WET TROPICS

ENHANCED EXTENSION COORDINATION

Regional Extension Plan

Queensland Government

FUNDED THROUGH THE QUEENSLAND GOVERNMENT REEF WATER QUALITY PROGRAM

Wet Tropics Regional Extension Plan 2019/20:

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1 EXECUTIVE SUMMARY

The Queensland Government is investing in more effective, targeted and coordinated extension and broad-scale practice change programs as part of its response to Recommendation 3: *Extension and Education*, Water Science Taskforce (Taskforce) Report (2016). Project TF3.5 *Enhanced extension coordination in GBR* is sponsored by the Office of the Great Barrier Reef (OGBR) in the Department of Environment and Science (DES) and is being administered through Department of Agriculture and Fisheries (DAF). The Taskforce proposes that the key to broad-scale and widespread practice change will be landholder engagement and understanding the drivers, motivations and also obstacles to change, and that water quality improvements alongside on-farm profitability and productivity must drive the agenda.

Project TF3.5 provides funding for salaries and project operating costs for a Manager (Extension Coordination) and seven Regional Extension Coordinators (RECs) (Appendix 1). The Wet Tropics REC has been appointed to support both Wet Tropics and Cape York Region sugar and banana extension officers to expedite the Wet Tropics Regional Extension Plan (REP). A second officer, the Cape York REC, has been appointed to support Cape York and Wet Tropics grazing and horticulture extension officers to deliver the Cape York REP.

Figure 1. Wet Tropics Regional Extension Plan Flow Diagram indicating the plan's components

The Wet Tropics REP aims to provide a strategic outline for the delivery of on-ground extension services consistent with Reef and Regional Water Quality Improvement Plans (WQIP's) and Taskforce recommendations taking into account, local experience and expertise. A combined Wet Tropics and Cape York REP was developed in September 2018 by both the Wet Tropics and Cape York RECs in conjunction with industry-based Regional Extension Working Groups (REWGs). To reflect the strengths

and needs of both the Wet Tropics and Cape York regions, this plan has now been separated and updated (see Figure 1), to incorporate additional information from the DAF-Skills Audit (2018) and further consultation with REWGs including recommendations for priority actions. Coordination of both plans will continue cross-regionally on a commodity basis, as described above.

REWGs comprise relevant extension organisations and practitioners that work together to continually identify and address regional extension needs and gaps, and coordinate priority extension activities before implementation. This enhanced approach to regional extension effectively encourages collaboration amongst regional stakeholders and service providers and allows for their input into decision-making and the design of the REP. REWGs bring substantial benefits, including more efficient shared learning within and between organisations, reduced duplication of effort and producer fatigue and enhanced opportunity for creating "win-win" scenarios. Based on geographic, land use and commodity considerations, a combined REWG has been established for the Wet Tropics region with representatives from the sugar (including extension staff from the Wet Tropics Sugar Industry Partnership/WTSIP) and banana commodities).

REWG inception took place over the latter part of 2018, where groups met and drafted generic terms of reference (TOR) for their operative function. The TOR (Appendix 2) elucidates issues such as roles and responsibilities, membership conditions, operational and conduct guidelines and decision-making processes. An agreed framework for REWG decision-making facilitates the delivery of coordinated extension by providing an objective means for project prioritisation, and allocation of project funds.

Project TF3.1.1 *Enhanced Extension and Education (2017-2020)* provides funds to support six focus areas identified as priorities in the Review report: *Practice change, Education and Extension in Reef Catchments* (Coutts J&R, 2017), hereafter referred to as the E&E Review. Through the Extension *Approaches and Methods* (focus area 5), Peer-to-Peer funds are available to support existing producer groups or establish new groups that select their own facilitator or delivery organisation to work with.

New Facilitated Peer-to-Peer learning groups developing across the Wet Tropics region are as follows:

- Next Generation Grazing Network (Herbert, Barron and Johnstone catchments, Wet Tropics)
- Dairy and Beef Pasture Productivity Management Group (Herbert, Barron and Johnstone catchments, Wet Tropics)
- Wet Tropics Sugarcane Leadership Program
- Cairns/Babinda P2P Bus Tour Group
- Daintree Sands Mill Mud, Basalt Rock and Compost Group
- Herbert Demo Farm WQ Project
- Mossman P2P Bus Tour Group
- Young Grower Engagement Group
- Tully Phosphorus (P) Grower Group
- Wet Tropics Soil Health Coaches
- Wet Tropics Regenerative Cane Farming Forum
- Review of Brazilian Sugarcane Farming Systems Group

Administered by DAF through the Training and Development Manager, the *Training and Capacity Building* (focus area 4) is developing and implementing a best practice framework for upskilling the extension delivery staff across sectors in all Reef regions. A Training Needs Analysis (TNA) explored the knowledge and skills needed by extension providers to improve their effectiveness to arrive at high priority Training and Development to be implemented Reef-wide. RECs play a key role in supporting capacity building by working closely with the Training and Development Manager to

provide advice and coordination at the regional level. Results of this work have been presented to regional stakeholders, with further feedback on regional priorities sought. Funding is provided to support reef extension personnel to attend training or participate in the mentoring program including the *Agriculture Extension Work Placement Program*.

A Monitoring and Evaluation (M&E) Framework (and template) has been designed to provide consistency in reporting and evaluation measures of REPs. The M&E Framework evaluates the performance of the REP in coordinating regional extension effort across Reef catchments. The Framework facilitates collaboration amongst extension providers to implement planning and is underpinned by key result areas established through Project TF3.5. These key result areas were developed by DAF and later reviewed with input from DES, Coutts J&R and REWGs from each region.

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5 ACRONYMS

ABGC – Australian Banana Growers Council

BCC – Barron Catchment Care

CCC – Cooperation, Coordination and Collaboration

CRC – Cooperative Research Centre

CSIRO – Commonwealth Scientific Industrial Research Organisation

CYNRM – Cape York NRM

CTAG – Cane Technical Advisory Group

DAF – Department of Agriculture and Fisheries

DES – Department of Environment and Science

E&E – Extension and Education

EEC – Enhanced Extension Coordination

FEAT – Farm Economic Analysis Tool

GBR - Great Barrier Reef

HCPSL – Herbert Cane Productivity Services Ltd.

IBPS – Innisfail Productivity Services

JRCMA – Johnstone River Catchment Management Association

MERI – Monitor, Evaluate, Review, Implement

M&E – Monitoring and Evaluation

MIPs – Major Integrated Projects

NLP – National Landcare Programme

NRM – natural resource management

P2P – Peer to Peer

P2R – Paddock to Reef

QFF – Queensland Farmers Federation

QPWS – Queensland Parks and Wildlife Service

QRWQP – Queensland Reef Water Quality Program

RAP – Reef Alliance Project (Growing a Great Barrier Reef)

RCS – Resource Consulting Services

REC - Regional Extension Coordinator

Reef 2050 LTSP - Reef 2050 Long Term Sustainability Plan

REWG – Regional Extension Working Group

REP – Regional Engagement Plan

SCYC – Southern Cape York Catchments

SRA – Sugar Research Australia

STPs – Sewage Treatment Plants

TNA – Training Needs Analysis

WWF – World Wide Fund for Nature

WTREP – Wet Tropics Regional Extension Plan

WTSIP – Wet Tropics Sugar Industry Partnership

WTMIP – Wet Tropics Major Integrated Project.

6 ACKNOWLEDGEMENTS

The Enhanced Extension and Coordination (EEC) in Reef catchments project is funded through the Queensland Government's Reef Water Quality Program.

Terrain NRM would like to thank the Wet Tropics Sugar Industry Partnership (WTSIP), Australian Banana Growers Council (ABGC), Barron Catchment Care (BCC) and the Department of Agriculture (DAF) for their support in developing the Wet Tropics Regional Extension Plan.

Terrain NRM would also like to acknowledge and thank Roy Murray-Prior and Agribiz RD & E Services for considerable effort assisting the Regional Extension Coordinators to properly structure, compile and edit the first iteration of the Wet Tropics and Cape York Regional Extension Plan.

This Plan has been reviewed and edited by the following people for whom the Regional Extension Coordinators' are grateful:

- Niall Connolly (Department of Agriculture and Fisheries)
- Steve Roeger (Wet Tropics Sugar Industry Partnership Manager)
- Michael Nash (Wet Tropics Regional Extension Coordinator)
- Oliver McConnachie (Cape York Regional Extension Coordinator)
- Harry James (Cape York NRM)
- Sue Sargent (Consultant)

7 INTRODUCTION

In 2016, the Great Barrier Reef Water Science Taskforce (the Taskforce) recommended that the Queensland Government invest in more targeted and coordinated extension to support broad-scale land management practice change that will result in improved water quality outcomes for the Great Barrier Reef (GBR) and accelerate achieving the objectives of the Great Barrier Reef 2050 Water Quality Improvement Plan (Reef Plan). In response, the Queensland Government engaged an independent consultant to review the current status of extension and education systems in Reef catchments. The final report: *Strengthening Practice Change, Education and Extension in Reef Catchments* (Coutts J&R, 2017) was published in June 2017.

The E&E Review identified a range of issues and made 65 recommendations on the education and extension systems to build on extension capacity in GBR catchments under the following themes:

- Improved coordination and collaboration of extension projects
- Skills gaps and the need for training and capacity building
- More effective monitoring and evaluation of the extension effort and outcomes

The Queensland Government agreed, or agreed in principle, with all of the review recommendations and are investing over $10 million to implement its recommendations. In consultation with the reviewer to address both the concerns the Taskforce and the findings of the Review; two key projects commenced in 2016/17:

- A pilot capacity building program to provide extension training and work placement to graduates that was administered by the Queensland Farmers Federation (QFF)
- An Enhanced Extension Coordination project to facilitate improved coordination of extension activities in GBR catchments administered by Queensland DAF (this project).

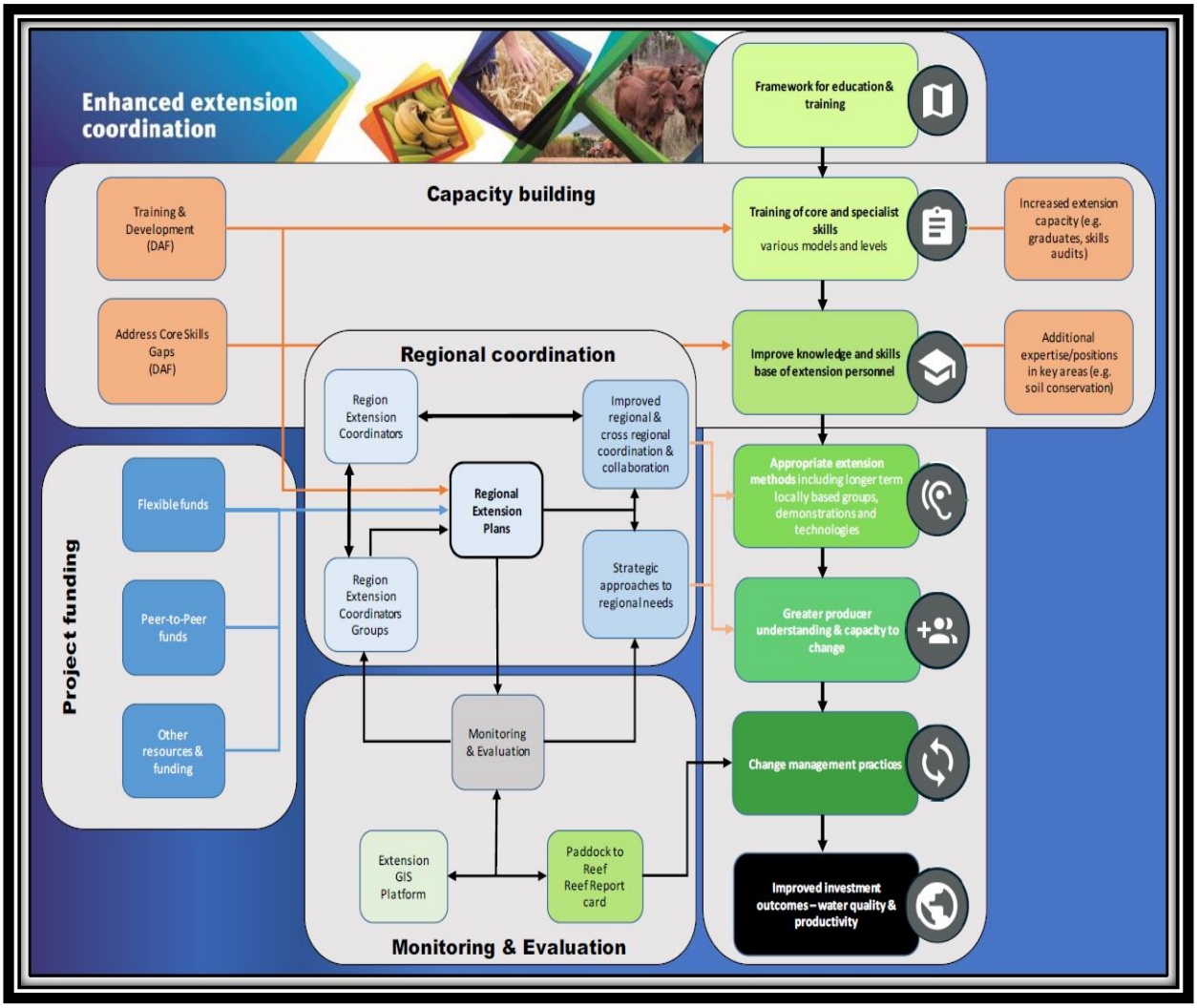
Through this project, Regional Extension Coordinators (RECs) were appointed in 2018 to facilitate local coordination groups/networks (REWGs) and develop Regional Extension Plans in the six Reef Natural Resource Management (NRM) regions (Cape York, Wet Tropics, Burdekin, Mackay-Whitsunday, Fitzroy and Burnett Mary). The Wet Tropics Regional Extension Plan (REP) is one of these plans. This version, the Wet Tropics REP 2019/20 is a revised and updated version of the Wet Tropics Cape York Cross-Regional Extension Plan 2018/19, which has now been translated into two plans. It should be noted that delivery of the two plans will continue on a cross-regional, shared commodity basis, with the Wet Tropics REC taking the lead for delivery across the sugar and banana industries and Cape York's REC the lead for delivery across the grazing, horticulture and mixed cropping industries.

Project TF3.1.1 *Enhanced Extension and Education (2017-2020)* provides funds to support six focus areas identified as priorities in the Review report: *Practice change, Education and Extension in Reef Catchments* (Coutts J&R, 2017), hereafter referred to as the E&E Review. Through the Extension *Approaches and Methods* (focus area 5), Peer-to-Peer and Flexible (Discretionary) funds have been made available to support regional networks to work together to develop projects.

In addition, DAF is delivering projects to service high priority skills gaps and training and development needs across regions and provide funding to each region for extension activities that facilitate improved coordination and collaboration to deliver better on-ground services for land managers and to encourage land manager peer-to-peer learning activities that are prioritised Regional Extension Plans.

Figure 2 (below) outlines the project logic of how the Queensland Government, in partnership with NRM organisations and industry will implement the recommendations of the E&E Review.

Figure 2. Project logic of the Queensland Government's implementation of the Education and Extension Review: Practice change, Education and Extension in Reef Catchments (Coutts J&R, 2017) being implemented through the Enhanced Extension Coordination project.



7.1 MAJOR STAKEHOLDERS

Extension support to the agricultural industries in GBR catchments is undertaken by a wide range of providers including industry, private consultants and agri-businesses, NRM bodies and government agencies. Major stakeholders consulted or directly involved in designing this REP included:

- Agforce
- Australian Banana Growers Council (ABGC)
- Australian Mango Industry Association
- Cooperative Research Centre for Northern Australia (CRC)
- Barron Catchment Care (BCC)
- Cape York NRM
- Commonwealth Scientific and Industry Research Organisation (CSIRO)
- Department of Agriculture and Fisheries (DAF)
- Department of Environment and Science (DES)
- Growcom
- Horticulture Innovation Australia Limited (HIAL)
- Indigenous corporations and organisations
- Mareeba District Fruit & Vegetable Growers Association
- Meat and Livestock Australia (MLA)
- National Parks Management Authorities
- NRM Regions Queensland (NRMRQ)
- Office of the Great Barrier Reef (OGBR)
- Queensland Farmers Federation (QFF)
- Queensland Parks and Wildlife Services (QPWS)
- Reef Alliance
- Regional Extension Practitioners
- Southern Cape York Catchments (SCYC)
- Wet Tropics Sugar Industry Partnership (WTSIP):
    - Australian Cane Farmers Association
    - CANEGROWERS
    - Herbert Cane Productivity Services Ltd.
    - Innisfail Babinda Cane Productivity Services Ltd.
    - Mossman Agricultural Services
    - MSF Sugar
    - Sugar Research Australia (SRA)
    - Terrain NRM (Wet Tropics)
    - Tully Cane Productivity Services Ltd.
    - Tully Sugar Ltd.
    - Wilmar

A synergy matrix of extension services and how they fit together within the Wet Tropics region can be found in Appendix 3.

7.2 Purpose of the Wet Tropics Regional Extension Plan

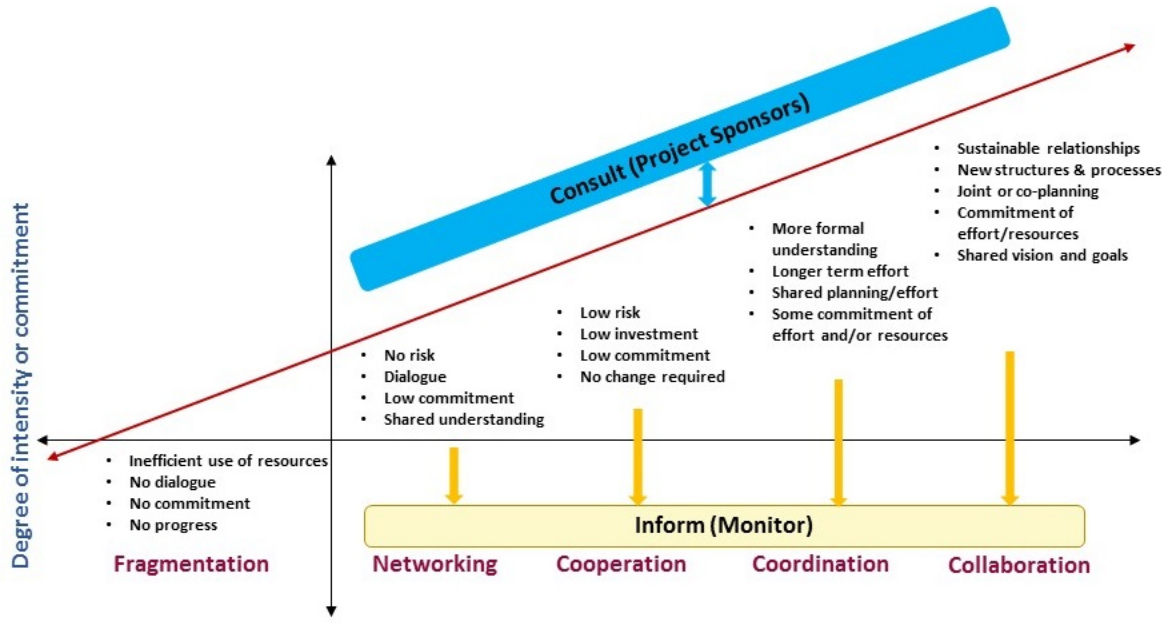
The Wet Tropics Regional Extension Plan (WTREP) aims to provide a strategic outline to the delivery of on-ground extension services consistent with Reef and Regional Water Quality Improvement Plans (WQIP's) considering local experience and expertise to deliver sustainable agricultural industries and communities.

This document was initially developed in September 2018 by both the Wet Tropics and Cape York Regional Extension Coordinators (RECs) in conjunction with Regional Extension Working Groups (REWGs). A decision was subsequently reached to separate the Wet Tropics and Cape York REPs given the geographical differences in significant land use, and existing mechanisms to enhance collaboration.

The current version of this plan was updated in July 2019, to incorporate additional information from the 2018 QDAF Skills Audit, reflect further consultation with industry REWGs and reflect the progress of WTREP implementation. The WTREP seeks to include all major stakeholders in decision making through developing and maintaining REWGs that support private and public service providers to enhance regional and cross-regional extension delivery and better meet land manager needs. The WTREP extends contemporary approaches to extension and will build on current delivery to better support whole-of-farm outcomes that affect broad-scale agricultural practice change.

Building coordination and collaboration between multiple extension partners is not a simple process, and the WTREP recognises that while increased collaboration may be the ultimate goal, it is not necessary or appropriate at all times and relationships often need to be developed over time before it can be fully achieved. For this reason, the WTREP has adopted the 'collaboration continuum' (see Figure 3) as a model to guide project participants and to monitor and evaluate the changes in relationships as they grow.

Figure 3. The Collaboration Continuum [Adapted from Success Works, Putting Partnerships into Practice, final report (Department of Human Resources, 2004)].



7.3 WTREP OBJECTIVES

As a major agricultural region of Queensland, the WTREP builds on the significant efforts of industry-funded extension in the Wet Tropics to enhance extension and collaboration and achieve better integration of the Reef 2050 Long Term Sustainability Plan (Reef 2050 LTSP). The WTREP sets out consultative and transparent processes to prioritise project activity and the allocation of project funds. The objectives of the WTREP are to deliver actions that:

- Ensure opportunities for coordination, collaboration and feedback on Reef Programs are identified and utilised
- Maintain, enhance and expand regional partnerships and improve coordination and collaboration across major agricultural industries and NRM groups within GBR catchments
- Respond to the relevant recommendations of the E&E Review including new and innovative approaches to extension and education
- Enhance and support the current extension efforts of Reef Trust, MIPs, incentives, R&D and other relevant programs, to accelerate broad-scale on-ground practice change
- Improve monitoring and evaluation of current extension efforts and support the development of more innovative extension approaches
- Identify and address factors impeding current extension delivery and provide informed feedback that supports the allocations of future funded programs
- Maximise information sharing by strengthening and expanding current extension networks and improving inclusivity in decision making
- Improve the professional capacity of the extension network by assessing training and development needs, identifying professional capacity gaps, and working collaboratively across programs to address them
- Minimise duplication of extension effort across programs and improve consistency in messages delivered to industry

To achieve these objectives, the WTREP established a transparent decision-making framework and processes that prioritise extension activities and allocate available funds to support (or enhance) these activities appropriately. A work plan for the implementation of project TF3.5 *Enhanced Extension Coordination in GBR* was developed in December 2018 and updated in June 2019. This plan also provides guidance for training and capacity building taking place within the Reef extension network by identifying skill gaps and prioritising training needed by practitioners in Wet Tropics Reef catchment.

YourDATA is an online monitoring and evaluation database developed by Coutts J&R to assist programs and projects to collect and report key evaluation data, including project activities, narratives, milestones, and feedback sheet responses. It provides a secure central data collection point with individual user accounts and allows team members to input, edit, and view their own M&E data. The platform has been chosen to manage reporting of REP implementation to DAF.

7.4 REEF EXTENSION AND EDUCATION WEBMAP PLATFORM

This platform is an interactive online mapping tool designed to display the extension, incentive and best management practice projects delivered in GBR on a catchment to sub-catchment level. Regional data on extension effort, resources and uptake of improved management practices; including spatial data on extension projects and information sharing with the Paddock to Reef project, will be collated by the REC and entered into the Reef Extension and Education WebMap App.

8 DISTRIBUTION OF TASKFORCE INVESTMENT FOR ENHANCED EDUCATION AND EXTENSION 2017-2020

Department of Agriculture and Fisheries (DAF) projects *TF3.5 Enhanced Extension Coordination in GBR* and *TF3.1.1 Enhanced Extension and Education in Reef Catchments (2017-2020)* (see Appendix 1) provide a range of funding to implement the recommendations of the E&E Review. This supports the seven REC positions and provides project funds to work with local extension networks to enhance current activities and address gaps in priority collaborative extension services and peer-to-peer learning activities that are prioritised in the REPS. The allocation of these funds is described below.

8.1 REGIONAL ALLOCATIONS OF FLEXIBLE (DISCRETIONARY) AND PEER-TO-PEER LEARNING FUNDS.

Terrain NRM (Wet Tropics) has been allocated $375,000 Flexible and Peer-to-Peer learning funds; with $250,000 and $125,000, respectively (Table 1). Due to a late project start, the first two financial year funds have been combined. Cape York NRM and Terrain NRM have agreed that Terrain NRM will deliver services to both the banana and the sugar industries (through WTSIP and the REWG across both NRM regions). Cape York NRM will continue to deliver services to the grazing, and mixed cropping and horticulture industries across both NRM regions.

Based on estimates of industry size, within the two NRM regions, a nominal 80:20 (%) split has been implemented between sugar and bananas through Terrain NRM. Similarly, grazing, and mixed cropping/ horticulture through Cape York NRM.

Table 1. Regional allocation of Flexible & Peer-to-Peer funds

Program	Year	Wet Tropics			Cape York		
		Sugar*	Bananas	Total	Grazing	Cropping/ Hort.**	Total
Peer-to-Peer	2018/2019	$60K	$15K	$75K	$60k	$15K	$75K
	2019/2020	$40K	$10K	$50K	$40K	$10K	$50K
	Total	$100K	$25K	$125K	$100K	$25K	$125K
Flexible	2018/2019	$120K	$30K	$150K	$120K	$30K	$150K
	2019/2020	$80K	$20K	$100K	$80K	$20K	$100K
	Total	$200K	$50K	$250K	$200K	$50K	$250K
Grand Total		$300K	$75K	$375K	$300K	$75K	$375K

*Wet Tropics Sugar Industry Partnership (WTSIP) is a collaborative partnership of 17 organisations within Wet Tropics sugarcane industry (including mills, canegrower organisations, NRM, SRA, DAF and productivity services). WTSIP's purpose is to coordinate and collaborate externally and within its membership to deliver sustainable water quality, productivity and profitability outcomes for the sugarcane industry in the Wet Tropics.

**The abbreviation (Cropping/Hort.) is referring to mixed cropping and horticulture.

9 WET TROPICS REGION AND WATER QUALITY IMPROVEMENT PLANNING

9.1 LAND USE IN WET TROPICS REEF CATCHMENT

Land use in the Wet Tropics Reef catchment is summarised in Table 2. Large areas of land in the Wet Tropics are incorporated into National Parks managed by the government, while other areas are managed by indigenous managers under native title. Indigenous rangers also work in partnership with National Parks management. Leasehold and freehold land is mostly managed by companies and family businesses. Extensive beef cattle breeding operations exist on large leasehold properties mostly in the upper Herbert. Intensive beef cattle breeding, fattening and dairy cattle grazing take place mainly on small freehold properties in the Herbert, Barron and upper Johnstone catchments.

Mixed Cropping and Horticulture takes place mostly on the Atherton Tablelands (Barron and upper Johnstone catchments) in the Wet Tropics and includes annual crops in rotation such as peanuts, grass hay, maize, oats, pasture plus tree crops and perennial horticultural crops such as avocados, coffee, tea, blueberries, bananas, custard apple, limes, macadamia nuts and sugar cane.

Sugarcane (referred to in this document simply as Sugar) is the major crop on the coastal plains in the Wet Tropics region and is also incorporated into rotations on the Atherton Tablelands.

Bananas are also grown in the Wet Tropics in the Barron, Tully, Murray, South Johnston and Mulgrave/Russell catchments. The banana industry is expanding within the Cape York region, which is also serviced by the Wet Tropics REC, at Lakeland in the Normanby catchment. Bananas are also grown on a small scale in the Endeavour catchment around Hopevale.

Table 2. Summary table of land use[1] in Wet Tropics NRM region

Basin/ Catchment	Area (Ha)	Nature/ conservation (%)	Forestry (%)	Grazing (%)	Sugarcane (%)	Cropping (%)	Bananas (%)	Water (%)
Daintree	210,672	56	32	8	<1	<1	<1	2
Mossman	47,243	79	<1	4	10	<1	<1	5
Barron	218,882	35	18	32	6	7	<1	3
Mulgrave/Russell	198,397	72	1	5	13	<1	<1	4
Johnstone	232,391	55	2	16	12	<1	<1	2
Tully	168,354	73	2	5	11	4	<1	3
Murray	118,039	63	10	8	15	3	<1	2
Herbert	984,589	28	3	58	6	<1	<1	1

[1] Land use excludes urban

9.2 WATER QUALITY IMPROVEMENT PLANNING IN REEF CATCHMENTS

The Reef Water Quality Protection Plan (Reef Plan) was established in 2003 with the long-term goal that "the quality of water entering the reef from broad-scale land use will have no detrimental impact on the health and resilience of the GBR". Reef Plan has since been audited and reviewed a number of times to evaluate progress and to revise the current state of knowledge regarding the health of GBR

ecosystems and impacts from terrestrial run-off; in the form of scientific consensus statements prepared for the Queensland Government.

The Queensland Government's consensus statement 2017 concluded that key GBR ecosystems are showing declining trends due to severe weather events and terrestrial run-off from adjacent catchments. The consensus statement identified that anthropogenic activities, in particular, diffuse source pollution from agricultural land use, were the main source of excess sediments, nutrients, pesticides and herbicides transported to the GBR. Greatest risks to the GBR were linked to:

A) Nitrogen discharge and associated crown-of-thorns starfish outbreaks,

B) fine sediment discharge affecting the light availability for inshore seagrass ecosystems and coral reefs and;

C) pesticide movement within freshwater and some inshore and coastal habitats.

Water quality improvement plans (WQIPs) for catchments draining to the Great Barrier Reef were initially prepared by regional NRM Bodies and Councils under the Australian Government's Coastal Catchments Initiative. The QG worked with WQIP project teams to ensure that environmental values and water quality objectives were established that were consistent with Environmental Protection (Water) Policy (2009) requirements.

9.3 WATER QUALITY TARGETS FOR REEF CATCHMENTS

The Australian and Queensland governments released the Reef 2050 Water Quality Improvement Plan 2017-2022 in January 2018. The Plan (WQIP) developed new catchment-based water quality targets for all of the GBR catchments, with end-of-catchment water quality targets expressed as percentage reductions of anthropogenic loads (required by 2025). Targets are as follows:

Table 3. End-of-catchment anthropogenic water quality targets (t = tonnes)

Basin/ Catchment	Area (Ha)	Dissolved Inorganic Nitrogen		Fine Sediment		Particulate Phosphorus Target		Particulate Nitrogen Target		Pesticide target to
		tonnes	%	Kilo-t	%	tonnes	%	%	T	
Daintree	210,670	MCL	MCL	MCL	MCL	MCL	MCL	MCL	MCL	
Mossman	47,240	52	50	MCL	MCL	MCL	MCL	MCL	MCL	
Barron	218,880	52	60	MCL	MCL	MCL	MCL	MCL	MCL	
Mulgrave/Russell	194,400	300	70	16	10	19	10	53	10	
Johnstone	232,390	350	70	100	40	250	40	490	40	
Tully	168,350	190	50	17	20	23	20	68	20	
Murray	110,840	120	50	8	20	11	20	32	20	
Herbert	984,590	620	70	99	30	57	30	200	30	

Key:

Very high	High	Moderate	Low	Minimal	Not assessed

MCL Maintain Current Loads

From these end-of-catchment targets and consistent with the Wet Tropics WQIPs; Reef catchments in the Wet Tropics region can be broadly classified into two main water quality goals as follows:

1. **Maintenance and prevention to meet Reef 2050 Plan targets** – Maintaining the current condition of water quality and preventing new developments or increasing disturbance from increasing sediment load in the sub-catchment.

- Daintree Maintenance and Prevention*

2. **Improvement to meet Reef 2050 WQIP Plan targets –** Improving water quality from current condition to achieve a 50 to 70% reduction in dissolved inorganic nitrogen (DIN), and 0 to 40% reductions in particulate nitrogen (PN), particulate phosphorus (PP), and total suspended sediment (TSS) loads in priority sediment sources at sub-catchment scale by the year 2025.

- Mossman Improvement to meet targets
- Barron Improvement to meet targets
- Mulgrave Improvement to meet targets
- Johnstone Improvement to meet targets
- Tully Improvement to meet targets
- Murray Improvement to meet targets

**The Reef 2050 WQIP infers the Daintree Catchment should be classified as Maintenance and Prevention, however, based on the nitrogen pollutant yield of the sugar industry in this catchment, the relatively low management practice standards and associated linkages with the Mossman Catchment for delivery of extension; REWGs justify assigning this catchment to be classed as Improvement required! By applying a similar logic to sediment; the same should be considered for the Barron catchment.*

The long-term vision of Reef 2050 Water Quality Improvement Plan is to achieve a water quality level that protects the value and uses that the community as a whole has agreed upon. This includes protecting the ecosystems and lifestyle; including uses such as recreational fishing, irrigation and stock watering.

9.4 CATCHMENT PRIORITISATION PROCESS

To assist extension practitioners with prioritising catchments in terms of what level of extension effort is required to meet current Reef Plan objectives, land use and catchment maps were used in conjunction with the results from the situational analysis and Reef Plan water quality targets. Catchment land use percentages (Table 2) and Reef Plan 2050 water quality targets (Table 3) are presented above. Considerations during the prioritisation process were as follows:

- Where are the major gaps in extension reach?
- Are these gaps in high-risk catchments/ sub-catchments?
- What is the current extension capacity and focus for each catchment?
- What is the level of collaboration between organisations and producers?
- How does the wider extension network benefit from current projects?
- How effective are current efforts in terms of improved practice change adoption?
- Is current work efficient in terms of value (cost-benefit analysis)?
- Are suitable service delivers and suppliers available for producers to achieve required management changes?

The summary results of the catchment prioritisation process organised on a catchment basis (Table 4) dictate where extension effort should be concentrated. A ranking scale of Very High, High, Moderate and Low was used to define priority.

*Table 4. Regional catchment prioritisation**

Priority	Grazing	Mixed Cropping & Horticulture	Bananas	Sugar
Very High	Herbert	Barron	Tully & Johnstone	Herbert, Johnstone, Mulgrave, Russell,
High	Johnstone & Barron	Upper Johnstone & Upper Herbert	Barron & Mulgrave/Russell	Tully, Mossman & Daintree#
Moderate	Daintree & Murray	Mulgrave/Russell, Tully, Murray & Herbert	Murray	Barron & Murray
Low	Mossman, Mulgrave/Russell, Tully	Daintree & Mossman	Herbert, Daintree, Mossman	

Although Daintree is considered low- moderate priority for DIN reduction in the Reef 2050 - WQIP which states no reduction in DIN is required, this is at odds with opportunities to abate DIN from high loss (yet relatively small) areas in this district through the adoption of improved management. It also makes no sense having Mossman and Daintree at odds in terms of priority from an extension and engagement perspective, since many growers farm in both catchments.

*This table represents priority but does not suggest that work in non-priority catchments should cease. Work in non-priority catchments should continue to maintain momentum across the entire region

10 Enhancing extension coordination in Reef catchments

This section of the WTREP deals with setting the scene to enable effective implementation of Project *TF3.5 Enhanced Extension Coordination in GBR (2017-2020).* The process involved the following steps.

- Appointment of Regional Extension Coordinators (RECs) and a cross-region Manager
- Initial Scoping Study
- Project Inception meeting
- Situation Analysis
- Formalising Regional Extension Coordination Groups (REWGs)
- Catchment Prioritisation (prioritising extension effort by catchment)
- Identifying factors that impede current extension delivery

10.1 Appointment of Regional Extension Coordinators

In September 2018, a Wet Tropics REC (0.5 FTE) was appointed to assist the Cape York REC (1FTE) with implementing the WTREP components of the plan and in line with the commodity coordination arrangements agreed. This WTREC is based within the Wet Tropics NRM Region and services the sugar and banana industries across both NRM regions, while the Cape York REC services the grazing, mixed cropping and horticulture industries across both NRM Regions. Both RECs work collaboratively to collate information and provide feedback on extension delivery to the Manager (Extension Coordinator) and Manager (Training and Development), who are both positioned within DAF.

Regional Extension Coordinators (RECs) role responsibilities:

- Develop a Regional Extension Plan (REP) to guide the allocation of Flexible and Peer-to-Peer learning funds at the regional level and provide strategic and practical advice to inform investment programs (Queensland Reef Water Quality Program, Australian Government Reef Trust, amongst others) in relation to extension requirements and solutions that support broad-scale agricultural practice changes across Reef catchments.
- Facilitate and support the continuation or establishment REWGs and provide initial contact points for the wider network of extension practitioners.
- Strategically plan and proactively facilitate collaborative responses by REWGs, that address priority water quality issues and support broad-scale land management practice, change across Reef catchments
- Enable improved sharing of information and joint decision making and coordinate the implementation of REWGs decisions through the REP.
- Ensure resource investment into extension delivery achieves maximum benefit and avoids duplication of effort
- Collate and provide feedback on extension delivery to the Manager (Extension Coordinator) and Manager (Training and Development); both positioned with DAF
- Work collaboratively across regions and facilitate cross-regional capacity building and sharing of information through the broader Reef extension network and programs.

10.2 Initial Scoping Study

From May through July 2018, an initial scoping study was conducted to identify extension practitioners that were interested in forming formal REWGs. The initial study included:

- Desktop analysis of available spatial data
- Review of available literature and web content
- Phone and one to one consultation with key industry organisations and extension providers
- Developing a scoping study survey that was subsequently sent to all known extension personnel working within the Wet Tropics and Cape York Reef catchments.

10.3 Project Inception Meeting

In August 2018, following the Initial Scoping Study, a project inception meeting workshop was held with representative Reef extension practitioners from all major agricultural industries present within Wet Tropics and Cape York regions. This workshop was purposefully not confined to industry or region to enable identification of cross-industry and cross-regional trends and collaborative opportunities. Many of the extension practitioners from across the Wet Tropics and Cape York regions met for the first time at this meeting. After introductions and a presentation on project objectives and funding, the REC facilitated the following group tasks:

- Situation analysis: defining a broad overview of current regional extension delivery and capturing how the group perceived the status of the current extension system
- Establishing formal Regional Extension Working Groups, where they should be based, and how they might operate
- Catchment prioritisation; directing extension effort where most needed.

10.4 SITUATIONAL ANALYSIS OF THE CURRENT EXTENSION SYSTEM

Extension practitioners attending the inception meeting assisted the lead Regional Extension Coordinator to analyse the current extension situation. This activity included:

- Documenting current extension activity supporting agricultural practice change
- Capturing how the group perceived the status of the current extension system.

Key Australian and Queensland government investments totalling over $600 million support delivery of Reef 2050 Water Quality Improvement Plan actions from 2017–2018 to 2021–2022 are detailed in an Investment plan.

Details of current regional extension and education-related funding activity in the Wet Tropics are provided in Appendix 4.

10.4.1 Status of the current extension system

Public and Government concern over declining water quality in Reef catchments and its detrimental effect on GBR ecosystem health has increased dramatically during this century. Considering agricultural extension capacity had declined over the last 20 years, the Reef Water Science Taskforce (2016) identified this as a challenge – how could agriculture production continue in Reef catchments without compromising the long-term health of the GBR? The E&E Review (2017) found that to successfully meet that challenge, partnering with the private sector to enhance regional and cross-regional agricultural extension capacity would be key.

Extension practitioners perceive the current extension system as fragmented, with high turn-over in government-funded programs and a lack of expertise and capacity in key areas of delivery. It was conceded at the Project Inception Meeting that implementing key recommendations of the E&E Review—including the formalising of REWGs facilitated by REC's—would help to rebuild/consolidate the extension system and encourage better collaboration within and between delivery organisations. However, more is needed, including clear sustainability objectives, proper training and a clear direction of what messages should be delivered.

Key themes emerging from targeted consultation with a range of stakeholders, including those attending the Project Inception Meeting included:

- The need for better alignment between Queensland & Australian Government programs, specifically relating to agricultural practice change
- It was also agreed that substantial training in extension methodologies and industry-based technical skills is required to enhance extension capacity in Reef catchments
- More opportunity for one-on-one consultations between practitioners and producers as well as more time for collaboration and feedback is needed since the evidence suggests this works best
- A focus on encouraging late and non-adopters of innovation should be a priority, instead of always servicing the early adopters and those who regularly engage in extension activity
- Support was expressed for a more integrated approach, focussing on practice change (not just program delivery) that incorporates social and economic dimensions of change
- Strong interest in capturing more property data (including profitability, productivity and business structure) to ensure credibility and to better engage producers in the conversation
- Better integration of NRM program delivery with P2R requirements, using the Reef Water Quality Risk Framework as a foundation for project design

- Demand for better spatial information at finer scales including water quality and practice change measures
- Strong support for a core M&E framework that goes across industries, regions and projects

Terrain NRM had already identified the need to increase and enhance extension in the Wet Tropics which was a key component of the previous Reef WQ Grants Program and now features in two currently funded activities:

1. The broadscale Reef Alliance Project (RAP): Growing a Great Barrier Reef 2016-2019 project (funded by the Australian Government through Queensland Farmers Federation) which is being delivered across all GBR catchments and coordinated through the Reef Alliance Partnership; with $45.6M to support 1,196 farmers and graziers improve their practices over 1,841,480ha across 33 Great Barrier Reef catchments by June 30, 2019); and
2. The intensive Wet Tropics Major Integrated Project 2017-2020 (funded by the Queensland Government), with $15M to reduce nutrient and pesticide losses in the Wet Tropics' Johnstone and Tully catchments with a focus on interventions and management efforts at a catchment scale (and to fully evaluate their effectiveness in improving water quality).

Given the urgency and scale of the problem, it's a complex space with often over-lapping funding programs (with associated challenges of attribution and shared outcomes), on-ground delivery and extension provision.

In an exercise undertaken with the Project Steering Committee of the Wet Tropics Major Integrated Project (MIP), a mapping exercise was undertaken of all agricultural improvement projects with an extension component underway within the Wet Tropics. The exercise was designed to demonstrate the current pressures being applied to an individual landholder and represented by the potential number of extension visits that a single landholder could potentially experience.

Termed "the Wet Tropics Gravitron" (see Figure 4) – a sugar producer could potentially receive up to 40 visits per year. While it is unlikely that a producer would participate in all the projects currently underway throughout the region, the exercise highlighted the challenges of partnering, enhanced coordination, collaboration and the need for clear and consistent messaging for extension providers.

Figure 4. The Wet Tropics Gravitron – unravelling the challenges of reaching and engaging with sugar producers in the Wet Tropics region.

10.5 WET TROPICS SUGAR INDUSTRY PARTNERSHIP (WTSIP)

Although the Wet Tropics REC was required to establish a sugar REWG, considerable progress had already been made to enhance collaboration in the region through the Wet Tropics Sugar Industry Partnership. WTSIP was formed in 2014, primarily to support the delivery of industry-led extension and training services to growers in the Wet Tropics under the previous Reef Water Quality Grants Program. The latest iteration, which consists of a partnership of 17 industry bodies, productivity services, sugar research, millers, natural resource management and government organisations, continues to support the coordination and delivery of Reef programs in the Wet Tropics Sugar Industry.

WTSIP Partners are signatories to the WTSIP MoU which was formalised in October/November 2017, demonstrating their commitment to support the following objectives until March 2020. These are:

1. To assist with delivery of relevant sugar industry projects and activities in the Wet Tropics Region.
2. To work as a Partnership to align all project efforts and further promote improvements in farm management practices, particularly those which deliver identified water quality benefits to downstream ecosystems.
3. To develop a WTSIP Strategic Plan to provide a clear vision for the future of the Wet Tropics sugar industry.

WTSIP has the overarching benefit of providing a platform for shared learning and industry-wide strategic thinking, working toward the goals of productivity, profitability and sustainability.

Members of WTSIP continue to host District Extension Officers and supporting team staff at both local and regional scales providing linkages to farmers, BMP and industry as a whole. For the last three

years WTSIP leadership staff have developed several strategic documents including, Landscape Prioritisation, Priority Practices for Change and Extension Plans to guide District Extension Officers in developing whole of farm Nutrient Management Plans which are a practical tool for growers to improve nutrient use efficacy and an important part of building a supportive extension relationship.

The WTSIP Management Committee provides regional oversight for program implementation. The Management Committee, consisting of unpaid, elected industry representatives, and has demonstrated a high level of commitment to environmental stewardship for the sugar industry through consistent participation in monthly meetings. The Cane Technical Advisory Group (CTAG) provide technical oversight and advice to the Management Committee as directed and requested by the Management Committee. The CTAG meets quarterly in the calendar year.

WTSIP have invested in, and now manage, a network of Extension Officers employed through hosting agreements with Industry Partners and connected to growers at a meaningful local, basin-level scale. Terrain NRM whilst being a member of the Partnership on the one hand also helps to service the Partnership providing a legal entity to auspice its activities.

The Extension network of 12 officers is supported by a team of specialists, also employed by or through Terrain NRM, including agronomy, water quality, and farm practice expertise. This capacity is enhanced by the local delivery/hosting arrangements that help to maximize effective and meaningful engagement with industry bodies including millers, productivity services, resellers, universities and research organisations including Sugar Research Australia (SRA) to deliver on their strategic and operational objectives.

WTSIP provided the governance framework for delivery of the RAP - Growing a Great Barrier Reef project. Key strategic documents developed for the RAP, and principles that led to its success, have been shared through the partnership to support the development of other significant programs such as the MIP's and SRA's Adoption Planning, Investment Strategy and Cane to Creek programs.

WTSIP has actively responded to identified knowledge gaps including the development of professional standards to guide hosts with remuneration and career progression for extension staff and provided support to regulatory agencies in the assessment of farming practices (Reef Regulations), Paddock to Reef (P2R) and other Reef Plan initiatives. These are invaluable contributions to industry thinking and methodologies that have been generated through the WTSIP.

WTSIP organisations' representatives meet a minimum of four times per year in a combined meeting with the Management Committee. This provides an opportunity to ensure partners are fully informed of Management Committee actions and are consulted throughout the program.

10.6 Formalising Regional Extension Working Groups (REWGs)

The E&E Review emphasised the important role that REWGs will play to address regional and sub-regional priorities and facilitate better integration and planning of funded programs prior to their implementation. The purpose of REWGs is to plan, coordinate and target relevant extension and education activities to specific landholder populations within (and across) regional boundaries. Formal REWGs were established following the inception meeting and are now well developed.

The WTREP involves GBR catchments from the Daintree in the north to Herbert in the south. This is an extremely diverse area – geographically, agriculturally and culturally. It contains wet and dry tropical environments, coastal plains, tablelands, mountains, hills, rainforest, cropping, horticulture and

grazing. It has many forms of land management: freehold, leasehold, indigenous protected areas and national parks. For these reasons, four REWGs, based on geographic, land use and commodity considerations, were initially established for the Wet Tropics and Cape York regions as follows.

1. *Sugar and Bananas REWG*

The sugar industry is prevalent in the Wet Tropics' coastal areas, from the Daintree to the Herbert. But, in recent years, has expanded up into the Atherton Tablelands, often incorporated into a mixed cropping cycle or when sugar prices are favourable. There is no significant sugar industry presence in the Cape York region.

As noted above, the Wet Tropics already had significant partnership arrangements in place for the sugar industry in the form of the Wet Tropics Sugar Industry Partnership (WTSIP) (and previous iterations since 2009). However, as WTSIP was primarily established for governance and strategic decision making, and not operating at the field/paddock level, it was deemed necessary to form a sugar REWG at the Extension Officer level.

The banana industry is most prevalent in Wet Tropics coastal areas in Barron, Tully, Murray, South Johnston and Mulgrave/Russell catchments however there is a small but expanding industry represented at Lakelands (Normanby) and Hopevale (Endeavour) in Cape York region.

Given the similarity in intensive cropping challenges of sustainability and the geographical overlap of bananas and sugarcane, the REC trialled a combined REWG for these two commodities in March 2019, to discuss industry, WQ and extension priorities, with great success. Members of the combined sugarcane/banana REWG have agreed to continue working together to improve cross-industry (and regional) linkages.

The REWG assesses and makes recommendations for EEP funded projects to meet operational needs and approves these quite independently of WTSIP. However, the WTSIP Manager and committee members are provided regular updates by the REC.

2. *Grazing REWG (intensive and extensive)*

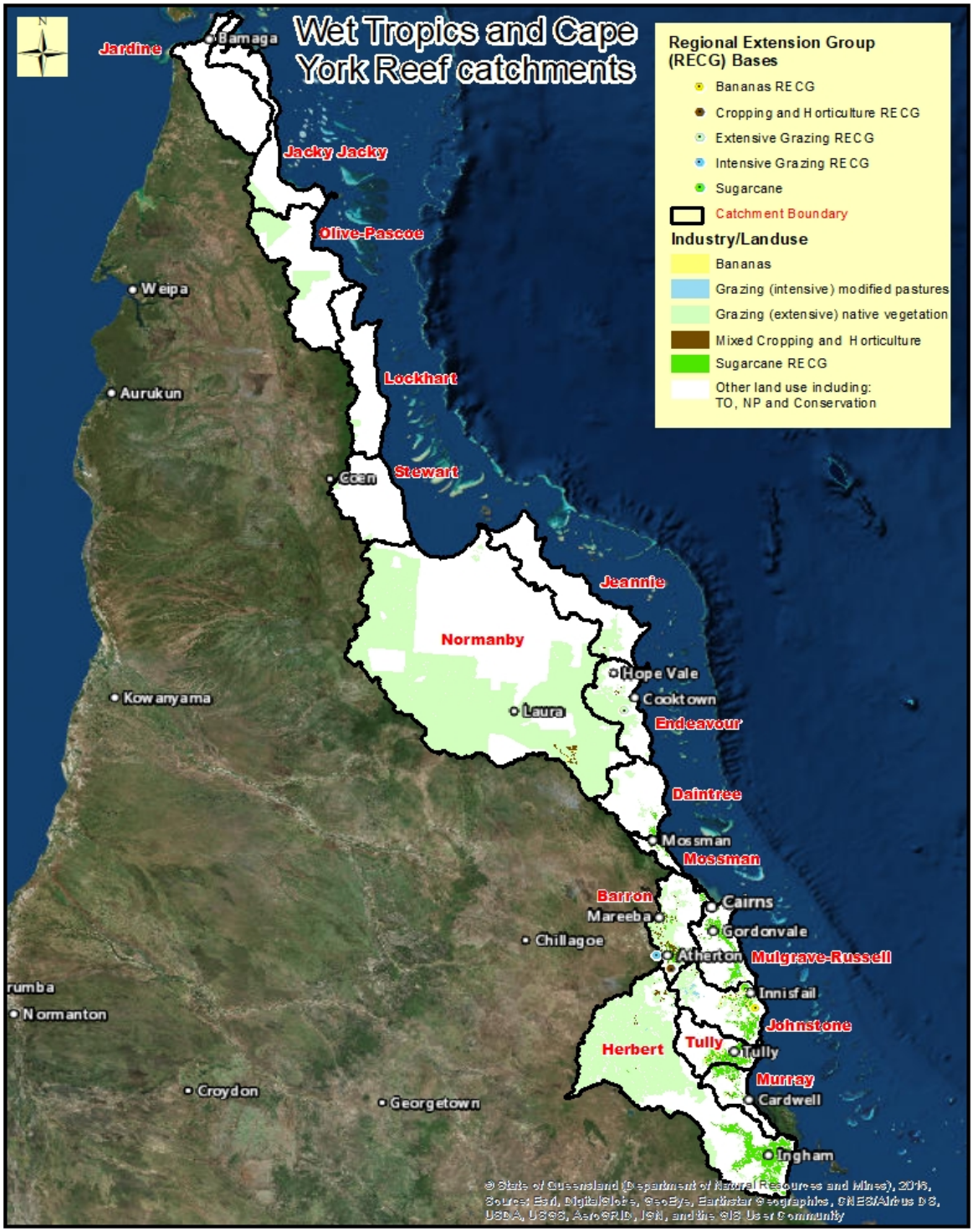
The majority of grazing takes place in the Herbert, Barron, upper Johnstone (Wet Tropics), Normanby and Endeavour (Cape York) catchments. Due to the vast areas involved and due to differences in needs, the grazing REWG has been subdivided into intensive grazing that is based in Atherton, Wet Tropics and extensive grazing, based in Cooktown. Both groups, however, do come together regularly to meet, either in Cooktown or Atherton.

3. *Mixed Cropping & Horticulture REWG*

Most mixed cropping and horticulture take place in Herbert, Barron and upper Johnstone (Wet Tropics) catchments with a smaller industry represented at Lakeland (Normanby) and Hopevale (Endeavour) in the Cape York region.

Terms of Reference (Appendix 2) that describe REWG aims and activities, roles and responsibilities, codes of conduct and other operational procedural detail are now well developed. Figure 5 below shows industry catchment distribution and REWG base locations across the two regions.

Figure 5. Industry catchment distribution and REWG locations



11 BARRIERS TO REGIONAL EXTENSION DELIVERY

The Wet Tropics Regional Extension Plan supports the current extension efforts of Reef Trust, MIPs, WQIP incentives, BMP, R&D and other relevant programs, to accelerate broad-scale on-ground practice change across Reef catchments. In order to achieve this, the WTREP identifies factors that impede regional extension delivery and outlines specific actions to be implemented that build on current extension capacity and enhance the coordination of its delivery.

Key WTREP stakeholders and extension staff work together at REWG meetings to analyse the status of current regional extension and identify factors impeding extension delivery. So far, six main themes have emerged, as follows:

1. Increased competition between organisations to secure funding
2. Perceived lack of management and/or consistent direction from funding bodies
3. Lack of extension capacity in the Reef extension network
4. Producer engagement
5. Data resolution and validity of models
6. Lack of specialist technical/skill providers

Table 5 describes the specific barriers associated with each of the six themes and justifies how groups came to identify them. The table also outlines priority actions that will help overcome identified barriers and shows the progress addressing them so far.

Table 5. Factors impeding regional extension

Theme 1: Increased competition between organisations to secure funding (outcome dependant)			
Barrier to delivery	**Justification**	**Priority actions**	**Progress to date**
Pluralistic and highly fragmented Reef extension environment.	Lack of coordination within and between organisations. Lack of collaboration between organisations.	Annual Queensland Government Great Barrier Reef (GBR) Science Synthesis Workshop to generate new knowledge, better network within and between delivery agents/organisations, communicate science and inform policy, research priorities and delivery.	GBR Science Synthesis workshop is now held annually. Enhanced Extension and M&E Projects are in place to assist with cohesion.
Different drivers and motives between organisations with no common commitment or agreement.	Different philosophies within and between organisations about what and how practice should change. This often results in conflicting delivery positions. Some organisations are unaware of current standards and run blind.	Develop a common Reef-wide theme with direct objectives that are transparent and easily disseminated. Disseminate relevant information from Annual Science Symposium and communication of best practice and how to achieve it.	The EEC Project has supported the refinement of the Water Quality Risk Framework by reviewing details across regions, which will see longer-term benefits such as improved understanding, networks and coordination.
Delivery of mixed messaging to producer groups due to lack of organisational collaboration and limited enforcement of guidelines (best practice best management, etc.). Lack of consistency across regions.	Different organisations have conflicting philosophies to reduce pollutant loads.	Encourage understanding and support the development of agreed methodologies. REWGs inclusive of resellers, agri-business, and supply chains/organisations. Development of consistent and robust messages (supported by best available information) to growers and ensure these messages are broadly disseminated.	Regionally adapted *'Rules of Thumb'* guide drafted and disseminated via REWGs. Local trials and events are used to demonstrate production benefits.
Duplication of extension efforts, cross over of extension activity and producer fatigue	REWG members are realising they are undertaking similar work to their peers and pitching it at the same producer groups. Duplication has been highlighted as detrimental to adoption due to producer fatigue	REWG members to clearly define current and proposed extension activity and REC to disseminate through a calendar of scheduled events. Annual Regional Forums to devolve project activity across and within regions. District work planning for intensive industries for extension delivery.	Currently REC is acting as an information relay for REWGs. Calendar of scheduled events progressing. The Base Camp platform being trialled as an information hub. Many extension activities now coordinated through REWGs. Annual Regional Forum/exhibition now organised for most regions. District work planning is already occurring and working well in some places

Feelings of ownership over catchment areas and/or working producer groups	There are certain areas that extension practitioners avoid intuitively in order not to encroach on other organisations. Some vocally express their disapproval at other organisations "stealing" their producers.	Develop and utilise producer Peer-to-Peer learning groups and coordinate delivery through REWGs. Better integration of National and State-funded Reef programs.	P2P learning groups are evolving that welcome delivery from all organisations. Collaboration through joint projects is proving valuable in overcoming this issue. REWGs enable better coordination within the Reef extension network.
Leadership styles that are autocratic and uncooperative discouraging officer-level participation	Often historical and driven by competitive processes to access funds; collaboration can be discouraged between staff and/or their respective organisations.	Take a proactive response to encourage participation and highlight the benefits of enhanced extension and collaboration to extension officers (and producers).	This process has commenced with some early indications of success through the sugarcane/banana REWG and WTSIP.
Lack of cooperation and collaboration between some regional delivery organisations and reluctance to disseminate project findings/learnings or share data	There are examples where one organisation has no idea what another is doing or where they are working. This has caused overlap, conflict and confusion within some extension networks. Competition for funding can drive this issue.	Use regular meetings of the REWGs to prioritise extension and act as a conduit to share regional learnings. Relationship building and collaboration training are needed at all levels of extension through to management and at the executive level.	REWG meetings now provide a formal platform for information and project learnings to be shared across organisations. Max Hardy Consulting has produced a report to assist and has held some workshops (this is valuable and should continue).
Inadequate linkages between regional investors, key stakeholders, research and extension practitioners	A lack of grassroots involvement in design for the delivery of Reef Plan programs creates unnecessary barriers for adoption of farming systems with some conflict in content and practice.	Ensure relevant stakeholders, including resellers and private consultants, are included in future design processes. Strengthen links between research and extension, and between the Annual Science Symposium and REWG.	Existing links between research and extension are already well-established for some industries in the Wet Tropics region. Appropriate M&E is developing and will be implemented across Reef Plan programs.
Theme 2: Perceived lack of management and direction from funding bodies			
Barrier to delivery	**Justification**	**Priority actions**	**Progress to date**
Short-term funding cycles do not allow time for proper stakeholder consultation nor development of long-term collaborative partnerships.	Lack of job security due to short-term project funding. Changing program agendas (and roles) where long term relationship with producers are dissolved as staff are replaced. Lack of consistency retards adoption rates.	Projects need better flow on, i.e. building on past progress. Staff retention should be a priority. Job security, satisfaction and pathways for promotion needs improvement.	WTSIP has made significant progress in developing a professional standards matrix (framework) for extension officers to provide appropriate guidance from early career to technical (subject matter) experts, which could be adopted by other industries/regions. Terrain NRM continues to advocate for longer-term funding for key extension services.
Smaller properties miss out as larger-scale businesses considered more cost-effective (value for investment). Current extension programs result in low levels of engagement with smaller enterprises.	Spatial mapping of projects and investment distribution and P2R data reflect this and in some situations. Programs have inherently restricted service provision to smaller enterprises.	More effective engagement of smaller enterprises in workshops conducted at P2P and REWG meetings and invite them to visit trial sites and demo/focus farms.	This is attainable with integration into the program. Awareness is increasing through group collaboration during REWG and P2P gatherings, and greater mindfulness of the needs of smaller enterprises is being realised.

Lack of time for proper consultation with industry and key stakeholders to develop collaborative and trusting partnerships are not built in to project design.	Reef 2050 LTSP program design doesn't factor in time for networking and comprehensive collaboration between organisations.	Allocated time is needed for proper stakeholder consultation, getting the right people to the table, networking and collaboration should be built into project design and budgets.	This has not been effectively addressed and maybe beyond project scope. Max Hardy (Collaborative Plans Project) has touched on how to elevate from networking to collaborating and this valuable approach will continue to be investigated.
Theme 3: Lack of extension capacity in the Reef extension network			
Barrier to delivery	**Justification**	**Priority actions**	**Progress to date**
Little knowledge of peer skills and expertise within the extension network.	REWG meetings often have staff that do not know each other or each other's skills and where to go to access expert advice.	Develop a Reef-wide list of staff skills and expertise linked to a central database/ SharePoint. Regional forums and networks need to expand range and increase profiles.	Online/SharePoint platforms are being trialled (Basecamp/YourData). Think Tank conference initiative has worked well for networking and knowledge sharing.
Loss of expertise from extension network (due to redundancy) and lack of mentoring and tutoring.	Available mentors and experienced staff are overwhelmed with commitment and questions. Advisors often end up in trial and error mode due to lack of direction/support.	Restore the long-term government commitment to both resource and the building of capacity and provide incentives and time for experienced staff to mentor and tutor.	The Training and Development Project and Agricultural Extension Work Placement Program (QFF Graduate Program) are providing an opportunity for capacity building and connecting mentors with less experienced staff. Existing services are augmented through DAF specialist provider support.
A lack of training in adult learning principles and extension techniques for the delivery of extension services.	Staff have expressed the need for better understanding of methodologies around the psychology of behaviour change.	Targeted/formal training and development opportunities for practitioners.	Training and Development Project and Flexible Funds are available to fill extension skill gaps. Funds are available for staff to attend events such as APEN and the annual Science Symposium, Behaviour Innovation events etc.
Lack of suitably qualified and experienced staff.	Feedback suggests many staff are often overwhelmed with project complexity and the lack of peer support. They complain of a lack of human resources and extremely high workloads.	More suitably qualified practitioners are needed on-ground to reduce workloads and implement a meaningful extension for on-ground outcomes.	The QFF Traineeship initiative is assisting to improve human resources. Staff are encouraged to stay on in a more coordinated extension environment that has good networking capacity and career path.
Current workloads may restrict attendance to training opportunities.	Staff have expressed the need for better upskilling opportunities and a more coordinated system of notification.	Reef-wide training needs analysis to be conducted annually. Training budget needs to be available or training to be factored into project/program design. Reef-wide calendar for training events.	Training and Development Project needs analysis conducted end-2018 and has set up an E-Bulletin to communicate training opportunities. Basecamp is being trialled as a proxy for a Reef-wide calendar.

Theme 4: Producer engagement issues			
Barrier to delivery	**Justification**	**Priority actions**	**Progress to date**
An increasing regulatory approach to enforce agricultural practice standards is being introduced	Feedback suggests some producers are angry and feel singled out.	Reef Regulations need to demonstrate adequate support for change and improve information around the cost: benefit to producers. Increase recognition that other groups (utilities, STPs, council, etc.) are also regulated.	Supporting the linkage to science and extension needs to be maintained and supported.
Project-based Extension Officers are seen as office workers or pushing a biased conservation agenda.	It is often a difficult conversation to have when talking about conservation issues or Reef health with producers who don't share similar views.	Knowing your industry, directing the conversation and framing questions correctly. Training required.	Training and Development funds available for upskilling (i.e. the psychology of behaviour change and extension techniques). Max Hardy Consultancy has provided some insight with respect to framing questions in the correct manner.
Focus on management practice alone limits producer engagement for some programs.	Producers will often seek advice from Extension Officers to address a specific issue that the farmer is experiencing, and although often related, Reef-funded Extension Officers may feel that they do not have the scope to assist or address their issue (rather than seeing this as a mechanism for engagement).	Provide scope for Extension Officers to engage with growers around holistic farming systems which will deliver long-term practice change and benefits for the environment.	Although some progress has been made through the Wet Tropics Major Integrated Project (WTMIP), other Extension Officers are still constrained by program delivery (RTIII).
Theme 5: Data resolution and validity of models			
Barrier to delivery	**Justification**	**Priority actions**	**Progress to date**
Producers lack faith in P2R models.	Feedback from workshops early 2019 (introducing Reef Regulations and practice standards). Concerns that producers will be punished with extra cost to prove they are doing *the right thing*.	More transparency in P2R methodologies. Deliver workshops that explain the modelling procedure and data analysis methods. Involve producers in WQ sample collection. Strengthen MERI capacity in the P2R Program and regional NRM groups to support improved modelling of WQ, social and economic outcomes.	Experts from P2R are providing advice on modelling procedures and making data available to industry. Projects currently underway to engage (WTMIP) producers in local WQ sampling. Herbert WQ Monitoring Program has made significant in-roads to increase producer awareness.

Perceived lack of legitimacy of modelled data in general.	There is a lack of fine-scale data within GBR Catchments with a perception of many other industry/utility pollution sources in between.	Collect finer scale, spatial data which accurately reflects the extent of practice change to support better modelling of outcomes. Improve on local WQ monitoring resolution	Farm-scale, spatial data is being collected through P2R. P2P learning group WQ on-farm sampling taking place.
Theme 6: Lack of Specialist Skill Providers			
Barrier to delivery	**Justification**	**Priority actions**	**Progress to date**
Extension Staff Training.	DAF Training Needs Analysis (TNA)	Upskilling through the Training and Capacity Building Project.	Training of extension staff: – Cert III Irrigation Systems – Agronomy Principles – Psychology of Behaviour Change – Think Tank Facilitation Training – Water Quality regulations – Nutrient Management Planning – Collaboration Training – M&E training
Extension networking and coordination across the GBR.	Regional Needs Analysis	Calendar of events and central data point for Specialist Skills Providers need to be developed	Basecamp is working well to assist coordination across GBR catchments. A list of Specialty Skills Providers is being drafted, and staff capacity building is recorded for future to augment current expertise.
Lack of specialist skills and/or availability of providers.	REWG feedback suggests a lack of specialist skills providers and the need for improved coordination to utilise those available.	Improve coordination, including developing a central database of specialist skills providers. Identify specialist needs within the region and utilise experts to provide some upskilling or share their skills where appropriate. Seek external specialist skills providers as needed.	WTSIP model has demonstrated how specialist skills can be shared across industries/organisations/districts. Training and development of existing staff are on-going and will also augment future services.

12 IMPLEMENTING THE WET TROPICS REGIONAL EXTENSION PLAN

The REWG is taking a lead role in prioritising and implementing projects that enhance extension coordination in Wet Tropics Reef catchments. REWGs will continue to identify and address factors that impede extension and utilise existing programs, build synergies and collaborative partnerships to enhance its delivery.

The level of new extension activity required to meet Reef Plan 2050 targets will be high; requiring long-term investment and strong regional stakeholder support and collaboration. For activities that require new resources and additional support outside the scope of TF3.5 *Enhanced Extension Coordination in GBR (2017-2020)*; the WTREP sets out processes for REWGs to prioritise and direct the allocation of future funds, as they become available. The implementation of the WTREP is now ongoing, and comprises the following basic themes:

- Prioritising extension training and capacity building
- Prioritising extension activity and funding allocations
- Extension approaches and methods (facilitated Peer-to-Peer learning)
- Supporting broad-scale agricultural practice change

12.1 PRIORITISING EXTENSION TRAINING AND CAPACITY BUILDING

Considering agricultural extension capacity has been diminished in recent decades, restoration in long-term government commitment to both resource and the building of network capacity is needed. The Queensland Government has taken a number of steps towards resolving the issue, by initiating projects TF3.1.1 *Enhanced Extension and Education (2017-2020)* and TF3.5 *Enhanced Extension Coordination in GBR*.

The Great Barrier Reef Water Science Taskforce has recommended that the Queensland Government:

- Restore capacity in extension service across the Reef catchments
- Formalise extension and advice networks and define leadership and roles across the local delivery organisation for whole-of-farm business approaches, incorporating Reef health outcomes
- Support ongoing training programs and career development of accredited extension advisers
- Make greater use of more innovative extension approaches and technological developments
- Partner with industry to develop broad-scale practice change programs

The *Training and Capacity Building*; focus area R4 of project TF3.1.1, provides funds for the appointment of a Reef-wide Training and Development Manager to identify, approve and subsidise priority training that builds capacity within the Reef extension network. In addition, the *Extension Personnel and Expertise* (focus area R3), provides funds, to be allocated by DAF, to support extension personnel and expertise to address technical deficiencies in some priority speciality areas.

Support will be allocated across the GBR NRM regions and where possible, coordinated to share specialist skills providers across programs and cross-regionally. Identification of opportunities that align and add value to the *Training and Capacity Building* program is encouraged.

12.1.1 Reef-wide Extension Training Needs Analysis

A Reef Extension Training Needs Analysis (TNA) was undertaken in October 2018 by the Training and Development Manager to guide both the range and the form of training and development activities needed to build the capacity of extension service providers in GBR catchments. The TNA investigated factors impeding current extension delivery, including knowledge and skill gaps within the Reef extension network that needed to be bridged. Two main topics were explored as follows:

- The building of capacity in extension methodologies
- Improving specific technical skills of the extension network

To efficiently coordinate the delivery of training and development activities and enable extension practitioners to keep up to date with the latest opportunities; the Manager developed an *e-bulletin* that extension practitioners can subscribe to in order to keep up with training opportunities. *Base Camp;* is an online communications platform that the Manager is trialling as a central point for information storage and dissemination. To coordinate the utilisation of specialist skills providers across the GBR, a list of identified providers is developing, that will link to a utilisation calendar for extension personnel to reference. The Training and Development Manager will also keep records of staff upskilling and make them available to the Reef extension network to help augment the provision of speciality skills in the future.

12.1.2 Regional knowledge and skill gaps and system limitations

An assessment of the Wet Tropics regional extension system was undertaken by the REC during the Project Inception Meeting held early in 2018. Since then, the establishment of REWGs across the Wet Tropics and Cape York has allowed for more informed analysis to occur on a continuous basis.

By participating in established REWGs, key delivery organisations: such as ABGC, Cape York and Terrain NRM, and WTSIP partners, are now able to provide input into the coordination and enhancement of extension, by continually identify factors that impede its delivery. With processes now put into place by the Training and Development Manager, improving knowledge and skills in the technical aspects of agricultural practice and extension methodology are now easier for extension personnel to access.

Priority training and development needs identified by REWGs so far have been collated by the RECs and are detailed in Table 6 below.

Table 6. Priority Training and Development (regional level)

Priority training needed	Extension benefits	Progress
Extension Methodology: – Small-group facilitation, group dynamics and workshopping. – Practical implementation of extension methodologies. – Behavioural Sciences and producer engagement skills and dealing with conflict. – Using webinars and social media. – Influential and scientific writing skills (audience targeting).	– Assisting facilitated Peer-to-Peer learning. – Portray a more confident, professional persona to industry. – Improve adoption rates. – Bridge the distance gaps between learners. – Engage geographically distributed clients and showcase achievements to a wider audience. – Reach and influence a wider audience.	– Behaviour Management. – Organisational collaboration and relationship building skills. – M&E training. – Think Tank Training (including small groups facilitation) – EO Extension Training (Cane Changer)

Industry-specific technical training: – Paddock to Reef Program specifics, methods and analysis. – Background training for soil testing and nutrient management and whole of farm planning. – Precision agriculture specifics (including irrigation systems and property plans). – Integrated pest management and chemical use. – Grazing land management and grazing systems. – Economics behind practice change and underlying economics behind specific industry businesses.	– Improve participation in and perceived credibility in catchment WQ modelling. – Reducing mixed messages and improving the credibility of advice given to industry. – Improve the credibility of technical advice given. – Improve knowledge of alternate products that reduce the impact on the natural environment. – Knowledge of agricultural best practice and ways of assessing the sustainability of alternative practices. – Basic knowledge of how to improve profit margins and bottom-line outcomes.	– Cert III Irrigation Systems – Agronomy Principles. – Nutrient Management Planning. – Water Quality regulations and standard practices (details and legislation). - Reef Plan induction Training for WTSIP and MIP staff - Soil Health Workshops

12.1.3 Specialist Skills providers

The E&E Review noted a lack of capacity in some speciality areas (e.g. soil conservation, soil health, hydrology, farming systems, and mixed farming). The National Sugar Industry RD&E strategy also identifies succession planning, economic and financial as priorities. This is exacerbated by the loss of experienced extension personnel in NRM regions and an inability to readily replace them in a timely manner. This issue is partially being addressed through The Extension personnel and Expertise (focus area 3) of TF3.1.1. Support is allocated across the GBR NRM regions and where possible coordinated to share skilled experts across existing projects and cross-regionally. REWGs provide a platform for coordination and a database of specialist skills providers for Extension Officers. Staff training will also help augment the lack of providers currently available, however establishing specialist capacity in the regions will take time.

12.1.4 Agriculture Extension Work Placement and Mentoring Program

The Queensland Farmers' Federation (QFF) has partnered with the Queensland Government to deliver the *Agricultural Extension Work Placement Program* that has placed a number of trainees across NRM regions. Through dedicated mentoring arrangements, the program provides an opportunity to increase extension capacity by fast-tracking skills development in a younger generation of extension staff. The program will help address skills and knowledge gaps within the Reef extension network and has great merit. However, in NRM regions with limited human resources to act as mentors and trainers, additional support may be needed. It is important for program managers to ensure that adequate time and training are provided for mentors to effectively tutor and coach trainees. In some cases, this may include specific training for mentors and a restructuring of duties, for example; delegating lower-level duties to the trainees, as a compromise for them receiving mentorship.

12.2 Wet Tropics Sugarcane Extension Training and Development Needs

The barriers to effective extension in the delivery of broadscale farm management adoption of improved practices in the Wet Tropics sugarcane industry can essentially be described under four broad themes.

12.2.1 Theme 1: Skills and Technical Expertise

Surveys of sugarcane extension officers undertaken from 2015 – 2018, suggest there is strong support for skills development and training amongst district extension staff within the Wet Tropics sugar industry, as well as a willingness from those with specific skills/expertise to share their knowledge with others. However, it appears that many of the experienced, progressive, well respected and influential extension providers are simply over-committed already, delivering the myriad of separately funded projects, all with their own, staffing, grower delivery and reporting requirements from multiple investors – and all chasing maximum attribution towards Reef WQ outcomes, with little or no regard for the complexity and demands this environment creates. Furthermore, the fact that extension providers have individual objectives means that WQ is often very low on the list of priorities. Better integration of extension activities to address farmers' needs, including specialist skills, is far more likely to yield improved farm management and sustainability outcomes than the current model of delivery. There is also a place for dedicated professional advice and training by specialist from outside the region/industry to help build the capacity of the sugarcane extension network in specialised fields, such as soil conservation, hydrology, soil science, economics or dedicated pollutant treatment systems.

Table 7. Theme 1- Skills and Technical Expertise for sugarcane extension

Agronomic and Farm Management Skills		
Activity title/description	**Who is involved?**	**Outcomes**
- Core principles and constraints of the sugarcane production system. - Economics - Industry-specific technical training (Eg Soil Health, Drainage, Climate Forecasting and PA - Whole of farm planning and environmental stewardship. - Active involvement of resellers in training opportunities. *Nationally Accredited Training in:* - Soil testing and nutrient recommendations - Integrated pest management - Soil conservation planning	- Extension training experts - Extension personnel. - Specialty Skills Trainers - Industry Specialists - Resellers - RTO's	- Improving extension personnel skills helps them when working with growers on farming issues - Portray a more confident, professional persona to industry - Improving the credibility of advice given and information presented by extension / reseller personnel - Improve consistency in the information provided

12.2.2 Theme 2: Engagement and Communication Skills

Table 8. Theme 2 – Engagement and Communication Skills for sugarcane extension

Extension and Behavioural Science		
Activity title/description	**Who is involved?**	**Outcomes**

- Practical extension training in how to successfully engage with adult learning principles - Extension Methodologies - How to facilitate groups, present and workshop- topics effectively. *Nationally Accredited Training:* - Modules in Extension Theory	- Extension training experts - Extension personnel - Specialty Skills Trainers - Workshop facilitators. - Industry Specialists - RTO's	- Improving extension communication skills helps EO's when working with growers on farming issues - Portray a more confident, professional persona to industry and build meaningful relationships. - Improving the credibility of advice given and information presented by extension personnel - Improve the impact and consistency in the information provided.

12.2.3 Theme 3: Mentoring and Leadership

QDAF Skills Survey (2018), reviews (incl. Coutts 2017, 2019) and discussions including the REWG Workshop on sugarcane and banana training and development needs facilitated by Max Hardy in March 2019, highlighted that there was significant interest in mentoring and leadership in the Wet Tropics region. Participants (or respondents) to these processes were largely supportive of the concept; however, many commented that they were: (a) either too busy to be mentored (or be a mentor); (b) that although experienced in industry (and extension), potential mentors weren't sure if they had all the necessary the skills to be effective and may require training/mentoring themselves; and (c), from feedback recently received from those that have been mentored by so-called 'industry leaders'… that *"just because someone has been doing something for 20-30 years, doesn't necessarily make them a good mentor*." In fact, evidence suggests that perhaps they are the very reason the industry is so far behind in meeting its social, corporate, environmental responsibilities, and are likely to have a negative impact on the attitude, wellbeing and career choices of early-career extension staff.

Table 9. Theme 3 – Mentoring and Leadership Skills for Sugarcane Extension

Mentoring and Leadership		
Activity title/description	**Who is involved?**	**Outcomes**
Mentors: - Assessment and training of skills required to be a good mentor. - Dedicated time allocated in work planning and PD. - More than one mentor for each mentee. Mentees: - Assessed for needs and future career prospects/interest - Hosted/located close to mentors for support	- Extension training experts - Early career EO's. - Specialty Skills Trainers - Other extension personnel - Industry Specialists - RTO's	- Improving support for mentoring allows appropriate resourcing and expected outcomes. - Builds capacity in both mentor and mentees (and industry) - Portray a more confident, professional persona to investors, industry and growers. - Improves acceptance and credibility of advice given by early-career extension personnel - Improve the impact and consistency in the information provided. - Provides a career path (and succession planning) and potential expansion of specialist skills across the region/industry.

12.2.4 Theme 4: Networking, Cooperation, Coordination and Collaboration

Several reports have specifically identified varying capacity and a lack of coordination (or fragmentation) within extension delivery in the sugarcane and other agriculture more broadly (Coutts 2015, 2017; SRA, 2018; SCS, 2017).

In some districts industry extension, usually funded by industry levies, only deliver core industry obligations that may not align to Reef WQ objectives, or support for improved cooperation, coordination or collaboration (CCC). In the Wet Tropics sugar industry there are examples of where more progressive districts have reconciled industry productivity, profitability and environmental sustainability (including WQ) are all interrelated, and by focussing on the farming business and system as a whole, multiple organisation have successfully managed to plan and integrate extension programs across multiple projects and core industry business over a number of years. Unfortunately, because no one actually paid for this to happen in these districts, and it often only occurs at a district level between individuals (and not necessarily supported by their organisations), much of this work has gone unnoticed and unreported.

A lack of leadership was also a highlighted as a barrier to better extension coordination at the sugarcane and banana REWG, where a number of extension staff openly admitted to helping other extension staff from other organisations within their district but said that they would not tell their manager for fear of being disciplined. After further discussion, many REWG attendees felt that there was very good cooperation and collaboration between individual extension staff within the sugar industry but were more concerned that their actions would not be supported by their respective leaders.

A collaborative extension system which is coordinated, with shared attribution by all (at least at a district scale) is likely to yield far better WQ outcomes by extension delivery providers working collectively and sharing their relative expertise and putting growers needs first will deliver far better WQ, land management, and community outcomes over time.

Table 10. Theme 4 – Better Networking, Cooperation, Coordination and Collaboration

Enhancing Networking, Cooperation, Coordination and Collaboration		
Activity title/description	**Who is involved?**	**Outcomes**
- Greater understanding of ALL the different programs by EO's at a district level. - CCC on the delivery of program deliverables. - More pro-active CCC leadership at the organisational level. - Better collaboration (at least cooperation) with resellers in delivery of industry objectives	- All Extension personnel. - All managers and strategic advisors - Industry Specialists - Resellers and private agronomists	➢ Improving extension CCC helps EO's divide growers and workloads, and better-assisting growers in whole of farm decision making. ➢ Portray a more confident, professional persona to industry and build meaningful relationships. ➢ By sharing skills EO's Improve credibility of advice given and gain access to specialists. ➢ Improve the impact and consistency in the information provided. ➢ Reduced grower fatigue if EO's already know who's working with who.

12.3 Grower Needs

Growers who participated in training conducted as part of Reef WQ Grants Program administered by Terrain NRM and its industry partners (now administered through WTSIP) from 2014-2016, were asked to select three key barriers to improved management practice adoption in the three principal areas of practice change: nutrient management; weed and pesticide management; and soil, drainage and farming systems management (Table 11).

Finance, lack of equipment, small farm size, lack of information and technical skill were identified as key barriers to adoption. It is possible that some of these answers are correlated and, in some cases, compounded – for example, finance, lacks equipment and small farm size. This suggests possibilities for overcoming these barriers or adapting through innovation may need to be considered. Lack of information and technical skill could also be related answers but imply that grower training and/or access to better information (extension) are required for these farmers to properly implement management practice change.

Table 11. Main barriers to adoption of categories of management practices of participating growers in Reef Program training 2014-2016

Response category	Nutrient management*	Integrated pest/ weed management	Farming systems & soil management
Finance	20%	21%	19%
Lacks equipment	14%	15%	13%
Small farm size	13%	12%	10%
Lack of information	9%	9%	10%
Technical skill	10%	5%	5%
None	12%	13%	13%
n	**819**	**750**	**720**

** % of responses (3 selections allowed per category) Source: WTSIP (2017) Report of WTSIP training and extension for sugarcane in the Wet Tropics 2014-2016.*

Growers participating in training conducted as part of Reef Program from 2104-2016 were also asked to select the three main stimuli for adoption of improved management practice across all practice change areas. Reef Rescue funding was chosen in one-quarter of responses. Productivity Services and Extension Officer were also important although the percentages of responses, although this varied by district, with Productivity Services being most important in Ingham, while the Extension Officer category was most important in Cairns. Other responses also varied by district, reflecting the extension activities conducted in the districts. Interestingly, Neighbours/other growers was mentioned only 12% of times, which is below the benchmark for farmers when adopting new practices.

Table 12. Important stimuli for adoption of improved land management across all practice change areas of grower participants in WT's training 2014-2016

Stimulus for change	% responses*
Reef Rescue $	24%
Productivity Services	21%
Extension Officer	12%
Neighbours/other Growers	12%
Training Course	11%
Available Expertise	7%
Grower meeting	6%
Smartcane BMP	4%
On-Farm demonstration	3%
Water Quality Improvement	2%
N=	**1012**

* up to 3 options possible.

Source: WTSIP (2017) Report of WTSIP training and extension for sugarcane in the Wet Tropics 2014 – 2016.

12.4 PRIORITISING EXTENSION ACTIVITY AND FUNDING ALLOCATIONS

TF3.5 *Enhanced Extension Coordination in GBR* (2017-2020) has been initiated with Flexible (Discretionary) funds to support regional networks to work together to develop projects for 2018/19 and 2019/2020 (see Table 15), that address regional and sub-regional priorities outlined in the REP, and value-add to existing programs by addressing factors that are otherwise impeding the rates of broad-scale practice change. The development of REWGs provides for more informed decision making and better-targeted extension delivery at the regional scale. REWGs link to the wider extension network and provide a platform for all extension practitioners and delivery organisations to contribute to decision making within and across regional boundaries.

In addition, *Peer-to-Peer (P2P) Learning Funds* are available to support existing producer groups and/or establishment of new groups where REWGs have identified gaps in regional coverage (see Table 14). In collaboration with P2P Group facilitators and key P2P members; REWGs utilise available funds to undertake local trials and plan training and education components of P2P group learning. Producers stay better connected to the extension network through their P2P group facilitator and involvement with local REWGs Producers are involved in all stages (including design, content and type) of their own capacity building.

12.4.1 Activity prioritisation tool

As an objective means for REWG decision making regarding project prioritisation, the Fitzroy Basin Association (FBA) developed an activity prioritisation tool; a spreadsheet to prioritise the allocation of Flexible and Peer-to-Peer funds. This tool has been adopted by Wet Tropics REWGs. It allows for input from all key stakeholders in a fair and respectful manner. The activity prioritisation tool provides a weighting to rank projects based on the following criteria:

1. Project aligns with the eligibility guidelines for Flexible and Peer-to-Peer funds (see Appendix 1 – Table 20) and addresses key recommendations outlined in the E&E Review
2. Project aligns with Reef and Regional Water Quality Improvement Plans with acceptable project governance, value for investment and in-kind contribution
3. Project aligns with REP objectives; addresses extension barriers (see Table 5) and or priority training requirements (Table 6), avoids duplication of effort (e.g. considers catchment prioritised for other funding such as Major Integrated Projects – MIPS and the BMP Program) and seizes opportunities for building synergies across programs, regions and industry
4. Project incorporates the use of innovative learning approaches and/or new tools and technologies to support on-farm learning (i.e. remote engagement technologies)
5. Project has a lasting impact (legacy) on the industry (i.e. the likelihood of Peer-to-Peer learning group integrity being maintained after project funds have ceased)

12.4.2 Project work implemented through the REP

REWGs meet on a regular basis to coordinate planned extension activities that target specific landholder populations within and across regional boundaries. The improved; more coordinated approach to extension provides for more efficient use of industry-related resources and allows for extension personnel to better support broad-scale practice change. REWG meetings very much rely on members input to achieve an overall picture of how to meet regional needs, and mutual activity planning reduces the tendency to duplicate delivery. REWGs make joint decisions on how to allocate

Flexible and Peer-to-Peer Learning funds. They design projects that enhance extension coordination and encourage the development and maintenance of collaborative relationships.

After REWGs have arrived at project ideas and have completed the activity prioritisation process; regionally approved projects go through a higher level (GBR wide manager and Project Steering Committee) approval process. Successful proposals are then developed into collaborative agreements between the proponent and funding administrator, that include outputs/outcomes, milestones, M&E activities, communication activities and payments. RECs support successful proponents to implement projects and activities and ensure all milestones are met on time and within budget.

12.5 Facilitating Peer to Peer Learning

12.5.1 Establishing facilitated Peer-to-Peer Groups the Wet Tropics region

The E&E Review highlighted the distinction between a group meeting; where technical experts present information, observations, recommendations and answer questions (which still has an important place in extension delivery) to groups based on facilitating Peer-to-Peer learning. The E&E Review outlined the typical characteristics of facilitated Peer-to-Peer groups as follows:

- The group chooses to come together with peers and a facilitator who they trust and with whom they feel comfortable sharing farm information
- There is a skilled facilitator (who ideally has some technical understanding of the farming context but does not dominate discussion using this expertise)
- The group chooses what it is they wish to explore and learn about (however, if there is group funding related to water quality, for example, a boundary would be that the group activity has some connection with water quality outcomes)
- The group makes decisions about activities and their purpose and are involved in the planning and undertaking of those activities
- The group benchmarks what they are currently doing/achieving on-farm so that changes can be measured/documented
- The group considers what has been learned from the activities and from their own related experience and decide further actions to take, whether to change topics or whether to disband the group.

P2P groups established in the Wet Tropics region as a response to available funding are as follows:

Johnstone Peer-to-Peer Grazing Group (established)

The Malanda Beef Plan Group (MBPG) are a well-established producer lead group comprising of ~ 50 Beef producers that have been operating in the Johnstone and Barron catchments (Wet Tropics) over the last decade or so. The Johnstone P2P Grazing Group (10 members) is a subset of members from MBPG. The Johnstone P2P Group are directly involved in designing and implementing innovation trials at the local level. These trials are around soil and plant health so, are relevant cross-industry. Due to the nature of the trials; they form a linking point and common ground for all new P2P groups to integrate and interact regardless of their industry base.

Tablelands Next-Gen Grazing Network (established)

This group, targeting the younger generation of Tableland beef producers, was formally established in early 2019. The small (9 members) Peer-to-Peer Learning Group is currently facilitated by Kasmin Brotherton; InnerBoss CEO. The group is actively participating in capacity building extension activity

currently delivered by DAF Mareeba. The group plans to expand in scope and membership over the next 12 months or so. Kasmin is in close contact with the Cape York Regional Extension Coordinator and has reported that P2P group members have advanced their property action plans to the implementation stage.

Tablelands Beef and Dairy Productivity Group (not yet established)

This group is not formally established; however, will link with the established Tablelands Next Gen Grazing Network to pursue the common goal of improving pasture productivity and reducing nutrient and sediment loads entering the GBR. The P2P group facilitator will work closely with Mungalli Creek Biodynamic Dairy business administrators, DairySat (national program) and Tablelands Senior Farm Services Officer, Howard Smith (Lion Pty Ltd.), to encourage information sharing and collaboration between the Beef and Dairy sectors.

Cairns/Babinda P2P Bus Tour Group

The Cairns region has been identified as a priority for management adoption, and it is envisaged that by supporting this P2P group to visit other regions, sugarcane growers will learn about new farming practices, technologies and potential innovation.

Herbert Water Quality Grower Group

Growers in the Macknade area are interested in assessing the water quality improvements associated with controlled traffic farming and the use of alternative nutrient sources as part of a sustainable, best practice farming system. This project involves water quality sampling comparisons between farming systems and associated practices.

Daintree Sands Mill Mud, Basalt Rock and Compost Group

Growers in the Daintree/Mossman District are interested in using mill mud, basalt rock and compost to improve soil organic carbon in black sands, a unique feature of this district. Trials have been established to test the efficacy of these products in improving soil health.

Mossman Region P2P Bus Tour Group

The Daintree/Mossman region has been identified as a hot spot for dissolved inorganic nitrogen generation, and it is envisaged that by supporting this P2P group to improve their nutrient management by visiting other regions, growers will consider the adoption of alternate farming practices to reduce nutrient losses.

Wet Tropics Sugarcane Leadership Group

Within the sugarcane industry, recognised industry leaders have been selected to evaluate lessons from overseas and identify opportunities to improve farming systems in Australia. The Brazilian sugarcane industry has similar sustainability challenges to the Great Barrier Reef catchments and is developing a number of improvements to farming systems and technologies to address these challenges.

Young Grower Engagement Group

The purpose of this group is to empower young growers who are looking to take over the family farm and to challenge the status quo by instilling the benefits of adopting best management practice as a means for the long-term sustainability of their business.

Tully P-Grower Group

Growers in the Tully district have expressed concern over the recommended amounts of phosphorus outlined in 6ES may not deliver the best economic result over a crop cycle on some soil types. This project aims to demonstrate that the 6ES guidelines are or are not appropriate for these particular soils.

Wet Tropics Soil Health Coaches

Farmers who have been involved for some time in improving their on-farm soil health through a series of courses are now going to be trained on how to be mentors for other growers.

Wet Tropics Regenerative Farming Forum

This project involves a wide range of growers from across the Wet Tropics who have made significant changes on their own farms to come together to share their experiences with other growers and extension staff from across the Great Barrier Reef.

A summary of Wet Tropics activities that P2P learning groups, established through TF3.5, are involved in are presented in Table 13 below.

Table 13. New facilitated Peer-to-Peer learning groups developing across the Wet Tropics region

P2P learning group title	Status	Industry focus	Catchments	Extension activities completed
Johnstone P2P Grazing Group *Facilitated by Oliver McConnachie, Cape York NRM*	Established in November 2018	Intensive Grazing	Upper Johnstone catchment	– Microbial soil conditioner trials (see project sheets 2018/2019) – Nutrient management planning workshops
Tablelands Next Gen Grazing Network *Facilitated by Kasmin Brotherton, Inner Boss*	Established in December 2018	Grazing (intensive & extensive)	Barron, Johnstone & Herbert	– Capacity building (see project sheets 2018/19) – Business management & succession planning – BeefUp Forum Mareeba, Queensland
Tablelands Beef & Dairy Productivity Group	Pending funding: will be formally established in July 2019	Grazing (including Beef & Dairy)	Barron, Johnstone & Herbert	– Key stakeholders contacted & group establishment discussed
Cairns/Babinda P2P Bus Tour Group *Facilitated by WTSIP*	To be established in late 2019	Sugarcane	Wet Tropics	– Project scope under development

Herbert Demo Farm Water Quality Grower Group *Delivered by Ian Carr (Grower), Macknade Grower Group & HCPSL*	In progress	Sugarcane	Herbert	– One year of water quality data has been collected 2018-19 – Due for completion June 2020
Daintree Sands Mill Mud, Basalt Rock and Compost Group *Facilitated by Mossman Ag Service*	In progress	Sugarcane	Daintree/Mossman	– Trials have been established – Due for completion June 2020
Mossman Region P2P Bus Tour Group *Facilitated by Mossman Ag Service*	To be established in late 2019	Sugarcane	Wet Tropics	– Project scope under development.
Wet Tropics Sugarcane Leadership Group *Facilitated by WTSIP*	To be established	Sugarcane	Wet Tropics	– Due to be completed by June 2020
Young Grower Engagement Group *Facilitated by CANEGROWERS/WTSIP Cairns region*	To be established	Sugarcane	Russell/Mulgrave	– Due to completed June 2020
Tully P-Grower Group *Facilitated by WTSIP, TCPLC and TSL*	Contract under development	Sugarcane	Tully	– Due to completed June 2020
Wet Tropics Soil Health Coaches *Facilitated by Soil Food Land, Terrains and HCPSL*	Contract under development	Sugarcane	Wet Tropics	– Due to completed June 2020
Wet Tropics Regenerative Cane Farming Forum *Facilitated by MSF*	In progress	Sugarcane	Wet Tropics	– To be delivered by May 2020
Review of farming practices in the Brazilian Sugarcane industry *Facilitated by HCPSL*	In progress	Sugarcane	Wet Tropics	– To be delivered by May 2020

Key:

Delivered in conjunction with the CYREC
Delivered in conjunction with the WTREC

12.6 SUPPORTING BROAD-SCALE AGRICULTURAL PRACTICE CHANGE

The Great Barrier Reef Water Science Taskforce – Final Report (May 2016), proposes that the key to affecting broad-scale practice change was not only landholder engagement but, understanding the drivers, motivations and obstacles to change; stating – *Water quality improvements alongside on-farm profitability and productivity must drive the agenda*. A literature review indicates that a supported learning approach is likely to be the most successful in achieving long-term practice change; change that improves business profitability and environmental outcomes in situ.

12.6.1 Behaviour Change Program

Complementary to the expanded extension presence, the Great Barrier Reef Water Science Taskforce; in their Final Report (May 2016) recommended a *Behaviour Change Program*. This program is being piloted initially within the sugarcane industry and includes undertaking research to understand the motivations for change and the benefits and barriers of specific actions. Establishment of REWGs and P2P groups through implementing the REP allows for better consultation with industry and the Reef extension network to support the development of a more extensive Reef-wide behaviour change program, planned for roll out in the future, once the pilot stage is complete.

Behaviour change is influenced by individual and group identities within differentiated farming cultures, therefore, understanding and influencing behaviour is a complex and multi-faceted issue. Raising awareness of current behaviour and its problematic consequences for water quality and the Reef, and encouraging farmers to feel a sense of ownership, is a necessary first step in the adoption process. Attempts to influence farmer behaviour need to take account of good practice in developing and communicating consistent and salient messages that the farmer feels able and willing to respond to. REWG groups established across the Wet Tropics and Cape York regions see a great opportunity in cross-regional and cross-industry collaboration, and the Wet Tropics and Cape York Regional Extension Plans will help integrate learnings from all industry; to develop a network of well-informed producers that work together with REWGs under the common goal of improving water quality entering the GBR.

12.6.2 What leads to practice change?

REWGs report that farmers under financial strain are less likely to undertake projects that improve natural resources unless incentives are provided, as they are more likely to focus on productivity alone. Larger properties with greater human resources, however, have more capacity (and efficiency in scale) to adopt new processes and participate in programs. REWGs and WTSIP agree with the E&E Review, in assuming why there was a good uptake of the Reef Trust water quality improvement incentive scheme for example. Considering this, it makes sense to explore the characteristics that make up a successful farming business and deliver training and education to producers based around business management and profitability as a precursor to changing attitudes towards improving land and water stewardship. For this reason, better use of economic tools, such as FEAT, should be incorporated into extension delivery within the Wet Tropics to improve producer-knowledge and skills in this area.

Sugar and banana producers in the coastal regions of the Wet Tropics, and mixed cropping and horticulture (as well as some sugar) in the Tableland area make fair use of industry-funded or private consultants to support technical developments and assist with individual property initiatives such as; nutrient, and weeds and pest management planning. Due to grazing enterprises being located more remotely; especially extensive grazing businesses, this is not necessarily happening within the grazing

industry. The WTREP acknowledges this, and through the Cape York REP is developing and linking together a number of grazing P2P learning groups: Johnstone P2P Grazing, Next-Gen P2P Grazing and Beef and Dairy P2P Groups, that will help diversify graziers and dairy producer's knowledge and incorporate other elements and concepts into decision making that they might otherwise overlook.

12.6.3 Improved collaborative relationships between industry and extension providers

P2P Grazing groups linked together directly through extension activity and through REWGs, collaborate more effectively with extension provider groups such as BCC, DAF, HSPC, JRCMA, SCYC, and NRM organisations including Terrain, than they normally could on an individual basis.

In collaboration with private consultants and REWGs, newly established Peer-to-Peer groups are designing and running local trials that demonstrate the application of innovation at the local level; in actual field situations on their terms. These local trials better meet producer needs in many ways; including providing a technological development element (see Table 15) and instilling confidence in alternative products and innovative practice. This approach is leading to clear changes in attitude and mind-set. Learnings are reaching a wider audience than traditional methods due to linkages between P2P groups and REWGs, potentially affecting more broad-scale practice change.

12.7 Peer to Peer Funded Projects

Following prioritisation and consideration by the REWG, the following projects were allocated peer to peer (P2P) funding during Round 1 and 2.

Table 14. Wet Tropics Peer to Peer Funded Projects – Round 1 and 2

No.	Title	Key Issue	Summary	Budget	In-Kind	Completion Date
P1	Leadership workshop and mentoring Delivered by WTSIP	Lack of leadership	The project focus is to identify expert and experienced leaders to deliver peer-to-peer training and mentoring within local regions from Mossman to Ingham, cross-regions and between industries to enhance leadership potential	$20,000	$1,000	June 2019
P2	Bus tour Delivered by WTSIP	Identify the grower gaps in Cairns/Babinda area compared to other regions or industry	Cairns and Babinda growers to visit another region/agriculture industries to learn new practices, technology, innovation and farmers teaching farmers.	$10,000	$1,000	June 2020
P3	Compost/basalt rock/mill mud trial Daintree Sands Delivered by Mossman Ag Services	Reducing bagged fertiliser rates by using with mill mud, compost by Peter Inberditzin and crushed basalt rock from John Carroll. Sandy soils in the Daintree have lost the ability to build up carbon, and overall productivity is down. Build soil health back and reduce bagged fertiliser by improving organic carbon levels.	Grower Clint Reynolds owns and operates sugar cane farms in the Daintree. Dominant soil is black sand, which has lost its organic carbon over time and is difficult to maintain healthy and productive. The landholder wishes to reduce bagged fertiliser due to cost/effect on burning up organic matter, and trial compost, mill mud/ash and crushed basalt individually and combined. This trial will assess effects on plant cane productivity and soil health, following a mix species fallow.	$15,000	Growers time, equipment, subsurface ash spreader hire, sugarcane paddock ready for plant cane, monitoring and documentation with local DEO.	Ongoing treatment for up to 4th ratoon perhaps more.

P4	Herbert Demonstration Farm *Delivered by Ian Carr (Grower), Macknade Grower Group & HCPSL*	WQ data from zero till low N & CT (B/A-class) farming system V mixed (C-class) sugarcane system.	A grower in the HBT who has been doing zero tillage and low N rates as part of his Controlled Traffic farming system for 15 years - doesn't believe any pollutants are leaving his farm and wants to be able to demonstrate this to other growers in a priority WQ area.	$20,000	$10,000	February 2020
P5	Bus tours *Delivered by Mossman Ag Services*	Understanding other regions' farming systems, what other farmers do and do not do. Looking at innovations, projects and significant trials that do not occur in the Mossman area and that most farmers do not have the opportunity to see on their own.	This bus tour will help expose growers to other regions, create social networks and build an understanding of alternative farming systems. This project will help reveal gaps and create opportunities to implement new methods and concepts that suit local needs and climate. Cross knowledge sharing will bring innovations and strengthen links between growers and farming regions. This will also indirectly benefit extension staff from different regions.	$10,000	Smoko, drinks, events coordination (farm visit planning and logistics)	February 2020
P6	Review of farming practices in the Brazilian industry to improve productivity and environmental outcomes for the Herbert and Australian cane industry. *Delivered by HCPSL*	Due to the sheer size of the Brazilian cane industry, significant research, development and extension dollars are now being poured into the industry, by the major agri- fertilizer and chemical companies, NGO's and private individual companies from within Brazil. The Brazilian agricultural industries have or are developing improved farming systems and technologies to improve industry	The project proposes to take an industry delegation to Brazil to investigate farming systems and technologies that may lead to improvements in the Australian farming system and lead to improved environmental outcomes. The project has specifically targeted Brazilian companies that are progressive, innovative and leaders in their industry. HCPSL has already got commitments from the various Brazilian companies to host this	$30,000	$120,000	May 2020

		productivity and sustainability. The Brazilian industry is now also being challenged to improve its environmental footprint and be involved in environmental accreditation programs like Buonsucro.	Australian delegation. The Brazilian sugarcane industry is the largest industry globally, crushing approximately 600,000 million tonnes of cane annually, compared to Australia's 30,000 million tonnes of cane.			
P7	Young Grower engagement group Delivered by CANEGROWERS/WTSIP Cairns Region	Empower younger growers who are taking over family farms to trial different farming systems. Leading to practice changes to move away from traditional family farming practices.	Create a positive peer to peer learning environment for young growers to learn/discuss farming practice changes that will empower the younger growers to challenge some of the traditional practices used on the farm. Leading to a new generation of growers adopting practice change. These meetings will be combined with a bus trip before the 2020 season starts to look at a different region and different farming practices used by younger growers who have taken over the family farming unit.	$6,000	$2,000	May 2020
P8	How much P is enough? *Delivered by WTSIP, TCPSL &TSL*	Growers lack of confidence in 6ES P guidelines and optimal growth conditions	Some growers have expressed concern that the recommended amount of phosphorus from the 6ES guidelines may not deliver the best economic result over a crop cycle. This project would raise grower awareness and knowledge of P through guest speakers, on-farm trials and Peer to Peer learning.	$5,000	$5,000	May 2020
P9	Developing Wet Tropics Soil Health Coaches *Delivered by Soil Land Food, Terrain & HPCSL*	Building capacity of farmer innovators to mentor their peers at a district level in regenerative farming practises that build and maintain soil health in the Wet	There are a number of local informal networks of cane farmers who are helping each other to implement regenerative agriculture practises improving farm system	$3,600	$4,000	May 2020

		Tropics cane farming communities.	sustainability and soil health across the Wet Tropics. In 2019, the first Regenerative Cane Farming Forum was held in Ingham with over 100 farmers attending. This project will build on leadership capacity in the regenerative cane farming network by enabling early adopters by providing skills training in one on one soil health extension and in understanding the process of change that farmers go through as they adopt new techniques. Soil Health coaches will then be linked to the Regenerative Cane Farming website to enable Wet Tropics growers to access a local farmer to change their farming system.			
P10	Wet Tropics Regenerative Cane Farming Forum *Delivered by MSF*	The proposed Regen Forum would address a range of regional priorities in the cane industry and help address gaps in extension delivery in the northern Wet Tropics through the mechanism of farmers talking directly to other farmers.	This project involves bringing together a wide range of growers from across the Wet Tropics who have made significant changes on their own farms to share their experiences with other growers and extension staff from across the Great Barrier Reef. Demonstration sites for the proposed Regen Forum would be likely to include the following: Composting facilities • Mixed species cover crops • Soil health pits • Legume fallow crops with cash crop potential (peanuts, soybeans) • Oilseed crops on the wet coastal lowlands (canola, sunflower)	$20,000	$16,000	May 2020

12.8 Flexible Funding Projects

Following prioritisation and consideration by the REWG, the following projects were allocated flexible funding during Round 1 and 2.

Table 15. Wet Tropics Flexible Funded Projects – Round 1 and 2

No.	Title	Key Issue	Summary	Budget	In-Kind	Completion Date
F1	Mossman WQ Monitoring to engage farmers. *Delivered by Mossman Ag Services, TropWater and REC*	Lack of and belief in WQ data for the Daintree Mossman district.	Mossman WQ has no local WQ monitoring and is only just getting DES EoC data for 2017/18 water year. There is strong interest by sugarcane producers to understand what is coming off their paddocks which will provide considerable value and supplement the new EoC data from DES.	$20,000	$10,000	June 2020
F2	GPS RTK with the mobile base station *Delivered by Mossman Ag Services*	The MAS GPS unit is often needed on the same day by different growers or extension staff, resulting in important farming or levelling operations not being done on time or with precision CTF technology. In addition, significant losses of the signal are experienced in various locations, be it growers or extension staff, preventing use of the technology.	Since the purchase of an initial FarmScanAG RTK GPS unit by MAS through Reef Rescue, extension staff have been able to conduct paddock level surveys for laser levelling purposes. This aims to address productivity issues (waterlogging, disease, nitrogen losses) and growers have been able to hire the equipment to use the laser scoop as well as perform farm operations (planting, tillage, fertilising, spraying) implementing controlled traffic. This will double the capacity for precision ag operations to be performed in the Mossman area and eliminate dead zones. This will have significant benefits to compaction, drainage, fertiliser use efficiency, variable rate applications - all benefits of controlled traffic.	$25,000	Ongoing maintenance by MAS staff and specialist, ongoing provision of FarmScan Ag RTK GPS and mobile base station services	June 2020

F3	Direct drill bean planter *Delivered by MSF Sugar*	There is minimal legume fallow in the Cairns and Babinda region. Growers normally use a monoculture. This direct drill machine helps to manage multiple species (like peanuts, ebony cowpeas, sunflowers and other legumes crop)	Noel from MSF will manage the bean planter to demonstrate to the Cairns/ Babinda growers. With 200+ business entities in the region and minimal growers who have adopted fallow management/alternative legumes crops or cash crops, like peanuts, sunflowers and other legume species. If this project is successful, we will increase the area with a legume fallow and alternative cash crops.	$20,000	Maintenance of the machine and delivering the planter from farm to farm	June 2020
F4	Using foliar sampling to determine nitrogen fertiliser requirements for sugar cane on blocks previously used for growing bananas *Delivered by TCPSL. WTSIP and SRA*	Residual nitrogen from banana production is not correlated with organic carbon, and growers know that nitrogen is not required for several years after land is converted from bananas to cane. Foliar samples may provide an insight into when fertiliser is required.	Collect leaf samples from a range of sites with varying management history (especially, time since bananas), and collect soil samples for comparison. Compare recommendations from soil tests with critical levels from foliar samples. Compare results through time (recent vs 5 years since ex-bananas). Gain insight into expected levels of variation in leaf samples. Encourage growers to monitor levels through time	$5,000	$1,800	April 2019
F5	Liming effects on primary nutrient use efficiency *Delivered by HCPSL*	Nitrogen is rarely a limiting factor when it comes to cane production, yet it is often the first thing growers increase when they have productivity issues.	This project aims to improve NUE by addressing other soil constraints such as pH, sodicity, and nutrient holding capacity/ availability on two different soil types, and create a working group of growers to assist in conducting the trial	$25,000	$5,000	September 2019
F6	Trialling improved legume cropping the Wet Tropics *Delivered by HCPSL*	Improved legume cropping leads to improved soil health, ground cover and reduced N application through budgeting of N contributions.	Purchase of Mounder, Ripper Legume Planter to support Wet Tropics farmers to trial improved legume cropping for areas traditionally 'too wet' to grow legume crops and associated benefits. HCPSL would officially own (and maintain) the equipment and make it available to producers in the HBT and further afield.	$9,000	$12,000	June 2019

F7	Banana Industry - Innovation Workshop *Delivered by ABGC*	Sharing innovative solutions to on-farm problems	To bring growers and engineering firms together to showcase new ways of doing things on the farm, to raise issues to which there are currently no solutions and realise common problems.	$12,000	$5,000	May 2020
F8	Simple three-row direct drill legume bean planter *Delivered by* IBPS	This machine targets those growers who do not do crop rotations using legumes crops on their farm.	IBPS has identified that small growers lack the capacity to do crop rotations. IBPS seeks to demonstrate the value of legume crops and breaking a monoculture crop by providing greater engagement and the required technology to rotate their fallow blocks using legumes to improve soil biology and soil health	$20,000	$5,000	June 2020
F9	Unlocking GPS potential *Delivered by CANEGROWERS/ WTSIP Cairns Region*	Getting the most out of GPS systems	Engage service provider to run workshop/information sessions on unlocking the full potential of growers GPS units. Possibilities to set up units to allow for record-keeping and the potential to create variable rate applications of nutrients where information is available.	$3,000	$1,000	May 2020
F10	Mossman Practical Extension Tool Kit *Delivered by Mossman Ag Services*	Increasing grower engagement and productivity with an extension and soil health tool kit for extension providers in Mossman, helping work towards positive water quality outcomes. This project fills the extension gaps, which will maximize the current work being undertaken. Several growers have enquired about the use of a drone for various reasons. A drone would greatly complement our current services provided to growers and add great value to many of our current projects.	The project will provide new tools to support on-farm learning with innovative learning approaches and technology, including the purchase and use of a drone for crop assessments and an extension tool kit focusing on soil health and nutrition. Tools have been determined from several well-attended soil health workshops and direct requests from growers in the Mossman area. Tools will provide the ability to identify areas of improvement for growers, for a water quality benefit. Project findings and learnings will be shared with other extension providers to maximise uptake and to minimise duplication of workloads.	$10,500	$33,280	December 2019

F11	Cairns Region Legume Planter Delivered by CANEGROWERS/ WTSIP Cairns Region	Targeted break crops to reduce plough out and replant in the Cairns district.	Cairns Region delivering extension services, agronomy advice, variety advice and chemical recommendation have identified that small growers lack the capacity to do crop rotations, the value of legume crops and breaking cropping monocultures. A dual row DD legume planter is appropriate for the needs of farmers in this district. Objectives include improving grower productivity, profitability and sustainability.	$31,000	$5,000	December 2019
F12	Benchmarking financial performance of sugarcane production systems in the Far North Region of Queensland for enhanced profitability and water quality outcomes *Delivered by SRA - Meringa*	This project is targeted at improving the profitability of cane farming enterprises in the Far North region by providing growers with tools (financial benchmarks) against which they can first assess their current operations and secondly assess the impacts of changes in land management practices on their own businesses. This is a necessary precursor to the adoption of more profitable and sustainable production systems and/or upgraded technology as it allows growers to target their efforts and investment at aspects of production which have the greatest potential to impact on improved profitability and improved land management.	This project will be developed in consultation with the Far North Regional Adoption Advisory Committee working with the SRA Regional Coordinator. The project aims to: • Quantify production costs for cane growing systems in the Far North Region • Enable growers in the region to compare their production costs with regionally specific benchmarks to help identify where improvements and investments can be made • Enable growers to identify options for improvement and change that may be applicable to their business, especially those with improved profitability and WQ outcomes • Assist service providers in the region better target their support to growers • Create a network of industry stakeholders in the Far North Region with a greater understanding of the costs of production and industry profitability and sustainability.	$35,000	$25,040	May 2020

13 MONITORING, EVALUATION AND REPORTING

An independent review of Reef-catchment best management practice programs, Stockwell et al. RP150 report; *Reef Best Management and Evaluation Review* was undertaken in 2016. The review identified a range of weaknesses and gaps in M&E tools currently utilised within the Reef Plan 2050 Program and are as follows:

- Overall the system is excessively focussed on lag indicators (those measured after the event) with few documented lead indicators (predictive indicators) – suggesting the program may be slow to respond to trends and inefficiencies
- Unaligned M&E approaches across projects – data is being collected against too many criteria across various service providers and projects in a way that does not lend itself to a comparison of performance and results
- Multiple incompatible databases are used across various service providers (often due to different funding program requirements); increasing the workload and reducing the efficiency of delivery M&E
- Current follow-up survey instruments have 'grown' to meet new standards and expectations and may have become cumbersome as a result
- The Report Card is tailored to a government audience to broadly communicate progress toward Reef Plan targets. Consequently, it is not an effective reporting tool for producers and the regional community
- There is a large gap in resource requirements between self-assessed and audit BMP, the latter being very resource-hungry (e.g. reports that it requires 4-5 days' work for both the producer and the supporting extension officer)

The findings of RP150 are incorporated into the MERI Framework (Appendix 5), for TF3.5 *Enhanced Extension Coordination in GBR* to ensure consistent and meaningful project evaluation, that aligns with and complements P2R monitoring and reporting. Surveys were conducted at the start of TF3.5 by Coutts J&R to benchmark current extension practice and will be repeated at the end of the program to evaluate progress.

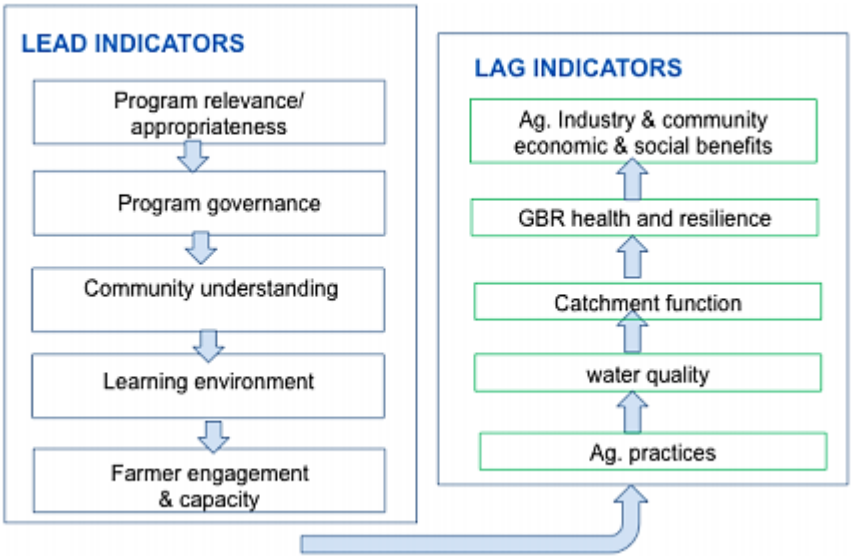
13.1 MONITORING FRAMEWORK

13.1.1 Lead and lag indicators

The Department of Environment and Heritage Protection's (DEHP) working document describes human dimensions with respect to reef water quality as *encompassing factors that influence people's practices, behaviours and/or attitudes, relationships and governance*; all of which can be linked to either a direct or indirect impact on water quality outcomes entering the GBR. Current Reef M&E system(s) however, are strongly focussed on lag indicators and do not capture the human dimension of change to adequately represent progress towards practice change. Lag indicators (Figure 6) *follow the fact* (i.e. measure change that has already occurred at the outcome level) and do not show progress in a linear fashion. A key difference in TF3.1.1 is the stronger use of lead indicators (Figure 6). Lead indicators offer several additional benefits to outcome measures already in place. These benefits include: Providing early warning of any program failures, enabling delivery agents to make timely adjustments

- Investor reassurance about how programs are tracking, particularly where significant time lags exist in the collection of outcome measures
- Better support for ongoing development evaluation processes that enable rapid learning and adaptive program delivery

Figure 6. Diagram of lead and lag indicators



Source: Final report – Best management program monitoring and evaluation review
https://www.qld.gov.au/__data/assets/pdf_file/0026/69074/rp150p-a-review-reef-catchment-best-mgment-programs.pdf

13.1.2 Paddock to Reef Project

At a systems and process level, the Paddock to Reef modelling framework is considered to represent current best practice. Input measures for Australian Government grant projects program; where detailed responses to each of the Water Quality Risk Framework questions are linked to a paddock level spatial polygon (GIS shapefile) are superior to those used in previous Queensland Government practice change programs. Better alignment between Queensland & Australian Government programs; specifically relating to practice change M&E requirements, is clearly needed to ensure consistency. This is recognised within the Queensland Reef Water Quality Program (QRWQP) and is currently being addressed through TF3.1.1 *Monitoring and Evaluation* (focus area 6)

Feedback from REWG meetings suggests that the reef-wide scale of Paddock to Reef reporting makes it unsuitable for promoting adaptive management and continuous improvement and innovation at the local level. Models are based on very little real data and some un-tested major assumptions such as; assuming farming system changes made under the Reef Alliance Reef Trust III and previous programs are maintained for the long-term.

Extension practitioners consulted during the development stage of the REP agree that a more integrated approach to evaluation; focusing on practice change (not just program delivery) but; evaluation that also incorporates the social dimensions of behaviour change will paint a better overall picture of what stage we are at in terms of broad-scale adoption of improved agricultural practice. REWGs suggest capturing more production data (profitability, productivity etc.) will allow better information and communication to producers and will also provide a means for better engagement as; these types of data are paramount to evaluating business success. A core management practice M&E

framework (see Appendix 5 - Table 23) that goes across industries, regions and investors is currently evolving and will be tested by TF3.1.1 and other concurrent, parallel programs.

13.1.3 YourData Platform

The *YourDATA* database platform has been chosen for each REC throughout GBR catchments to report to the Manager (Extension Coordination) (DAF) on activities coordinated through the REWGs and the implementation of the REPs. The online monitoring and evaluation database developed by Coutts J&R to assist programs and projects collect and report key evaluation data including project activities, narratives, milestones, and feedback sheet responses. YourData platform provides a secure central data collection point with individual user accounts – allowing team members to input, edit, and view their own M&E data (or all data for their assigned region/project) and the Manager (Extension Coordination) to view, filter, analyse and export all project/program data for reporting.

13.1.4 Reef Extension and Education (E&E) WebMap App

In addition, regional data on extension effort, resources and uptake of improvement management practices will be collated by RECs and entered into the *Reef Extension and Education (E&E) WebMap App*, an ESRI ARCGIS online interactive mapping platform designed to display the extension, incentive and best management practice projects activities being delivered by a range of industry, government and regional NRM organisations. This tool makes information more accessible and allows for multiple datasets to be viewed simultaneously for REWGs and other extension providers to review, prioritise, plan and monitor regional extension.

The information collated in the YourDATA and E & E WebMap platforms will form part of the Evaluation Methods and be used to inform the Performance Indicators. Analyses will be limited by the information that is available at the time, and not all datasets will be at the same spatial or temporal scale, as they are aggregated from various sources. The aim of the evaluation will be to coordinate and prioritise extension effort in the Wet Tropics region but will also identify data needs and target the information required to improve the efficacy of Performance Indicators to implement in future iterations of this Regional Extension Plan.

13.1.5 M&E Framework template for projects supported by the REP

This monitoring and evaluation framework (Table 16) is designed for the evaluation of projects supported through Flexible and Peer-to-Peer learning funds outlined in the REP. The evaluation questions are designed to assess five key evaluation criteria as follows:

- Effectiveness: how well has the project delivered on planned methods and outputs, and what were the benefits?
- Efficiency: how efficient has the project been in targeting investment and using resources?
- Impact: what impact has the project had on creating change and contributing to Reef2050 and regional targets?
- Legacy: what are the lasting long-term benefits and obligations of completing the project?
- Project Management: what project processes and systems have been developed and are there evidence of learnings and adaptive management?

By following this M&E framework, the REP can be revised and updated and processes improved over time, so extension projects that it supports will be more effective in increasing the adoption of

improved management practices that result in improved water quality outcomes. This monitoring and evaluation framework will be implemented by the REC with the support of the REWGs.

13.2 REPORTING

Reporting for TF3.5 *Enhanced Extension Coordination in GBR* is required six-monthly (including financial reporting) and is to be prepared by the REC and approved by the Manager (Extension coordination) prior to submission to the Queensland Government's Project Steering Committee (DAF/OGBR).

Reporting must:

- Outline funding allocated to different activities, including any administration fees
- Describe the processes used to allocate, distribute, manage and report on the funds, being consistent with timeframes required under any collaborative agreement
- Detail the activities undertaken (and expenditure) in the reporting period and their contribution to the achievement of the E&E review implementation outcomes and the clear alignment to REPs and regional water quality priorities
- Describe the peer-to-peer learning facilitated through the allocated proportion of funds
- Describe the outcomes in terms of the increased capacity of the target audience (KASA) and how effective the activities/processes were in targeting extension delivery, adding value and building synergies across other projects
- Describe how the program will be sustainable beyond the initial injection of funding.

It is recognised that by nature of the purpose of Flexible funds, it is likely that expenditure may be connected to several E&E projects which have separate MERI plans. Alignment with existing MERI processes is encouraged to minimise duplication, provided it contributes to Paddock to Reef reporting. A Project Plan developed for each separate project sets out Project Logic and SMART Objectives to guide the Monitoring and Evaluation Plan. Each Project will be assessed against the criteria of Effectiveness, Efficiency, Impact, Legacy and Project Management.

Table 16 outlines the Key Evaluation Questions (KEQ) that are based on those from the MERI Plan; that will be used for program scale evaluation, need to be devised for each of the criteria. These KEQs are only examples, and new, project-specific questions will be added under the relevant criteria. Monitoring data can be quantitative (such as Paddock to Reef reporting and output measures) or qualitative (e.g. collected through interviews, focus groups and through other means).

Table 16. Monitoring and Evaluation Framework template for projects supported by the REP

Evaluation criteria	Key Evaluation Question	What will be monitored and how will it be monitored. Metric and how measured (method)	What information sources and monitoring data (including existing M&E tools or specific monitoring or data collection) will be used to answer the question? Where will you get the data from and what is that data	Monitoring frequency. How often will the data be gathered?	Evaluation and reporting process. How often will the evaluation be reported (through a MERI report)?
Effectiveness	– How well has the project delivered on planned methods and outputs?				
	– What measurable progress has been made towards the stated Project Objectives (as a result of the methods and outputs)?				
	– What extent has this progress contributed to the WQIP intermediate outcomes?				
Efficiency	– What measures have been taken to improve project efficiency (e.g. targeting investment, cost-sharing)?				
Impact	– What evidence is there that the project has made a contribution towards Reef 2050 WQIP land management and water quality targets?				
	– What progress would have been made anyway, in the absence of the funding for this project?				
	– What, if any, unanticipated positive or negative impacts have resulted from the project?				
Legacy	– What are the long-term requirements and arrangements for managing and resourcing maintenance of the project outcomes?				
Project Management	– How well are the project management arrangements, systems and processes contributing to efficient and effective project performance?				
	– What processes and evidence is there of adaptive management and learning and active implementation of MERI?				

APPENDIX 1: BACKGROUND TO ENHANCED EXTENSION COORDINATION AND ENHANCED EXTENSION AND EDUCATION PROJECTS

TF3.5 Enhanced Extension Coordination in GBR (2017-2020)

Project TF3.5 *Enhanced Extension Coordination in GBR* is sponsored by the Office of the Great Barrier Reef (OGBR) in the Department of Environment and Science (DES) and is being administered through DAF. It provides funding for salaries and project operating costs for a Manager (Extension Coordination) and seven RECs, as detailed in Table 17.

Table 17. Positions supported through project TF3.5 Enhanced Extension Coordination in GBR

Title:	Host organisation	FTE
Manager (Extension Coordination)	DAF	1.0
Regional Extension Coordinator (Burnett-Mary)	BMRG	1.0
Regional Extension Coordinator (Fitzroy)	FBA	1.0
Regional Extension Coordinator (Mackay-Whitsundays)	DAF	1.0
Regional Extension Coordinator (Burdekin-Sugar)	DAF	1.0
Regional Extension Coordinator (Burdekin-Grazing)	NQ Dry Tropics	0.5
Regional Extension Coordinator (Wet Tropics)	Terrain	0.5
Regional Extension Coordinator (Cape York)	CY NRM	1.0
Project Support (Communications)	DAF	0.5

TF3.1.1 Enhanced Extension and Education (2017-2020)

Project TF3.1.1 *Enhanced Extension and Education (2017-2020)* is sponsored by the OGBR and administered through DAF. It provides funds to support six focus areas responding to the identified priorities in the E&E Review. These focus areas are as follows:

R1. Overseeing the implementation of the review ($30,000)

Key recommendations (E&E Review) for this focus area are summarised as follows:

- Establish Reference Group and annual review with expert input on progress
- Extension delivery survey to assess gains in extension capacity and functioning

R2. Coordination and Collaboration ($1,500,000)

This focus area provides support to REWGs, through discretionary Flexible Funds, to enable regional stakeholders to work together to address regional and sub-regional priorities and value-add to existing programs by addressing gaps and barriers that are otherwise hindering the rates of broad-scale practice adoption. Key recommendations (E&E Review) for this focus area are summarised as follows:

- Appoint RECs and a Cross-Region Coordinator
- Establish or continue REWGs
- Develop REPs to guide the allocation of flexible funding at the regional level

Flexible funds have been provided for each NRM region (Table 18).

Table 18. Allocation of Flexible funds to NRM regions in the GBR catchment.

NRM Region	2018/19	2019/20
Burnett Mary	$150,000	$100,000
Fitzroy Basin	$150,000	$100,000
Mackay-Whitsundays	$150,000	$100,000
Burdekin-Sugar	$75,000	$50,000
Burdekin-Grazing	$75,000	$50,000
Wet Tropics	$150,000	$100,000
Cape York	$150,000	$100,000

R3. Extension personnel and expertise ($1,400,000)

This focus area provides funds, to be allocated by DAF, to support personnel and expertise to address technical deficiencies in some priority speciality areas in the regions. Support will be allocated across the GBR NRM regions and where possible coordinated to share skilled experts across existing projects and cross-regionally. If there are opportunities to align to the Training and Development Program and value add to this program this will also be encouraged.

How high priority skills gaps can be delivered via a service provider(s) or alternative mechanisms will be investigated with regional extension working groups through the development of the Regional Extension Plans. Projects should source expertise from where it may reside to provide expert input to existing programs and train/mentor/advise resource management officers across the regions to upskill personnel and develop future capacity. The decision on what skills gaps can be filled will also depend on being able to access personnel with suitable expertise and their availability to service projects in the regions at times when aligned projects are being rolled out.

Collaborative approaches are encouraged where regional stakeholders work together to develop regional capacity in a priority speciality area that will improve water quality entering the GBR. To this effect, a Collaborative Project Plan template has been developed to assist regional stakeholders developing projects to access these funds. Key recommendations (E&E Review) for this focus area are summarised as follows:

- Augment existing services by providing additional support in areas where technical expertise is limited, such as soil/conservation/health/hydrology, mixed crop farming, business management and economics where gaps are identified
- Plan on a rolling 5-10-year basis
- Develop a focussed website for Reef extension staff information sharing
- Recognise the role of the public sector, industry, regional NRM organisations and Landcare.
- Increase the role of the private sector and industry engagement and involvement
- Recognise the role of Best Management Practice programs in providing increased returns for producers and in meeting regulatory requirements
- Extend Pilot Capacity Building and Graduate Program

R4. Training and Capacity Building ($1,960,000)

Administered by DAF through the Manager (Reef Extension Training Development), the Training and Capacity Building focus area will develop and implement a best practice framework for upskilling the extension delivery staff across sectors in Reef regions. This includes undertaking a collaborative process whereby regional extension staff participate in a GBR-wide training needs analysis, specifically

seeking feedback on generic extension capabilities and industry-specific technical skills. The analysis will identify the high priority skills and knowledge that extension providers need to improve their effectiveness. Results will be presented to regional stakeholders, with further feedback sought on regional priorities.

Funding will be provided to support reef extension personnel to attend training or participate in mentoring programs. The RECs will play a key role in supporting capacity building for the regional extension providers, working with the Manager (Reef Extension Training Development) to make available and coordinate opportunities for regional extension staff to participate in extension training. Key recommendations (E&E Review) for this focus area are summarised as follows:

- Recruit Training Development Manager
- Promote, use and develop the extension best practice framework
- Develop a training framework and develop and source training material for core reef extension skills
- Provide professional development for program managers and funders
- Develop a mentoring framework
- Establish and use a formalised network of Reef Extension delivery
- Support opportunities for the career development of extension officers

R5. Extension Approaches and Methods ($1,000,000)

The E&E Review discussed a number of extension approaches and methods and identified that programs which deliver long-term peer-to-peer learning had demonstrated considerable success in leading to practice change. Key recommendations for this focus area are summarised as follows:

- Support longer-term, Peer-to-Peer facilitated group learning (particularly directed towards producers who have not previously been engaged through other mechanisms) such as Focus Farms; Whole-farm Review Groups and Producer Demonstration sites
- Greater use of extension technologies, including distance engagement technologies
- Broker/leverage enhanced services through existing funding programs to encourage private sector delivery and on-ground practice change
- Support communication initiatives, including developing rules of thumb

Through the *Extension Approaches and Methods* (focus area 5), Peer-to-Peer Funds are available to support existing producer groups or establish new groups that select their own facilitator or delivery organisation to work with (Table 19).

Table 19. Allocation of Peer-to-Peer funds to NRM regions in the GBR catchment.

NRM Region	2018/19	2019/2020
Burnett Mary	$75,000	$50,000
Fitzroy Basin	$75,000	$50,000
Mackay-Whitsundays	$75,000	$50,000
Burdekin-Sugar	$37,500	$25,000
Burdekin-Grazing	$37,500	$25,000
Wet Tropics	$75,000	$50,000
Cape York	$75,000	$50,000

R6. Monitoring and Evaluation ($50,000)

This focus area provides funds to oversee the implementation of the Monitoring and Evaluation of project TF3.5 and TF3.1.1. This includes development and maintenance of the YourDATA database to record activities of Regional Extension Coordinators and to fund a contractor to develop a monitoring and evaluation framework for projects TF3.5 and TF3.1.1 and undertake extension coordination benchmarking and evaluation surveys at the beginning and end of the project. Key recommendations (E&E Review) for this focus area are summarised as follows:

- Reef Monitoring, evaluation, reporting and improvement (MERI) Framework (RP150 2016) should be adopted as the 'higher level' guide for Reef E&E
- All Reef E&E programs should report against this framework
- Efforts should continue in benchmarking practice levels related to the water quality risk framework
- The Extension Coordination Manager should provide leadership and support in partnership with the Paddock to Reef Program
- Greater use of qualitative data methods should be exercised to show the role of different programs in building capacity and influencing management practice change

Flexible (Discretionary) and Peer-to-Peer learning funds

TF3.5 *Enhanced Extension Coordination in GBR* has been initiated with Flexible (Discretionary) funds to support regional networks to work together to achieve agile, focused responses to local needs. In addition, Peer-to-Peer Learning Funds to establish or maintain producer peer-to-peer learning groups are also provided. Flexible and Peer-to-Peer funds have been provided for each NRM region, as described previously in Table 21. The funds are allocated through REWGs in line with guidelines for Flexible and Peer-to-Peer funds (Table 22), which describes what types of activities are eligible.

Table 20. Eligible activities guide for allocation of Flexible and Peer-to-Peer funds

Types of activities that are eligible for funding	Types of activities that are out of scope
Targeted activities to increase the uptake of key practices to address water quality priorities	Activities that fall outside Great Barrier Reef regions
Targeted extension activities that address challenges and fill gaps in current delivery effort	Vehicle purchase/lease/running expenses
Building synergies within catchments and regions to add value to current programs	Purchasing equipment for the host organisation, which is not for use in a demonstration/trial
Supporting cross-regional and cross-organisational activities, learnings and information sharing (e.g. events such as field days/ workshops)	Delivery of existing activities or projects (e.g. BMP programs which have ongoing support via other funding arrangements), or activities which duplicate others, or are otherwise funded from previous or current funding sources
Innovative capacity building for producers and/or extension staff	Water quality monitoring or research if producer engagement and education is not the purpose of the activity
Piloting/demonstrating new technologies or platforms that assist in the engagement or education of producers and/or extension staff	Purchasing equipment or providing funding to a particular producer (e.g. as per grants program)
Facilitating producer groups (peer-to-peer learning), and may include targeted training for facilitators were not duplicating other projects/activities	Activities that are not related to agricultural management (e.g. urban or industrial)
Multi-year projects, in particular to support longer-term peer-to-peer learning groups (annual funding allocations pending demonstration of outcomes and endorsement of reporting requirements)	Activities that do not contribute to improved water quality outcomes
Demonstrations/applied research trials aimed at engaging and educating producers, e.g. regional validation of existing improved management practices in new areas* *This may include on-ground works in limited situations where it is an essential component of an extension activity that facilitates learning in an area of identified need or as part of peer-to-peer learning via facilitated producer groups.	Salary for existing staff and staff relocation costs Activities which are retrospective—have commenced/are funded but not yet completed. Activities required to comply with any legislation or are part of an approval or funding contract under Commonwealth or State legislation or agreement Administrative costs above 10% of the total annual allocation

APPENDIX 2: GENERIC TERMS OF REFERENCE FOR THE REGIONAL EXTENSION WORKING GROUPS (REWGS)

The primary objective of Regional Extension Working Groups (REWGs) is to enhance industry-related extension resources and capacity to support improved productivity, profitability and environmental performance. Each REWG will promote these objectives by:

- Supporting the development of the Regional Extension Plan that identifies priorities, gaps and opportunities in the Wet Tropics and Cape York NRM regions to increased land manager participation and the adoption of management practices that lead to improved water quality
- Supporting the development of specific, targeted extension projects and activity work plans addressing gaps and opportunities identified within the Regional Extension Plan. This will include:
    - Undertaking a risk analysis on the implementation phase
    - Implementing effective monitoring and evaluation of change
    - Facilitating the sharing of information, ideas and learnings from past and current projects and activities relating to productivity and water quality extension
    - Facilitating a more coordinated and consistent approach to extension delivery
    - Promoting existing and upcoming extension related activities amongst networks through the development of a regional calendar of events
    - Avoiding duplication of extension effort and landholder engagement (including surveys) to ensure any new projects value add to what the region has already achieved or is committed to achieve in the near future
- Support the development of key regional messages and rules of thumb so that there is consistency amongst extension providers when communicating to graziers, farmers and traditional landowners
- Assist with the development of effective platforms for peer-to-peer learning and collaboration
- Identifying possible funding sources to implement work plans such as through Reef Taskforce or Reef Trust

Responsibilities

REWGs will be independent groups, supported by both Terrain and Cape York regional NRM bodies with facilitation and support provided by Regional Extension Coordinators.

Regional Extension Coordinators will report back to the Reef-wide Extension and Education Coordinating Manager (DAF) on the number of meetings held, attendance rate, actions undertaken, decisions made. Outcomes will be recorded annually through an established regional extension reporting process. This information will be collated with information from other Regional Extension Coordinators and reported to the Office of the Great Barrier Reef in the Department of Environment and Science (DES).

Membership

Core membership for each group should comprise and where practical, be representative of organisations, agencies and practitioners that are directly involved in the delivery of extension delivery to their respective industries.

Operational guidelines

- Meetings will be held quarterly to biannually as directed by relevant REWGs. An overarching meeting, however, will be conducted annually and will be open to all extension staff associated with the organisations involved
- Regional Extension Coordinator will support REWGs through:
    - Organising the venue and refreshments
    - Developing the meeting agenda and directing proceedings (agenda will be distributed 3 days prior to meetings held)
    - Collating required resources, props and discussion material
    - Notify the extension network 3 weeks prior to the meeting date
- Duration of the meeting will vary depending on the agenda; however, a general target of 4 hours is proposed.
- Meeting rules will be established by the REWG over the first two meetings and will be provided to new members or other parties on request
- Terms and relevance of meeting rules will be reviewed annually or as groups require.
- At each meeting, minutes will be taken by the Regional Extension Coordinator or a nominated group member, reviewed, then circulated to all other members (via email) within 5 working days from meeting end. Minutes will include:
    - Meeting content and a discussion summary
    - Proposed venue and date for the next meeting
- Recruitment of new persons/organisations for the group will involve group discussion and then consensus

Decision-making process

Decisions and actions of the REWGs will be taken by consensus where possible with reference to the guidelines outlined in the REP and be consistent with the eligibility criteria in the Flexible Funding guidelines. The use of an agreed If consensus is not reached, it will be by majority vote. All decisions will be compatible with federal and state (Qld) laws and policies.

Conflict of interest

All REWG members must alert the group of any potential or perceived conflicts of interest that may arise during decision making, particularly involving allocation of project funding, at meetings, project work or at workshops. On matters pertaining to the meeting agenda; members shall verbally declare any conflict of interest to the group at the commencement of the meeting.

Other attendees

Other organisations or businesses (e.g. government, universities or research organisations) may be invited to meetings where appropriate or on group request. The Regional Extension Coordinator must be notified prior to the meeting if other attendees or guests have been invited outside the discretion of the Chair.

Media

Any statements, media stories or other materials prepared under or linked to the banner of the group are to be endorsed by all group members and reviewed by Terrain NRM and Cape York NRM Communications Managers prior to public release.

Data Management Agreement

A data management agreement will be developed within REWGs as this is quintessential where sensitive data is presented by research or industry. Caveats need to be identified, and data confidentiality protocols clearly expressed and agreed to by members.

Remuneration

Each member of the REWG is responsible for travel costs for attending meetings. There are no sitting fees. All refreshments and food at meetings will be provided via the Enhanced Extension Coordination project. With the approval of the Reef-wide Extension and Education Coordinating Manager (DAF) travel and accommodation costs incurred by guest speakers, hired consultants and/or external facilitators will be reimbursed via the same funding source.

Budget

If funding is made available to deliver projects/activities, these projects must be identified within the Regional Extension Plan and associated work plan and meet any funding guidelines or conditions. This could include training and development for extension staff, graziers, targeted extension activities/events and the development of communication products. In-kind contributions will be provided by staff from member organisations where possible.

Through the Reef Plan, a range of extension and education, incentives/ grants and Best Management Practice programs are provided to improve the water quality of the Great Barrier Reef by maximising the adoption of management practices and systems by landholders in the Burnett Mary region. They include the provision of financial incentives for infrastructure and equipment, projects offering Programmed Learning and Training, industry Best Management Practice (BMP) programs, specific action learning extension projects and market-based incentive projects for specific priority issues in priority areas.

APPENDIX 3. SYNERGY MATRIX OF EXTENSION DELIVERY

Table 21 describes the major extension service organisations and how they fit together in the Wet Tropics region.

Table 21. Synergy matrix of major stakeholders

Key stakeholder organisation	Sub-groups	Geographic boundary	Types of services/ approaches	Role	Outcome areas
Governmental agencies: (DES, QPWS, CSRIO, OGBR etc.).	Extension, administrative, research & regulatory staff.	All regions and catchments.	Administrative, advisory & policy.	Coordination, media, training, research & science.	Water Quality & regulatory. Political and economic sustainability.
Catchment Care & Community groups.	Conservation, production & NRM related.	In respective regions and, in particular, priority sub-regions & sub-catchments.	Recipients of financial incentive schemes; extension and training, on-ground activities & media.	Deliver local to catchment scale projects and engage primary producers within the general community.	Water Quality, Pest & weed management. Sustainable farming & Conservation
Indigenous corporations and organisations.	Traditional landowners & managers. Horticulture and Beef producers.	All coastal and western catchments.	Heritage & cultural advisory. Land management.	Consultants and Elders, cultural training and awareness advisors	Coordination, conservation & production. Improved collaboration and extension effectiveness.
Industry bodies (QFF, MLA, SRA, AgForce, etc.).	All sugar producers & advisors. *note growers choose to be members.	All sugar regions. Special skill providers across all regions.	Researchers undertake trials. Coordination. Media information. Training activities & Meetings.	Increase awareness of research and technical knowledge to improve industry outcomes.	Production, profitability & Water Quality.
Productivity Services.	Sugar producers in respective mill areas.	Respective mill areas.	One-on-one visits. Variety selection. Pest & disease Management & response. Grower meetings. Media information.	Maintain and improve the productivity of sugar producers providing cane to their respective mill.	Disease/pest management & production focused.
DAF sugar extension.	Sugar producers in respective regions – some cross-regional collaboration.	All sugar regions. Staff can support cross-regionally.	Demonstrations. Individual farm visits. Field days, farm walks & workshops. Media information.	Complement other providers. Field trials & demonstrations.	Water Quality & Production.

CANEGROWERS.	All sugar Producers *note growers choose to be members.	All sugar regions. Members focus Independent organisations cater to own growers.	Smartcane BMP. Grower meetings. Advocacy. Media information & RD&E.	Support and protect the broader interests of the industry.	Political and economic sustainability.
Australian Banana Growers Council.	All banana Producers. *note growers choose to be members; independent organisations.	All banana regions. Cater to own growers.	Bananas BMP. Better Bunch. Grower meetings. Advocacy. Media information & RD&E.	Support and protect the broader interests of the industry.	Political and economic sustainability.
DAF, BMP & Beef extension team.	Beef producers and private advisors.	Mainly in Mareeba & Cairns.	Grazing BMP. Workshops. Individual visits.	Improve overall practices – especially in relation to water quality outcomes.	Improved grazing & business management practices.
DAF Business extension group.	All primary producers.	Across all Reef regions.	Analysis of data, case studies, tools and training in business management.	Improved business management.	Production and profitability. Succession & some WQ.
Sugar Mills.	All sugar producers. Suppliers to their respective mills – including own farms.	In respective mill areas.	Provision of productivity information & statistics. Technical support for own farms.	Provide information to improve farm performance. Maximise production on own farms.	Production & profitability.
NRM Bodies (Terrain NRM etc.).	All producers in a region targeted by respective Program funders.	In respective regions – in particular, priority sub-regions.	Roll out financial incentive schemes; extension & training activities. Some BMP. Media information.	Deliver region-wide programs directed at water quality, conservation & NRM.	Water Quality Pest & weed management Sustainable farming.
Regional Coordinators.	Extension delivery organisations, programs & their staff across all industries.	In respective regions.	Coordination activities Extension planning & sharing meetings Information sharing Evaluation support.	Coordination to increase collaboration, delivery efficiency & extension effectiveness.	Improved collaboration & extension effectiveness towards improving water quality outcomes.

Private agronomists, vets and advisers.	Producers prepared to pay or targeted by Programs being delivered by private agronomists.	Depends on individual organisation or individual – some presence in all regions.	Commercial or user-pay technical & management support. Some cases of group activities and workshops. Tailored support based on requirements.	Provide individual expertise and advice to producers. Deliver specific programs for funders.	Individual productivity and profitability. WQ (if contracted to a program).
Supply companies and Resellers.	Producers who use goods or services provided by the supply companies – e.g. fertiliser, seeds, irrigation equipment, chemicals etc	Depends on the individual provider – Most larger companies represented in all regions – main support to active clients	Some field days & demonstrations. Mostly individual visits and technical support.	Sell products and services. Support and retain clients.	Improved sales and company profits. Improved productivity, reduced costs and improved profits for clients.

APPENDIX 4: CURRENT REGIONAL EXTENSION AND EDUCATION-RELATED FUNDING ACTIVITY

Queensland Government

The Queensland Government Extension and Education Program

https://www.qld.gov.au/environment/coasts-waterways/reef/reef-program/education-extension is in direct response to the GBR Water Science Taskforce (the Taskforce) recommendations (2016). The program supports extension practitioners and service providers to accelerate on-ground practice change to improve GBR water quality through:

- Restoring capacity in extension service across the Reef catchments
- Formalising extension and advice networks and defining leadership and roles across local delivery organisation to achieve whole-of-farm business approaches
- Support for ongoing training programs and career development for accredited extension practitioners and service providers
- Increasing the use of more innovative approaches and technologies
- Partnering with industry to develop broad-scale practice change programs
- Conducting an annual GBR *Science Synthesis Workshop* to bring together scientists, practitioners, policymakers and program managers to ensure reef policies and programs remain relevant and based on the best available science

Best Management Practice (BMP) Programs

This program focuses on encouraging and supporting industry-led best management practice (BMP) programs (Smartcane BMP, Banana BMP, Hort360GBR and Grazing BMP) which are robust and practical systems that maintain or improve the productivity, profitability and sustainability of farm enterprises. BMP programs are being rolled out in all Wet Tropics Reef catchments and include:

- Smartcane BMP (running since 2012)
- Grazing BMP (running since 2013)
- Banana BMP (running since 2013)
- Horticulture and Grains (Hort360GBR has been running since 2015)

The Wet Tropics host a significant Dairy industry (concentrated in the Tablelands area); however, it mostly relies on DairySAT (national program) for best management guidelines.

Wet Tropics Major Integrated Project

The Wet Tropics Major Integrated Project (WTMIP) was initiated in the Tully and Johnstone catchments of the Wet Tropics region in 2017 to focus on reducing nutrient, sediment and pesticide run-off into waterways https://terrain.org.au/projects/wet-tropics-major-integrated-project/. This Project concentrates on:

- Installing, trialling and monitoring catchment repair and treatment systems, including wetlands, bioreactors, high-efficiency sediment basins and riparian buffer zones, to improve quality of water entering the GBR systems
- Increasing support services for growers by investing in extension staff, and providing performance-based incentives and technical support for landholders

- Local-scale water monitoring in key locations to better understand the links between land management and water quality
- Engagement activities to support a collaborative, whole-of-catchment effort to improving water quality
- Influencing activities to reduce barriers for change, including trialling of innovative finance options and investment opportunities such as trialling Reef Credits.

Project Cane Changer

This project is based in the Wet Tropics and has been implemented in partnership with CANEGROWERS organisations and human behaviour experts, *Behaviour Innovation* https://www.canechanger.com/. The Project concentrates on engaging growers to take ownership of the change processes in a supportive environment and to recognise, value and accelerate their efforts to adopt farming practices that help protect the land, and subsequently, the Great Barrier Reef.

Report cards

Report cards include the Great Barrier Reef Report Card and regional waterway health report cards in Reef catchments. The Wet Tropic Report Card is overseen by the Wet Tropics Healthy Waterways Partnership which is made up of industry, research and community organisations and all levels of government. The Partnership aims are to coordinate the pooling of shared water quality monitoring data. All of the partners who contribute have been galvanised around a shared vision to improve the health of waterways and the quality of water flowing to the Great Barrier Reef.

GBR Innovation Fund

Innovation funding has been made available to increase and improve water quality monitoring at a local level and trial water treatment options. Projects include:

- Bioreactors for GBR (B4GBR): developing and networking of nitrogen mitigation in cane and bananas
- Denitrification bioreactor trial in the Russell catchment
- Maximising the efficacy of variable rate technology to reduce nutrient use and sediment transport in vegetable and melon production (Burdekin and Wet Tropics)
- Reducing run-off using deep-rooted crops to improve infiltration rates and nitrogen use efficiency (Wet Tropics)
- Synchronised controlled-release fertiliser (Burdekin, Mackay Whitsunday and Wet Tropics)

Reef Water Quality Science Program

The Queensland Government funds a number of projects under their Reef Water Quality (RWQ) Science Program (2009-2019). The program aims at capacity building and improving farming practice across all industries. Between 2009 and 2014, the RWQ science program provided much-needed products to extension providers and landholders. This included an understanding of reef catchments, the sources of the greatest pollutants (nutrients, pesticides and sediment) affecting the reef,

and processes within these catchments that generate these pollutants, such as subsurface erosion from gullies. Other outputs included vital scientific evidence about priority management practices and tools to help landholders make decisions. This science also informed Reef Plan 2013, the associated Scientific Consensus Statement 2013, and the updated Reef Plan RD&I Strategy. During Phase 2 of the program, 2014-19 investment was focused around four major themes of which three were relevant to the Wet Tropics:

- Theme 1 Sugarcane - improving nutrient use efficiency and weed management

- Theme 2 Cattle grazing - improving sediment management and land condition
- Theme 3 Bananas – managing nutrient use efficiency, pesticides and sediments
- Theme 4 Cross-agriculture - program prioritisation, monitoring and evaluation, changes to agricultural landscapes and commodities, implementing Great Barrier Reef Water Science Taskforce recommendations, response to Reef Plan 2013 and the Scientific Consensus Statement 2013.

This phase is of the program is coming to an end with a new program being developed that will roll out in the near future.

Queensland NRM Program

The Queensland Government invests in reef related projects through its NRM program which is managed by the Department of Natural Resources and Mines. The majority of the funding is being provided to support strategic projects delivered mainly through NRM regional bodies – providing a linkage between governments and the community. However, the program also supports collaborative relationships with volunteer and grass-roots organisations, rural industry groups and individual landholders.

Strengthening reef protection regulations

After more than two years of extensive work with peak bodies and broader community consultation, in February 2019 the Queensland Government introduced a Bill to Parliament – Strengthening Reef protection regulations – to further reduce the chance of nutrients and sediment pollution from agricultural and industrial land uses entering the GBR. The *Environmental Protection (Great Barrier Reef Protection Measures) and Other Legislation Amendment Bill* was passed in September 2019.

Australian Government

Reef Trust

The Reef Trust program includes incentive funding (use of market-based instruments) to encourage the uptake of new agricultural practices and technologies that improve water quality outcomes on farms and properties in GBR catchments. NRM Bodies and industries are collaborating through the Reef Alliance Project (RAP): *Growing a Great Barrier Reef* to deliver and report on Reef Trust Phase III and IV. Reef Trust Phase III is coming to a close in 2019; however Phase IV has already commenced and focuses predominantly on reducing sediment and nutrients. Three key water quality projects have been identified for investment through phase IV—further reverse auctions for nutrient reduction in the Wet Tropics and Burdekin natural resource management regions; trials of enhanced efficiency fertilisers on sugar cane farms; and management of stream bank and gully erosion.

Great Barrier Reef Gully and Streambank Joint Program

NRM bodies work with the Australian Government to tackle sediment run-off from gully and streambank erosion in key Reef catchments (including priority Wet Tropics) through the Great Barrier Reef Gully and Streambank Joint Program.

National Landcare Program

The National Landcare Program is part of the Australian Government's commitment to natural resource management. The program is jointly by the Department of the Environment and Energy and the Department of Agriculture and includes a range of measures to support natural resource

management, sustainable agriculture and to protect Australia's biodiversity. The Department of Agriculture component includes the Regional Land Partnerships and Smart Farms Program to support the development and uptake of best practice management, tools and technologies that help farmers, fishers, foresters and regional communities improve the protection, resilience and productive capacity of our soils, water and vegetation, and in turn support successful primary industries and regional communities. Under the RLP program, Terrain NRM was successful with the *Healthy Farming Futures: Wet Tropics Farmers Driving a Soil Health Culture* project.

Other successful Smart Farms projects (Round 2) included:

- Reinvigorating the wise use of trees on farms in the Wet Tropics
- Smart Drones - Smarter Farming
- Australian sugarcane industry soil health benchmarking in the Wet Tropic Region of Queensland-Increasing profit and transforming soil health practices through cooperative industry research, extension and adoption.

Through the Department of the Environment and Energy, the second phase of the National Landcare Program provides additional funding towards meeting the Government's commitment to the Reef 2050 Long-Term Sustainability Plan. NLP funds projects aimed at delivering education programs to improve land manager understanding of soil health and management such as the *Healthy Farming Futures Program* in the Wet Tropics.

Independent Funding

Project Catalyst

Project Catalyst https://www.projectcatalyst.net.au/ is a partnership between WWF and natural resource management groups, including Terrain (Wet Tropics) up until mid-2019. Project Catalyst has a focus on the improvement of water quality from agricultural catchments that flow into the Great Barrier Reef. Project Catalyst is a farmer-led program funded mainly through the Coca-Cola Foundation that encourages innovation in the cane industry relying on significant components of extension, agronomic, and economic support to encourage practice change.

Reef Trust Partnership

Over $19 million has been to eleven projects under the Great Barrier Reef Foundation's Water Quality Improvement Grant: Stage 1. These projects will see gullies restored, on-ground action with cane farmers and graziers to reduce run-off of the highest priority pollutants (sediments, nutrients and pesticides) in the highest priority Reef catchments and training opportunities for early-career agricultural experts (extension officers) boosted.

The Reef Trust Partnership includes $201 million to improve water quality on the Great Barrier Reef over six years. This first round of investment will focus on water quality projects that maintain or develop capacity and seek to build on existing programs with proven beneficial outcomes. Future funding rounds will provide opportunities to explore innovative approaches.

APPENDIX 5: MONITORING, EVALUATION, REPORTING AND IMPROVEMENT PLAN FOR TF3.5 *ENHANCED EXTENSION COORDINATION IN GBR*

This monitoring, evaluation, reporting and improvement (MERI) plan has been developed for the TF3.5 *Enhanced extension coordination in GBR* project to monitor and evaluate the performance of the REP in coordinating extension effort.

M&E Framework

The M&E Framework is based around Key Result Areas (KRAs) established in the Enhanced Extension Coordination Project that was developed by the Department of Agriculture and Fisheries (DAF) with input from the Department of Environment and Science and Coutts J&R. In addition, the M&E Framework includes objectives identified by the REWGs and associated with other projects and funding sources that are being managed through the REP. The purpose of the evaluation information can be summarised into the following categories:

- Reporting: justifying the investment
- Communication: increasing awareness of the outcomes, successes and lessons learnt
- Adaptive management: making improvements to project delivery
- Informing future work: evaluate outcomes to provide recommendations for future projects.

This M&E Framework (Table 11-13) is heavily influenced by the Stockwell et al. (2016) RP150 report, Coutts et al. (2017) E&E Review report and Moore and Rinehart (2017). The framework is not a substitute for project-level monitoring and evaluation and does not provide for the monitoring and evaluation of all the individual extension projects that will be implemented in Wet Tropics and Cape York regions in general. The aim of the framework is to build on project level evaluation and capture outcomes from such projects as a measure of the overall effectiveness of TF3.5 *Enhanced Extension Coordination in GBR*. For monitoring and evaluation of projects supported through Flexible and Peer-to-Peer funds; a separate M&E Template to guide the process, is provided previously (Table 10).

The Monitoring and Evaluation Framework is designed to streamline and clarify the M&E process around key elements set out in three Tables:

- Table 22 describes who needs the evaluation information and what they need it for; By identifying the users and needs upfront, the framework will be selective and efficient and only conduct the evaluation that is needed and negate unnecessary over-evaluation
- Table 23 that sets out how progress towards each project objective will be measured in terms of effectiveness, efficiency, impact, legacy and project management
- Table 24 that outlines how the evaluation information will be collected including, the proposed timeframes and responsibilities

Performance measures are based on the project objectives and will be measured through a combination of quantitative and qualitative data and analysis. Table 12 outlines how the information in the Evaluation Methods described in Table 13 will be collected, including, the proposed timeframes and responsibilities.

Table 22. Users and uses for the evaluation information.

Who needs the information?	What do they want to know?	How will they use the information?
Regional Extension Coordinators & REWG partners	– Are RECs and REWGs functioning effectively? – Is the REP & work plan implementation on track? – Is the work meeting needs?	– Report on progress to DAF towards milestones and objectives – Make improvements to the structure and functioning of the REWG – Make improvements to the REP & work plan – Make decisions about resourcing
Stakeholders (e.g. extension officers, industry, NRM, growers)	– What is the project doing? – How does the project impact their work? – Is the project improving the on-ground delivery?	– To inform their work program/determine whether to participate – To develop linkages with the project or others – To communicate with other stakeholders or peers
Department of Agriculture and Fisheries (DAF)	– Is the project on track? – Have REPs been developed, and are they being implemented? – Are partnerships operating effectively? – Is there improved extension coordination & collaboration in each GBR region? – What results, expected and unexpected, and direct and indirect, are produced?	– Report on progress to OGBR (DES) towards milestones and objectives – Make improvements to the Enhanced Extension Coordination project – To facilitate learning and continuous improvement – Make recommendations about investment – Make decisions about staffing, resourcing – To justify the program and continued support for Regional Extension Coordinator positions
Office of the Great barrier Reef (OGBR)	– Are partnerships operating effectively? – Is the project meeting milestones and objectives? – Is the project worth the investment? – What results, expected and unexpected, and direct and indirect are produced?	– To justify investment – Make decisions about investment – Report on Taskforce recommendations
External funders (including Australian Government and GBR Foundation	– Is the Extension network functioning effectively and worth investing in?	– Make decisions about investment

Table 23. Evaluation framework for TF3.5 Enhanced Extension Coordination in GBR

Project objectives	Activities/deliverables	Evaluation questions	Performance indicators	Evaluation methods
Overall Reef Water Quality Outcomes.	– Reef 2050: Queensland Reef Water Quality Program Goals of which the Regional Extension Plan and associated actions are contributing activities.	**Impact:** – What measurable progress has been made towards meeting Reef 2050 WQIP 2025 land management and water. – How has the Regional Extension Plan and coordination added to the rate and quality of progress? – What have been the positive and negative impacts that have resulted?	**1. Extent of progress:** 2. **Evidence of added value:** from the Regional Extension Plan and coordination. **3. Examples of positive and negative impacts:**	– Paddock to Reef Report Card. – Scientific Consensus statements**.** – Collated data from the evaluation of the coordination project below.
Key Result Area 1: Improved effectiveness and efficiency through improved collaboration and coordination: – Maintain, enhance and expand regional extension partnerships and collaboration across major agricultural industries and NRM groups, programs (e.g. MIPs) and projects (e.g. Reef Trust Phase 3 and future funding, e.g. Reef Taskforce) – Strengthen links, collaboration and leverage of product development between researchers/ scientists (reef, industry etc.) and extension staff to maximise knowledge transfer – Minimise the duplication of effort across Australian Government, State	**Coordination Positions:** – Regional Extension Coordinator – Regional Extension Group **Resources:** – Flexible regional funding to support collaborative activities and fill regional gaps. – Peer-to-Peer funding. – Personnel and Expertise Program (DAF). – Training and Development Program (DAF). – Other funding or extension provider's resources being provided. **Platforms:** – Establish and maintain a Regional Extension Group and regional extension network – formally bringing deliverers together, facilitating collaboration and new initiatives to fill gaps and	**Benefits derived:** What cost efficiency, practice change, economic and environmental benefits have occurred from the extra coordination and funding in terms of improved efficiencies and effectiveness of extension. Has the effectiveness of extension in the Wet Tropics and Cape York regions improved through the implementation of the Regional Extension plan? **Impact on organisations and people:** – To what extent has extension coordination improved across the Wet Tropics and Cape York regions? – To what extent are extension and other programs being (better) strategically planned and targeted (with reduced overlap) at areas of greatest	4. **Documented cases** of newly initiated collaborative extension activities, projects or Programs and linkages between related Programs – at regional, cross-regional, state and national levels. 5. **Increased formal linkages** between extensions and capacity building programs and projects funded to improve water quality. 6. **Evidence of the impact of improved coordination on practice changes** on enterprises which have a known impact on economic and/or water quality benefits.	– **Secondary data** – Documentation/progress reports of structures, positions, resources, activities and outputs put in place in the coordination Program. – Membership and activity details of proposed Wet Tropics and Cape York Extension Network. – Regular extension practitioner workshops sessions about coordination, learning, issues and impacts. **Primary data collection** – Outputs of monitoring and evaluation from projects and programs being funded and/or supported through the Regional Extension Plan. – Use of YourDATA to record extension coordination activities.

Government and industry programs which have extension activities associated with them – Enhance and support the increased extension effort being provided through and the increased urgency for this to lead to on-ground practice change outcomes for reef water quality **Key Result Area 2: Improve the professional capacity of the extension network:** – Key Result Area 3: Improve evaluation and review of extension effort and impact. – Identify gaps/opportunities and provide feedback to inform and support future allocation and targeting of on-ground resources – Provide strategic advice on regional gaps, needs and appropriate responses that meet the needs of the Reef Plan and the Queensland Government Great Barrier Reef Water Quality Program **Key Result Area 3: Improve evaluation and review of extension effort and impact** – Identify gaps/opportunities and provide feedback to inform and support future allocation and targeting of on-ground resources – Provide strategic advice on regional gaps, needs and appropriate responses that	developing the Regional Extension Plan. – Inclusion of other regional industry/NRM/Community groups in coordinated extension program, e.g. SRA regional adoption coordinator. – Community of practice – on-line platform and face to face events. – Working with other regional groups and industry extension coordinators. **Activities:** – Development of Regional Extension Plan. – Identified regional extension gaps and barriers. – Identify extension practitioners influencing improved management practices in the Wet Tropics and Cape York regions. – Identify opportunities to improve collaboration. – Undertaking agreed collaborative activities in line with the Regional Extension Plans, supported through Flexible funds. – Facilitated peer-to-peer learning projects. – Undertaking regional Communication Activities – led or facilitated by Regional Extension Coordinators **Training:** – Undertaking the training needs analysis, identifying professional capacity challenges, and working collaboratively to address them.	need and to achieve the largest potential impact towards water quality targets? – What new initiatives have resulted from the coordination activities? – To what extent do extension practitioners feel more connected, supported and valued and better able to undertake their extension activities? **Effectiveness of process:** – Has the implementation of the Regional Extension Plan been effective? – To what extent is communication and sharing of information/ experience (more effectively) occurring in the Wet Tropics and Cape York regions and between projects within and across regions and industries? – What extra capacity building activities have occurred and what was the participation, reaction and impact on participants? – To what extent is the communication and collaboration between researchers/scientists and extension officers increased? – To what extent does reporting of M&E meet the P2R needs and requirements? – To what extent is strategic advice being provided to	7. **Improvements in the levels of stakeholder satisfaction** re coordination, access and effectiveness of extension delivery. 8. **Increases in the extent/type of interaction** between extension staff within the region and between regions and their awareness of other Programs 9. Production and use of required Regional Extension Plans. 10. **Extent of participation in extension capacity building activities** and the resulting improvement in the levels of understanding, skills, motivation, job satisfaction and commitment to extension in the reef regions. 11. **Documented use of new science** being used in extension activities and their uptake by land managers.	– Narratives and detailed case studies of where extra coordination has resulted in collaboration and impacted on efficiency and impacts – Regional Landholder Engagement Project List updated annually – Updated E&E Spatial Database / Layers annually

meet the needs of Reef Plan and the Queensland Government Great Barrier Reef Water Quality program	– Raise awareness amongst network and facilitate training organised through Manager (Training & Development). – Skill/expertise gaps – Identify regional needs for skills and expertise to value add to extension activities and for support from DAF skills gap/expertise project. **Evaluation:** – Record information in YouDATA and provide data for the E&E WebMap platform. – Regional Extension Coordinators to work with P2R and delivery organisations to increase spatial monitoring and evaluation of extension impact. – Document findings to provide policymakers with information and implications for extension policy, funding and operational activities. – Facilitate annual regional meetings to provide feedback to key stakeholders including Manager (Extension Coordination)	investors on where extension effort should be targeted? – What barriers/ issues have impacted on the process, and what changes are needed? – What were the expected/ unexpected results of coordination?		

Table 24. Evaluation methods and timing

Evaluation Method	Focus	Timing	Responsibility
Secondary data capture and analysis	– Using available reporting and data sets to capture trends, activities, changes in linkages and impacts. Includes an analysis of capacity building/extension projects and linkages; progress reports of extension providers; P2R reports and Report card; Reef Extension Network data.	Annually	– Regional Extension Coordinators – Member extension providers
Narratives	– To qualitatively capture impacts and outcomes from projects and also barriers/issues.	Collected throughout projects and reported via six-monthly progress reports.	– Regional Extension Coordinators
Case studies	– To quantify where possible specific instances of change and resulting efficiencies and impact	Annually with an emphasis on the final 6 months	– Regional Coordinators – Member extension providers
Interviews with informed stakeholders	– To quantify and qualify benchmarks and changes in coordination, collaboration and extension delivery performance. Informed Land manager input should also be sought in the final benchmark.	Annually	– Regional Extension Coordinators – Member extension providers – M&E Consultants
Workshop debrief of coordinators	– Capture observations, experiences and outcomes from coordinators as well as opportunities for improvement.	Annual Regional Extension Coordinator workshop	– Manager (Extension Coordination) to organise the workshop – M&E Consultants
Workshop evaluation – AG and QG	– Capture feedback provided to AG and QG, actions planned and success of the workshop, areas for improvement	Annual Regional Extension Coordinator workshop	– Manager (Extension Coordination) to organise the workshop – M&E Consultants/ Independent facilitator to collect data
Extension practitioners survey	To capture feedback, satisfaction, observations and experiences from stakeholders involved in the project and document examples of actions taken and how activity assisted.	Annual	– Manager (Extension Coordination) – M&E Consultants
Analysis of Communication activities	– Show evidence of key messages being developed and used by extension officers. – To share project outputs and outcomes.	Reported in six-monthly progress reports	– Regional Extension Coordinators – Communications officer – Manager (Extension Coordination)
Capacity building evaluation	– Show evidence of capacity building in the extension network.	Reported in six-monthly progress reports	– Regional Extension Coordinators – Manager (Training & Development)