

LOWER HERBERT WATER QUALITY PROGRAM

Achievements and learnings

August 2024



Australian Government

REEF TRUST



Great Barrier
Reef Foundation

Introduction

The Great Barrier Reef is globally renowned for its intrinsic beauty, immense spatial scale, outstanding biodiversity as well as its natural, social, economic, and cultural values. A healthy and resilient Great Barrier Reef is critical to protect the vast array of ecological communities and species that inhabit coastal, marine, and terrestrial ecosystems. However, the health of the Reef is at risk from a range of factors including climate change, expanding coastal development, direct human use and poor water quality from land-based runoff.

In a bid to significantly improve the health of the Great Barrier Reef, the Reef Trust Partnership (the Partnership) – a landmark collaboration between the Australian Government’s Reef Trust and the Great Barrier Reef Foundation – was awarded \$443M to elevate and amplify efforts to build Reef resilience. As part of the Partnership, the Water Quality Program received \$199M to address poor water quality from land-based runoff and respond to the priorities of the Reef 2050 Water Quality Improvement Plan (WQIP).



Lower Herbert Water Quality Program

The Lower Herbert Water Quality Program was one of ten regional water quality programs delivered under the Partnership between 2020 and 2024. Through the adoption of improved land management practices, this \$16M program aimed to prevent 142 tonnes of dissolved inorganic nitrogen that are lost from sugarcane land from entering the Reef's waters every year.

The Lower Herbert sugar industry commenced operations in 1888, and the regional community is highly dependent on its viability. Located in the Wet Tropics, the Herbert catchment discharges more than 5,000 gegalitres of fresh water into the Great Barrier Reef annually.

The WQIP identified the reduction of Dissolved Inorganic Nitrogen (DIN) as a priority for the Lower Herbert region. The four-year Lower Herbert Water Quality Program (the Program) was delivered by six organisations through six on-ground projects, each with its own pollutant reduction target.

Projects tracked their progress to targets using the Paddock to Reef ([P2R](#)) Projector Tool and a project-specific approved alternate method for calculating the impacts of precision application of Mill Mud across a broader area, which estimate water quality improvements based on a reported change in the management practices by farmers involved in the Program.

Program activities mostly centred around tailored agronomic extension support, with projects working one-on-one with farmers to reduce nutrient losses at the end of catchment. Other key cross-cutting activities included a regional engagement strategy, demonstration trials, financial incentives, and water quality monitoring technical support which together contributed to critical behavioural, technical, economic and environmental goals.

The success of the Program is reflected by the nearly 280 sugarcane farmers who improved their nutrient management practices, positively impacting over 35,500 hectares of sugarcane growing land. That represents approximately 48% of growers in the Lower Herbert region and 54% of the entire Herbert sugarcane production area. This collective effort resulted in the reduction of 143 tonnes of DIN per year, while maintaining or improving productivity for engaged growers.



Great Barrier Reef Foundation



CANE GROWERS
HERBERT RIVER



“We can now monitor all of our crops and apply fertiliser and chemical selectively, as needed to minimise over-usage for an environmental and economic advantage.”

Herbert grower and Major Grant recipient Clint Lyon



Achievements



35,500

hectares of cane under changing management practices



1,696

attendees at Lower Herbert Water Quality Program events



279

sugarcane farmers taking direct action to improve water quality



32

water quality information, knowledge sharing and training events.



11

water quality trials comparing the impacts of common management practices.

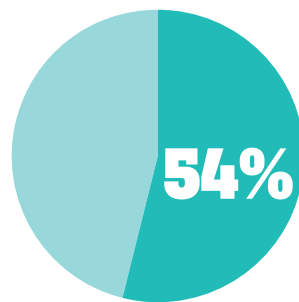
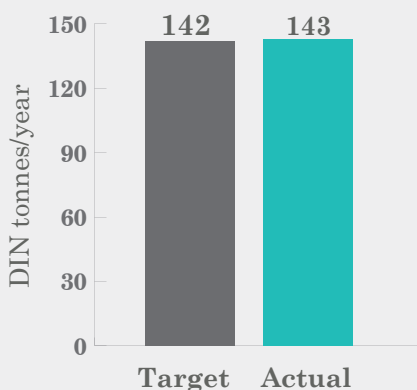


15%

increase in mill mud applied more than 30km from the mill from 2020-2022.

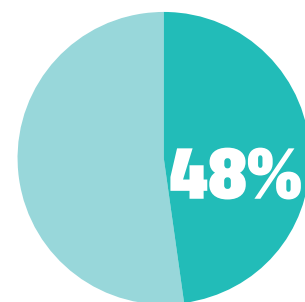
PROGRAM IMPACTS ON THE HERBERT RIVER CATCHMENT

Progress against DIN reduction targets




Ha of improved practices

Improved practices recorded across more than half of the Herbert harvest area



Growers taking direct action

Improved practices recorded across nearly half of all Lower Herbert growers

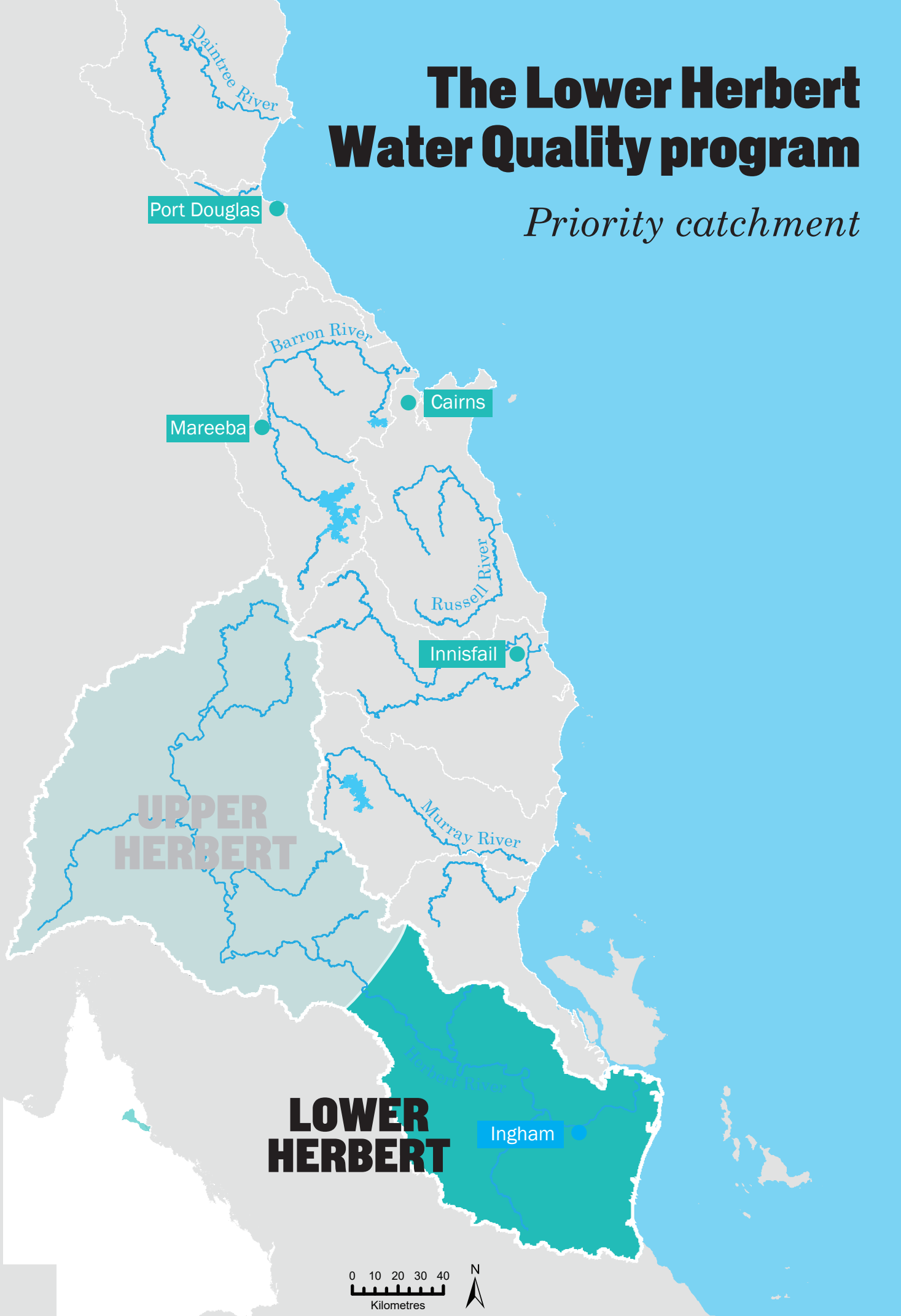


“Here in the lower Herbert, we are on the doorstep of the Great Barrier Reef, so it’s important that everyone is environmentally conscious. My sediment ponds catch my runoff water. They are very healthy, full of fish, water lilies and a few crocodiles.”

Herbert grower Raymond Jayo

The Lower Herbert Water Quality program

Priority catchment



Program Model

Governance arrangements for the program ensured projects delivering on the ground reported directly to the Foundation while also being supported by a regional partnership coordinator. This model has increased transparency of outcomes and agility to manage contractual commitments while providing access to local support to manage risk, coordinate activities, identify synergies, and promote the program to the wider regional audience.

A key role of the regional partnership coordinator was to oversee the program's spatial reporting dashboard, which allowed checking for historical overlaps, vetting of farm-level projects to ensure adoption of practices not previously funded, and tracking of progress towards targets.

The partnership coordinator reported directly to a regional steering committee made up of key stakeholders including CANEGROWERS Herbert River, a Technical Water Quality Advisor and the Foundation. The steering committee was supported by a Technical Advisory Group and the water quality working group, which provided technical and strategic advice across the whole of the Reef Trust Partnership Water Quality Program.

The design of the governance model recognised the importance of independent local leadership and oversight, as well as strategic and technical guidance and collaboration.

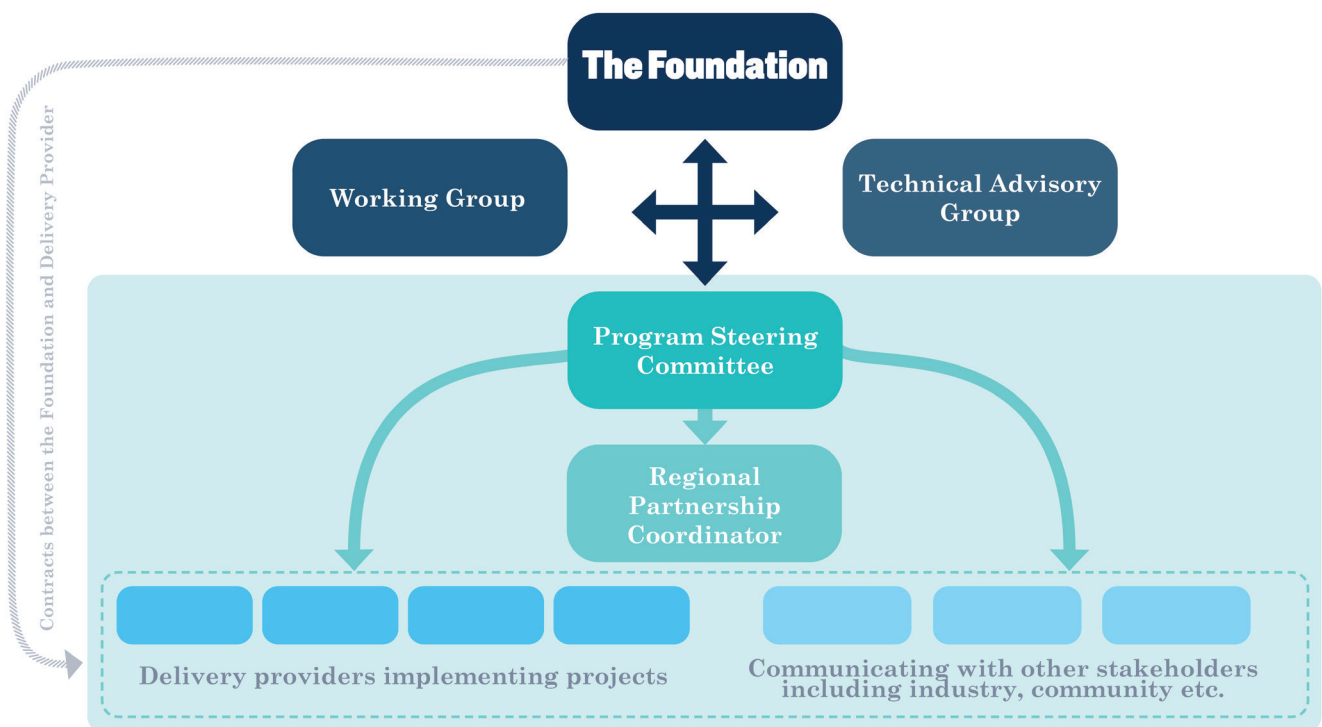


Figure 1 Reef Trust Partnership Lower Herbert Water Quality Program governance model

Funded Projects

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This market-based solution incentivises water quality improvements to support a healthy Great Barrier Reef. Farmers in the Lower Herbert region undertook projects that improve water quality through changes in land management to generate and sell units of nutrient reduction through validated and audited activities that go above and beyond regulatory requirements. Investors seeking water quality improvements, such as the RTP Water Quality Program, purchased Reef Credits in the region creating impact to endure far beyond the program.



MODERNISING ON-FARM MILL MUD APPLICATION

Agro Group's Modernising On-Farm Mill Mud Application project developed and implemented new technology to better manage nutrient application and maximise the positive impacts of mill mud. Two prototype mill mud spreading spinner trucks were deployed to achieve reduced on-farm mill mud application rates, accurate and variable placement on the cane and wider regional distribution.

Since 2021, there has been a 15% increase in mill mud application more than 30 kilometres from the mill. Broader and more precise application of mill mud is not only benefiting individual farms but is making a significant positive contribution to the health of the lower Herbert waterways as well.



PROJECT CATALYST BROADER ADOPTION

Catchment Solution's project, delivered in partnership with Ingham-based Herbert Cane Productivity Services, supported management practice changes through agronomic advice, and demonstration trials.

Thirty growers evaluated their current farming system and identified and adopted farming practice changes. Networking events included shed meetings, field days and an annual forum enabled and expanded the grower network, which has been critical in providing "Peer-to-Peer" learning through open discussion and the sharing of information. The project has contributed to improved environmental health of regional waterways to help sustain water quality and water flow for the health and management of our rivers and creeks.

Funded Projects

LOWER HERBERT MAJOR GRANTS PROGRAM

CANEGROWERS Herbert River administered financial incentives for the upgrade or purchase of equipment in support of sustaining or improving practices that reduce nutrient runoff losses.

Ninety-four sugarcane growers, who met the eligibility requirements, accessed \$1.6M in financial incentives and accelerated the adoption of cost-prohibitive new farming practices.

Herbert growers invested \$2M of their own funds to achieve practices such as matching nitrogen supply to crop nitrogen requirements, timing of fertiliser application and/or fertiliser application methods. Growers were also supported to achieve SmartCane BMP accreditation.



LAND hub (LOCAL AREA NUTRIENT DATAHUB)

The LiquaForce LAND hub collects critical data such as crop history, land topography, EM mapping, and soil composition to produce optimised Six Easy Steps nutrient management plans that reduce excess nutrients flowing into local waterways. This all-in-one solution for fertiliser management gives growers the tools for fast and efficient decision-making.

The combination of agronomic and technological support has improved both the economic and environmental sustainability of sugarcane farming operations. The quality and accessibility of the connected data in has supported widespread practice change, which has resulted in less dissolved inorganic nitrogen (DIN) running into local waterways.



PROJECT CANE™ (Crop and Nutrient Efficiency)

Herbert Cane Productivity Service's Project CaNE™ addressed the issue of DIN being exported from the farm into freshwater and marine ecosystems within the Herbert catchment area. One hundred and forty-five growers were supported to develop whole-of-farm nutrient management plans.

Agronomic support was provided for improved management practices to drive productive, financially, and environmentally sustainable farming systems. A robust scientifically

proven water quality monitoring program underpinned a range of extension approaches that included face-to-face, group extension, and mass media extension methodologies to engage with farmers to support practice change activities leading to improvements in water quality and productivity.

James Cook University's TropWater undertook real-time water quality monitoring and communicated local water quality outcomes to empower farmers who were improving farming practices to reduce DIN and other agriculturally based pollutants entering local water ways.



“The project is striking a great mix with helping growers improve practices and productivity, while also lifting their overall sustainability”

Project CaNE™ participant Michael Penna



Cross-cutting activities

Value-Add Projects

In 2022, the Foundation invited proposals, through a competitive process, for additional deliverables that would add value to existing projects and programs.

Agro Group was awarded funding to participate in mill mud trials, support the development of an alternate method to assess mill mud practices, and deliver incentives to new growers for the adoption of improved practices to reduce DIN losses. LiquaForce were awarded funding for the capture of harvester productivity data that was included in the LAND platform.

Water Quality Monitoring Support and Communication

The JCU TropWATER project supported delivery providers to improve the design and implementation of paddock water quality monitoring to ensure monitoring activities were consistent and fit for purpose.

Scientific expertise from leading water quality researchers was combined with strategies from science communication specialists.

Key messages around common water quality questions were developed to improve understanding and knowledge for growers and extension staff. Support and training were provided across regions for the interpretation and communication of water quality results to growers.

Independent Verification and Engagement

On-ground projects were independently verified to ensure the extent, quality, and accuracy of reporting in the spatial dashboard. The process provided the unique opportunity for growers to share their experiences participating in the program first-hand, while facilitating communication between growers, delivery providers and funders. This included discussion on communication and engagement, effectiveness and extent of practice change and legacy outcomes relating to the program.

Regional Program Communication Materials

In their role as regional coordinator, CANEGROWERS Herbert River developed additional communication materials to highlight the regional program's positive impact on water quality and regional communities. These enduring communications products will be an authentic record of current efforts into improving the health of the Lower Herbert region and the Great Barrier Reef.

Learnings

1. A functional governance structure tailored to the program provided transparency and accountability of the on-ground delivery by effectively tracking progress as well as tangible support to delivery providers by swiftly addressing any risks or issues identified during the delivery of the program.
2. Including water quality targets as a contractual commitment increased competition between delivery providers. During project initiation, the perception was that grower participation or pollutant savings would rapidly diminish. However, once growers were engaged, delivery providers worked together with the regional coordinator's support.
3. Maintaining a real-time spatial data platform provided transparency by enabling effective and real-time reporting of water quality improvements to stakeholders, including funders, industry, and the community, over the duration of the program.
4. The combination of agronomic advice, technical support, and access to financial incentives accelerated the adoption of improved practices and progress to water quality targets.
5. A range of delivery providers with diversified approaches was critical to accommodating individual grower needs and requirements.
6. Trusted extensions officers with extensive local knowledge were critical to building trust, engaging growers and achieving program outcomes.
7. The demand for agronomic support exceeded the regional capacity to service growers. However, the legacy of water quality programs subsidising growers has impacted the willingness of growers to pay a fee for this support. Future programs should incorporate cost-sharing to encourage the transition to a more sustainable fee-for-service extension approach.
8. Resellers providing contradictory advice continues to be a challenge for improved water quality practices to endure. There is an opportunity for future investment to formalise more education and involvement of resellers, subcontractors and the harvesting and planting sector in supporting water quality beneficial practices.
9. Regulations were critical to the success of voluntary programs. Compliance was identified as a main driver and motivation for grower involvement. Engaged growers realised the additional benefits of Program participation.

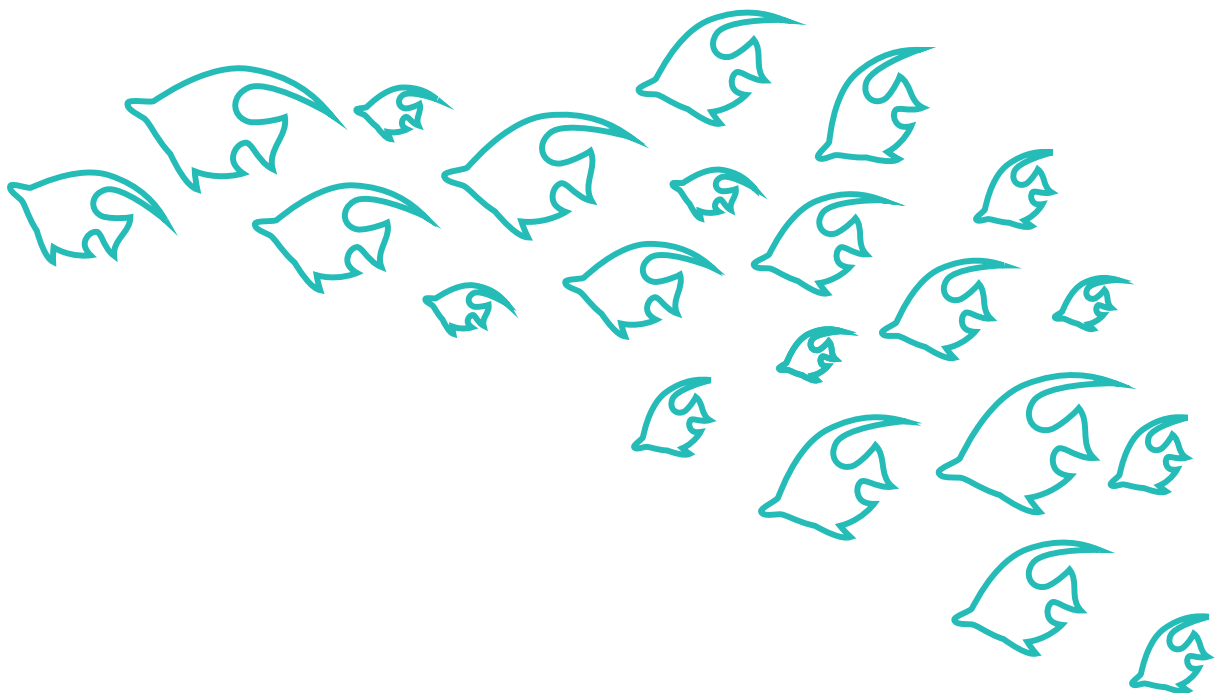
Summary

Over the four years of the Reef Trust Partnership Water Quality Program, nearly 280 sugarcane farmers improved nutrient management practices increasing the productivity and sustainability of over 35,500 hectares of sugarcane growing land in the Lower Herbert region.

The combination of agronomic extension support with a suite of additional cross-cutting activities enhanced the outcomes achieved through the Program. Real-time water quality monitoring, demonstration trials, financial incentives, and water quality monitoring technical support together strengthened the coherence of the program and contributed to critical technical, economic and environmental goals.

Transparency and accountability were delivered through a regional-specific governance model. Real-time data of on-ground actions provided timely and public progress towards pollutant reduction targets. The broad range of delivery providers represented across the six projects provided different approaches to suit all growers. A new data platform for nutrient planning and management increased digital literacy. Financial incentives through major grants removed the financial barriers to the timely adoption of best management practices.

The combination of all the above has contributed to the Program exceeding its original pollutant reduction target with a reduction of 143 tonnes of DIN per year. This has resulted in a more sustainable sugar industry and better water quality in the local waterways and, the Great Barrier Reef lagoon.



Acknowledgements

Reef Traditional Owners have been caring for land and sea Country for more than 60,000 years, using Traditional Knowledge passed down through ancestral lines for millennia. The Great Barrier Reef Foundation extends its deepest respect and recognition to all Traditional Owners of the Great Barrier Reef and its Catchments, as First Nations People holding, the hopes, dreams, traditions and cultures of the reef.

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