Land Food

With over 20 years' experience in rural landscapes, farming and food systems, David develops and delivers many of the extension projects for Soil Land Food across Australia.

"Cane farming is no longer just about growing food. It is also about having a social licence and looking after our environment. After people, soil is the next pivotal element in every farming system as it controls the cycling of nutrients and water and drives plant growth."

Working in community development and then horticulture before completing a dairy traineeship on an organic dairy in NSW, his wide-ranging career working in both management and technical roles, includes Landcare extension, agronomy, soils, agribusiness, biofertiliser R&D and manufacturing.

David's passion is agroecology and empowering farmers with knowledge and skills that make a difference, sharing organics, training, and consulting with agricultural entities and NRM's.

"Healthy soils also influence the health of catchments and biodiversity across the wider landscape and waterways. So, soil is central to everything in cane farming and the wider environment."

With both practical and applied knowledge, for many years he helped run a regional farmers market business with his wife Suwanna, before working on rural cooperative and social enterprise projects. In demand across the country, David teaches soils, regenerative agriculture, farm planning and agroecology at TAFE NSW on a casual basis.

"Building and maintaining high functioning soils in cane farming systems requires a whole of farm approach and new thinking. It also means following a logical sequence of steps to ensure success."

Understanding cane farmers have started this process and there are a number of key elements to success when you embark on this change, David will outline those steps during his keynote presentation, Regenerating Our Soils for the Future.



Jannik Olejas

CEO - Mackay Sugar

CEO of Australia's second largest sugar milling company, Mackay Sugar, and Chairperson of the Australian Sugar Milling Council, Jannik is an advocate for high performance and excellence. Committed to leading the sugar industry, particularly Mackay Sugar, towards a successful future as part of the international Nordzucker Group.

"Sweet Horizons: Navigating the Sugar Industry towards 2030 and beyond paints a picture of our journey into the future. I will discuss the innovative collaborations, technological advancements, and the sustainable practices the future will hold."

Arriving in Queensland in 2019 from Copenhagen eager to reinvigorate community support for the sugar cane industry, Jannik brings a global perspective to Australia's sugar milling sector. With his passion for creating a sustainable and resilient future for agriculture, he is deeply interested in using innovation and collaboration to find new approaches and challenge the existing, as well as exploring green alternatives for the use of sugar, sugar cane and other products.

Through his work with the Greater Whitsunday Alliance, Jannik is a driving force behind the growth and development of the sugar industry as a potential manufacturer of bioproducts, using many of the region's unique opportunities to capitalise on expected global growth.

During his presentation Jannik will invite you to,

"Join us as we chart a course beyond sweetness to shape a landscape where the sugar industry stands resilient, agile, and more versatile - poised for success in the years to come."



Ray Zamora

Project Catalyst Grower Euramo, FNQ

Diversity: Paddock to Palate

Since taking over the family farm from his father Ron in 2007, Ray continues to learn and embrace new ideas. Originally taking an interest in practice change adopting controlled traffic in 2003, four years later he moved to 1.9m dual rows, GPS in 2008, followed by zonal tillage in 2012 – the same year he encountered Project Catalyst through Terrain NRM.

His true passion to this day is soil health. "It kind of dawned on me one day when I was out in the paddock spraying or something, I realised I didn't know anything about the soil," he said in a 2017 Australian Cane Grower magazine article.

After completing a course to make Bio-fertiliser in 2014, he converted his thinking from what he could kill, to what he could GROW. Ray began to focus on crop diversity, both in his cane varieties and cover crops.

"Mother nature doesn't grow monocultures, there's always different plants intermingled together."

With his soil depleted over decades of conventional farming, he knew that synthetic fertilisers weren't going to fix it. Implementing all the changes, the proof is in his yield and productivity, reducing his Nitrogen and potassium, the tonnes per hectare increased.

The diversification doesn't end there, praised as a true innovator, and awarded for his tonnes and water quality improvements, in the last year Ray decided to branch out into the culinary field, producing a new income. "I have been making cane syrup for some time now just for family and friends. I dreamed of selling it as I love the taste of it, (so does his family and friends! KK) but it was daunting; how would I make it in large volumes, then sell it – would people even want it?"

The 2023 Cairns Forum took Ray to a place where all those questions were answered the FNQ Food Incubator. His first networking event was a smash hit with people signing up to work with him. No one in Australia makes it, so that would make him the biggest 100% pure cane syrup producer in the country. Not to mention creating a legacy for his children – the best succession plan.



Gino Zatta

Catalyst Grower Bambaroo, Ingham

Growing sugarcane for more than 35 years brothers Gino and Remo Zatta are described as progressive and open to new ideas. Farming over 330ha of cane, they've adopted many new practice changes in an effort to improve productivity and profitability, whilst reducing environmental impacts to the waterways that border their operations. Gino believes that excessive ripping, discing, and other cultivation methods are detrimental to soil health and can contribute to yield decline. Land preparation is a major cost for sugar cane growers and reducing cultivation can decrease tractor hours and labour hours, lowering the overall production costs.

"I'd like to share a brief history of the farming enterprise, size, what we grow, as well as farming and environmental practices. As farmers we can all learn from each other's experience."

In the last 15 years Zatta Farming has completely transformed their previously conventional methods to adopt minimal tillage, legume crops in fallow, zonal mud application, and double disc billet planting. Joining several programs through Terrain NRM and working with DAF Economics, Gino has witnessed the physical, chemical, and biological improvement to his soil, both on family paddocks and newly acquired blocks.

"We wanted to reduce our fertiliser rates so when these programs came along, we saw it as an opportunity to purchase a variable rate controller so we could adjust our rates in soil zones that require less nitrogen as well as adjusting rates on plant cane and older ratoons."

Initially concerned about what would happen if the trial failed and whether the program compensated him enough, it worked by reducing their N application by 25kg per hectare. "This may not be a huge saving for our business, but it is a good result in terms of reducing runoff, and I only represent a fraction of the cane industry."

The changes haven't stopped there, Gino and Remo continue to trial a variety of fallow crops and cash crops. "We were looking for a rotational crop that would work in with the sugarcane and soybean crops. After being approached by DAF, we decided to trial industrial Hemp."

Gino will go through the pros and cons encountered and the outcomes associated with growing Hemp for the future markets.

SPEAKER PROFILES



Jason Bradford
Cattle and Cane Farmer Mackay

In the 50's, 60's and 70's the Department of Agriculture promoted the bunding of low-lying coastal areas adjacent to estuaries and salt marshes. Many coastal properties along the coast embraced this practice to preserve grazing areas, planting invasive species like Hymenachne from Africa to ensure fodder for cattle in the dry season.

Jason often says, "Hymenachne is a cattleman's dream, but a barra's nightmare."

A generational farmer Jason's Grandfather purchased the 117Ha cattle property in the late 60's, diversifying to sugarcane with his parents in the 1980's. Managing the areas of his mixed cane growing and grazing operation is challenging, from Sandringham Wetlands and ponded pasture to natural savannah and mangrove wetland, to an estuarine area at the convergence of Sandringham and Alligator Creeks where they meet the Coral Sea.

"This place is important, especially so close to town. I feel blessed: on any given day here, you can see things that people come a long way to see, wildlife-wise."

Abundant with life including fish, crocodiles, migratory and native birds, Jason is intent on increasing the diversity, working with Reef Catchments and Catchment Solutions to address invasive weeds and fish barriers.

"I had a situation where the waterways were being taken over by hymenachne, and that didn't sit right with me. I knew of local fish migrating into that lagoon from the estuary, and I knew what the potential was for those fish to exit again if everything all lined up. I thought there was potential to enhance that."

Mechanically removing the weed from the farm's primary irrigation dam - a 2.5ha reservoir, it was placed into stockpiles on a fallowed 'gluepot' paddock. 9 months later it had mulched down and was worked into the soil. In 2022 it was planted with cane and Jason noted an improved strike rate.

"A couple of months down the track, you could see the difference where it was planted. Overall, the cane was very healthy, and noticeably taller."

Jason's story will inspire and instigate a new way of thinking about managing natural areas of coastal properties.



David Rowlings
Associate Professor Queensland University of Technology (QUT)

A soil scientist in the Sustainable Agriculture program at the Centre for Agriculture and Bioeconomy, David Rowlings' research sits at the nexus of the environmental and agricultural science, enabling high impact research outcomes that benefit both fields for positive global change and food security.

Soil carbon and nitrogen cycling are just one of his research interests that will be presented at Forum 24. David feels there is not enough scientific data available to farmers. "Farmers are increasingly bombarded with conflicting and confusing information, on the potential for income diversification through carbon and natural capital markets and the best way to maximise these opportunities."

Specialising in the development and utilisation of improved sensing and monitoring technologies, for mitigating environmental greenhouse gases, improving crop fertiliser-use efficiency and monitoring soil carbon, reactive nitrogen, and biogeochemical processes. His work spans the Australian beef, dairy, grains, sugar and horticulture industries and he has worked internationally in cropping and rice systems.

"The farming literature and media sources are awash with advocates promoting easy and large-scale wins, counter to the scientific community outlining a lower potential and urging caution."

Working with farmers, state governments, the composting industry, and researchers from across Australia he currently leads the national Smart Farming Partnerships Unlocking the true value of organic soil amendments project, to develop a farm-ready tool for the effective management of composts into farm fertiliser budgets for environmental, soil health and economic sustainability. David's presentation will cut through the carbon confusion associated with the hype and hyperbole of the broad suite of management options that constitute regenerative agriculture.

"There is a concern that farmers are vulnerable to potentially misleading (and in the worst-case false) claims when faced with such complexity."



Alex Olsen
Managing Director & Co-Founder AutoWeed Pty Ltd.

Dr. Alex Olsen has over 10 years of experience in research and development with foundational understanding and expertise in machine vision and deep learning for precision agriculture. He holds a PhD in Electronics Engineering from James Cook University, where he conducted research showing the promise of deep learning for weed species detection and robotic weed control.

Co-presenting the results of a 4-year GBRF project, "Reducing herbicide usage on sugarcane farms in reef catchment areas with precise robotic weed control", a collaboration between AutoWeed, JCU, SRA and DAF with Mostafa Rahimi Azghadi, Alex has overseen 9 trials performed with different crop-weed scenarios using a 13-row high-rise sprayer, a 4-row boom sprayer, Irvin legs and flat boom nozzles.



Mostafa Rahimi Azghadi
Associate Professor James Cook University

Mostafa is currently an Associate Professor at James Cook University, Australia, where he develops high-performance artificial intelligence tools and techniques for a variety of applications from agriculture to aquaculture.

"Our presentation outlines the aim, method, results and outcomes of the project, which has seen the development and trialling of a new smart spot spraying technology for sugarcane that lowers input costs for farmers and reduces the environmental footprint of herbicide application."



Paul Brady
SwarmFarm Robotics

In 2012 Andrew and Jocie Bate partnered with two universities to develop and test their first autonomous RTV. By 2014 they'd built their first SwarmBot weighing only 300kg. In 2017 Campbell Newman shared the SwarmFarm Robotics story with the Project Catalyst family.

Currently the team have deployed autonomous robots to farmers who've used them to commercially farm over 1.3 million acres, operating for 68,000 hours and reducing pesticide inputs by an estimated 780t.

With 20 years' experience in various sectors of the agriculture industry including Ag machinery, precision agriculture, Biotechnology and crop protection within row crop and broadacre farming systems, Paul Brady knows the AgTech business inside out.

"We're creating tailored solutions for efficient and sustainable agriculture. Our robots are empowering farmers to deploy new technology in their fields with customised solutions for challenges faced in their local farming systems, developed around an autonomous farming platform, for farmers, by farmers."

Working with a range of farmers from different growing regions to build out case studies to better understand the impact of robots in their operations, Paul will present indicative statistics regarding robot use, the reduction of chemical output, the shift in mindset relating to IPM strategies, and the opportunity to introduce new modes of action that may have previously been cost prohibitive.

"There is obviously an opportunity to discuss the impact these robots are having on industry wide challenges such as skilled labour shortages, sustainability, soil health etc. Constantly adapting to the industry needs, now we are in discussions with a sugar company with over 9000ha of plantations in Africa."

Autonomous technology is the next step change for agriculture, allowing new farming techniques and methods previously not considered possible or practical.



Tony Jeppesen
Dinner MC

As a fourth-generation farmer, Tony is an early adopter of change - especially when it comes to water management on his 250ha property, of which 180ha grows sugarcane. With his wife Mandy and sons Ben and Sam, there have been many challenges over the years since they took over the business started by his Great Grandfather in 1921.

"My farming life has been greatly influenced by the information and networking I have received by being a member of Project Catalyst since its inception. To turn a farm around that had poor drainage, no irrigation and soils that were so depleted to what we have now is my greatest achievement."

A wide range of improved management practices implemented since 2006, include controlled traffic systems, addressing drainage, increasing soil health through cover crops, and securing water availability. Developing a water management plan, they identified key locations where new storage structures could be built.

"We wanted to improve our irrigation management but first needed to ensure that any investment in infrastructure could see a return."

An existing dam provided water for irrigation and in 2007, the Jeppesens received funding from the Queensland Government to construct a wetland, with the aim of providing water quality outcomes through increased detention times, allowing sediment to settle and removal of nutrients and pesticides.

"We could also reuse the water around the farm, retaining any pollutants within the system, whilst leaving enough for the fish and other wildlife."

His story of being on the family property, increasing water storage capacity, managing the way it moves across his farm and the influence of Catalyst on his entire operation will transform your perspective.



Jamie Jurgens
Dinner Speaker

Jamie was North Queensland's first Reef Guardian farmer, a title bestowed in recognition of his work around sustainable and environmental farming practices.

"We believe in long fallows and crop rotation helping us maintain soil sustainability. We grow a grass cover crop for a two-year fallow. The bulk is mulched often, which helps maintain good soil microbiology."

5th generation farmers who have been farming in the Bowen region since 1915, their Vee Jay's Tomato brand was first established in 1974 by Vern and Janette Jurgens. Jamie and Melita began their journey to organic certification in 2015 and received full organic certification in 2018. The Jurgens pride themselves on growing environmentally and socially sustainable, safe food, grown using a biodynamic farming system.

"We take biodiversity to the next level by increasing the natural flora & fauna on farm and by increasing the micro-organisms in the soil. We use a 'Bugs for Bugs' Integrated Pest Management (IPM) system which uses insects to control pests which harm our crops."

Precision Farming: Adopting a controlled traffic system on farm, using GPS technology which outlines permanent roadways and growing areas. Never driving tractors on the dedicated growing areas. This system minimises the destruction and compaction of soil. Controlled traffic improves the soil structure and water-holding capacity and minimises the amount of water required to grow crops.

Permanent Irrigation: invested in permanent irrigation systems to minimise water losses and reduce runoff. The water is caught in silt traps before leaving the property and recycled.

Crops: Certified Organic Green Beans
Certified Organic Sweet Corn
Certified Organic Pumpkin
Certified Organic Baby Capsicums
Certified Organic Snacking Tomatoes
Certified Organic Mini Melons

VJK also grows a range of conventional produce - green beans, sweet corn, pumpkin, and baby capsicums, between April and November.

VJK Produce is Australia's largest grower and supplier of Sweet Baby Snacking Capsicums.



The future looks bright with new systems, technologies, and financing options



Koumala grower Rob Hand inspecting his multispecies crop. Photo taken by Rob Sluggett from Farmacist

Since 2020, the Reef Trust Partnership Water Quality Innovation and System Change program has been addressing the need for transformational change in how water quality improvement activities are designed, funded, and implemented by supporting activities to make this change a reality.

Over 120 proposals were received on initiation of the program. Funded projects have begun to show results that will have a real impact on the way we do things. Here, we highlight some of our innovative projects.

Nitrogen Risk Insurance is a world-first insurance product. Developed by CSIRO in partnership with multinational insurance company WTW, it helps farmers manage the risk of reduced yields from reduced fertiliser application. This commercial solution has the potential to reduce 900t/yr DIN (20% of total discharged) if implemented in 50% of cane cropping area. Nitrogen Risk Insurance is currently available in regions such as South Johnstone, Babinda, Tully, Herbert, and Mackay.

Autoweed Ltd and James Cook University have developed a new smart weed technology to detect and spot-spray weeds. By harnessing deep learning technology (artificial intelligence) this system identifies and targets weeds without hitting non-target crops. On average, spot spraying has been 97% as effective as blanket spraying at weed knockdown. This approach also has the potential to reduce herbicide usage by 35% or more on sugarcane farms, as well as the mean concentration and load of herbicide in runoff by 40-60%.

Eco-Markets Australia Ltd, Australia's first non-government environmental markets administrator, has transitioned the world-first Reef Credit Scheme into a fully independently governed and administered scheme. The Reef Credit Scheme enables land managers to undertake projects that improve water quality through changes in land management to generate a tradeable unit of pollutant reduction. This market-based mechanism incentivises water quality improvements across catchments of the Great Barrier Reef.

More information on these and other projects is available at barrierreef.org. To keep up to date with the program, subscribe to our e-newsletter at barrierreef.org/you-can-help/subscribe.

Local growers in the Mackay-Whitsundays region and Farmacist, have developed innovative ways to establish multispecies break crops. Existing equipment was successfully modified to cost-effectively and simultaneously plant different seed sizes to incorporate multispecies crops into the sugarcane monoculture. Accessing practical and affordable equipment has significantly increased adoption of multispecies break crops, resulting in improved soil health, organic carbon, and reduced pollutants runoff.

For banana growers, one of the most significant challenges to achieving precision agriculture is the inability to successfully identify the spatial locations of yield variability within plantations. Farmacist has developed a precision agriculture approach to nutrient management for bananas through yield monitoring. Commercial scale benefits are being validated and the yield map datasets will form the foundation for implementation of precision agriculture solutions for banana production and environmental outcomes.

CSIRO and SRA have tested the effectiveness of Enhanced Efficiency Fertilisers (EEFs) that closely match the nitrogen requirements of growing crops by releasing nitrogen over time. Comprehensive on-farm evaluation data across reef catchments and modelled 'virtual experiment' data was coupled with data mining and machine learning to identify where and when nitrogen losses are reduced by using EEFs. Key outcomes and recommendations for consideration when applying EEFs are now used by sugarcane farmers across reef catchments.

These are just a few of the projects funded through the partnership with the Australian Government's Reef Trust and the Great Barrier Reef Foundation. As the \$10 million innovation investment program winds down to June 2024, it is leaving a legacy of 22 new systems, technologies, and financing options now available to support water quality improvement activities and achieve enduring impact into the future.



MACKAY / WHITSUNDAY

STEVE VELLA

WITH IAN LEONARD (Tech Notes) AND AUDRA ALLAN

Traditional granulated phosphate fertilisers Vs next generation high efficiency phosphate fertilisers

The role of phosphorus in sugarcane promotes early root formation which is essential for a strong and vigorous root system, growth, spindle development and tillering.

Phosphate is an essential element for cellular growth needed for cell division and protein development and is required for photosynthesis, respiration and essential for crop maturity. Phosphate provides energy to cells powering adenosine triphosphate (ATP) when in contact with moisture. Britannica,2023.

Canegrowers Steve and Neiola Vella from

Farleigh are investigating and trialling a new high efficiency phosphate fertiliser against traditional fertiliser products. This was following soil test results on a block with high Phosphorus Buffering Index (Colwell) (PBIc) level of 330 and very low available Phosphorus (BSES) of 5 mg/kg requiring 80 kg/ha of phosphorus in plant cane. From the soil test this block also had low pH, and low calcium, and very high aluminium levels with potential for high phosphorus lock-up in the soil and unavailable to the plant.



Steve walking through plantcane

(NH₃) which is reacted with liquid (ortho) phosphoric acid to manufacture DAP (diammonium phosphate) NPK 18-20-0 or MAP (monoammonium phosphate) NPK 10-22-0. Different amounts of NH₃ are used to produce the two different formulations.

Liquid phosphates like NPK 10-15-0 are manufactured by adding ammonia (NH₃) to Super Acid (36% elemental P), and most of the acid is neutralised.

The problem with phosphate (P), when added to soil for our crops, is that it binds up quickly and a majority of the P when placed in the soil quickly becomes insoluble P unavailable for this year's crop. Between 5 – 20% will remain available (80 – 95% unavailable), for the current year's crop according to the NSW DPI.

Loveland Nutrition and Actagro have conducted many years of Research and Development to find a new form of phosphorus that would stay in a plant available form for longer in soils. Structure offers Reacted Carbon Technology (RCT) to stimulate microbial populations and buffer salts in the soil, proprietary formulated organic acids, that resist tie up by competing with phosphate for soil absorption sites on cations such as Al, Fe, Ca, Zn and Mg within the soil which provides highly available phosphate and offers much greater P availability to all crops including Sugarcane in the current cropping year.

Structure is a vastly different liquid phosphate, offering much greater potential phosphate uptake for your crop, than traditional DAP, MAP or liquids like Phosphoric Acid or APP and risk of loss to the environment is reduced (see Tables 1 and 2).

Graph 1 - Soil test results

Nutrient (Depth 0.00 - 20.00)	Result	Low	Marginal	Sufficient	High	Excess	Sufficiency Range	
pH (1.5 H ₂ O)	5.3	[Bar chart showing 5.3 in the Marginal range]						5.5 - 8.5
pH (1.5 CaCl ₂)	4.1	[Bar chart showing 4.1 in the Marginal range]						4.7 - 7.7
EC (1.5 H ₂ O) dSm	0.03	[Bar chart showing 0.03 in the Sufficient range]						0.00 - 0.20
EC (se) (dSm)	0.2	[Bar chart showing 0.2 in the Sufficient range]						0.0 - 1.7
Organic carbon (Walkley Black) %	1	[Bar chart showing 1 in the Marginal range]						1.20 - 2.00
Phosphorus (Colwell) mg/kg	33	[Bar chart showing 33 in the Marginal range]						41 - 50
Phosphorus (BSES) mg/kg	5	[Bar chart showing 5 in the Low range]						41 - 50
Phosphorus Buffer Index (Colwell) (PBIc)	330	[Bar chart showing 330 in the Marginal range]						15 - 420
Potassium (Amm-Acet.) cmol+/kg	0.23	[Bar chart showing 0.23 in the Marginal range]						0.40 - 2.00
Potassium (Nitric K) cmol+/kg	3.5	[Bar chart showing 3.5 in the Sufficient range]						0.70 - 2.00
Potassium % of CEC	3.9	[Bar chart showing 3.9 in the Sufficient range]						3.0 - 10.0
Sulfate-S (MCP) mg/kg	29	[Bar chart showing 29 in the Sufficient range]						15.0 - 25.0
Calcium (Amm-Acet) cmol+/kg	1.7	[Bar chart showing 1.7 in the Marginal range]						2.0 - 20.0
Calcium % of CEC	29.1	[Bar chart showing 29.1 in the Marginal range]						55.0 - 90.0
Magnesium (Amm-Acet.) cmol+/kg	1.1	[Bar chart showing 1.1 in the Marginal range]						0.3 - 10.0
Magnesium % cations	18.8	[Bar chart showing 18.8 in the Sufficient range]						0.0 - 25.0
Sodium (Amm-Acet.) cmol+/kg	0.11	[Bar chart showing 0.11 in the Sufficient range]						0.00 - 1.00
Exch. sodium %	1.9	[Bar chart showing 1.9 in the Marginal range]						0.0 - 8.0
Electrochemical Stability Index	0.016	[Bar chart showing 0.016 in the Low range]						0.050 - 10.000
Aluminium (KCl) (prewash) cmol+/kg	2.7	[Bar chart showing 2.7 in the Marginal range]						0.00 - 0.50
Aluminium Saturation %	46.2	[Bar chart showing 46.2 in the Marginal range]						0.0 - 10.0
eCEC cmol+/kg	5.8	[Bar chart showing 5.8 in the Sufficient range]						2.0 - 40.0
Copper (DTPA) mg/kg	1.1	[Bar chart showing 1.1 in the Sufficient range]						0.20 - 1.00
Zinc (DTPA) mg/kg	0.73	[Bar chart showing 0.73 in the Marginal range]						0.30 - 1.00
Zinc (BSES-HCl) mg/kg	1.2	[Bar chart showing 1.2 in the Sufficient range]						0.6 - 1.0
Manganese (DTPA) mg/kg	230	[Bar chart showing 230 in the Marginal range]						2.0 - 200.0
Iron (DTPA) mg/kg	91	[Bar chart showing 91 in the Marginal range]						4.0 - 400.0
Silicon (CaCl ₂) mg/kg	58	[Bar chart showing 58 in the Marginal range]						10.0 - 2,000.0
Silicon (BSES) mg/kg	330	[Bar chart showing 330 in the Marginal range]						70.0 - 2,000.0

Commonly a cost-effective way to address these areas would be to either broadcast mill mud pre-plant and incorporate within 3 days of application or applying high rates of granular phosphate fertiliser in plantcane and ratoons crop stages. The terrain, particularly the slope on this block was way too steep had issues with safety for mud truck traffic and/or using a spreader, with the high PBI and high aluminium levels would potentially tie up the plant available

phosphorus quickly. Although the Coca Cola practice change project has been focusing on DIN Savings and reported through P2R, phosphorus is also a part of the Water Quality Regulations and legislation with focus on sediment movement. Chemically, phosphorus is a very stable element, fertiliser phosphorus does not move far from where it is applied because it reacts rapidly with

soil. Phosphate quickly binds with iron (Fe) and aluminium (Al) in the soil and becomes unavailable to plants, especially when soil pH is below 5.0, conversely P binds to fertilisers ions like calcium (Ca), magnesium (Mg) and zinc (Zn) in soils with higher pH's, above 7.2. NSW DPI. Sediment movement removes phosphorus from paddock to waterways, this in mind, the block with its steep slope and high phosphorus

requirement has some risk for sediment movement which was a part of the decision to focus on lowering the potential losses and keeping products infield. The block was planted across the slope to slow potential water flow off paddock, headlands have maintained grass cover to capture and slow water flow and sediment loss further.

At planting, Steve used the tradition fertiliser GF Planter 5 at 160 kg ha which only applied 6 kg ha of phosphorus for plant establishment, after planting when developing Steve's Nutrient Management Plan that we had the discussion on the phosphorus amounts required to finish the crop phosphorus requirement.

Finding more efficient forms of nutrients, that can enable a reduction in usage, (and thus the potential for loss), whilst not compromising productivity, is a key focus area for cane farmers and all industry stakeholders. Phosphate is a strongly charged anion (negative charge), which

usually attracts all sorts of cations (positive fertiliser ions).

Dry phosphate fertilisers have been available for Australian farmers for decades. Manufacturing of dry phosphate fertilisers involves ammonia

Table 1 - The RCT proprietary organic acids and unique manufacturing process used to make Structure keep the phosphate ions 80% available for crops for over 45 days.

Type of Phosphate	Analysis	Efficiency	Rate / Ha	Adjusted available P
MAP / Dry Orthophosphate	11-22-0	15%	100 Kg	3.30 Kg
DAP / Dry Orthophosphate	18-20-0	12%	100 Kg	3.40 Kg
Ammonium Polyphosphate (APP)	17-26-0	25%	50L	3.25 Kg
Structure	10-12-0	80%	50L	4.80 Kg

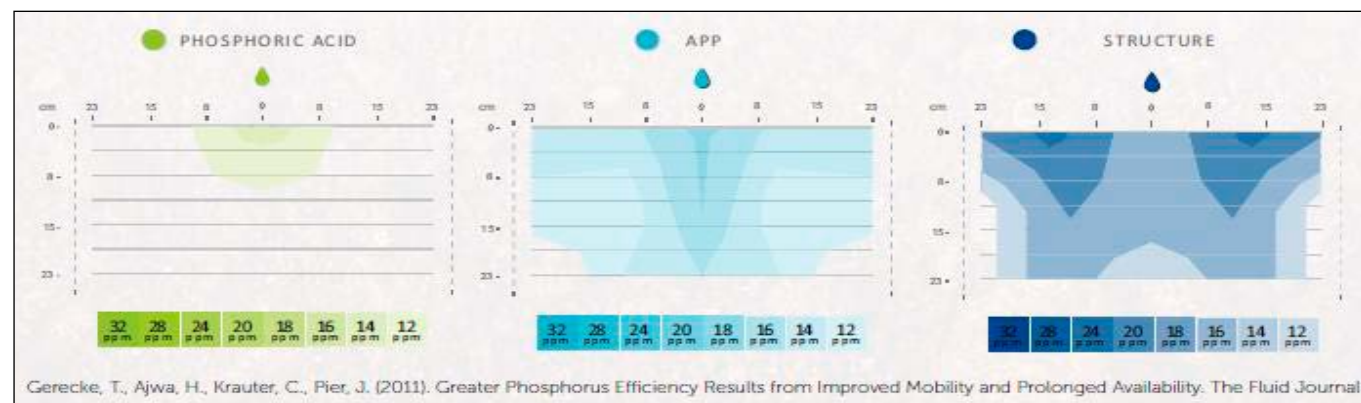
Table 2 - Ammonium Phosphate forms, their manufacturing processes respective plant availability in soil

Type of Phosphate	Analysis	Efficiency	How is it made	How reactive is the P with Ca, Mg, Fe, Zn, Cu & Al	How Long does P remain available?
MAP / Dry Orthophosphate	11-22-0	15%	Reacting Phosphoric Acid & NH ₃	≈ 85%	≈ 20 - 30 days
DAP / Dry Orthophosphate	18-20-0	12%	Reacting Phosphoric Acid & NH ₃	≈ 88%	≈ 20 - 30 days
Ammonium Polyphosphate (APP)	17-26-0	25%	Reacting Phosphoric Acid & NH ₃ , remove H ₂ O	≈ 75%	≈ 20 - 30 days
Structure	10-12-0	80%	Reacting proprietary RCT at extreme heat with NH ₃ & Super Acid, adding H ₂ O. This reaction creates a single bond complex P, between RCT and P anions, keeping P more available by not binding with as many cations, resulting in more root available P anions.	≈ 20%	> 45 days



Steve applying Structure through his grub control applicator at 100 L/ha

Graph 1 - Distribution of soil-available Phosphorus (42 days after application)



Gerecke, T., Ajwa, H., Krauter, C., Pier, J. (2011). Greater Phosphorus Efficiency Results from Improved Mobility and Prolonged Availability. The Fluid Journal

In trials (results shown below in figure 2), where Structure was applied to an irrigated bed without plants at pH 7.8 and irrigated 2 times per week over the course of 42 days the phosphorus in Structure was significantly more plant available than the ortho and polyphosphate comparisons (DAP and APP respectively).

This was why this product was selected based on its unique properties, buffering abilities and less application rate compared to the traditional granular fertiliser.

The next issue was placement of the post-plant products, how and what application rate to apply Structure post-plant? It was decided to work out

rates for both DAP and Structure by matching the amount each product would deliver in the plant available form which then gave the rates for each product using the product analysis. DAP was to be placed side-dressed sub-surface and Structure was stool-split using the grub control applicator sub-surface. Placement of both products was also a concern as the slope of the block and the possibility of a large rainfall event occurring, the risk of water running down the application point and rows with the traditional side-dressing verses the placement of Structure into the plant row and the potential of sediment movement and potential phosphorus losses.

On the 2nd November 2023, Steve applied on the eastern side of the block side-dressing with DAP @ 250 kg/ha and the remaining western half with the new product Structure @ 100L/ha. The plantcane was filled-in on the 13 November 2023 and side-dress with GF Marian Ratoonier @ 253 kg/ha to finalise the crop requirement.

We are monitoring the crop throughout the growth period to see if there have any visual differences in crop and expect that the 2024 harvest will reflect similar or improved yield and maturity benefits.

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Ensuring nutrient precision



SLR Project Consultant Michael Carr takes a Bio Dunder sample from an application contractor's load on a Mackay region farm



Sampling Bio Dunder liquid fertilisers on farm is an important part of Wilmar AgServices' QA process for Bio Dunder sampling



Stringent record-keeping is part of Wilmar AgServices' QA process for Bio Dunder sampling



Bio Dunder samples are tested at Wilmar's in-house laboratory as well as at an independent facility



SLR Project Consultant Michael Carr and Wilmar AgServices Business Manager David Parker with Bio Dunder samples

In the world of agriculture, fertilisers play a crucial role in nurturing crops to their fullest potential.

Derived from sugarcane and made in Queensland – Bio Dunder® is more than just a just a renewable fertiliser resource. It represents precision and reliability in nutrient application.

Unlike traditional NPKS blends, there are more than 80 customised fertiliser blends in the range, all of which enrich the soil with 9% organic carbon, calcium, magnesium, minor trace elements and yeast.

Wilmar AgServices employs rigorous quality assurance (QA) processes to ensure its fertiliser products meet strict standards and precise nutrient delivery. Those QA processes run from the factory to the field.

AgServices Business Manager David Parker said Bio Dunder undergoes rigorous testing twice daily within Wilmar's manufacturing facility at the Sarina Distillery.

"Our Truck in Field (TIF) testing, carried out by SLR consulting, underscores our dedication to precision and transparency," he said.

"During the crushing season, SLR meticulously samples from two contractors every week, analysing these samples to ensure the nutrients the farmers expect are precisely what they receive."

SLR consultants collect samples from applicators and trucks within farm premises, ensuring a comprehensive analysis.

These samples undergo meticulous scrutiny not only in Wilmar's in-house laboratory but also at an independent facility. This multi-faceted approach reaffirms Wilmar's commitment to delivering quality, reliability and precision in fertilisers.

"Our QA processes mean Bio Dunder is more than just a product; it's a reliable partner for your farm," Mr Parker said.

"By entrusting us with your fertiliser application, you get more than nutrients – you gain the assurance of precise nutrient delivery."

"This assurance gives you the freedom to focus on other priorities, like irrigation and weed control, or just taking some well-earned downtime."



MACKAY / WHITSUNDAY

RICHARD GALEA

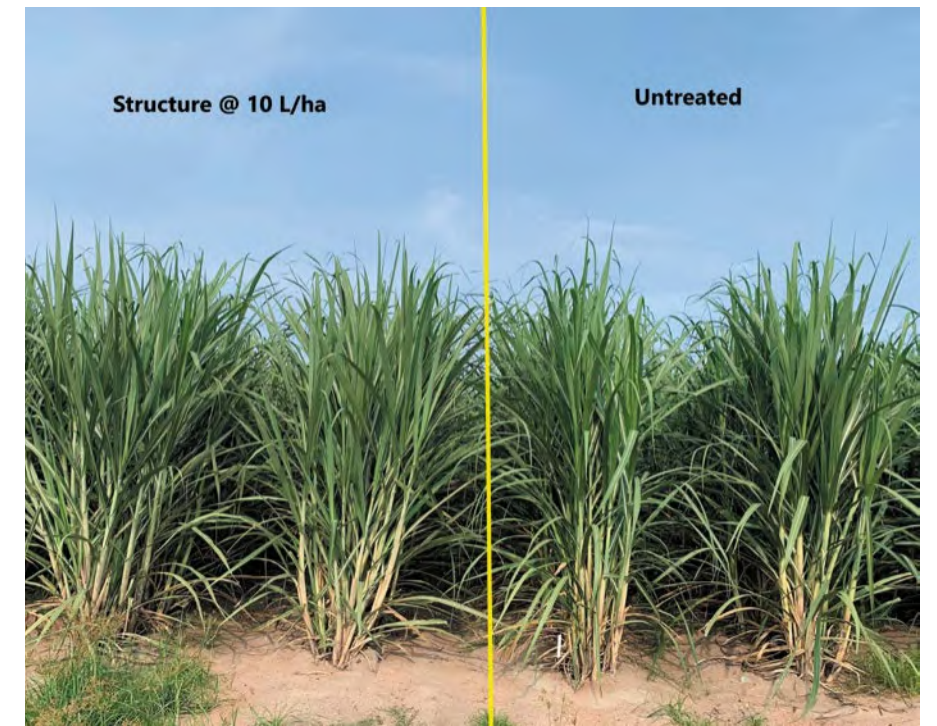
WITH AUDRA ALLAN

Tailored nutrient management plans

Richard Galea and his family joined Project Catalyst Broader Adoption Program with Nutrien Ag Solutions Mackay in late 2020. They had some initial reservations in that in their view historically some projects had the stigma of a “feel-good” program but did not deliver substantially on improved good business practices and viability. The critical test being, “it must provide value to our business”. Their business started in the early 1960’s initially in Mackay ultimately growing to where their

farming now entails approximately 300 ha in the Mackay Region and approximately 1440 ha in the Burdekin Region, with crops of sugar cane, cowpea, soybeans, and corn.

Although the broader adoption program was initially for the Mackay region a decision was made to incorporate practice changes throughout all operations by growing legumes, maximising soil health, and targeting nitrogen use to required levels after a good legume crop.



Richard understands that the NMP has been tailored to his farm and crop requirements, by asking questions for clarity and even challenging the science behind the decisions; all considerations (soil constraints, mill by-product applications, ameliorant etc.) have been identified with a recommended product and rate to ensure all crop nutrients matched the soil test recommendations.

Richard added "It's been a busy three years of plans with addressing the soil constraints and ways to amend and managing these constraints across two districts. In Mackay, we're working on phosphorus lock up in the Krasnozem soil with high aluminium levels. In the Burdekin, products such as Structure and other measures are used to address alkaline soils and sodium chloride toxicity".

In December 2020, Reef Regulations and Legislation required all sugarcane farming entities to work within a nitrogen and phosphorus budget for the 2021 season. Nutrien became involved to help cane farmers navigate the interpretations of the legislation and regulated guidelines and develop and update their Nutrient Management Plans throughout the duration of the project.

Nutrien Ag Solutions made the decision early, that working only on an N & P Budget didn't support the sugarcane crops nutrient requirement entirely. They developed a more individual tailored Nutrient Management Plan (NMP) based on soil tests and optional plant tissue testing results when required. Incorporating this planning process with their existing on the ground service provided a more comprehensive service assisting the grower to make more timely and informative business and farm management decisions.

This more complete service enticed the Galea family to come on board and develop a tailored plan for each farm which then formed part of a consolidated plan for each area. This planning tool identified inherent issues and soil constraints and made recommendations for maximising crop yield whilst remaining compliant with legislative requirements for both the Mackay and Burdekin regions.



Richard explained, "the initial Nutrient Management Plan process made me nervous as I had a significant reduction on purchasing fertiliser product amounts and I was concerned about less fertiliser-less crop."

Undertaking targeted soil testing is a key part of NMP development. It is critical that testing is representative of each specific field or subset of fields. Identification of soil testing sites is done by visually inspecting crop characteristics - size, unevenness, expressing deficiency symptoms and yields. Variability of yield maps can also be generated by harvesting operations in the Burdekin. EM Mapping is used where required.

The above process assists in identifying not only soil constraints but also what areas are producing well and hopefully why. Overlaying soil test results over farm maps helps to visually associate results with yields. It leads to more timely and productive discussion of what is going on, what can be done and what can we expect. The presentation of farm maps with planned application rates for ameliorant and fertiliser products helps ensure easy grower/contractor/employee understanding of what needs to be applied and where.

Another tool for assisting with cropping problematic areas along with yield mapping is plant tissue testing, especially where visual symptoms are displayed. The test when used on a targeted basis is an excellent way to analyse exactly what is readily available to the plant and provides clues as to what nutrients might be locked up and unavailable in the soil. Combining both soil test and plant tissue tests supplies a clearer picture for issues and constraints. For those reasons Richard has recently included plant tissue testing and deep (20-60 cm) soil testing with the standard 0-20 cm soil testing. It provides information on what is happening further below the surface especially where soil constraints have been identified which leads to the power to manage these areas more effectively.



Revolutionising future farming with automated irrigation



Innovation often begins in the fields. Our story began listening to grower's challenges, their insights crucially tailor our systems to not only be technologically advanced, but also deeply attuned to the practical needs of farmers. In an industry often overwhelmed by complexity, it is simplicity and user- friendliness, making sophisticated irrigation technology accessible to all farmers.

'Allowing farmers to focus more on what they do best - farming.'

Managing Director, Luke Malan is well known for his problem solving. "In the evolving landscape of precision agriculture, true innovation isn't just about embracing new technologies, but creating solutions that genuinely resonate with the day-to-day realities of farmers. Our latest venture into automated irrigation systems embodies this ethos, marking a significant advancement in practical farming solutions."

Proudly developed in the heart of the Burdekin region, this automated irrigation system is a testament to Australian innovation, yet its benefits are universal. It's a product born from local expertise but designed for farmers everywhere.

"Beyond the technology itself, our involvement in initiatives like Project Catalyst and other innovative grower groups is about nurturing a community of forward-thinking farmers. These collaborations offer a

platform for sharing ideas and exploring new opportunities, fostering an environment where practical, innovative solutions can flourish."

The introduction of an automated irrigation system isn't just a milestone for Aglantis; it's a step towards a future where farming is more efficient, profitable, and sustainable. It's about building a connected agricultural community where innovation is driven by real needs and shared aspirations.

"We understand that farming is more than just a profession; it's a way of life. Our goal is to provide tools that make this life easier, more productive, and sustainable."

As the industry continues to explore new frontiers in precision farming, the focus remains steadfast on empowering farmers with solutions that are not just advanced but also relatable and impactful.

"Your experience and insights are invaluable to us. We encourage you to register your expressions of interest on our website, for early testing of our automated irrigation system. By getting involved, you can help us refine this system to better meet your needs and those of the farming community at large. Let's work together to shape a sustainable future in agriculture."

Visit us at aglantis.com.au to learn more and join us in forging a new path in precision farming



A conversation with a local grower recently offered up one of those golden moments when everything just seems to come together. Talking about the generational journey of his family property, he noted practice changes that had been adopted, and the integrated support systems he had been able to access. As a result, he has achieved improvements in production and a reduction in costs and resources. The icing on the cake he said, was his ability to

Getting it right for growers - getting it right for the environment

contribute to water quality and the preservation of the regional environment where he and his family have lived for generations.

"The more you do it right, the easier it gets and the more you get it right."

Getting it right for this grower is the result of a co-ordinated resource network sharing a cohesive approach to improved and sustainable agriculture practices. During 2023 Reef Catchments have been able to continue support for Project Catalyst and growers through our Sustainable Agriculture projects such as Mackay Whitsunday Water Quality Program (MWWQP), Major Grants, and the Reef Trust VII program.

Through these programs Reef Catchments has:

- connected with more than 1,800 cane farmers at events and forums
- assisted with targeted on-property farm plans
- supported eligible growers with grants for approved equipment
- worked in cooperation with resellers, extension providers and industry representatives

- exceeded pesticide and dissolved organic nitrogen (DIN) reduction targets
- facilitated peer-to-peer support and shared learnings to reduce barriers to practice change.
- participated in water quality monitoring activities across the region
- consistently been an advocate and supporter for the development and adoption of improved practices and technology in agriculture
- collected and monitored data which is then fed back programs such as Paddock to Reef and the Reef 2050 Plan.

Delivering on our vision of resilient ecosystems and an engaged community involves a strategic, multifaceted approach with a view for the long-term game. Conversations such as this one with our growers keeps us in touch with your issues and ideas and our progress toward getting it right.

For more highlights see the 2022-2023 Annual Report at www.reefcatchments.com



Land hub proving to be indispensable

understand the agronomy and cropping soil characteristics and to work to a whole-farm nutrient management plan.

"We wanted to improve nutrient use efficiency for the farm, reducing costs where possible, and address production constraints. Within the nutrient management plan whole farm budget, we've strategically reduced nutrient input on older ratoons in some soil types. Results to date are good."

LAND produces optimal six easy steps nutrient management plans for growers, tailored to regions and specific farm, paddock, and soil lab data inputs. It provides secure, private, digital storage of farm, soil, and production data year on year, enabling easy long-term monitoring of crop and financial performance, and a greater understanding of underlying agronomic issues and solutions suitable for each farm.

As part of the project the entire Johnson farm has been flown, and imagery collated using

Drone Deploy software. Providing a valuable overview of the farmland, identifying possible constraints to production.

Available to growers both online and off-line, via desktop, tablet, and smartphone, LANDHub.com.au is the premier digital farming platform currently available to Queensland sugarcane growers. Its leading-edge capabilities enable sustainable practice change on farm, delivering productivity and profitability benefits to growers across north Queensland, and positive environmental outcomes for the region and the reef.

"Having a platform that can handle all aspects of the cane farming operation is a huge win for the industry. The younger generation thrive on technology, and everyone can make use of LAND's easily accessible information for fast and efficient decision making." Rob Donato - Tully

The LAND HUB Project is funded by the partnership between the Australian Government's Reef Trust and the Great Barrier Reef Foundation.



Great Barrier Reef Foundation



BURDEKIN

JASMINE GIRGENTRI

WITH GROWERS DAVE FOWLER AND JOHN ARRATE

Growers doing things differently

DAVE FOWLER

I come from a long line of farmers spanning five generations, my family have been farming in the Home Hill area since 1912. The connection to the land has been ingrained in me from a young age, fuelling my lifelong aspiration to pursue farming—a dream job that runs in my blood. Sugarcane is our main crop; however, I have also grown green manure crops such as cowpea during the fallow period to improve our soil health whenever time and weather permits.

Like many other farmers, I have another job outside of farming which I am committed to, and this creates a bit of an issue with time. Additionally, with a growing young family that is my priority, the demands on my time have increased. To address the issue of restricted time on the farm, we are dedicated to enhancing sustainability by pursuing greater efficiency, minimising input needs, and ultimately reducing the personal time required for its management.

Our ongoing quest for innovative farming methods brought us to Project Catalyst. We find value in collaborating with different organisations to participate in trials and explore novel approaches. The prospect of continual learning drives our interest. Involvement in trials provides a hands-on opportunity to assess and test new methods before considering large-scale changes throughout the entire farm.

Recognising the pivotal role of a robust biological structure in the soil, we know that optimising soil conditions is key to improving overall crop health and yield, as well as reducing our environmental footprint. Our focus on improving soil health motivated my interest to investigate biostimulant products. Through Catalyst, I wanted to have a look at how biostimulants could enhance the biology of our soils and in turn improve our crop production/resilience.



I became apart of Project Catalyst through Burdekin Productivity Services when I expressed interest in trialling a mix of two biostimulants in my plant cane. I wanted one to introduce a host of bacteria into the root zone and another to feed those microbes. The products used in this instance were Bacstim 100 at 1L/ha and Rhizovator OB at 20L/ha. We also wanted to look at our nitrogen inputs to see if we could optimise our crop's requirement. We thought we would try three different N rates:

- High: Six Easy Steps (6ES) replant rate
- Mid: 6ES plant after bare fallow rate
- Low: lower than 6ES N rate

All nitrogen varied by 40 kg/ha and each rate had a with and without biostimulant addition. We applied a base fertiliser across the block so all nutrients apart from nitrogen were the same, and then topped up with urea to get our desired rates of N.

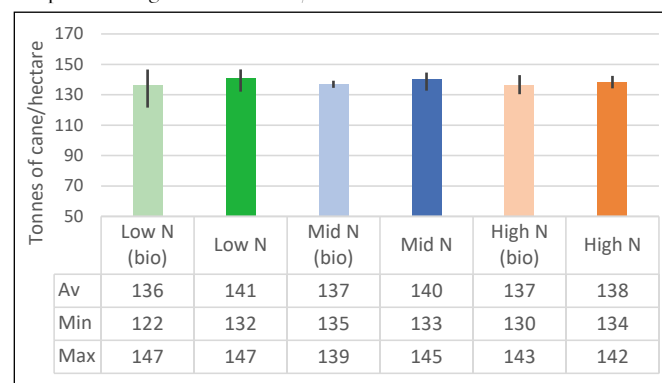
Soil samples were taken early after crop establishment to assess several aspects of soil biology including: labile carbon, fungal biomass, enzyme activity and CO₂ respiration. The results did not show that there were any differences between the biostimulant and control or between the rates of nitrogen. However, we did see some evidence of fungal growth in the root zone of some of the biostimulant treatments. Biological sampling is very dependant on temperature, moisture and timing so sampling can be tricky.

The block was harvested when the cane was 12 months old and we wanted to see if tonnes of cane, CCS and tonnes of sugar were affected by the nitrogen rates and/or the biostimulant. Below are some graphs showing the results we got. Each graph has the average, minimum and maximum values for the treatments. Overall, we did not see any yield response to the biostimulants. The CCS, TCH and TSH were consistent across all treatments. We also did not see a difference in CCS, TCH and TSH between the nitrogen rates. What this indicates is that the biostimulants did not directly influence the plant cane's yield and that nitrogen is not a limiting factor for cane growth in this situation.

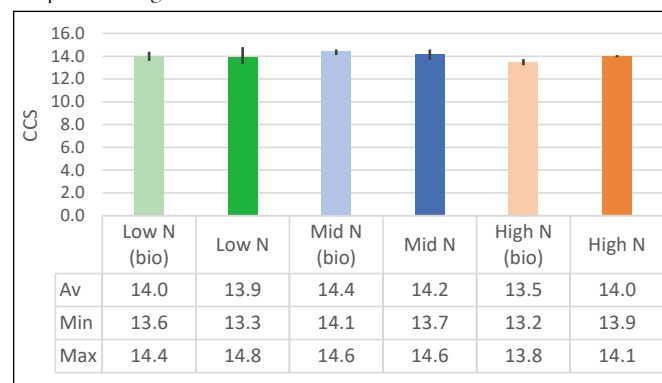
For us, the trials reaffirmed that increased nitrogen and additional inputs do not necessarily translate to higher crop or sugar yields. Understanding this has guided me towards a more judicious approach to resource management. It underscores the importance of conducting on-farm tests and trials for new products before implementing them across the entire farm, promotes informed decision-making. There are so many variables involved in crop growing and what works for my neighbours or other farms, might not work for us.

Our long-term objective is to manage our farms more remotely, enabling extensive travel with my family. Achieving this involves refining irrigation methods, implementing automated irrigation systems, and enhancing soil health for sustained crop vitality. We are always looking at better ways to do things so may investigate diversifying crops as our enterprise grows, to enhance sustainability and regeneration. This holistic approach aims to reduce disease and pest pressures, optimise yields, and contribute to environmental sustainability, ultimately saving time and resources. Taking part in initiatives like Project Catalyst accelerates our testing of various products and methods, hastening our progress towards achieving our ultimate goal.

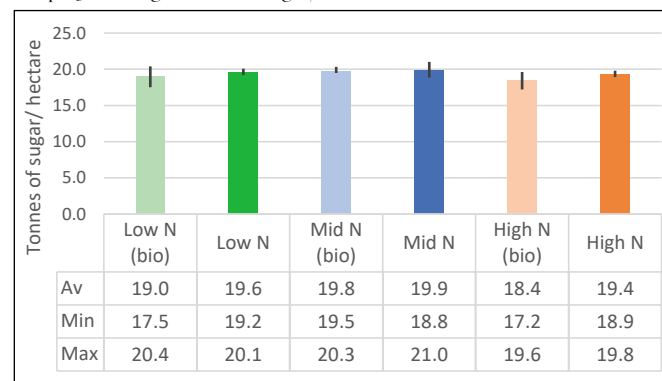
Graph 1 - Average tonnes of cane/hectare



Graph 2 - Average CCS



Graph 3 - Average tonnes of sugar/hectare



JOHN ARRATE

My dad moved from the Basque country to Ingham to cut cane by hand. Once he had earned enough money, he then purchased a farm at Clare where he mostly grew sugarcane and a few small crops during the fallow. I ended up buying some haulouts to start making some of my own money and did that for 10 years until I could afford my own farm in Home Hill. I bought around 50 hectares up against the Burdekin River where I've been growing sugarcane. I even did a bit of time working at BSES and this job always had me thinking about ways I could be more efficient on my farm.



A couple of years ago I attended a Project Catalyst conference in Ingham and went on a bus trip to Laurence DiBella's farm to look at some cover crops. This got me thinking about what I can do on my farm and whether it can help me with some of my soil issues, particularly around nematodes. Historically I've had root knot and root lesion nematodes affect about 15-20% of my river blocks quite significantly. Most years I would struggle to get past 3rd ratoon before the yield dropped off too much. I tried nematicides in the past, however the cost was too great, and the results only lasted for a short time before the parasitic nematodes returned. One day I got talking to someone who had heard of the old veggie growers around Gumlu using molasses to control their nematode issues, so I thought I'd do a bit of investigating. I ended up finding a bit of information and worked out the brew they were using and decided to try it myself. I was talking to Jasmine, and we decided to put together a trial through Project Catalyst to test it out on my farm.

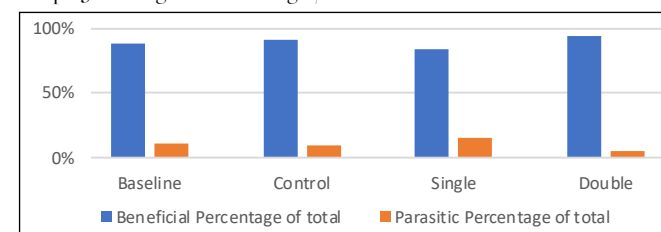
I found an old liquid applicator and decided I could use to apply the molasses like a side dresser. We worked on a rate of 500L/ha of 50:50 water to molasses so it wouldn't clog up, it was still thick but could easily move through the hoses. The idea behind applying the molasses mix was that the molasses would feed the whole community of organisms in the soil which would help control the parasitic nematode issue.

We took a baseline sample from the block to get an idea of what the starting nematode levels were, and to my surprise they weren't terrible like they normally were. We decided to do the trial any way as a proof of concept. I wanted to see if applying more molasses would change anything, so we decided to do:

- single application at 500L/ha
- double application at the same rate but one month apart
- a control with no molasses to compare against

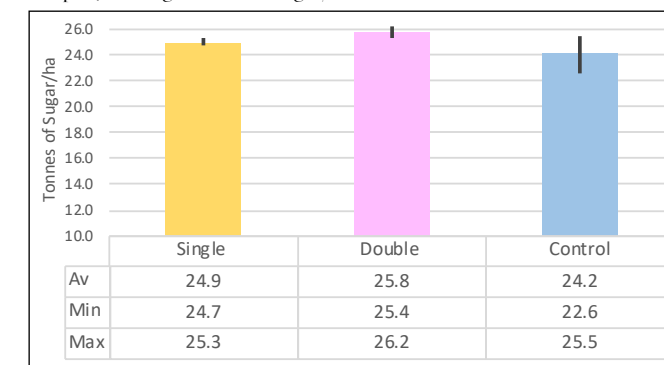
What we ended up seeing was that the two applications of molasses decreased the parasitic and increased the beneficial nematodes, so the more we put on, the better the result. We didn't test for how the bacterial and fungal community were affected; however, nematodes are good indicators for what else is in the soil. This is because there are nematodes that eat bacteria, fungi and other nematodes. If we know how many of each type are in the soil, we can get an idea of what those levels were like at that point in time. We saw a few species of fungal, bacterial and predatory nematodes in the test and these numbers jumped when we applied the molasses.

Graph 3 - Average tonnes of sugar/hectare

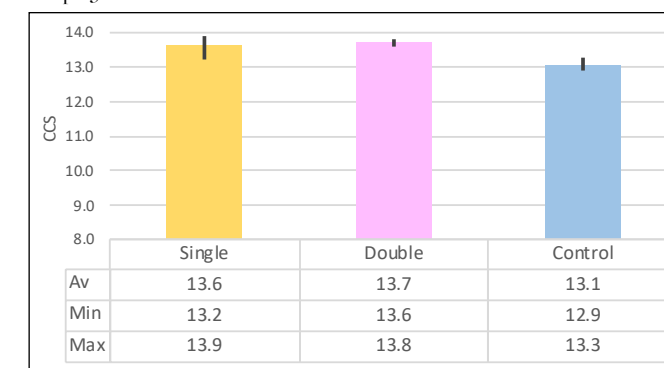


We took the cane to harvest to see if there was an effect on cane yield. The results showed that there was a fair bit of variation between the min and max values in the control, whereas the molasses treatments were more consistent. The double application had slightly better TCH than a single application but it was not significantly different. CCS was half a unit better than the control in the molasses treatments. The TSH were also slightly better in the double application compared to the control with 1.5 TSH more.

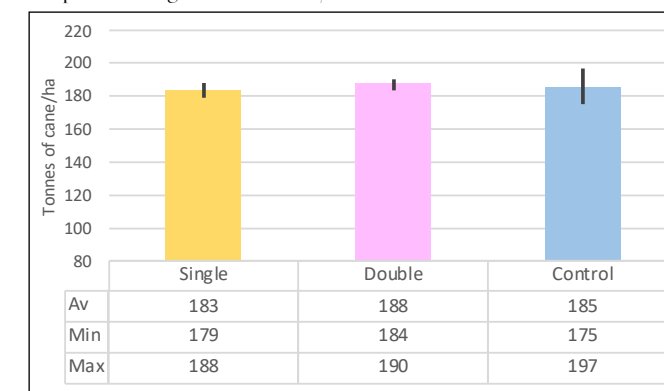
Graph 4 - Average tonnes of sugar/hectare



Graph 5 - CCS



Graph 6 - Average tonnes of cane/hectare



I was pretty happy with the result and I'm still applying molasses across my farm at the 50:50 rate and believe I am getting good results with it. I'm only using the single application, purely for the ease of applying it otherwise cane can get too big, and timing is important when applying. My ratoons are lasting longer and looking healthier, and there's more stool there. I've even had some growers come around to have a look at my set up and ask me a bit about what I do.

In the future I would like to have a bigger tank and be able to mix the molasses with my fertiliser for easy application. At the moment, I only have a 600L tank meaning I have to fill up fairly frequently. I'm also thinking about using a mixed cover crop like Laurence Di Bella to help boost the overall health of my soil and to encourage good biology. I believe a combination of cover crops to break the monoculture of sugarcane and molasses to provide a food source to the soil organisms would be a great way to help combat my nematode issue and to increase my soil health.

Something very fishy is going on in the Pioneer River



Cr Belinda Hassan, Matt Moore and David Perkins at the Carlyle Street fishing platform

Recent underwater video monitoring surveys show Fish Habitat Reef Modules in the Pioneer River are now thriving.

An amazing 22 fish species have been recorded using the new Habitat Reefs which were deployed in 2021 by Mackay Regional Council.

All up, 45 Habitat Reef Modules were deployed at the base of three easily accessible fishing platforms on Bridge Road, Brisbane Street and Carlyle Street.

Matt Moore, Fisheries Ecologist with Catchment Solutions said recording 22 species on these reefs was a fantastic result and represented substantial increase compared to pre-deployment surveys.

“Monitoring results demonstrate the reef design and project have been a huge success, both in terms of increasing populations of iconic recreational fishing species at the sites, like barramundi, mangrove jack and fingermark, and providing habitat for juvenile fish species,” Mr Moore said.



Mr Moore said the most encouraging results had been the high numbers of juvenile fish species utilising the reef modules as nursery habitats.

“Fish typically have millions of eggs and larvae, but most of these are eaten by predators,” he said.

“A great way to increase fish populations is to provide nursery habitats for these baby fish, allowing them to shelter from predators.”

Busy fish nurseries also get a big thumbs up from recreational fishers. John Bennet from Mackay Recreational Fishing Association (MRFA) said they fully supported sensible and practical ways to improve fisheries management.

“It’s fantastic to turn desert landscapes into productive fisheries by protecting juvenile fish. If there is no habitat, then there are no juvenile fish.”

Some of the more iconic fish species spotted during the video surveys include barramundi, golden snapper (fingermark), mangrove jack, barred grunter, estuary cod and trevally.

Catches of large barramundi and barred grunter from the fishing platforms have also been reported by young and old fishers alike.

In addition to the recreational fishing species, the reef modules also provide habitats for fish species that feed on algae, such as rabbitfish, red scats, mullet and small-bodied wrasse.

Mr Moore said that these ecosystem engineers are vital for maintaining healthy habitats in Great Barrier Reef waters, as they feed on fast-growing algae, which often outcompetes slower-growing corals and molluscs.

Chair of council’s Recreational Fishing Advisory Committee Cr Belinda Hassan said it was amazing to see the results of the video surveys.

“Seeing just how much these innovative concrete structures have transformed into healthy marine ecosystems in a relatively short time is really exciting,” Cr Hassan said.

“It’s also fantastic that, as part of council’s Recreational Fishing Strategy, we have been able to offer three easily accessible fishing platforms and install reefs off them that are now home to some big barra, and plenty of other quality fish,” she said.

“Council is really pleased to see the platforms being used by so many anglers, as well as local Mackay schools for outdoor curricular activities.”

The innovative Habitat Reef Modules were designed by Catchment Solutions to provide complex vertical relief structures for a wide range of fish species and encrusting marine organisms. The modules comprise an internal chamber at the top, only accessible via small openings to provide shelter for juvenile and small-bodied fish species. A large cave at the bottom of the modules can be occupied by larger-bodied fish, including recreationally significant species.

See the modules in action at <https://youtu.be/h7DrBXR94ho>

For more information on the Habitat Reef Modules, including technical specifications, contact Matt Moore on 0417 083 898.

Effectively adopting a practice change



Reduced Nitrogen Application on Sugar Ratoons including Older Ratoons

Located near Homebush this Mackay grower’s farm with a total farming area of approximately 60 hectares is situated in the Plane Creek Catchment Area. A proud third generation farmer, he has worked on the farm helping his parents since he was a young boy.

Through the broader adoption Project Catalyst Practice Change Program, the grower has benefited by now having a compliant nutrient management plan and an incentive payment to go towards costs associated with the recommended practice change.

The main soil type across the farm is identified as Sunnyside. The duplex soil has a dark brown loamy topsoil with a weak granular structure. Subsoils are grey clay with conspicuous yellow mottles and a moderate angular blocky structure. The farm has limited irrigation and relies on supplementary rainfall.

Through his dealing with Nutrien Ag Solutions Mackay he became aware of the Great Barrier Reef Foundation Mackay Water Quality Program and was interested in participating with Nutrien Mackay and Project Catalyst to improve his farm management practices while meeting the reef regulation requirements.

For the grower to participate in the Program he was required to adopt one Practice Change on his farm over 12 months to meet the projects practice change pathway goal of

one new practice adopted over one year. The implemented ‘Reduced Nitrogen Application on Sugarcane Ratoons (including older or late cut) by 12.7kg/ha. Project Catalyst and Nutrien Mackay Agronomists revised and updated the grower’s nutrient management plan.

Resulting in increased nutrient use efficiency, reduced losses, and increased profitability.

“I can now see where Nitrogen application savings could be made simply and safely without impacting the farm’s productivity, while improving potential impacts on the environment by reducing DIN and Sediment losses.”

A Nitrogen reduction of 12.7kg/ha was implemented on ratoon/older ratoon sugarcane blocks across the farm, providing additional environmental benefits achieved through reducing excess nutrient entering waterways in irrigation run-off. This was a simple and an effective operation for the grower to coordinate with his fertilising contractor.

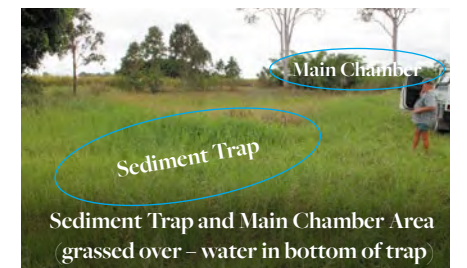
Reviewing previous practices, it was also clear he was committed to implementing further water quality steps through the construction of a recycle pit.

Also known as tailwater storage pits, sediment ponds or retention ponds, they will be positioned in areas where surface furrow irrigation results in tailwater and designed to



Construction of Recycle Pit North Eastern side of farm

collect irrigation run-off water for re-use on the farm. Recycle pits provide water quality benefits by ensuring that run-off water along with the sediments, nutrients, and pesticides it contains, is re-used and does not enter waterways. The recycle pit area will be grassed as soon as environmental conditions permit.



Sediment Trap and Main Chamber Area grassed over – water in bottom of trap

The sediment trap’s role will be to filter tail water by removing sediment, debris, and litter in run-off, allowing it to settle out and deposited when the water moves on. There is also a proposed site for the construction of a Turkey Nest Dam situated at the highest point of the farm so that water can be reticulated or piped from the recycle pit.



Turkey Nest Site South Eastern side of farm

Turkey Nest Site

WET TROPICS

PETER BECKE

WITH GROWERS RAY RINAUDO AND ALAN AQUILINA

Cultivating confidence in legume fallow crops in the Wet Tropics

The benefits of legume fallows are continuing to be illustrated by Project Catalyst in the Wet Tropics, with cane growers increasingly gaining confidence that subsequent reductions in applied Nitrogen rates won't negatively impact their productivity.

In the 2022/23 season, Project Catalyst supported two growers in the South Johnstone Basin to maximise the benefits of legumes. At the time, fertiliser prices were at record highs, providing added incentive to discount applied Nitrogen rates according to contributions from the planting of Nitrogen-rich legumes.

In previous years, grower Ray Rinaudo had planted legume break crops, however in each case applied fertiliser rates according to the SIX EASY STEPS guidelines without discounting for potential Nitrogen contributions from the legume cover crops. Ray's latest venture aimed to change that.

The Cowley grower built on previous Project Catalyst work where he grew a direct drilled cowpea and dolichos lablab cover crop and sampled the biomass. This sampling was used to calculate the potential Nitrogen contribution to the following plant cane crop.



Grower Alan Aquilina and Extension Officer Peter Becke crunch the numbers

Grower Alan Aquilina's legume cover crop



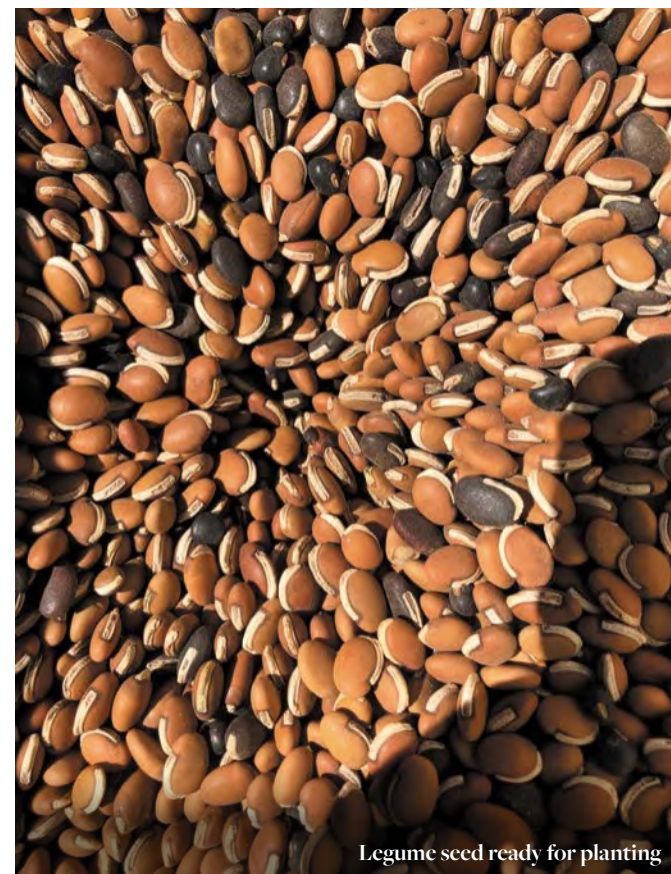
Grower Ray Rinaudo planting legumes

Prior to the subsequent sugarcane crop being planted, Nitrogen recommendations were accordingly adjusted downward. Ray decided to build his confidence in the figures by using the new, lower recommendation on only half of the block.

The sugarcane was harvested in 2023, with data showing there was no difference in tonnes harvested or CCS, with samples from each side of the block returning similar dollars per hectare. The reduced Nitrogen fertiliser rate led to a saving of \$117 per hectare in fertiliser costs.

Ray was thrilled with the cost savings from the trial. He said it added to other benefits from the fallow, including improved overall soil health and reduced weed pressures.

“The replant in a neighbouring block had weeds coming up and the fallow didn’t,” Ray said. “The soil in the fallowed block was finer, too. It’s a good thing.”



Legume seed ready for planting

Alan Aquilina was another South Johnstone grower who wanted to reduce applied fertiliser rates through the planting of a legume fallow. Ray Rinaudo’s results, along with other similar previous Project Catalyst demonstrations, gave him the confidence to test a reduction in Nitrogen inputs in a sugarcane block where legumes had been planted prior.

In December 2022, Alan planted a mixture of cow pea, dolichos lablab and sunn hemp. The legumes were broadcast and incorporated into the soil and the following May, biomass from the legume crop was sampled before the crop was terminated.

The Nitrogen contribution of the legume biomass was calculated, and the results led to an adjustment of Nitrogen requirements for the following cane plant crop. Data from the initiative will be analysed once the sugarcane is harvested during the 2024 season.



Sampling legume biomass on Alan Aquilina’s farm



Leading the way with precision farming for Australian farmers



A global leader in agricultural machinery, we continue to focus our attention on the Precision Land Management Intelligence (PLMi) system for all types of machines, from high horsepower tractors and combines through to sub compact tractors. Designed to revolutionise farming practices, enhance efficiency, and contribute to a more sustainable future for Australian farmers.

We are combining cutting-edge technology from a suite of technologies, whilst bringing together a commitment to sustainability. Our goal is to continue to provide farmers with an enhanced precision farming solutions to meet the challenges of modern agriculture. The PLMi system integrates precision farming tools, advanced data analytics, and artificial intelligence to optimize farming operations and resource utilization. The key focuses have been on the following benefits:

Enhanced Precision Farming: PLMi enables farmers to achieve unparalleled precision in planting, cultivating, and harvesting. By leveraging real-time data, GPS technology, and machine learning algorithms, farmers can optimize field management, reduce waste, and enhance overall productivity.

Resource Efficiency: With PLMi, Australian farmers can make informed decisions based on accurate data, leading to more efficient use of resources such as water, fertilizers, and fuel. This not only reduces operational costs but also promotes environmental sustainability.

Yield Optimization: The intelligent analytics provided by PLMi enable farmers to monitor and analyze crop health, weather patterns, and soil conditions. This valuable information empowers them to make data-driven decisions, leading to improved crop yields and higher profitability. Through the MyPLMConnect platform, New Holland farmers can view their connected machines live through the platform and review data and performance in real time.

Integration of Clean Energy Solutions: New Holland recognizes the importance of transitioning to clean energy in the agricultural sector. PLMi seamlessly integrates with clean energy solutions products recently launched including the methane powered T7 and T4 electric-powered machinery, aligning with our commitment to a cleaner and more sustainable future.

Melody Labinsky, Precision Farming Product Manager at New Holland, stated, “Our PLMi system represents a significant leap forward in precision farming technology. We believe that by empowering Australian farmers with cutting-edge tools and a sustainable mindset, we can collectively address the challenges of today while preserving the land for future generations.”

We invite the Australian farming community, to explore the transformative possibilities of PLMi and join us in the journey towards a more sustainable and efficient agricultural future.

For more information on New Holland’s PLMi and our commitment to sustainability, please visit Newholland.com/au



Brian Dore
Dore and Co, Tully

In 2022, Brian and Jamie Dore (Dore and Co) engaged local independent agronomist Dr. Charissa Rixon to assess the biostimulant Evergrow (Metagen) to increase production and nutrient efficiency on their sugar crop. Sugarcane variety Q240 was planted in July 2021 with 36 kg/ha of nitrogen (N), 9 kg/ha of



Soil microbiome stimulation lifts sugar yield by 1.3 t/ha

phosphorus and 36 kg/ha of sulphur. When top dressing at fill-in, 7 plots, treated with the biostimulant, 21 kg/ha of N and 100 kg/ha of potassium (K) were paired with standard plots receiving 41 kg/ha of N and 100 kg/ha of K, equating to 20 kg/ha more N.

At harvest, gains were seen in both CCS and raw yield on Evergrow treated, lower nitrogen plots, achieving an average gain of 1.3 t/ha of actual sugar and cost savings of \$36/ha on treated plots (based on urea at \$800/tonne).

Local Total Grower Services agronomist Anita Davina explains that many growers using Evergrow, benefit from additional gains, such as improved phosphorus availability. While nutrient efficiency is critical to long term sustainability of agriculture, improved soil health has also been shown to lift water use efficiency and disease suppression across many cropping systems and diverse environments. Metagen has unique product support, using their DNA laboratory in the Lockyer Valley to quantify changes in soil biology. Anita has found that soil health improvements compound over time and

many clients have found longer ratooning as an added benefit.

Of note is the simplicity of the Metagen biostimulant and nutrient management program, leading to enhanced bio-efficiency of the soil, benefiting our many long-term users, like the Dores, Les Blennerhassett or Mario Quagliata, to be group leaders in nutrient and cost efficiency, yield and sustainability.

For more information visit our website metagen.com.au



Strong relationships power a resilient and sustainable Herbert sugar industry



The Lower Herbert Water Quality Program Coordinator reflects on its successes and achievements as it enters its last six months of implementation.

The Lower Herbert district is witnessing remarkable progress in its agricultural landscape, thanks to the collaborative efforts of growers, industry experts, and delivery providers under the Lower Herbert Water Quality Program (LHWQP).

Through the program, a spirit of unity has been fostered among over three hundred growers in the Lower Herbert district. Farmers have recognised the urgent need to address nitrogen losses and have proactively embraced change on their farms. This shift has improved water quality and enhanced productivity and profitability, laying the foundation for a more sustainable agricultural sector.

Since 2020, approximately 55,696 ha* of farming land have been positively impacted through management practice changes. This amounts to an impressive 85% of the district. The six water quality projects funded through the program are all contributing to the overall regional target of 140 tonnes of dissolved inorganic nitrogen stopped from entering the Great Barrier Reef lagoon annually.

As the mid-2024 end date approaches and the program winds down, its success is rooted in a passion for the sugar industry and the shared commitment of growers, extension officers, and industry organisations. Strong relationships have emerged as a cornerstone for creating sustainable farming practices, with on-ground extension officers playing a crucial role.

The trust bestowed by local growers in the advice and expertise of extension officers has been pivotal in implementing effective changes.

These relationships go beyond the program boundaries, highlighting the importance of collaboration and knowledge-sharing for the betterment of the sugar industry and the region.

The program has become a beacon of what can be achieved with positive relationships and trust between industry experts and growers to drive and refine sustainable farming practices. With \$16.2 million in funding through the partnership between the Australian Government's Reef Trust and the Great Barrier Reef Foundation, the LHWQP has made significant strides in reshaping the future of farming in the region by adjusting land management practices to improve profitability, productivity as well as lessen the environmental impact long term. It stands as a testament to the positive outcomes that can be achieved through collaboration, hard work, and a shared vision for sustainability.

The Lower Herbert district sets an example for how communities can come together to challenge certain narratives for the sugar industry. The results of the program prove that farmers and landowners are deeply connected to the land they live and work on and protecting it is a high priority for them. The success of the LHWQP underscores the transformative power of strong relationships and a collective commitment to building a resilient and sustainable future for agriculture and the environment.

*Figures are based on the Reef Trust Partnership Progress Dashboard developed from progress report data based on (2019-2022) figures.

Figures are based on the Reef Trust Partnership Progress Dashboard developed from progress report data based on (2019-2022) figures.



BB Print are committed to protecting the environment, continually striving to improve their daily procedures with the primary objective being to limit the impact on their local habitats. With the assistance of Visual Media Association, BB Print have continued to implement and promote environmentally sound printing practices for over 10 years, ultimately achieving independent certification and accreditation at Level 2 of Sustainable Green Print.

Sustainable Green Print (SGP) is the Australian Printing Industry's own recognized certification program which ensures the industry meets its environmental responsibilities. The printing industry has a long history of undertaking environmental initiatives such as recycling,



Responsible sustainability in the printing industry

reducing emissions to water, land and air, and generally improving environmental performance. Based on the ISO14001 framework, SGP allows BB Print to manage the every day demands of their clients and the changing trends in the dealing with environmental issues.

The printing industry has improved in leaps and bounds when it comes to environmental responsibility which is an area Office Coordinator, Nicola Kaye, is passionate about, having led the charge to make BB Print a sustainable green printing business.

"BB Print has made significant changes to reduce our impact on the environment with every waste stream we have. We strive every day to better our procedures to reduce the impact on our surroundings," Nicola said.

"This became particularly challenging in 2020 when China stopped accepting recyclable waste from Australia. We needed to identify an alternative solution which would allow us

to continue recycling our paper waste, such as trimmings. This is when we discovered 'Beneficial Recycling' who have helped reduce our general waste from 600kg to 150kg per week through a new sorting and bailing process."

This 'out-of-the-box' solution earned BB Print the honor of being a finalist in the 2022 Resource Industry Network awards.

BB Print Partner, Gary Bye said "It's a great source of pride for us that we're an environmentally responsible company. We're environmentally conscious at every step, utilising greener chemicals, soy-based inks, even recycling the rags we use. By taking responsibility for our environmental impact, we can also focus on improving efficiency."

BB Print's promise is to continually be environmentally aware and think green in their everyday working practices, encouraging them to stay focused and continue working towards a cleaner and brighter future.



WET TROPICS

ALAN LYNN

WITH BETHANY DONKER AND MEGAN ZAHMEL

The positives of social networking when taking on major practice change

The positives of social networking when taking on major practice change.

Herbert sugar cane grower Alan Lynn has been described as a mentor, but he does not see himself as such. Instead, he likes to describe the give-and-take of ideas he has with farmers from across the north and down to northern Victoria as networking.

Since purchasing his first farm in 1988, Alan and his wife Jenny have joined a number of industry groups, including Catalyst, that have allowed them to connect with likeminded growers challenging the status quo in sugarcane production.

Through these networks, Alan has been able to draw on the experience and knowledge of other growers, researchers, extension staff and agronomists. The bed renovator which Alan developed in the Herbert, arose out of hearing from David Hardwick talk on the negative impact of overworking soil. Alan realised he was working his soil to the point it had lost its structure, past the 'cottage cheese' stage. As a result, the loss of structure in his challenging clays was reducing their capacity to build nutrients and retain moisture.

To redevelop soil structure Alan looked at controlled traffic, mounding, retaining the trash, and establishing multispecies fallows. He then developed a disk moulder that only built

mounds but couldn't work them – so he then developed a small renovator which allowed him to keep the mounds and reduce the number of passes on his heavier clays. Alan stresses that the development of the renovator was not overnight. Multiple versions were developed, with new learnings for each iteration.

"It wasn't a five-minute thing. It took years to develop. Even now its still changing. People tweak it 'Oh, this works better'. And what works in my situation will be different to what works in the Burdekin."

Alan built eight renovators before retiring from engineering, but he has not stopped being involved in their development. Growers in the Herbert and from other districts often approach him with questions about developing their own renovators and planters.

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Cameron Barber met Alan when he first came to Ingham in 2018. In 2021 he joined the Catalyst Grower Support Program. When he first arrived, he was impressed by Alan's small bed renovator. "I went around actively trying to find best management practice as soon as I turned up. Someone said, 'you might want to meet Alan Lynn then'. He [Alan] was very good at talking my language. He wants to know where you are coming from. What makes you tick."

"The first topic was mounding. We talked about it, I borrowed his gear, and we gave it a flogging. We thought 'that's number one' then we went to Alan and said, 'we need to make this and scale it up'. Alan then designed a 3-row renovator with Cameron and Charles Girenti that enabled them to cover more ground."

Both Alan and Cameron note that the target aim for a practice may be the same, but the methods of implementation may differ. Practices need to be adapted to fit different systems. When Cameron arrived in Ingham, he had already seen the impact from minimum tillage and improving soil health in the grain industry in northern Victoria.

"We made that change back in the late 80s, early 90s. I had already seen soil health make a massive change. You just had to adapt that to sugarcane, which was what Alan was already doing."

Alan explains that "you have to implement a system that works for you. It has to be a system. When you are talking to people you are not directly mentoring. You are saying 'this is what worked for me – and this is what didn't work. You might be able to try this'. That person has to develop that system for themselves...There is no silver bullet."

Alan believes understanding how any practice fits into your system starts by following a process to understand your aims, the constraints you are facing and the positives and negatives of different changes.

"You've got to set down your goals. Reducing compaction is probably number one in the Wet Tropics. Increasing the size of the soil bucket under your plant, as big as you can possibly get it depending on your weather constraints and your soil constraints. Every soil type is different."

"Mounding like I do, I have 'pluses': my interspaces are hard; I can cut in the wet a lot easier; I can retain my bucket; I have reduced my fuel costs. A minus: you have to go out and spend money and buy that implement. How do you justify it? Another minus is when you are planting all these legumes, you're doing it at Christmas time when you're flat out trying to spray and the weather is trying to beat you. It's not the time you want to be doing it but that's the window we have, and you have to make the most of it."

Megan Zahmel, Project Catalyst's agronomist in the Herbert worked with Alan on his 2017-20 soil ameliorant trial. She believes that the best way to approach new or challenging practices is to reach out to the networks around you.

"Alan has hard soils to work with so to stay profitable he has had to take on these new farming practices and the challenges that come with them. Because he is interested in a lot of that soil health, he tends to be at a lot of the same information sessions as myself. In some ways we bounce off each other – I introduce him to people; he introduces me to people."

"I had only just started in the sugarcane industry so Alan was really helpful to me as well when it came to learning not only the farming practice trial and error but he also had that fabrication knowledge, how to set up the equipment and how best to use the farm implements to get the results you wanted...we set up the lime trial and had big discussions around that...I have learnt just as much from Alan over the years. I think because Alan asks so many questions that is how you really get that back and forth. He will tell you if he disagrees and he will ask you those questions."

Alan also describes how much he learns from others in his network. He stresses that it is not necessary to implement everything but that there is value from being receptive to different perspectives.

"Cameron has influenced me in the fact that he goes into everything with a very open mind. Because he doesn't have any preconceived idea of how he should farm here... a lot of the time I get just as much out of them. They will bring something, and I'll think 'that's not a bad idea'."

"Two years ago, we had a multi-species biomass workshop here. Danielle Skocaj did the biomass sampling. Cameron came and he brought his cousin, Lachlan from Birchip in Victoria. He is a farmer down there. He loved it. I visited him in 2021. I rang him up and he drove us around all day long. It was a big show. They were finishing seeding that day. We came onto this wheat paddock and there were wet sodic patches. He said 'I am going to plant salt tolerant wheat grass here. I can't harvest anyway. Nothing grows there. But the problem is the spot is growing. It's getting bigger and bigger. I don't think I can

mitigate them but if I can manage them. I'm not getting any benefit off them now. So, if I can just grow something there to manage the problem'. He is trying to turn a minus into a plus."

Trialing a new practice that growers have never done before can be overwhelming. Megan suggests deliberately trialing one practice at a time in order to know what is and is not working. Growers can be quick to dismiss a practice, particularly in plant cane where trial differences are hard to determine. She recommends giving the trial time for a full crop cycle before deciding if a practice is working or not. Alan seconds this, adding that it takes time to rectify soils.

"If you do a row spacing change it takes basically seven years to get around your farm. And you think it's not that big of a change, but it is. This whole system relies on that row spacing change to reduce my compaction. To achieve the system, it has taken me seven years just for that simple practice change. Then it will be fourteen years before I am really starting to get the benefit of it."

As an early innovator, Alan knows that experimenting with new ideas can be isolating. "When I started my change, it was something new. Very few people were down that road. I copped a lot of flak."

Alan, Cameron, and Megan all agree that following a process and drawing on networks can provide confidence to keep exploring the possibilities of better practices.

"If you have someone like Alan to go and talk to, he can say 'Oh, I've done that and it didn't work, maybe you can do it, but I find that this is what happened'. That is a huge advantage and help to anyone starting something new. It is all a big sounding board, bouncing ideas off each other. The support for each other is that social networking."

... ***Hear more from Alan and growers in the Wet Tropics in the Virtual Farm Tour - Growing Ideas on the Project Catalyst YouTube Channel.***





Proud to support innovation with Project Catalyst

Over the last 15 years, many growers have benefited from support to implement GPS controlled fertiliser application and variable rate technology. These projects arm growers with the data, knowledge, and confidence they need to manage their crop's nutrient requirements, soil variations, and applying the right inputs to the right area, thereby saving product and input costs.

Catalyst grower Tony Bugeja agrees, "Once you have a library of data, you can make more informed farm decisions." Point-Of-Difference grower, Brad Penhallurick, said "Calibrating the new fertiliser box is a lot more accurate, and changing the application rates between blocks is much faster."

Soil health improvement continues to be a priority focus for many growers. Our Innovative Multispecies Project has stimulated a rapid increase in the area planted. Supported by grower collaboration with our extension team, through equipment modifications, unique crop mix evaluations and innovative planting ideas – including the first commercial planting of multispecies crops by a cane harvester!

Developing tailored species mixes to meet the objectives of different farming systems, growers planting multispecies often end up with expensive part bags of different species. In Mackay, seed mixes as well as individual seeds are dispensed by the kilogram. Senior Agronomist Che Trendell said this has resulted in 800ha planted.

Over the last year, our team has rebuilt an impressive number of spray rigs for more efficient chemical use and provided education to aid better chemical choices through the Pesticide Risk Model, now attached to the Pesticide Decision Support Tool from UQ. Growers working with us have learned how



to apply chemicals more effectively, and they appreciate the support.

"The Farmacist team has always been excellent with their advice and recommendations to help from the smallest improvements to the larger ones... Adam helped me bring life to my existing spray rig equipment with his wealth of knowledge," said Nev Huddleston from Koumala. "When driving around the farm, I can see the difference in the cane's performance and very little product is needed. I'm saving money and time thanks to Project Bluewater."

Ongoing research into the use of biobeds is also yielding exciting results, providing a solution to remove chemicals from runoff leaving mixing sites and spray tank wash down areas.

Our Burdekin research farm has provided an opportunity to flex the team's innovative streak, which has resulted in the implementation of an affordable, fully automated irrigation system, powered largely by Observant technology. Visiting growers have been able to appreciate the simplicity and reliability of the system, which also includes the solar powered pumping unit to reduce running costs. The Australian Government's On Farm Connectivity Program offers growers rebates of up to 50% on these systems.

All resources for Farmacist's projects and R&D are available at www.farmacist.com.au

The Innovative Multispecies Project, Project Bluewater 2, and The Point-Of-Difference Project are funded by the partnership between the Australian Government's Reef Trust and the Great Barrier Reef Foundation, and Farmacist.



In 2023, the sugar market saw the highest prices since 2011, fuelled by disappointing crops in Thailand and India in 2023/24 amid the ongoing El Niño event that usually coincides with dry weather across much of Southeast Asia. The current El Niño event continues to have the potential to increase the probability of dry weather in some of the largest exporters of sugar



Another season of sugar maximization in Brazil is expected

in the world, but in India and Thailand, low rainfall in the next four to six months (the dry season) will be less crucial and potentially aid harvesting efforts.

It is still early days, but it is quite likely that Brazil will maximize sugar production (to the detriment of ethanol) in the 2024/25 season and see additional crystallization capacity coming online. The premium of sugar over the ethanol parity has reached record levels in 2023 (of over USc 12 lb). Also, cane ethanol production is increasingly complemented by more corn ethanol production. A small increase in ethanol demand and/or energy prices will not be enough to lead to a lower sugar mix next season. An escalation of the Israel-Hamas war could result in very volatile energy prices ahead, but for now we assume a sugar max.

Thailand will likely see a drop in production in 2023/24, and with that, the white premium is likely to remain strong globally. However, in

2024/25, Thailand could recover both in terms of area and harvest yield (this is, however, by no means certain), leading to a lower white premium from Q4 2024 onward. India will delay announcement of export quotas, if any. Typically, export quotas are announced in September or early October, but we are not expecting any announcement until early 2024. India could see an improvement in cane output in 2024/25, but it is entirely possible that any increase could go to ethanol. The increase in ethanol use in India will continue to limit the export surplus available to the global market in the coming years.

.....
Carlos Mera
 London, UK
 Head of Agri Commodity Markets
 Research, Rabobank



Since Mackay Sugar became a member of the Nordzucker Group in 2019, more than \$300 million has been invested into renewing and upgrading its assets with similar - if not higher - spends expected in years ahead. This sizable and ongoing investment is also being seen as a unique opportunity to seek out new technology that is positioning Mackay Sugar as an industry leader.

For example, Mackay Sugar's Racecourse and



Creating value through SWEET innovation

Farleigh Mills are now home to Australia's first Honeycomb Pan Calandrias, which are significantly more efficient to build and install as they allow heating surface area to be increased without increasing footprint. Although still early days, the new tech is already showing positive performance increases with more benefits to be realized.

The entire High-Grade Centrifugal (Fugal) stage at Marian Mill is currently being replaced with the latest batch fugal design and sugar conveying system. The technology is expected to halve the factories batch fugal numbers and greatly reducing ongoing maintenance costs.

On the horizon, Mackay Sugar has a Falling Film Tube Evaporator ready for construction this year, with installation planned for 2025. This will be the second evaporator of this type in Australia and the first made entirely of stainless steel, offering improved reliability that will increase security of Mackay Sugar's electrical cogeneration steam system; allowing for the removal of five 80-year-old

evaporators.

Other projects in the pipeline include trialing a Belt Filter Press as a first step towards alternative mud filter technology that is intended to replace Mackay Sugar's existing and difficult to maintain rotary drums. In addition, continuous Vertical High Grade and Seed Pans are also under investigation and if successful will potentially enable the replacement of several old batch pans with one larger asset.

With innovative solutions like these creating value throughout the sugar production chain, this is an exciting time for Mackay Sugar who, along with stakeholders across the industry, are interested to see how much impact this new, more efficient technology can have in other areas such as energy efficiency, lower maintenance costs, lower operating costs.

Thank You

We could not accomplish our goals without the support, involvement and enthusiasm of our committed supporters.

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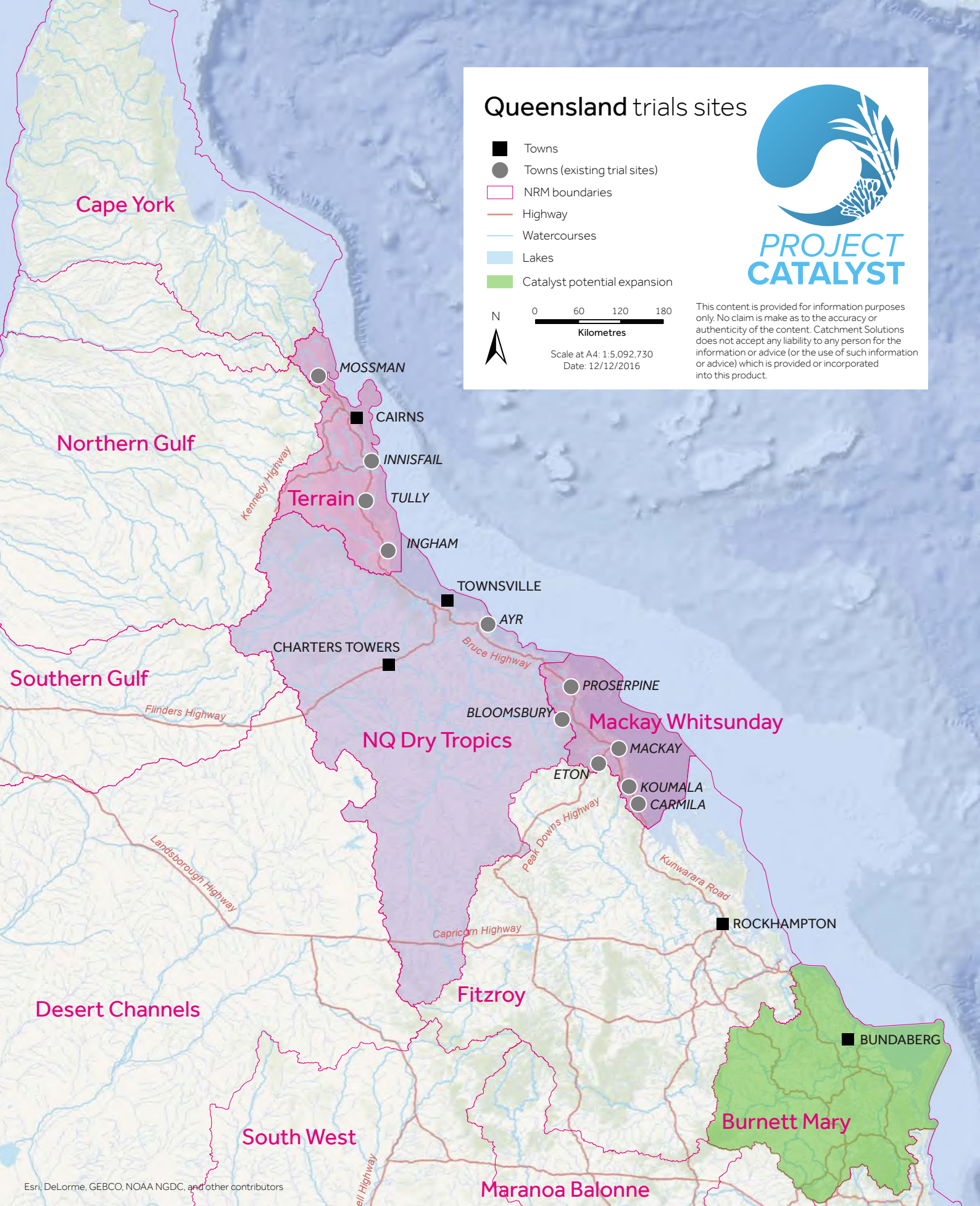


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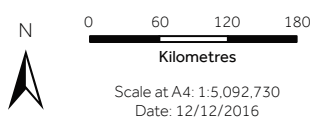




Queensland trials sites



- Towns
- Towns (existing trial sites)
- NRM boundaries
- Highway
- Watercourses
- Lakes
- Catalyst potential expansion



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