FINAL REPORT
Management synthesis for Reef programs

29 May 2020

Queensland Government

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Document history

Distribution:

Version no.	01
Issued to	Billie Gordon, OGBR Tracy Schultz, OGBR
Date	31/03/2020
Description:	Draft Report
Version no.	02
Issued to	Billie Gordon, OGBR Tracy Schultz, OGBR
Date	6 May 2020
Description:	Final Report
Version no.	03
Issued to	Billie Gordon, OGBR Tracy Schultz, OGBR
Date	29 May 2020
Description:	Final Report

Revision:

Revision no.	02
Author/s	Fiona Chandler Lilly Stevens
Checked	Sandra Carter
Approved	Steve Skull
Revision no.	03
Author/s	Fiona Chandler Lilly Stevens
Checked	Fiona Chandler
Approved	Fiona Chandler

Citation:
Alluvium (2020) Final Report: Management synthesis for Reef programs. Alluvium Consulting Australia. Brisbane.

We acknowledge the Traditional Owners of land and sea country throughout the Great Barrier Reef Region and recognise their continuing connection to land, waters and culture. We pay our respects to their Elders past, present and emerging.

The project team would like to acknowledge and offer our sincere thanks to all of the individuals and organisations who participated in a focus group, interview or our Expert Advisory Panel. This project would not have been possible without these generous contributions.

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Summary

The **Management Synthesis for Reef Programs** project (RP205) has demonstrated that by understanding and documenting the management factors that contribute most significantly to overall project success, it will:

- enable current and future project managers to adopt and adapt lessons relevant to their context that are based on real life experiences, that will
- help minimise avoidable disruptions and delays in project design and delivery, so that we can
- enhance our investment in planning, design and management of projects that address complex or wicked problems, ensuring we can
- achieve optimum project outcomes and a legacy from water quality improvement projects.

It recognises that good project design and delivery is as important to achieving long-term outcomes for the Reef as quality science and evidence-based decision making.

The Management Synthesis for Reef Programs project is a key deliverable of the Reef 2050 Water Quality Improvement Plan (Reef 2050 WQIP) — Action 4.2 *To capture on-ground management knowledge and expertise that will provide guidance for program designers and managers*. The project is funded through the Queensland Government's Reef Water Quality Program and is supported by the Australian Department of Agriculture, Water and the Environment (DAWE).

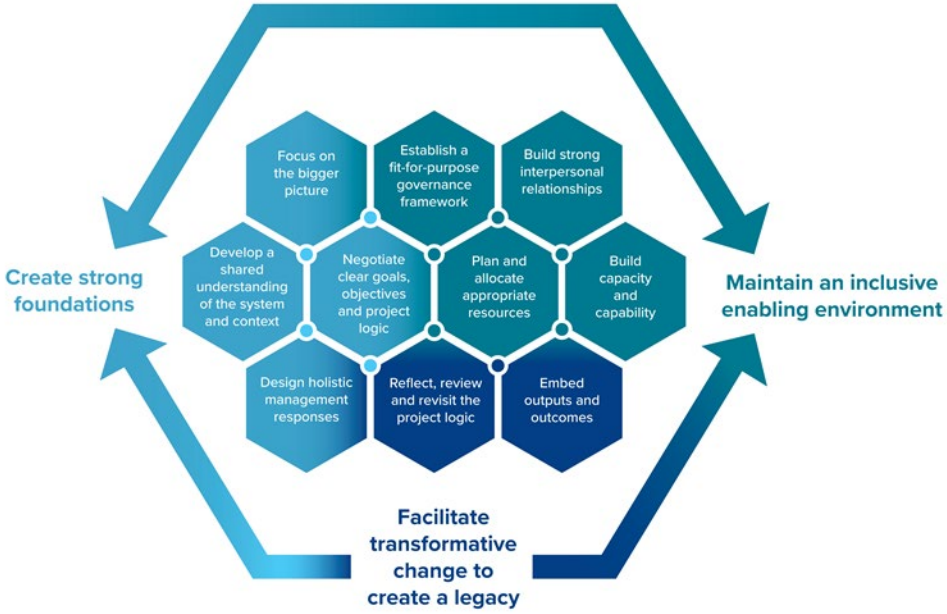
A key output from the project is the Framework for Reef Project Design and Delivery. It comprises ten principles for successful design and delivery of Reef programs and projects that are known to contribute to the achievement of three overarching outcomes. These outcomes were found to be present in some form in all projects investigated as part of this study.

The outcomes recognise the importance of:

- creating a strong foundation
- maintaining an inclusive and collaborative enabling environment
- facilitating transformative change to create a legacy.

The ten principles for successful design and delivery of Reef programs and projects are considered to be broadly relevant to all project, program and various policy contexts.

Each principle encompasses a cluster of unique success factors. The success factors are substantiated with evidence and may not be equally relevant or applicable to all project and program contexts. Evidence has been sourced primarily from stakeholder interviews and focus groups and supplemented with information from a review of project documentation and literature.



Recommendations

Recommendation 1:

Invest in the development and testing of a **web-based tool** to facilitate easy access to the management synthesis findings. The architecture for a suggested website and functionality has been provided in a supplementary document. It is recommended that the website initially focusses on basic functionality until the tool can be tested with a range of end users. To support the development of the tool, further refinement of a range of information resources will be required, as a minimum this should include:

- further guidance on the application of the management principles and success factors
- case studies and examples of success factor application
- list of resources and possible contacts
- supporting evidence.

Recommendation 2:

Support the use of the web-based tool and adoption of the management principles by developing **capacity building modules and associated resources** (i.e. short video explainers). These can be disseminated as standalone training modules and seminars or integrated with other programs and training initiatives such as the Agricultural Extension Program run by Queensland Farmers Federation or other Reef-related training initiatives. If referenced in funding application guidelines, it would be prudent to ensure these resources were accessible and encouraged to be reviewed prior to submission.

Recommendation 3:

Continue to collaborate with Reef funding agencies and investment program managers (government and private) to refine the use of the management principles as **guiding questions and minimum standard requirements** for including in Reef funding program applications. An example of possible guiding questions has been provided in this report.

Recommendation 4:

Collaborate with other lead investment program managers (government and private) to investigate opportunities to incorporate the Management Principles for Reef Project Design and Delivery Reef into **future program logics and evaluation frameworks** to ensure the principles and their associated outcomes are assessed as part of future project and program evaluation activities.

Recommendation 5:

Invite the Management Synthesis Expert Panel to continue to meet to discuss the value of, scope and approach to developing a **management synthesis statement** to complement the next Scientific Consensus Statement. It is suggested that the management synthesis statement development process expands on the current evidence collected through this project to increase the number and type of Reef projects to be analysed, specifically focussing on projects that have demonstrated high degrees of success and innovation.

Recommendation 6:

Continue to **assess and synthesise project management success factors** across a broader suite of projects and experiences (current and future). It is recommended that interviews be the primary source of data, followed by final evaluation reports that specifically report against these management principles (see Recommendation 4). To ensure there is a continued focus on identifying and documenting management principles and factors that are known to contribute to success, it is recommended to expand on existing metrics and articulate what a successful project looks like as a criteria for selecting projects that will contribute to the synthesis with a high degree of confidence. However, it is cautioned that it is equally beneficial to learn from failures.

It is recommended that a selection of projects are assessed at their completion as part of their final evaluation and the management synthesis updated on a biennial basis.

Contents

Context and background

The Office of the Great Barrier Reef (OGBR) engaged Alluvium to conduct a management synthesis of projects recently designed and delivered in the Great Barrier Reef catchment to improve water quality.

The Management Synthesis for Reef Programs is a key deliverable of the Reef 2050 Water Quality Improvement Plan (Reef 2050 WQIP) — Action 4.2 *To capture on-ground management knowledge and expertise that will provide guidance for program designers and managers*.

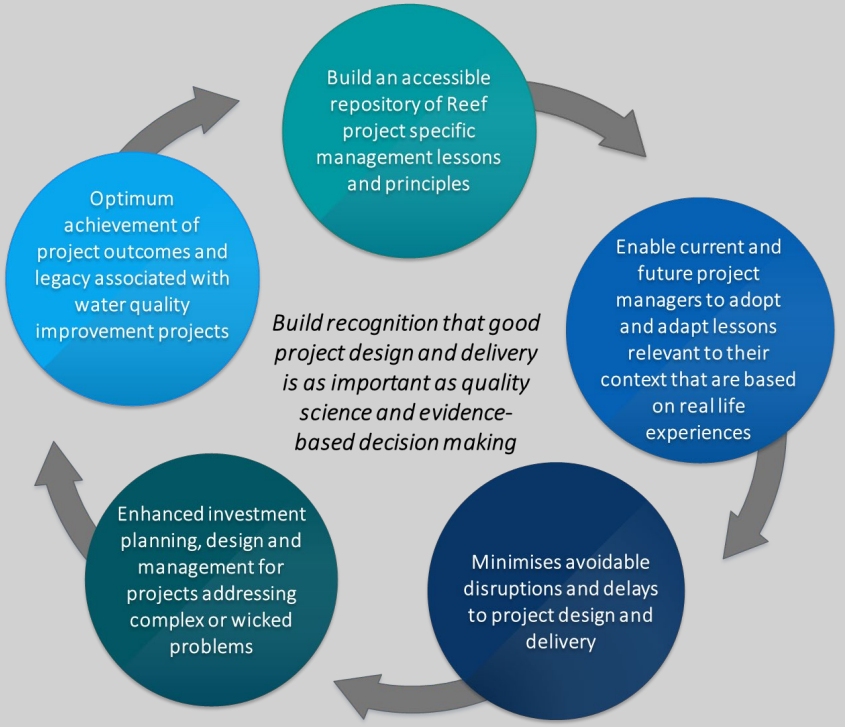
The objectives identified in the Project Plan were to:

- Capture the lessons associated with investments made to date on Reef water quality improvement.
- Synthesise the current understanding and develop an evidence-based framework that describes the critical success factors that underpin program and project management and delivery success.
- Provide Reef-related program and project managers with assistance in the form of the project outputs to scope, design, implement and monitor projects to maximise their likelihood of achieving their intended objectives and outcomes.

The original intended end users and beneficiaries of this management synthesis were identified at the beginning of the project to include a) current and future project proponents, b) current and future project managers, c) investment program managers, d) social science and natural resource management practitioners and academics.

The Management Synthesis for Reef Programs is funded through the Queensland Government's Reef Water Quality Program and is supported by the Australian Department of Agriculture, Water and the Environment (DAWE).

Why synthesise Reef project management lessons?



Approach and methodology

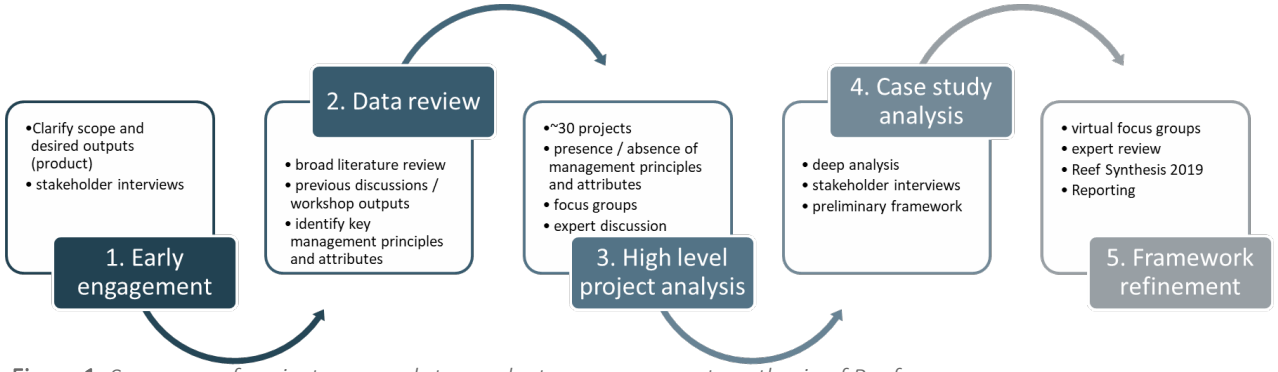


Figure 1. *Summary of project approach to conduct a management synthesis of Reef programs*

Proposed approach

The approach proposed in the original project plan (Figure 1) included early engagement (1) with both the OGBR project team a number of key stakeholders who had been early champions and advocates for the management synthesis concept.

Following the clarification of purpose and desired outcomes as understood at the time, a broad, high-level literature review (2) was undertaken to help identify examples of management principles that were likely to be identified during the synthesis. It also helped to provide an indicative list of principles that would be expected to be found during the project document review (3). Both the literature review and high-level project review was used to inform the design of a more detailed stakeholder engagement phase to develop case studies (4) and ultimately the management synthesis framework (5).

While all of the agreed tasks were completed, the process of engaging with stakeholders became necessarily iterative and resulted in using a number of different participatory processes to obtain the level of detail required to support the data collection process. Information to underpin the case studies was collected throughout the stakeholder engagement phase.

Approach and methodology cont.

Stakeholder participation

A Communication and Engagement Plan was prepared at the commencement of the project and reviewed regularly. The agreed objectives for communication and engagement during the life of the project was to:

- Engage Reef-related program and project managers in the design of a practical and meaningful resource to increase the likelihood that future projects will be scoped, designed, implemented and monitored to maximise effectiveness in achieving their intended outcomes.
- Establish an expert advisory group (EAP) to ensure scientific rigour, acceptance and integrity of the project is maintained during the initial project and during future implementation and review phases.
- Develop a community of practice or similar collaborative network to enable continual sharing of experience and broader opportunities for end users to provide feedback on the framework as implementation progresses over time.
- Build capacity of Reef-related program and project managers to scope, design, implement and monitor projects to maximise effectiveness in achieving their intended outcomes.

Key communication and engagement strategies included the following:

- Early discussions with key stakeholders to ascertain current understanding of the project purpose and desired outcomes from the project.
- Establishment of an expert advisory panel (EAP) comprising both government and industry stakeholders.
- Three-hour focus groups with government program managers and regional stakeholders.
- Interviews with project managers and stakeholders.
- Development of a project fact sheet.

Although focus groups were originally planned in each of the natural resource management (NRM) regions, only two focus groups went ahead as planned. This change in approach occurred following a review of the first two focus groups and an assessment that found that the level of detail required for the synthesis was not adequate within a three-hour session. It was also proving to be difficult to get the appropriate stakeholders in attendance. These challenges led to a shift to undertaking 90-minute interviews with project stakeholders.

Key communication messages:

- There is significant value in capturing the lessons and experiences of program and project managers who have previously been engaged with Reef-related projects to ensure others benefit in the future.
- Good project design requires the inclusion of both evidence-based solutions (e.g. practice change projects) and the establishment of a supportive enabling or management environment (e.g. stakeholder collaboration and capacity building) to ensure the delivery of effective programs in the short- and long-term.
- This project will help identify and support end users access this knowledge, e.g. principles for ensuring sustainable and effective program and project design through the development of an on-line framework tool and documentation of key lessons (e.g. via the 'consensus statement' and supporting documents.
- This project will provide a foundation for future work and continual learning in this field.

Approach and methodology cont.

Expert Advisory Panel

A Management Synthesis Expert Advisory Panel (EAP) was established early in the project to provide strategic advice and guidance, helping to ensure the outcomes and outputs of this project were successfully achieved within the project's constraints and context.

The role of the Expert Panel was to provide high level advice and guidance on:

- the scope of the project by ensuring it is relevant, achievable and realistic given the known constraints and allocated resources
- the project outcomes, ensuring they are evidence-based, reflect good practice and represent best available knowledge
- the proposed approach and methodology specifically with regards to data analysis
- the legitimacy of project findings for example the good practice principles identified for a range of different contexts
- project outputs by ensuring they are relevant, practical and appropriate for the target audiences
- future management of outputs and tools to effectively guide future programs and projects.

The Expert Panel had no executive powers or decision-making authority in relation to the project. The Panel had a Terms of Reference and met both in face-to-face and virtual meeting formats. A list of the Expert Advisory Panel Members is provided in Appendix A.

Data and evidence collected to underpin management synthesis

Each of the key steps in the project also contributed important information. Being the first management synthesis of its type, it was not immediately clear which source or sources of information would be most valuable hence, a number of different methods were tested and applied.

Each of the methods were subsequently viewed as a line of evidence that contributed to the data collection and the final synthesis. They were implemented in such a way as to build up layers of detail and understanding.

The final approach (Figure 2) included five lines of evidence, namely a broad, high-level literature review to support the identification of key management principles, a review of project documentation for a representative selection of Reef projects, focus groups and interviews with project stakeholders and focus groups and discussion with government program managers. These lines of evidence are discussed in the following pages.

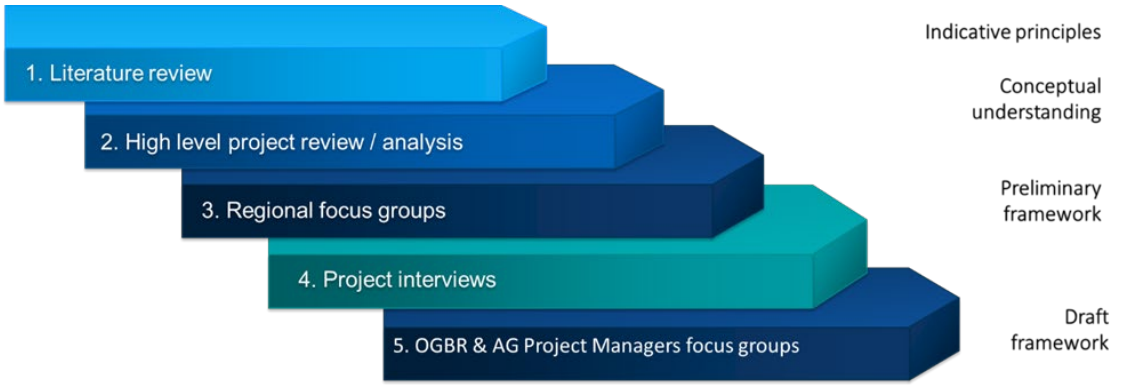


Figure 2. *Lines of evidence used in the management synthesis.*

Approach and methodology cont.

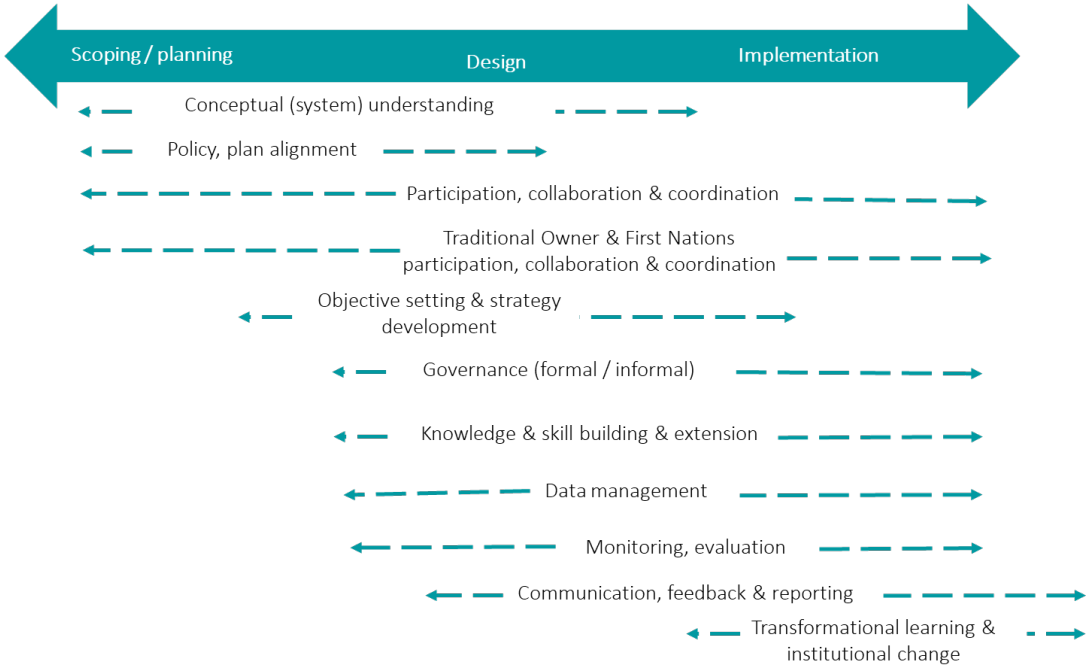


Figure 3. *Categories of indicative management principles identified during the literature review and their general applicability to a project life cycle.*

Literature review

This activity reviewed a broad range of peer reviewed and grey literature that had a core purpose to develop a better understanding of:

- the proposed purpose and scope of a management synthesis of Reef programs (peer reviewed and grey literature)
- the expected outputs or products of a management synthesis of Reef Programs (grey literature)
- important principles, attributes and tools for enhancing program and project design and implementation (peer reviewed and grey literature).

In addition to clarifying the purpose and background of a management synthesis of Reef programs, the literature review identified a suite of 'indicative' management principles which was used to inform the development of a preliminary conceptual framework and form the basis of the high-level assessment of project documentation.

The literature review resulted in a list of 67 indicative indicators grouped under eleven broad categories (Figure 3). Of early interest was the realisation that the majority of the indicative management principles were considered to be more important or significant during a specific part of the project life, e.g. during the scoping and design phase of during the implementation phase.

A list of the indicative management principles identified during the literature review is provided in the Milestone 1 report 'Management synthesis for Reef programs: Literature review summary document' (Alluvium, unpublished) and summarised in Appendix B.

Approach and methodology cont.

Review of project documentation

The indicative principles identified during the desk top literature review were used to inform a high-level assessment of approximately 25 Reef water quality improvement projects primarily funded through the Queensland Government's Reef Water Quality Program and the Australian Government's Reef Trust Program.

The projects reviewed were selected in collaboration with OGBR and DAWE. The projects were chosen to represent a range of different contexts across different geographies, commodities, industry sectors and project types. A full list of projects reviewed is provided in Appendix C.

Documents reviewed included:

- original project plans
- milestone reports
- reports and documents associated with specific deliverables and outputs
- final reports
- monitoring, evaluation, reporting and improvement (MERI) reports.

The high-level assessment sought to identify the presence or absence of the indicative management principles applied during each project's design and delivery phases. Evidence collected during this phase was recorded in spreadsheets to allow for easy sorting and categorisation.

Approach and methodology cont.

Focus groups

The first focus group was held with Program Managers from OGBR. The purpose was to build awareness of the project, share the preliminary findings from the literature review, discuss the project selection process used to inform the document review phase, and to broadly discuss the stakeholder engagement process. Feedback from this focus group and the first Expert Panel meeting informed the design of the stakeholder focus groups.

Project stakeholder focus group participants were initially identified from the relevant project documentation and advice from OGBR and DAWE. Invitees were typically project managers and key advisors across the project partners.

Stakeholders were organised into focus groups on the basis of their physical location, and the nature and commodity that their projects related to, recognising the importance of context in the discussions, i.e. sugarcane or grazing. Focus groups were planned initially to be held in five regional areas of the Great Barrier Reef (GBR) catchment.

Focus group discussions had four specific objectives:

- To introduce the purpose and scope of the project and to generally raise awareness of how the project outputs could support their own work in the future.
- To collect data to contribute to the management synthesis, specifically their deep reflection and experience in relation to the various management factors or principles that were utilised during a projects design, delivery and post-project phases.
- To discuss how the project outputs and products could best meet the needs of local stakeholders, that is, how would they like to access and use the potential information and knowledge obtained from the management synthesis.
- Share some of the preliminary findings of the project to date (primarily from the literature and background project review).

Only two focus groups went ahead as originally planned, Burnett Mary and Fitzroy. Burnett Mary was facilitated using focus group questions orientated around identifying key success factors for each project phase (Figure 5), whereas the Fitzroy focus group utilised visual aids and took generalised approach asking questions about what was done, why it was important to success, when it was important and how it was done.

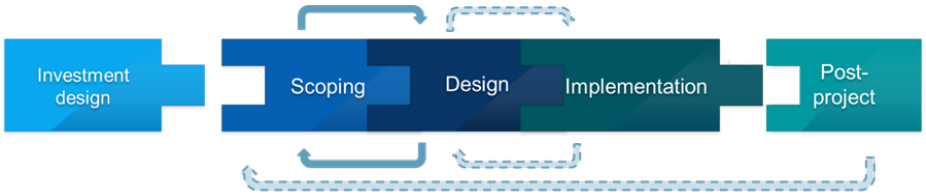


Figure 5. *A generic project life cycle used as a basis for focus group discussions.*

Following these two focus groups a review of the process and reflection on the value of the focus group outputs was undertaken. This internal review resulted in the decision to move away from focus groups and focus our engagement effort on interviews with individuals or in small organisation and project specific groups.

Follow up focus groups were also held towards the end of the project again with OGBR program managers and separately with staff from DAWE's Reef Trust team. The purpose of this discussion was to present and validate the draft findings and conclusions.

Approach and methodology cont.

Project fact sheet

To support communications with stakeholders, a project fact sheet (Figure 4) was developed. It was used to provide background information for focus group participants and interviewees. A copy of the fact sheet is provided in Appendix D.

Management Synthesis: Sharing Lessons for enhanced Reef Project and Delivery

At the heart of every water quality improvement on the Great Barrier Reef is a project founded on proven management principles and designed and delivered by a dedicated and skilled project team.

Achieving the desired water quality improvements on the Reef requires the right mix of:

- landholder involvement, evidence-based science and local knowledge that informs the development of appropriate solutions
- targeted investment and resources, including highly competent project managers and teams, and willingness of local communities to engage
- on-ground action that has been carefully and thoughtfully planned, designed, implemented and evaluated.

The challenge facing future Reef project managers is to ensure that projects are designed to be fit-for-purpose to each individual context and situation, and delivered effectively and efficiently to ensure maximum impact.

The Office of the Great Barrier Reef has engaged Alluvium to collate the management lessons and experiences captured from recent programs and projects aimed specifically at improving Reef water quality. The focus is currently on examining projects that have typically been funded by the Queensland and Australian Governments.

While the Scientific Consensus Statement synthesises peer reviewed published literature which forms the backbone of Reef investments, the Management Synthesis can act as an accompanying document and bring together the experience-based learnings that are too often only anecdotal.

This process can bring to light all the insight and knowledge gained over many years of implementation and can continue to inform Reef outcomes into the future.

An important output from this work will be to document a suite of management principles that can be applied in different circumstances. This will assist current and future project managers to ensure short term project outcomes are successfully achieved as well as ensuring the project contributes maximum long term or enduring impact for the Reef and local waterways.

Talking with experienced project managers has been the primary focus for collecting project data. A number of focus groups and one-to-one interviews are being held across the Great Barrier Reef catchment as well as in Brisbane. An Expert Advisory Panel has been established to provide high level project guidance and expertise. The stakeholder focused data collection is being supplemented with desk top reviews of project documentation and other literature review.

This project is funded through the Queensland Government's Reef Water Quality Program and will be wrapped up in mid-2020.

For more information or to share your own experience, please contact:

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Figure 4. *Project fact sheet*

Interviews

Interviewees were selected from the original master list of preferred focus group participants. Due to the diversity of physical locations of the interviewees, conversations were held primarily using Zoom™ an online video conferencing platform, or where internet or computer access was not available, by phone.

Interviews generally had a duration of between 60 – 90 minutes. Interviews were undertaken with 12 individuals in the January-February period. A Project Fact Sheet was also forwarded to interviewees with their interview request.

In addition to largely addressing the above challenges experienced with the focus groups, the interviews provided further advantages in terms of:

- enabling discussions to be strongly linked to a very specific project ensuring that the context of the contributions being accurately recorded
- enabling detail to be obtained that may not have been voluntarily offered during a focus group
- enabling the interviewer to discuss the purpose of the project in context of the person being interviewed and their work area.

Interviews were designed to be in-depth and followed a semi-structured format using questions and visual diagrams to prompt discussion. Interviews were inductive, taking a grounded theory approach (Khan, 2014)[1] to identifying management principles, i.e. not to pre-identify management principles and seek further information on them, rather to allow principles emerge organically through discussion in the interviewee's own words. Questions used in the semi-structured interviews are provided in Appendix E.

[1] Khan, S. N. (2014). Qualitative research method: Grounded theory. International Journal of Business and Management, 9(11), 224-233

Approach and methodology cont.

Data analysis

Five primary lines of evidence were collected and analysed to form the basis of the conceptual framework and synthesis (Figure 6). The raw data sets obtained from each of the five data collection phases were provided to OGBR. The final synthesis is presented in this report.

The synthesis was initially based on the data mined from the regional focus groups and project manager / team member interviews with each of these data sets being analysed using a clustering methodology (Figure 7).

Each data point (sticky note) prior to being amalgamated into a cluster, was viewed as an important success factor identified for a project and represents a detailed story with unique circumstance and context around how the success factor underpinned the achievement of successful project outcomes. Through the analysis, it was found that multiple projects identified similar success factors, while other success factors were context specific. The clusters were designed to be the point at which, regardless of context, the principle still applies under any circumstance.

While all the clusters were considered to be highly interrelated, during the initial analysis some general observations were made regarding the relationships between theme clusters, that is, many of the cluster themes had apparent prerequisites or preconditions for their successful execution. For example, the identification of clear goals and objectives is dependent on having first developed a strong system understanding.

Evidence from the other data sources (i.e. literature review and project documentation review) were then added to the initial theme clusters. Where required, clusters were revised to accommodate new evidence and understanding (Figure 8). At the completion of this process, 13 thematic based clusters had been identified.

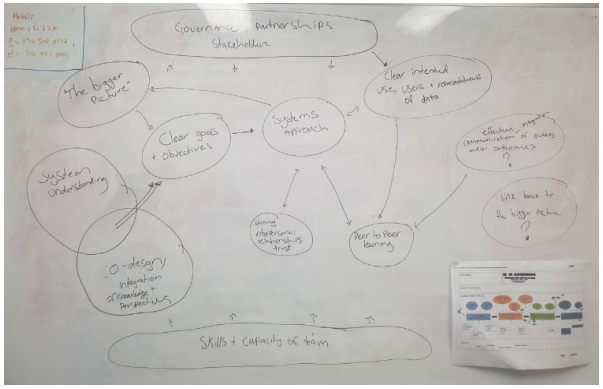

Figure 6. *Individual data points organised by cluster,* **Figure 7.** *Initial data clusters by theme and their interrelationships*, and **Figure 8**. *Theme clusters with combined data from all evidence sources.*

Framework for Reef Project Design and Delivery

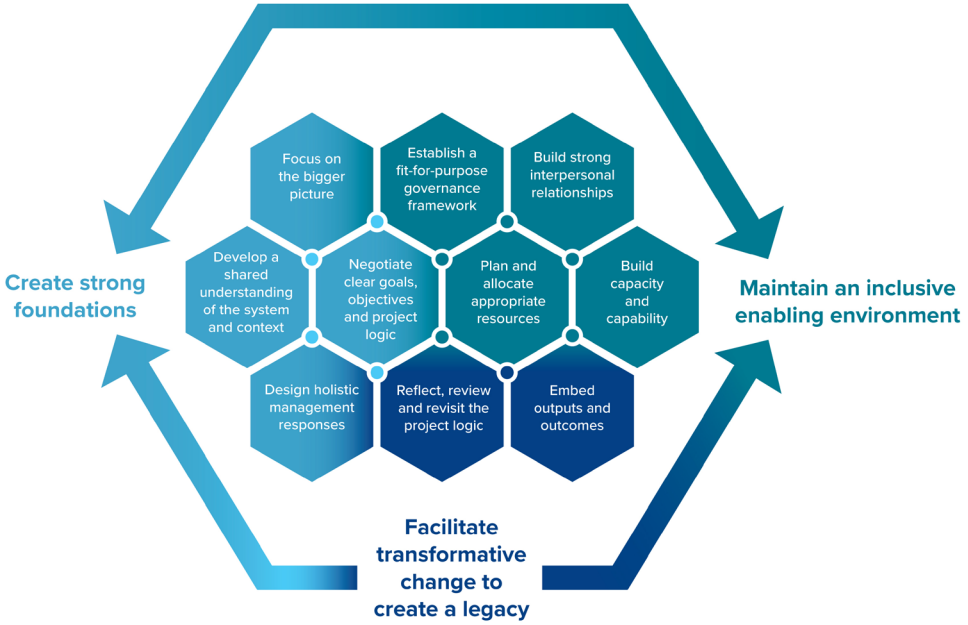

Figure 9. *Overarching framework of Reef project management principles*

Framework description

The Framework for Reef Project Design and Delivery (Figure 9) comprises ten Principles for successful design and delivery of Reef programs and project that contribute to the achievement of ***three overarching outcomes.*** These outcomes were found to be present in some form in all successful projects investigated as part of this study. The outcomes recognise the importance of:

- creating a strong foundation
- maintaining an inclusive and collaborative enabling environment
- facilitating transformative change to create a legacy.

The ten Principles for successful design and delivery of Reef programs and projects are broadly relevant to all project, program and various policy contexts. The position of the clusters and principles also reflect the nature of the relationship and connection with other interdependent principles. It highlights that some principles have specific pre-conditions and dependencies for optimal implementation.

Each principle encompasses a ***cluster of success factors.*** The success factors are substantiated with evidence and may not be equally relevant or applicable to all project and program contexts. The success factors for each management principle and its associated evidence is provided in Appendix F.

Each success factor is supported with ***evidence*** that supports how it contributes to project success. Evidence is sourced primarily from stakeholder interviews and focus groups and supplemented with information from the document review and literature review processes. Some aspects of the evidence have also been documented as case studies and are provided in Appendix G.

Where relevant, the ***specific context*** of each of the success factors has been recorded and categorised. In some circumstances it was identified that some success factors were more relevant and more closely linked to a specific project's overall success because of the context they were working within. For example, a specific success factor may relate to a specific commodity or land use the project is working with, a specific type of project, or the time during a project's life cycle that the success factor was most important to apply.

Summary of management principles for Reef project and program delivery

Create strong foundations

Develop a shared understanding of the system and context

Reef water quality management projects occur in a complex environment with multiple contextual factors and stakeholders to consider. Developing a solid foundational understanding of the system and context is critical for accurately defining the problem, understanding the risks, forming clear goals, objectives and developing an effective method for how to address the problem.

Projects that developed a shared understanding of the system and context by looking at the situation from multiple perspectives (i.e. the scientific perspective, the policy perspective, the landholder's perspective, the environmental perspective, etc) were successful because there was a common understanding of 'the problem' among stakeholders, negotiated solutions to maximise benefits (i.e. identifying win-win outcomes and / or co-benefits), and negotiation of the most effective method to reach goals and objectives. Successful projects purposefully included multiple stakeholders in this process using participatory / collaborative approaches that varied according to project context.

Negotiate clear goals, objectives and project logic

Projects need to have clear goals, objectives and a logical approach for how it's going to achieve these. Projects that did this very successfully identified clear goals, objectives and a project logic based on a system understanding, rather than responding directly to investment priorities which can result in a disconnect between high level strategy and what's happening on the ground.

They have clear goals and objectives that allow for a clear line of sight to plan and implement the project without the goalposts changing but are also open to adaptive management if something isn't working or could be improved.

Focus on the bigger picture

Projects are always limited in the outcomes that can be achieved within the project timeframe and budget. It can be tempting to think about a project in isolation, working only to achieve its own goals and outcomes. But to have a meaningful impact on the Reef, the environment, and the community, current and future projects need to be working in synchronisation to establish foundations and collectively build towards long-term outcomes.

Successful projects are thoughtful about how they are contributing to something bigger and beyond their own lifespan, purposefully setting up the project to facilitate continual advancement towards a long-term goal.

Design holistic management responses

Reef water quality projects operate in complex environment and trying to create change can be a challenge when many factors are interrelated or co-depended.

Successful projects acknowledged this complexity and design management responses that are holistic, considering all parts of a system. For example, it can be tempting to target practice change in single management practice with high water quality risks, however project that focused on taking a whole-of-farm approach rather than focusing on changing a single management practice were more successful in achieving sustained practice change outcomes.

Holistic management responses resulted in more successful projects that created long-term sustainable outcomes.

Summary of management principles for Reef project and program delivery

Maintain an inclusive enabling environment

Plan and allocate appropriate resources

Successful projects are driven by dedicated team members with the appropriate skills, capacity and resources. Identifying these skills and recruiting the 'right' team members for the life of the project, can be challenging and requires foresight. Successful project teams work well together, often requiring diverse and complementary skills and expertise.

More broadly, maintaining the presence of key individuals in a region is critical for building strong interpersonal relationships over time, and part of ensuring that projects could recruit the 'right' team members included ensuring that individuals can maintain their social capital between grant based projects in a region.

Establish a fit for purpose governance framework

Establishing an appropriate governance framework and associated systems that reflect each context is essential to support both strategic direction as well as the day to day operations. Good governance ensures that there are clear roles, responsibilities, expectations and accountability among project partners, team members, contractors and stakeholders. Governance ensures coordination and alignment between multiple organisations, levels of government and policy areas. Good governance also ensures that project protocols are put in places for establishing clear processes and expectations for data collection, data representativeness, management and sharing upfront. These are all aspects that may seem to be obvious, but if not managed correctly can results in unmet expectation, create large disturbances and tension among stakeholders.

Fit for purpose governance is also a success factors for supporting other key aspects of projects, depending on their needs, such as sustaining participatory processes throughout the life of a project, and ensuring that processes are in place to support ongoing adaptive management and learning.

Build strong interpersonal relationships

Strong interpersonal relationships built on trust have been shown to underpin the success of projects. But getting the conditions right to facilitate the development of strong interpersonal relationships over time, or within the life of a project can be challenging.

Successful projects were considerate of the timeframes required to build relationships, setting up the right foundations, and the behaviours and attitudes that can promote or break strong interpersonal relationships.

Build capacity and capability

Building the capacity and capability of stakeholders maximises the potential for positive change with sustained outcomes. Successful projects were strategic about providing the 'right' information and support to build capacity and capability.

Successful projects were thoughtful about the key audience they were working with and provided a variety of opportunities for learning that catered to different learning styles.

For projects working with landholders, successful projects provided information that landholders could easily relate to and understand such as through peer to peer learning or tailored agronomic extension.

Summary of management principles for Reef project and program delivery

Facilitate transformative change to create a legacy

Reflect, review and revisit the project logic

There is not always a silver bullet when it comes to reef water quality projects, things don't always go exactly as planned, new aspects emerge, and assumptions are made and realised. The only way to manage these things is to continually reflect, review and revisit the project logic in order to adaptively manage.

Successful projects pre-anticipated this and set in place systems or procedures to support ongoing adaptive management. While the development of project logics and Monitoring, Evaluation, Reporting and Improvement (MERI) plans are becoming more common, it is still a challenge to use these well as a tool to drive continual improvement.

Embed outputs and outcomes

Projects don't always stop when the money runs out, there are important roles and responsibilities for ensuring project outputs and outcomes are not only shared but are used to influence other Reef outcomes. Successful projects sought to identify and negotiate early on the intended use and users of the project's outputs and outcomes, to ensure that these could be practically used by others. For example, considering the type and format of information and data.

Projects that were thoughtful about how outputs could be practically used, and how outcomes linked back to the bigger pictures were more likely to create a strong legacy.

Management synthesis products, audiences and resources

Products

In addition to the Framework for Reef Project and Program Delivery, there are three core products that have been developed as a result of this synthesis. It is envisaged that the different target audiences will be able to use these products in different ways to support their different needs. The products are complemented by a number of audience-specific resources.

1. Concept design for a simple searchable **web-based tool** that is a repository of Reef program and project design and delivery knowledge (Alluvium & Truii, 2020).

   The website will enable users to either explore each of the ten Principles for successful design and delivery of Reef programs and projects or to use any, or all of, the four context categories to filter and search information to meet a specific need.

   The website will be updateable, allowing knowledge from future evaluations and synthesis activities to add to the repository.

2. **Synthesis of *evidence*** that underpins the framework for Reef program management, principles and success factors. The synthesis includes a deconstruction of the individual success factors considered within each management principle. It also includes examples and evidence that supports each success factor. The project also documents the analysis of raw data; however, this is not de-identified therefore and not currently publicly accessible.

3. **Case studies and examples** of how the principles and success factors have led to the successful delivery of project outcomes for different contexts.

   The case studies showcase the experiences and reflections of current and past project managers whose projects are considered to have not only achieved the project's original outputs and outcomes but have also resulted in a range of other benefits, and in many circumstances led to continued investment.

Primary audiences

Broadly, there are five target audiences for this first management synthesis:

1. investment portfolio and program managers
2. current, prospective and future project and program managers and practitioners
3. program and project evaluators
4. policy developers
5. academia and management researchers.

Each of these audiences are envisaged to use the management synthesis outputs in different ways. To support its efficient use we have recommended a number of different products and supporting resources that can be developed in subsequent stages.

The specific resources that can be developed for each of the audiences are discussed in the following pages.

Management synthesis audiences, products and resources cont.

1. Investment portfolio and program managers

Opportunities exist to use the ***Principles for successful design and delivery of Reef programs and projects*** during both the application and assessment phases.

During the application phase the principles can be converted to guiding principles or questions to be addressed by applicants. Similarly, the principles could be used to communicate a minimum standard guidelines of factors that are expected to be considered in funding applications. In this context, management principles can be converted into ***project design questions and/or a checklist*** located in funding guidelines.

Inviting proponents to consider the management principles and relevant success factors will help to:

- promote consistency across funding programs such that expectations of proponents are also consistent across multiple funding programs
- enables the collection of management information and factors of success to feed efficiently into future management synthesis initiatives
- drives rapid adoption and adaption of the management principles and hence innovation and continual improvement.

It is not intended that the management principles (or questions) are prescriptive or used as strict rules, rather, if a funding applicant suggests a sound alternative approach or exceeds the minimum guidelines and it is substantiated with evidence and clear justification, the management principles would not apply. This will be critical to driving innovation and adapting to changing contexts and understanding.

Suggested resources to be developed

- ***Project design application questions***. *Please see Table 1 (over page) for an example of possible questions project proponents could be invited to respond to during the application phase.*
- ***Project management checklist.*** *Converting the management principles into a project management checklist and referencing this within funding applications would provide clear guidance and expectations to funding proponents.*
- ***Application assessment selection criteria*** *aligned to the project design application questions.*

Management synthesis audiences, products and resources cont.

Table 1. Management principles and example questions for use in funding applications and/or assessment processes

Management principle	Guiding question
Develop a shared understanding of the system and context	*What underlying knowledge and factors are likely to influence the project? Do you have a strong understanding of the:* • *bio-physical system* • *social and cultural system* • *political and institutional system* • *economic and agronomic system* *Who will be involved in the process of identifying and analysing these elements and influencing factors and how?*
Focus on the bigger picture	*Where does this project fit in relation to all the other projects and programs being undertaken in the region and for that industry?* *What is the larger end goal or overall vision that this project is helping to work towards and how?* *How will you ensure strong linkages and connections with other parts of the big picture?* *Who will be involved in this process and how?*
Negotiate clear goals, objectives and project logic	*How will the goals, objectives and outcomes of the program logic be identified for this project?* *Who will be involved in this process and how?*
Design holistic management responses	*How will activities or management responses consider and respond to the broader context in which they are embedded?* • *Will this project consider having multiple, integrated or tailored activities to meet the needs of stakeholders / landholders?*
Build the 'right' team and allocate appropriate resources	*What team members and resources will be required for the life of the project?* • *What capacity (skills and knowledge) and capabilities will they require and when?* • *Are there any special skills required and how will these be addressed?*
Establish a fit-for-purpose governance framework	*What governance framework will be established / used for the project and why?* • *What project protocols will be put in place?* • *Who will be involved?*
Create strong interpersonal relationships	*How will this project build and maintain strong interpersonal relationships (e.g. with landholders or among stakeholders)?*
Build capacity and capability	*How will this project build continual capacity and capability (e.g. with landholders or among stakeholders)?*
Reflect, review and revisit the project logic	*How and when will the project reflect, review and revisit the project logic?* • *What systems and processes will be put in place to support adaptive management?* • *Who is responsible and accountable?*
Embed outputs and outcomes	*What data, information and knowledge will be produced? With whom and how will information and data be shared for positive change?* • *What can be done past the end date of this project to maximise its legacy?* • *Who needs to be involved in this?*

Management synthesis audiences, products and resources cont.

2. Current, prospective and future program and project managers

Many organisations who are leading projects and programs in the Reef region continue to experience loss of project management capacity and capability. This is often due to staff turnover as a result of natural attrition or through loss of continuity in project funding. The need to rapidly build capacity in basic project management and more Reef-specific project management is critical to help avoid delays and disruption to project delivery, and in the maintenance of critical stakeholder relationships.

For current and future project managers, the ability to source relevant information on successful project management principles for Reef-projects will help to:

- build and maintain high levels of capacity of individuals and organisations
- drive project management continuity and consistency across and within organisations
- facilitate information and knowledge sharing across stakeholders and project managers addressing similar challenges or working within similar contexts.

Suggested resources to be developed

- ***Guidance*** *on principles (relevant to context) that should be explored and addressed prior to commencing the planning and design of Reef projects, including for funding applications.*
- ***Continue to develop case studies and examples*** *of where the management principles have been successfully applied, including what was done and how this contributed to project success.*
- ***List of resources and possible contacts*** *to provide additional assistance on the application of specific management principles and success factors.*
- ***Video explainers or video blogs*** *on how to address the management principles (including case studies) to provide rich media resources to support capacity building.*
- ***Training modules*** *that can be accessed by project managers and Reef management practitioners during face-to-face or virtual training to enhance the application of management principles and success factors in different contexts.*

Management synthesis audiences, products and resources cont.

3. Program and project evaluators

The management principles have been identified based on the knowledge that they are important for delivering successful project outcomes. The management principles and success factors can also take the form of management inputs, allowing them to be integrated into program logics established at the commencement of a project and reviewed throughout a project's life. Currently, these management principles are not included in program logics, and are therefore operating as assumptions. By including management principles as an input or foundational activity, projects will be better able to understand the link between management principles and the achievement of outcomes, to test theories around this.

By converting the management principles to *key evaluation questions* (KEQs), an assessment of how these success factors influenced the short-term outcomes can be undertaken. There are some benefits (i.e. deep probing and discussion) if the assessment is conducted in an interview style.

The evidence provided in the initial synthesis provides a good benchmark for future evaluations.

The consistent use by project evaluators of management KEQs would also produce an important source of data to enable the regular updating of the project management repository and management synthesis statements as appropriate.

Suggested resources to be developed

- ***Articulated management inputs / foundational activities*** *that can be incorporated into future program logics and evaluation data collection and reporting tools such as MERIT.*
- *Converting the management principles into* ***Key Evaluation Questions*** *will support current project evaluation activities by providing additional information on the factors that have played a more significant role in the achievement of project outcomes.*
- ***Template for use by successful funding applicants*** *in the development of program logics and evaluation framework for milestone and end-of-project reporting.*

Management synthesis audiences, products and resources cont.

4. Policy developers

The management principles are equally relevant to the review of existing policy and development of new policy and planning instruments. They represent important elements and can be considered alongside existing policy development and improvement procedures.

For example, an assessment of how existing and new policy either enables or hinders program and project managers to adopt the principles.

Suggested resources to be developed

- ***Principles as an assessment tool for Reef-related policy development and improvement*** *– for integration into pre-existing policy development frameworks.*

5. Academia and management researchers

The management principles form a benchmark and starting place to further contribute to and test individual management principles and success factors, and to refine the Reef management synthesis.

It is envisaged that this work, alongside further research development could inform and support the next Scientific Consensus Statement, including a Management Synthesis Statement.

Suggested resources to be developed

- ***Management synthesis statement*** *that reflects contemporary information on the known management factors leading to overall project and program success.*
- *The synthesis incorporates* ***evidence collected from multiple sources****. It provides a basis for future management synthesis and project design and delivery investigations and analysis.*
- ***Continue to develop case studies*** *that provide real examples of application including personal reflections and experiences of Reef project managers.*

Management synthesis conclusions and reflections on process

The Management Synthesis for Reef Programs project led by OGBR forms part of an ongoing conversation amongst Reef stakeholders regarding the value of better understanding the management factors or principles that are known to contribute to a project's success. This specific project was the first of its kind to collect and synthesise data that would help inform future decisions regarding project design and delivery.

This section highlights key lessons and reflections identified during the project.

Methodology and approach

- Although five different sources of data were explored, interviews yielded the greatest quality and quantity of data, where success could be most easily attributed to a management principle. It is recommended that any future management synthesis utilise interviews as the primary source of data.
- Focus groups may have proved to be of greater value if used to complement interviews and used to verify and explore data collected during interviews, that is, verify and expand data rather then be seen to be a primary source of data.
- The review of project documentation early in the process was useful and necessary for interviewers to ensure they had a clear context of each project being investigated. However, the desk top review of project documentation in order to ascertain project management success factors was more challenging due to the following:
  - projects are rarely required to report on or consider specific project management approaches and initiatives
  - it is challenging to determine what aspects of the project were considered successful and more importantly what specific activities influenced the success
  - projects commonly evolved and adapted over their life but the actual reasons for the change were commonly not identified or communicated.

  Project success factors were only able to be ascertained (to an extent) from projects where a final evaluation report was available.

Determining what success looks like

Success will look different and mean different things to different projects. The factors that led to and influenced success over time may also differ. To develop confidence as to which factors influenced this success, it is important that there is a common approach to articulating what success looks like for each project as well as an agreed understanding of how success will be measured and assessed. This may include the need to develop agreed metrics that are quantifiable.

Future management synthesis initiatives will benefit from being able to continually build confidence in which projects are genuinely considered successful over time and what factors has directly and indirectly influenced its success.

Relevance and applicability

Good management principles for Reef projects are equally relevant to Reef-related investment programs, i.e. that may comprise a number of smaller projects, as well as in the development and implementation of policy initiatives. Many of these initiatives are also relevant to the development and implementation of plans of management such as water quality improvement plans.

Some identified success factors existed in direct response to systemic issues commonly experienced in natural resource management and water quality projects. For example, factors to address the possible loss of employees on fixed term contracts. In this context, we have identified success factors developed to mitigate the issues.

Recommendations

Recommendation 1:

Invest in the development and testing of a **web-based tool** to facilitate easy access to the management synthesis findings. The architecture for a suggested website and functionality has been provided in a supplementary document (Alluvium & Truii, 2020). It is recommended that the website initially focusses on basic functionality until the tool can be tested with a range of end users. To support the development of the tool, further refinement of a range of information resources will be required, as a minimum this should include:

- further guidance on the application of the management principles and success factors
- case studies and examples of success factor application
- list of resources and possible contacts
- supporting evidence.

Recommendation 2:

Support the use of the web-based tool and adoption of the management principles by developing **capacity building modules and associated resources** (i.e. short video explainers). These can be disseminated as standalone training modules and seminars or integrated with other programs and training initiatives such as the Agricultural Extension Program run by Queensland Farmers Federation or other Reef-related training initiatives. If referenced in funding application guidelines, it would be prudent to ensure these resources were accessible and encouraged to be reviewed prior to submission.

Recommendation 3:

Continue to collaborate with Reef funding agencies and investment program managers (government and private) to refine the use of the management principles as **guiding questions and minimum standard requirements** for including in Reef funding program applications. An example of possible guiding questions has been provided in this report.

Recommendation 4:

Collaborate with other lead investment program managers (government and private) to investigate opportunities to incorporate the Management Principles for Reef Project Design and Delivery Reef into **future program logics and evaluation frameworks** to ensure the principles and their associated outcomes are assessed as part of future project and program evaluation activities.

Recommendation 5:

Invite the Management Synthesis Expert Panel to continue to meet to discuss the value of, scope and approach to developing a **management synthesis statement** to complement the next Scientific Consensus Statement. It is suggested that the management synthesis statement development process expands on the current evidence collected through this project to increase the number and type of Reef projects to be analysed, specifically focussing on projects that have demonstrated high degrees of success and innovation.

Recommendation 6:

Continue to **assess and synthesise project management success factors** across a broader suite of projects and experiences (current and future). It is recommended that interviews be the primary source of data, followed by final evaluation reports that specifically report against these management principles (see Recommendation 4). To ensure there is a continued focus on identifying and documenting management principles and factors that are known to contribute to success, it is recommended to expand on existing metrics and articulate what a successful project looks like as a criteria for selecting projects that will contribute to the synthesis with a high degree of confidence. However, it is cautioned that it is equally beneficial to learn from failures.

It is recommended that a selection of projects are assessed at their completion as part of their final evaluation and the management synthesis updated on a biennial basis.

Attachment

Expert Panel Members

A

Expert Panel Members

Expert Panel Members

Adam Curcio, RCS

Amelia Forster, Australian Banana Growers Council

Bruce Taylor, CSIRO

Carole Sweatman, Terrain NRM

Cathy Mylrea, Burnett Mary Regional Group

Jayson Dowie, Farmacist

Jeanette Durante, Department of Environment and Science

Jenny Daly, Queensland Department of Agriculture and Fisheries

Katrina Dent, Reef Catchments

Kevin Gale, Department of the Environment and Energy

Lawrence Di Bella, Herbert Cane Productivity Services Ltd

Peter Noonan, Queensland Department of Natural Resources, Mines and Energy

Robert Speed, Great Barrier Reef Foundation

Scott Robinson, Queensland Department of Environment and Science (Office of the GBR)

Simone Parker, CHRRUP

Attachment

Management Synthesis for Reef Programs : Literature review summary and indicative management principles

B

INDICATIVE PRINCIPLES		
Theme	**Type**	**Indicative principle**
Sytem understanding	*Processes*	System understanding - interconnectedness across all dimensions
		System understanding - socio-political systems
		System understanding - cultural and First Nations
		System understanding - biophysical
		System understanding - economic
	Tools	Use of decision support tools (e.g. modelling, scenarios, forecasting, investment framework, predicting adoption of agricultural innovations (ADOPT)
	Behaviours & attributes	Trust-building (e.g. understanding of drivers/motivations for landholders)
Governance - policy alignment	*Processes*	Alignment between project and relevant policies / regulations
		Reef policy coordination and alignment between levels of government and policy areas
		The degree of coordination and alignment / integration with other related projects
		Alignment with non-reef-related outcomes / coordination of co-benefits
		Use of smart regulation i.e. 'Smart regulation'
	Behaviours & attributes	Credibility - building
		Communication with stakeholders to develop relationships
		Presence of formal governance structures
		Presence of informal governance structures Governance arrangements and approvals facilitate flexible delivery
Participation (collaboration & coordination)	*Processes*	Presence of formal participatory processes
		Presence / use of informal mechanisms to incorporate local knowledge, identify outcomes / objectives, obtain support etc.
		Presence / use of informal participatory processes
		Diversity of stakeholders engaged in formal and informal participatory processes
		Mechanisms for sharing data, resources and funds between collaborating stakeholder groups
		Evidence of co-design solutions (local knowledge used to tailor design solutions)
		Sustained formal participatory processes throughout lifecycle of project (i.e. with farmers / local beneficiaries? Peak industry bodies? other stakeholders?)
		Sustained informal participatory processes throughout lifecycle of project
		Support the continuation of local organisations
		Growing / adapting networks of stakeholders and collaborative partners
		Adapting solutions/approach in response to stakeholder/farmer needs
		Adapting solutions/approach in response to local context/ climate
		Engagement with existing regional coordination networks/groups/mechanisms
	Behaviours & attributes	Trust (levels of pre-existing trust and/or constructive relationship), project team/leader develops relationships and trust with local people, networks, organisations and to incorporate local knowledge into project design
		Negotiation (i.e. of roles, co-investment, objectives …) scoping
		Consilience / consensus (agreed approach / outcomes) design
		Sustained leadership throughout delivery phase
		Transparency
	Form & function	Funding allocated to continual collaboration during delivery phase
Traditional Owners & First Nations participation & collaboration	*Processes*	Formal participatory processes to ensure inclusion of traditional values and TEK
		Sustained formal participatory processes to ensure inclusion of traditional values and TEK
		Informal participatory processes to ensure inclusion of traditional values and TEK
		Sustained informal participatory processes to ensure inclusion of traditional values and TEK
	Behaviours & attributes	Trust - Project team/leader develops relationships and trust with indigenous groups
		Respect for traditional approaches
Objective setting & solution selection	*Behaviours & attributes*	Water Quality Targets and frameworks that can be perceived as credible, salient and legitimate by end users /landholders - Community engagement in water quality planning
	Processes	Targets and objectives are adapted and updated in line with changes in policy and understanding, all relevant project documentation is kept relevant, and changes are shared with wider stakeholders as necessary.
		Investigate solutions that provide multiple, place-making benefits including: water quality; community; environmental; local economies
	Tools	Water Quality Risk Frameworks are used to identify management practices, targets and objectives
		Targets and objectives are reasonable and provide a buffer to mitigate risk of failure / need for variation etc
		Use of decision support tools to inform prioritisation, solution selection and other objectives / outcomes (WQIP Priority Areas)
Financial instrument & incentives	*Processes*	Recognition of co-benefits
	Form & function	Extent of cost sharing, co-funding / co-investment
		Funding used to incentivise adoption and/or use of market-based instruments
		Sufficient resources and funding for ongoing project needs
		Active involvement of investors
		Investment in local businesses/economy
		Investment in implementation as well as operation and maintenance
Extension, knowledge & skill building	*Processes*	Assessment of capacity (i.e. skills and knowledge) and capability to implement / deliver outcomes on ground undertaken
		Formal and/or informal opportunities for peer-to-peer learning and stakeholder interaction e.g. mentoring, networking
		Mechanisms for coproducing and sharing knowledge with participants
		Access to specialist extension and advisory services during implementation

Data & decision making	*Processes*	Extent to which uncertainty is considered (i.e. in efficacy of solution
		Databases and data collection systems / procedures in place
		Flexible responses to unexpected delays/challenges Technology for onground data collection
Monitoring, evaluation & reporting	*Processes*	Program logic developed that clearly identifies (assumed) linkages between actions and outcomes – and outlines the assumptions behind those understandings Different perspectives and definitions of success are included in the Program Logic
		Presence of monitoring and evaluation strategy relevant for the continual improvement of project activities
		Use of MERI expertise
		Extent to which the M&E / MERI Plan aligns with Reef 2050 M&E requirements
		Use of programmatic indicators
		Share project knowledge to broader Reef WQ Program Evaluation and MERI coordinators to improve overall understanding of methods, metrics, and delivery and impacts of water quality improvement projects
		Program Logic is updated based on new knowledge -
		Monitoring evidence is used to tell a compelling story to investors and other audiences
		Practice adoption programs are delivered flexibly, responding to learnings of what didn't work
		Continual improvement and validations of methods/indicators/measures of agricultural practice change. Data collection is targeted, with capacity to adapt if data collection methods are not effective in collecting usable and relevant data.
		Focus on experimentation and experiential learning cycles
		Undertake a more comprehensive and systematic evaluation of existing and proposed policies and programs to improve their effectiveness in accelerating adoption
		Evaluation of governance mechanisms
		Innovative communication to reach and engage with a relevant audience
Communication		Regular feedback / reporting to wider project stakeholders and participants as well as funding bodies
		Milestone reports from government funding bodies reflect lead indicators – processes behind the achievement of outcomes – to develop a culture that this information is valuable and necessary
		Evidence of attempts to achieve higher level learning: Questioning and addressing regulative, normative or cultural-cognitive elements that are preventing large scale practice change

Attachment

Master project list

C

Alluvium project #	Project #	Long title	Start date	End date	Status	NRM Region A	NRM Region B	NRM Region C	Proponent	Proponent category	Scale	Commodity A	Evaluation theme	Target management priority A	Target management priority B	Mode of delivery
Queensland Government Reef Water Quality Program projects																
1	TF8.3.1	WTMIP - Wet Tropics Major Integrated Project	2017-09-27	2020-12-31	In progress	Wet Tropics			Terrain NRM	NRM Body	Catchment	Sugarcane Bananas	Innovative engagement	Nutrients (DIN & Phosphorus)	Pesticides	Direct on-ground
2	RP163C	SRA Protecting our chemicals for the future through accelerated adoption of best management practices	2016-07-01	2019-08-01	In progress	Wet Tropics			SRA	Research / Other	Sub-catchment / Region	Sugarcane	Applied R & D	Pesticides		Direct on-ground
3	TF11.9	Cane to Creek Russell Mulgrave Growers and the Nitrogen Story	2017-07-31	2019-06-30	Completed	Wet Tropics			SRA	Research / Other	Sub-catchment / Region	Sugarcane	Applied R & D	Nutrients (DIN & Phosphorus)		Direct practice change
4	RP122	Herbert Water Quality Monitoring Program	2015-05-07	2018-06-29	Completed	Wet Tropics			TropWater & Terrain	University	Catchment	Sugarcane	Evaluation	Nutrients (DIN & Phosphorus)		Direct on-ground
5	NESP2.1.8	(Cane) Improved Water Quality Outcomes from On-Farm Nitrogen Management	2016-04-11	2018-12-10	Completed				University of Queensland	University	Multiple catchments	Sugarcane	Applied R&D	DIN		On-ground
6	DAF Extension support	Cane BMP	1/7/17	30/6/22	In progress	Wet Tropics	Burdekin Dry Tropics	Mackay-Whitsunday	DAF	State Government	Multiple catchments	Sugarcane	Extension	Nutrients (DIN & Phosphorus)	Pesticides	Direct practice change
7	RP152P	Cost-effective restoration of wetlands that protect the Great Barrier Reef	2016-04-15	2019-04-15	Completed	Wet Tropics			Griffith university	University	Stream / reach	Ecosystem services	Applied R&D	Multiple		Indirect
8	TF11.5	Springvale Station Demonstration / Test Projects	2017-04-20	2019-12-31	In progress	Cape York			Cape York Natural Resource /Native seeds	NRM Body	Lot / farm	Grazing	Catchment restoration	Suspended Sediments		Direct On-ground
9	TF6.2.3	SBIR Proof of Concept - Cheaper Nitrogen Sensor Challenge	2017-12-18	2019-01-30	Completed	N/A			AJJA Technologies	Private	N/A	N/A	Applied R&D	N/A		Indirect
10	TF6.5.5	Validation of the Water Quality improvement from constructed wetland treatment trains in the Mackay Region '*Treatment train validation in the Mackay region*'	1/8/17	1/6/20	In progress	Mackay-Whitsunday			Reef Catchments	NRM Body	Multiple sub-catchments	Sugarcane	Applied R&D	Multiple		Direct on-ground
11	TF11.3.4	Project Grassroots	2018-01-22	2020-06-30	In progress	Fitzroy	Mackay-Whitsunday		Resource Consulting Services (RCS)	Private	Multiple catchments	Grazing	Catchment restoration	Suspended Sediments		Direct on-ground
12	TF11.8	Better Beef for the Reef	2017-07-03	2019-12-31	In progress	Burnett Mary			Burnett Mary Regional Group	NRM Body	Catchment	Grazing	Applied R&D / Extension	Nutrients (DIN & Phosphorus)	Suspended Sediments	Direct on-ground
13	TF11.3.5	Fitzroy River Catchment Erosion Gully Restoration	2018-05-31	2020-06-20	In progress	Fitzroy			Greening Australia	NGO - Other	Sub-catchment / Region	Multiple (Grazing, Grains)	Catchment restoration	Suspended Sediments		Direct, On-ground
14	TF8.2.1	BMIP - Burdekin Major Integrated Project	2017-09-27	2021-01-31	In progress	Burdekin Dry Tropics			NQ Dry Tropics Ltd	NRM Body	Multiple sub-catchments	Grazing	Innovative engagement	Suspended Sediments	Nutrients (DIN & Phosphorus)	Direct on-ground
15	NESP2.1.4	(Grazing) Demonstration and evaluation of gully remediation on downstream water quality and agricultural production in GBR rangelands	1/6/16	10/12/18	Completed	Burdekin Dry Tropics			CSIRO, DES	Research / Other	Catchment	Grazing	Applied R&D	Suspended Sediments		Indirect
16	TF11.13 RP176G	Northern grazing demonstration project	2017-07-01	2020-09-30	In progress	Burdekin Dry Tropics	Fitzroy	Wet Tropics	DAF	State Government	Multiple catchments	Grazing	Applied R & D	Suspended Sediments		Direct on-ground
17	TF6.3 / TF6.3.1	Innovative Gully Remediation Project	2016-10-01	2020-11-30	In progress	Burdekin Dry Tropics			Greening Australia	NGO - Other	Lot / farm	Grazing	Catchment Restoration	Suspended Sediments		On-ground
18	NESP3.1.7	Reducing sediment & nutrient loads to the GBR - OGBR Co-contribution	2017-01-02	2019-07-26	In progress	Burdekin Dry Tropics			Griffith University	University	Multiple catchments	N/A	Applied R & D	Suspended Sediments	Nutrients (DIN & Phosphorus)	On-ground / Indirect (coodination and monitoring)
19	RP161	Complete Nutrient Management Planning for Cane Farming - Burdekin	5/7/16	30/9/22	In progress	Burdekin Dry Tropics			Farmacist / SRA	Private	Catchment	Sugarcane	Applied R & D	Nutrients (DIN & Phosphorus)		Direct practice change
20	TF11.14 / RP167C	Sandy Creek - On farm change for water quality improvement	2016-11-07	2019-08-30	In progress	Mackay-Whitsunday			DES (WQI) - Farmacist MAPS Griffith Uni	State Government	Stream / reach	Sugarcane	Applied R & D	Nutrients (DIN & Phosphorus)	Pesticides	Direct on-ground
Australian Government - Reef Trust projects																
21		Project Catalyst Revamp - game changing farm management practices	6/05/2016	30/06/2019	Completed	Wet Tropics	Mackay-Whitsunday	Burdekin Dry Tropics	Catchment Solutions	Private	Multiple catchments	Sugarcane	Applied R&D	Nutrients (DIN & Phosphorus)	Pesticides	Direct on-ground
22		Project Pioneer: Innovation in Grazing Land Mangement	6/05/2016	30/06/2019	Completed	Fitzroy	Burdekin		Resource Consulting Services (RCS)	Private	Multiple catchments	Grazing	Catchment restoration / Extension	Suspended Sediments		Direct on-ground
23		Project Uplift	1/01/2017	30/06/2022	In progress	Wet Tropics	Burnett Mary		MSF Sugar	Private		Sugarcane	Extension	Nutrients (DIN & Phosphorus)		Direct on-ground
24		Reef Alliance – Growing a Great Barrier Reef Programme (Reef Trust III)	6/05/2016	12/12/2019	Completed	All GBR regions			QFF and other participating organisations AgForce; Australian Banana Growers' Council; Burnett Mary Regional Group; CANEGROWERS; Cape York NRM; Fitzroy Basin Association; Growcom; NQ Dry Tropics; NRM Regions Queensland; Queensland Dairyfarmers' Organisation; and Terrain NRM.	Indudustry and NRM body	GBR	Mutltiple Commodities: Sugarcane, Grazing, Dairy, Grains, Horticulture		Nutrients (DIN & Phosphorus)	Suspended Sediments	Multiple: Direct on ground, Communication, Monitoring and Evaluation, Indirect
25		Reef Trust Tender- Wet Tropics (Reverse Tender)	3/09/2014	30/06/2018	Completed	Wet Tropics			Terrain NRM	NRM Body	Multiple catchments	Sugarcane	Applied R & D	Nutrients (DIN & Phosphorus)		On-ground / Indirect
Other projects raised in conversation																
		Grazing BMP														

		Grazing Resilience and Sustainable Solutions (GRASS) Program	1/10/2019	1/06/2022	In progress	Burdekin Dry Tropics	Fitzroy	Burnett-Mary	DAF; NQ Dry Tropics, FBA, BMRG	NRM Body; State Government	GBR	Grazing	Extension	Suspended Sediments		
		(Reef) Enhanced Extension Coordination (REEC)														
		DNRME - Lower Fitzroy floodplain project														
		Stakeholder engagement - CQ Uni														
		DRFA - Cat D riverbank stabilisation														
		Regional Land Partnerships (RLP)														
		Paddock to Reef - Projector Tool development														
		Hort360														
		GBRF WQP														
		Fifty Percent Reduction in Gully Erosion from High Priority Sub-Catchments in the Normanby														

Attachment

Management synthesis project fact sheets 1 and 2

D

Management Synthesis: Sharing Lessons for enhanced Reef Project and Delivery

At the heart of every water quality improvement on the Great Barrier Reef is a project founded on proven management principles and designed and delivered by a dedicated and skilled project team.

Achieving the desired water quality improvements on the Reef requires the right mix of:

- landholder involvement, evidence-based science and local knowledge that informs the development of appropriate solutions
- targeted investment and resources, including highly competent project managers and teams, and willingness of local communities to engage
- on-ground action that has been carefully and thoughtfully planned, designed, implemented and evaluated.

The challenge facing future Reef project managers is to ensure that projects are designed to be fit-for-purpose to each individual context and situation, and delivered effectively and efficiently to ensure maximum impact.

The Office of the Great Barrier Reef has engaged Alluvium to collate the management lessons and experiences captured from recent programs and projects aimed specifically at improving Reef water quality. The focus is currently on examining projects that have typically been funded by the Queensland and Australian Governments.

While the Scientific Consensus Statement synthesises peer reviewed published literature which forms the backbone of Reef investments, the Management Synthesis can act as an accompanying document and bring together the experience-based learnings that are too often only anecdotal.

This process can bring to light all the insight and knowledge gained over many years of implementation and can continue to inform Reef outcomes into the future.

An important output from this work will be to document a suite of management principles that can be applied in different circumstances. This will assist current and future project managers to ensure short term project outcomes are successfully achieved as well as ensuring the project contributes maximum long term or enduring impact for the Reef and local waterways.

Talking with experienced project managers has been the primary focus for collecting project data. A number of focus groups and one-to-one interviews are being held across the Great Barrier Reef catchment as well as in Brisbane. An Expert Advisory Panel has been established to provide high level project guidance and expertise. The stakeholder focused data collection is being supplemented with desk top reviews of project documentation and other literature review.

This project is funded through the Queensland Government's Reef Water Quality Program and will be wrapped up in mid-2020.

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Queensland Government

Sharing lessons from successful Reef project design and delivery

The Management Synthesis for Reef Programs project recognises that good project design and delivery is as important to achieving long-term outcomes for the Reef as quality science.

The challenge facing future Reef project managers is to ensure that projects are designed to be fit-for-purpose to each individual context and situation, and delivered effectively and efficiently to ensure maximum impact. To assist project managers working in the Reef region, the Office of the Great Barrier Reef has engaged Alluvium to collate the management lessons and experiences captured from recent programs and projects aimed specifically at improving Reef water quality.

The Management Synthesis for Reef Programs project has demonstrated that by understanding and documenting the management factors that contribute most significantly to overall project success, we can enable current and future project managers to adopt and adapt lessons relevant to their context that are based on real life experiences. Importantly it will:

- help minimise avoidable disruptions and delays in project design and delivery, so that we can
- enhance our investment in planning, design and management of projects that address complex or wicked problems, ensuring we can
- achieve optimum project outcomes and a legacy from water quality improvement projects.

The Framework for Reef Project Design and Delivery (see Figure 1. below) incorporates three overarching outcomes found to be present, in some form, in all successful projects investigated as part of this study.

The outcomes recognise the importance of:

- creating a strong foundation
- maintaining an inclusive and collaborative enabling environment
- facilitating transformative change to create a legacy.

The ten management principles for successful design and delivery of Reef programs and projects are considered to be broadly relevant to all Reef project, program and policy contexts.

Each principle encompasses a cluster of unique success factors. The success factors are substantiated with evidence and may not be equally relevant or applicable to all project and program contexts. Evidence has been sourced primarily from stakeholder interviews and focus groups and supplemented with information from a review of project documentation and literature. An Expert Advisory Panel has also helped to guide project direction.

The Management Synthesis for Reef Programs is a key deliverable of the Reef 2050 Water Quality Improvement Plan. The project is funded through the Queensland Government's Reef Water Quality Program and is supported by the Australian Department of Agriculture, Water and the Environment.

Figure 1. The Framework for Reef Project Design and Delivery incorporates three overarching outcomes and ten management principles for successful design and delivery.

alluvium

Queensland Government

Sharing lessons from successful Reef project design and delivery

Summary of management principles for successful Reef project and program delivery

Create strong foundations

Develop a shared understanding of the system and context

Reef water quality management projects occur in a complex environment with multiple contextual factors and stakeholders to consider. Developing a solid foundational understanding of the system and context is critical for accurately defining the problem, understanding the risks, forming clear goals, objectives and developing an effective method for how to address the problem.

Projects that developed a shared understanding of the system and context looked at the situation from multiple perspectives (i.e. the scientific perspective, the policy perspective, the landholder's perspective, the environmental perspective, etc.). They were successful because there was a common understanding of 'the problem' among stakeholders who negotiated solutions to maximise benefits (i.e. identifying win-win outcomes and/or co-benefits), and negotiated the most effective method to reach goals and objectives. Successful projects purposefully included multiple stakeholders in this process, using participatory and collaborative approaches that varied according to project context.

Negotiate clear goals, objectives and project logic

Projects need to have clear goals, objectives and a logical approach for how they are going to achieve these. Projects that did this successfully identified clear goals, objectives and a project logic based on a system understanding (see above), rather than responding directly to investment priorities which can result in a disconnect between the high level strategy and what is happening on the ground.

They have clear goals and objectives that allow for a clear line of sight to plan and implement the project without the goalposts changing but are also open to adaptive management if something isn't working or could be improved.

Focus on the bigger picture

Projects are always limited in the outcomes that can be achieved within the project timeframe and budget. It can be tempting to think about a project in isolation, working only to achieve its own goals and outcomes. But to have a meaningful impact on the Reef, the environment and the community, current and future projects need to be working in synchronisation to establish foundations and collectively build towards long-term outcomes.

Successful projects are thoughtful about how they are contributing to something bigger and beyond their own lifespan, purposefully setting up the project to facilitate continual advancement towards a long-term goal.

Design holistic management responses

Reef water quality projects operate in a complex environment and trying to create change can be a challenge when many factors are interrelated or co-dependent.

Successful projects acknowledged this complexity and design management responses that are holistic, considering all parts of a system.

Holistic management responses resulted in more successful projects that created long-term sustainable outcomes.

Sharing lessons from successful Reef project design and delivery

Summary of management principles for successful Reef project and program delivery (continued)

Maintain an inclusive enabling environment

Build the 'right' team and allocate appropriate resources

Successful projects are driven by dedicated team members with the appropriate skills, capacity and resources. Identifying these skills and recruiting the 'right' team members for the life of the project can be challenging and requires foresight.

Successful project teams work well together, often requiring diverse and complementary skills and expertise.

Establish a fit for purpose governance framework

While projects may explore their specific policy and governance system while developing their system understanding, appropriate governance systems also need to operate at a project scale. Fit for purpose governance frameworks and clear project protocols were shown to underpin multiple success factors such as:

- establishing clear roles, responsibility, expectations and accountability among partners, contractors and stakeholders
- co-ordination and alignment between multiple organisations, departments, levels of government and policy areas
- sustaining participatory processes throughout the life of the project
- establishing clear processes and expectations for data collection, data representativeness, management and sharing upfront.

Build strong interpersonal relationships

Strong interpersonal relationships built on trust have been shown to underpin the success of projects. But getting the conditions right to facilitate the development of strong interpersonal relationships over time, or within the life of a project, can be challenging.

Successful projects were considerate of the timeframes required to build relationships, setting up the right foundations, and the behaviours and attitudes that can promote or break strong interpersonal relationships.

Build capacity and capability

Building the capacity and capability of stakeholders maximises the potential for positive change with sustained outcomes.

Successful projects were strategic about providing the 'right' information and support to build capacity and capability. Successful projects thought about the key audience they were working with and provided a variety of opportunities for learning that catered to different learning styles.

For projects working with landholders, successful projects provided information that landholders could easily relate to and understand such as through peer-to-peer learning or tailored agronomic extension.

Facilitate transformative change to create a legacy

Reflect, review and revisit the project logic

There is not always a silver bullet when it comes to Reef water quality projects; things don't always go exactly as planned, new aspects emerge, and assumptions are made and realised. The only way to manage these situations is to continually reflect, review and revisit the project logic in order to be adaptive.

Successful projects pre-anticipated this and set in place systems or procedures to support ongoing adaptive management. While the development of project logics and Monitoring, Evaluation, Reporting and Improvement (MERI) plans are becoming more common, it is still a challenge to use these as a tool to drive continual improvement.

Embed outputs and outcomes

Projects do not always stop when the money runs out. There are important roles and responsibilities for ensuring project outputs and outcomes are not only shared but influence other Reef outcomes. This principle refers to some of the key success factors that have allowed Reef projects to embed outputs and outcomes and create a legacy that links back to the bigger picture.

While this management principle appears to relate to an activity that happens at the end of a project, it is critical that the needs and intended use/users of any information, outputs or outcomes are identified early on.

The Framework for Reef Project Design and Delivery can be used by a variety of audiences including:

1. **Investment portfolio and program managers** during both the project application and assessment phases.
2. **Current, prospective and future program and project managers** to source relevant information on project management principles.
3. **Program and project evaluators** to acknowledge and continually build an understanding of the linkages between management principles and project outcomes.
4. **Policy developers** to review existing policy and develop new policy and planning instruments that takes into consideration management principles.
5. **Academia and management researchers** to utilise this information as a benchmark and starting place to test and refine management principles.

The Management Synthesis for Reef Programs has brought to light important insight and knowledge of Reef project managers gained over many years of implementation and will continue to inform Reef outcomes into the future.

Attachment

Interview questions and approach

E

Interview questions and approach

Interview questions

The interviewer and interviewee both followed a PowerPoint presentation to guide the interview. Four broad questions were initially asked to solicit 'success factors' and their meaning in the interviewees own words.

1. *What Reef projects have you been directly involved in?*
2. *What role did you play?*
3. *In your own opinion, how successful would you consider the project?*
4. *What were the main factors that led to the project succeeding (or not)?*

A laddering technique was then used for each 'success factor' identified to translate these into management principles to further explore the circumstances or driver, how it was done, and why it was important to the success of the project at the time. For example, if an interviewee identified a 'success factor' of 'peer-to-peer learning' the interview would then focus on identifying how peer-to-peer learning was facilitated and managed successfully, why it is important, and the circumstances of the project that made it so important.

Interviewees were then shown a generic project process diagram (Figure 3) and asked to talk through the story of each project stage, considering:

5. *What key management processes and tools influenced [insert project stage]?*
   a) *What influenced very positive outcomes?*
   b) *What were the unforeseen challenges and disruptions?*
   c) *How were they overcome?*

Finally, the interviewer had a discussion with the interviewee on some of the generic factors involved in project design and delivery to prompt any management principles that had been overlooked or not yet considered. This was facilitated using the following four questions.

6. *What management processes did you establish and use?*
7. *What tools and resources did you draw on?*
8. *What capacity (skills and knowledge) did you need and when?*
9. *What specific behaviours and attributes of team members were important to the success of the project?*

Interviewees were also asked to provide their opinion on the outputs of this project (Management Synthesis of Reef Programs), particularly noting what resources would be useful and useable for them:

10. *As an end user how would you like to access this information?*
11. *When do you think you might need this information?*
12. *What type of information would be most beneficial?*

Interview analysis

All interviews were recorded, transcribed and initially documented as 'raw data' (as see in section 3 below), where a first cut of possible management principles was generated.

To build on the initial analysis, a more detailed process of coding interview transcripts using NVivo software is currently underway to inform the following stages of the project. Specifically, NVivo will assist with systematically identifying themes across a range of projects (identifying common themes as well as context specific themes).

During this analysis care will be taken to tell the story of the data and not arrange the data to support the researchers' theory or overreach the data. When quality checking theme development, research should ask a few key questions:

- *Is this a theme (it could be just a code)?*
- *If it is a theme, what is the quality of this theme?*
- *What are the boundaries of this theme (what does it include and exclude)?*
- *Are there enough (meaningful) data to support this theme (is the theme thin or thick)?*
- *Are the data too diverse and wide ranging (does the theme lack coherence)?*

Attachment

Management principles and success factors for Reef project design and delivery including supporting evidence

F

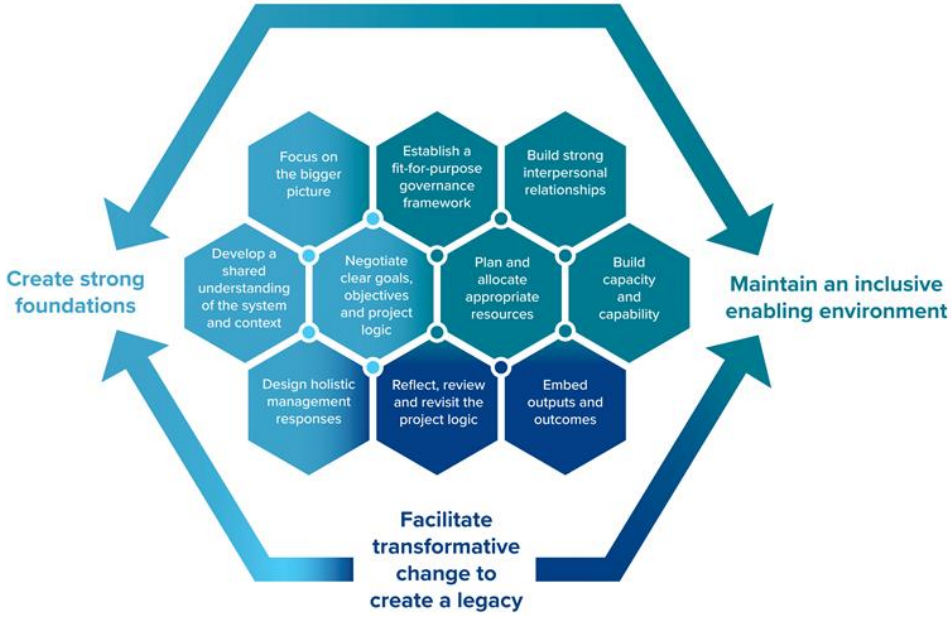
APPENDIX F - Management principles and success factors for Reef project and program delivery

This report documents the ten Management principles for Reef project design and delivery, and the individual success factors that underpin each principle. Each of the success factors are supported by evidence that has been identified through the Management Synthesis for Reef Programs project.

Each record of evidence has been referenced to a project type (Table 1) and a natural resource management region (e.g. Extension – Cape York).

Table 1. Project type descriptions (Roberts et al. 2018)

Project Type	Brief description
Extension	Extension and education activities to facilitate BMP adoption in cane, grazing, banana, horticulture and grains industries
Innovative engagement	Innovative ways of engaging farmers in cane and grazing industries (e.g. Major Integrated Projects and Cane Changer project)
Applied research and development	Research and development to support practice change activities
Catchment restoration	On-ground projects to improve water quality through catchment repair (gullies, wetlands, erosion control, etc.)



MANAGEMENT PRINCIPLE:	Develop a shared understanding of the system and context
DESCRIPTION:	Reef water quality management projects occur in a complex environment with multiple contextual factors and stakeholders to consider. Developing a solid foundational understanding of the system and context is critical for accurately defining the problem, understanding the risks, forming clear goals, objectives and developing an effective method for how to address the problem. Projects that developed a *shared* understanding of the system and context by looking at the situation from multiple perspectives (i.e. the scientific perspective, the policy perspective, the landholder's perspective, the environmental perspective, etc) were successful because there was a common understanding of 'the problem' among stakeholders, negotiated solutions to maximise benefits (i.e. identifying win-win outcomes and / or co-benefits), and negotiation of the most effective method to reach goals and objectives. Successful projects purposefully included multiple stakeholders in this process using participatory / collaborative approaches that varied according to project context.

Success factor	Supporting evidence	Example tools and process used in application
Consider the interconnectedness of social-political, governance, cultural, biophysical, economic and agronomic systems	Participatory and collaborative processes such as walking the landscape were used to develop a shared system understanding that gathered knowledge from a broad range of stakeholders in the region and integrated this information so that it could be understood and used spatially (Innovative engagement - Wet Tropics). Participatory and collaborative process (e.g. co-design) was used to develop a shared system understanding that gathered knowledge from a broad range of stakeholders in the region and integrated this information (Innovative engagement - Burdekin).	Walking the landscape Economic analysis Site visits Data and modelling Co-design / participation / purposeful engagement
Establish clarity and consensus regarding the problem definition (or clear knowledge gap in the case of R&D projects)	Researchers and policy makers worked in collaboration to target a known research knowledge gap with large policy implications. The project developed very targeted research questions that would fill the knowledge gap and provide relevant information to improve policy making (Applied research and development - Wet Tropics). Extension officers worked together with landholders to identify management practices that were hindering profitability of farms, as well as negatively impacting water quality. In this case, while there were differing underlying motivators or drivers, both parties were able to define the problem as a specific management practice. Agreement on specific management practices that were 'problematic' allowed extensions officers and landholders to identify possible solutions that provide win-win outcomes (Multiple extension projects – Burdekin, Mackay-Whitsunday, Burnett-Mary, Fitzroy).	Gap analysis Policy review Site visits Collaboration / participation
Identify clear (and known) benefits and co-benefits to multiple stakeholders at different scales	Multiple 'co-design' events and workshops were undertaken with multiple and diverse stakeholders to bring their knowledge and perspectives to the table, form a shared system understanding, put forwards ideas, and negotiate amongst each other what goals, objectives and activities exist that have shared benefits to all stakeholders (Innovative engagement – Wet Tropics, Burdekin).	Co-design / participation

Success factor	Supporting evidence	Example tools and process used in application
	Social research was undertaken to identify potential co-benefits of the project for landholders, this allowed the project to develop clear goals and objectives that had win-win outcomes (Extension – Burdekin, Mackay-Whitsunday).	
Understand the drivers and motivating factors for change, as well as the real and perceived barriers to change	Purposefully engaging with stakeholders and seeking to understand underlying drivers, ambitions and needs is critical for identifying where and how multiple benefits can be achieved. For example, understanding what activities supported landholders' ambitions for their farm, while also benefitting water quality This ensured that there is not a disconnect between the objectives, goals and strategies of the project, and what was actually occurring on the ground, as well as proving the opportunities to identify and maximise co-benefits at the local scale beyond benefits sought out by the investor. (Extension – Fitzroy, Burdekin, Burnett-Mary, Mackay-Whitsunday) Stakeholder profiling was used to understand drivers and motivating factors of practice change, understand real and perceived barriers to practice change in the region (including financial, material, psychological barriers), and benchmark landholder management practices. This allowed the project to target drivers and motivators, overcome real and perceived barriers and use the benchmarking to tailor the management response to each individual (Extension - Burdekin, Mackay-Whitsunday, Burnett-Mary, Fitzroy).	Landholder interviews / surveys Purposeful engagement with stakeholders (formal or informal) Participation Stakeholder profiling SWOT analysis
Focus on developing (implementing) a small-scale proof of project concept (e.g. based off a trial project, or other relevant project that has demonstrated success)	A smaller trial project was used to develop a proof of concept for the larger project and allowed for early learning and confidence in the proposed approach (Applied research and development - Mackay-Whitsunday). A smaller trial project was used to develop a proof of concept for the larger project and allowed for early learning and confidence in the proposed approach (Applied research and development – Wet Tropics). A smaller trial was used to confirm a proposed approach to practice change, to determine if it was easy to implement, effectively reduced nutrients and benefitted landholders financially. Following a successful trial, a larger project was undertaken using the same approach (Extension, Burdekin). Economic and financial benchmarking of performance was undertaken on a smaller pilot project to demonstrate successful outcomes that could be expected from a larger project, this provided confidence in the proposed approach (Extension- Fitzroy and Mackay-Whitsunday regions).	Trial project Review of related project examples or case studies Benchmarking performance
Explore the policy systems and ensure alignment and integration with other Reef projects in the region	An analysis reef projects and relevant policy in the region was undertaken to understand how a proposed project needed to position itself to ensure there was alignment and coordination of effort in the region to maximise impact and prevent overlap (Innovative engagement, Burdekin and Wet Tropics). A policy analysis was undertaken to demonstrate how the project plan aligned to relevant policy objectives, including targets / priorities in the Reef 2050 WQIP. This ensured the project met the needs of the investor and was contributing to larger policy objectives (Multiple projects – multiple regions). Multiple projects set up or project team members were a part of a regional working groups or something similar to coordinate the activities of various projects being delivered in the region, this promoted coordination of effort in the region (Multiple projects – multiple regions).	Policy analysis Project analysis Regional working groups Regional stakeholder engagement

Success factor	Supporting evidence	Example tools and process used in application
System understanding is communicated in a way that is easily understood	Scientific conceptual models were used to communicate the current system understanding and inclusion of the key findings of an applied research project so that the scientific understanding of wetlands and subsequent new knowledge could be easily used to inform policy development (Applied research and development – Wet Tropics). Catchment story maps were developed as part of developing a system understanding to enable effective communication and support stakeholder interaction by ensuring that the information could be easily used and updated as new knowledge became available (Innovative engagement - Wet Tropics).	Conceptual models Story maps
Provide opportunities for multi-directional learning and appreciation of different needs	A continuous and informal dialogue between policy makers and researchers informed research questions that were relevant to policy and facilitated multi-directional learning. Policy makers benefit from interaction with researchers through enhanced knowledge and skills, information about other pertinent research. Researchers benefit as they gain a nuanced understanding of the policy or practice environment, develop and pursue research questions that have real-world applicability, and, through ongoing conversations with policy makers, interpret results with a deeper understanding of contextual circumstances which, in turn, enhances the usefulness of the research finding (Applied research and development, Wet Tropics). Participatory and collaborative processes such as walking the landscape were used to provide opportunities for multi-directional learning and appreciation of different types of knowledge. Scientists and landholders brought different forms of knowledge about the landscape and were able to build respect and learn from each other (Innovative engagement, Wet Tropics).	Informal discussions and knowledge sharing Project steering committees Expert panels Embedding researchers among policy makers (i.e. sharing office space)
Consider the needs of the broader community not just the landholder	Working on an Indigenous owned grazing property required engagement with the broader community to identify needs / value of the sites to the whole aboriginal community in the area, not just the landholder. Planning for this upfront would have allowed for the project to accommodate the time and resource requirements for a more extensive engagement process without delays or resourcing constraints (Catchment Restoration, Fitzroy).	Formal and informal discussions with the community
Provide flexible and varied opportunities for meaningful stakeholder engagement including appropriate timeframes	An innovative engagement project sought to provide a variety of methods to involve stakeholders in system understanding and project design in order to maximise their input. As a result, the project used both formal and informal engagement in a variety of formats such as one-on-one discussions, farm shed meetings, formalised groups or networks, etc. This was a key success factor for engaging those who had not previously been involved and ensuring a high rate of participation in the region (Innovative engagement, Burdekin). Projects were realistic about the lead in times for stakeholder engagement which is critical to ensuring that deliverables and milestones are met. Several projects found that building new relationships could take up to 18 months. In many cases this also included scoping discussions and cultivating interest prior to the project commencement date (Extension - Burnett-Mary).	Use of a variety of engagement formats such as one-on-one discussions, farm shed meetings, formalised groups or networks, etc. Project planning Milestone development
Create a ‘safe space’ where various knowledge types,	A key factor that underpinned successful co-design was creating spaces where people felt comfortable and respected enough to express their thoughts, opinions and needs. This was facilitated in a social setting by communicating the expectation that everyone’s experience will be respected and seen as valid upfront. This was important to ensure that a variety of stakeholders contributed to the co-design process, not just a select group of	Co-design Online platforms

Success factor	Supporting evidence	Example tools and process used in application
experiences and needs are accepted and respected	people. If required, people were engaged in a different way (i.e. one-on-one) where it was easier to contribute (Innovative engagement – Burdekin). An online hub was established for water quality monitoring data to be safely shared and discussed in a private setting (Applied research and development, Mackay-Whitsunday).	

MANAGEMENT PRINCIPLE:	Negotiate clear goals, objectives and project logic
DESCRIPTION:	Projects need to have clear goals, objectives and a logical approach for how it's going to achieve these. Projects that did this very successfully identified clear goals, objectives and a project logic based on a system understanding, rather than responding directly to investment priorities which can result in a disconnect between high level strategy and what's happening on the ground. They have clear goals and objectives that allow for a clear line of sight to plan and implement the project without the goalposts changing but are also open to adaptive management if something isn't working or could be improved.

Success factor	Supporting evidence	Example tools and process used in application
Develop project objectives, goals and strategies that align with investment priorities, and with the findings of a system understanding to ensure that the needs of multiple stakeholders are being met	Project objectives, goals and strategies were based on a system understanding and the integration of knowledge and perspectives to ensure that they are relevant to the local system that the project is working within, not just the high-level investment priorities. This ensured that there was not a disconnect between the objectives, goals and strategies of a project, and what is actually occurring on the ground, as well as providing the opportunity to identify and maximise co-benefits at the local scale beyond benefits sought out by the investor (Extension - Burdekin and Mackay Whitsunday). Most examples referred to the disconnect between investors seeking water quality outcomes, and landholders seeking practice change that will ultimately support their productivity and profitability. This sub principle addresses the need to bring these two drivers together in the development of the project objectives, goals and strategies, utilising of the system understanding and engagement process (Innovative engagement – Burdekin & Wet Tropics).	Use system understanding (see above) Integrate knowledge and perspectives (see above)
Identify activities and solutions that can provide win-win outcomes or multiple benefits and build these into project design	Extension officers worked together with landholders to identify management practices that were hindering productivity and profitability of farms, as well as negatively impacting water quality. In this case while there were differing underlying motivators or drivers, both parties were able to agree on possible solutions that provided (win-win) outcomes, and what information and support would be required for practice change (Extension – Burdekin, Mackay-Whitsunday, Burnett-Mary, Fitzroy).	Use system understanding Integrate knowledge and perspectives Project trial
Provide clear desired project outcomes (long-term) that do not change	Provision of clear desired project outcomes that did not allow for a project to run with a clear line of sight without considerable delay or renegotiating project delivery as goal posts change. This required the desired outcomes to be identified accurately and effectively upfront (e.g. based on accurate system understanding etc). (Extension - Burdekin and Mackay Whitsunday). An example where this did not occur, a project changed its outcome from being originally a project oriented around water quality monitoring transformed into an extension project seeking practice change, this caused significant negative impacts as system understanding was inappropriate and a range of project planning areas were not suitable to undertake extensions effectively (Data and information - Mackay-Whitsunday).	Project plan with clear outcomes Use SMART goals

Success factor	Supporting evidence	Example tools and process used in application
Establish a clear logic for how goals / objectives will be achieved (and the underpinning assumptions)	Development of a clear logic for how goals and objectives will be achieved, as well as recognising the underpinning assumptions was used to bring together a system understanding and form this into a clear step by step theory / understanding of how the project will achieve its outcomes. Development of a project logic help to map out how planned activities were clearly linked to the achievement of the desired goals / objectives (Innovative engagement – Burdekin & Wet Tropics).	Program / project logic Project plan
Consider potential risks and assumptions when identifying targets, as not to set overly optimistic targets	An evaluation report that reviewed multiple projects in multiple regions and found that overall initial practice change targets were optimistic, with some of the reduced targets remaining a challenge. The time taken to build extension staff numbers and capacity, staff changes, reduced incentive caps in some commodities, competing projects, a stricter definition of what constituted a practice change in Paddock to Reef compared to previous years and challenges facing producers (drought, prices, floods, capacity to contribute to project costs and in-kind) are all barriers against targets being met (Applied research and development and extension – multiple regions).	

MANAGEMENT PRINCIPLE:	Focus on the bigger picture
DESCRIPTION:	Projects are always limited in the outcomes that can be achieved within the project timeframe and budget. It can be tempting to think about a project in isolation, working only to achieve its own goals and outcomes. But to have a meaningful impact on the Reef, the environment, and the community, current and future projects need to be working in synchronisation to establish foundations and collectively build towards long-term outcomes. Successful projects are thoughtful about how they are contributing to something bigger and beyond their own lifespan, purposefully setting up the project to facilitate continual advancement towards a long-term goal.

Success factor	Supporting evidence	Example tools and process used in application
Develop a long-term plan / clarify the end game or big picture beyond the life of an individual project, and how the current project contributes to achieving that	Landholders were involved in a water quality monitoring project in the catchment, with the long-term goal of practice change. This initial project was a foundational aspect of the journey for landholders to link their management practice to water quality, with the intent that the next project in this area will support them through practice change (Applied research and development - Wet Tropics). A project was designed to answer a specific research question that addressed a known policy gap, that if answered would justify the benefits of or set a solid premise for continuation of the research. A technical panel was set up in order to link this project to the bigger picture in terms of understanding the science that is currently required to inform the policy gap and research students were brought into to work with policy makers to continue on the legacy of the work (Applied research and development -Wet Tropics).	Policy review Broader program design Program logic Conceptual understanding of the bigger picture Succession planning projects Steering committee
Seek practical ways to facilitate the achievement of long-term goals beyond the life of an individual project	Established a delivery model with a schedule of events over an 18 month period that was proven to be effective, and then pulled in multiple lines of funding while continually improving the program and staff skills. The program supported landholders to create long-term change in their business, thinking as far ahead as succession planning and changes in farm management over a 10-20 year period and then linked farmers into ongoing peer-to-peer support network to facilitate change beyond any single project lifespan (Extension - Fitzroy). A larger project provided a robust working framework for multiple smaller project to work under a common contract to deliver complementary Reef water quality outcomes. This did however come with accompanying concerns about loss of 'line of sight' between individual partners and government in both directions (Applied research and development – multiple regions).	Broader program design Program logic Succession planning projects Conceptual understanding of the bigger picture
Innovation must accept the risk of failure – see project as a learning opportunity	An innovative project trialling a new methodology was designed with the intent that the lessons were just as important as the outcomes. This ensured that equal value was placed in monitoring and documenting lessons and outcomes along the way, as achieving the desired long-term outcomes. Without the opportunity to trial and capture success, innovation would have not been able to occur (Catchment restoration - Cape York).	MERI planning

MANAGEMENT PRINCIPLE:	Design holistic management responses
DESCRIPTION:	Reef water quality projects operate in complex environment and trying to create change can be a challenge when many factors are interrelated or co-depended. Successful projects acknowledged this complexity and design management responses that are holistic, considering all parts of a system. For example, it can be tempting to target practice change in single management practice with high water quality risks, however project that focused on taking a whole-of-farm approach rather than focusing on changing a single management practice were more successful in achieving sustained practice change outcomes. Holistic management responses resulted in more successful projects that created long-term sustainable outcomes.

Success factor	Supporting evidence	Example tools and process used in application
Design management responses that are holistic in the way they try to create change, this allows projects to tailor their approach to individual landholders	Extension was delivered in a way that considered the full range of factors that might be affected by changed management practices and sought to address those in addition to the specific aspect that the project was aiming to change, e.g. aiming to change nutrient application, but also considering what implications this will have for other farm management aspects such as irrigation, what implication this might have for the business, or if new equipment needs to be purchased. The project found that practice change of a single management practice was not sustained if other factors were not considered in addition to the desired management practice change (Extension, Mackay-Whitsunday & Burdekin). Extension planning was tailored for each landholder to consider their unique socio-economic circumstances, business, farming system, and the biophysical elements of the farm (e.g. soil type). Developing tailored property management plans considered all these elements, not just the specific aspects that relate to water quality (Extension - Fitzroy).	Tailored nutrient management plan Tailored property planning Succession planning Tailored business planning
Incentives or project buy-in require a clear purpose to be effective	An extension project provided cash incentives to participating farmers and found that this did not necessarily facilitate positive outcomes as the decisions about where to invest the cash was detached from how they might make decisions under 'business as usual' conditions. Upon reflection it was noted that any investment that landholders make into practice change should ultimately benefit them and therefore they should be able to justify the investment without needing a financial incentive (Extension - Fitzroy). As a counterfactual example, an extension project asked landholders to pay to participate in the project and as a result the level of commitment to the project was observed to be very high as landholders wanted to 'get their money's worth' (Extension - Burdekin & Mackay Whitsunday).	Practice change incentives Project buy-in

MANAGEMENT PRINCIPLE:	Build the 'right' team and allocate appropriate resources
DESCRIPTION:	Successful projects are driven by dedicated team members with the appropriate skills, capacity and resources. Identifying these skills and recruiting the 'right' team members for the life of the project, can be challenging and requires foresight. Successful project teams work well together, often requiring diverse and complementary skills and expertise. More broadly, maintaining the presence of key individuals in a region is critical for building strong interpersonal relationships over time, and part of ensuring that projects could recruit the 'right' team members included ensuring that individuals can maintain their social capital between grant based projects in a region.

Sub-principle / Success factor	Evidence / Examples	Example application tool or process
Scope required skills and capacity to deliver the whole project early on and build a cohesive team that includes core and supporting roles with a broad range of skills and knowledge	Team roles and the required skills and capacity to deliver the project were considered early on to ensure that needs were met throughout the life of the project. Consideration was given to both core and supporting roles, and the variety of skill and knowledge that need to be present. This ensured smooth delivery and prevented delays later in the project to hire someone in with the required skills (Extension – Burnett-Mary). As a negative example, project went underway with an overcommitted FTE in a project lead role. As a result, the project was not as effective as it could have been, and opportunities were missed due to a lack of time available to meet the project needs (Applied research and development – Mackay-Whitsunday).	Needs analysis Capacity analysis
Adaptively manage resourcing needs	Resourcing needs were adaptively managed when it became clear that additional expertise was required to deliver the project effectively (e.g. MERI expertise). Discussions were held with investors about the needs and someone was actively sought out to fill the gap (Innovative engagement - Wet Tropics) Resourcing needs were adaptively managed when it became clear that additional expertise was required to deliver the project effectively. Despite causing some delays to recruit the position, the project was better off with the expertise required (Catchment restoration, Fitzroy).	Project plan with consideration of roles, responsibility and skills / knowledge required to deliver the project plan
Pre-identify specific needs (e.g. cultural awareness)	Successful projects identified any specific needs early on and built a team accordingly or arranged for the appropriate training. An example includes a project that required specific MERI expertise, this allowed the project to successfully develop a robust MERI plan and continual implementation of the project (Innovative engagement – Wet Tropics, Burdekin). As a negative example, a project working with an Indigenous owned grazing company required team members with cultural awareness. The team was selected prior to the decision to work with Traditional Owners and this caused problems and delays later down the track to bring in new team members with appropriate training and experience (Catchment restoration, Fitzroy).	Project plan with consideration of roles, responsibility and skills / knowledge required to deliver the project plan Needs analysis
Invest in the continual development of the project	Project team (or staff within an organisation) received relevant training, learning and / or mentoring to improve their skill and capacity to deliver projects effectively. Thought was given to how to develop a diverse portfolio of	Training Mentoring

Sub-principle / Success factor	Evidence / Examples	Example application tool or process
team (e.g. training, learning, mentoring)	skills in the team, as well as core skills / needs that arose throughout the project (e.g. mental health first aid) (Extension – Fitzroy).	On the project learning
Develop a succession plan for team members moving between fixed term contracts so that their knowledge and network is not lost	A succession plan was developed to mitigate the risks associated with team members moving between fix term contracts towards the end of the project's lifespan. Particular emphasis was given to retaining team members in a position so that their knowledge, and the relationships they developed throughout the life of the project, is not lost in the region (Applied research and development – Burnett-Mary).	Succession planning Regional planning
Use local contractors that understand the landscape	Local contractors (e.g. earthworks contractors) were used for a gully remediation project because they had been involved with building dams in the region and brought a unique knowledge of working in that particular landscape which proved to be highly beneficial to the success of the project (Catchment restoration - Cape York & Burdekin).	Selective procurement processes
Scope required resources (financial material) to deliver the whole project early on and build this into the project plan and budget	A detailed budget was prepared in addition to the project plan to scope out costs for gully remediation works, as well as monitoring equipment and other material needs such as vehicles to access sites. Consideration was also given to risks such as weather events destroying monitoring equipment. This meant that the project had adequate financial and material resources to undertake the project successfully (Catchment restoration, Cape York).	Detailed budgeting

MANAGEMENT PRINCIPLE:	Establish a fit for purpose governance framework
DESCRIPTION:	Establishing an appropriate governance framework and associated systems that reflect each context is essential to support both strategic direction as well as the day to day operations. Good governance ensures that there are clear roles, responsibilities, expectations and accountability among project partners, team members, contractors and stakeholders. Governance ensures coordination and alignment between multiple organisations, levels of government and policy areas. Good governance also ensures that project protocols are put in places for establishing clear processes and expectations for data collection, data representativeness, management and sharing upfront. These are all aspects that may seem to be obvious, but if not managed correctly can results in unmet expectation, create large disturbances and tension among stakeholders. Fit for purpose governance is also a success factors for supporting other key aspects of projects, depending on their needs, such as sustaining participatory processes throughout the life of a project, and ensuring that processes are in place to support ongoing adaptive management and learning.

Success factor	Supporting evidence	Example tools and process used in application
Establish multi-layered governance structures with specific purposes (e.g. have a clear purpose for a reference group, technical panel, etc)	Consideration was given to a multi-layered governance structure to ensure that each 'layer' held a specific purpose. For example, a reference group was established to represent the views of industry and landholders, a technical panel was established to ensure policy alignment and scientific rigor, a working group was established to ensure that the project was collaborating with other projects in the region. Overall, this improved the efficiency because only the relevant people were being approached to give feedback on certain aspects of the project (Applied research and development - Wet Tropics). For example, a working group was established to guide the project itself, while a higher-level panel was established to link the project into some broader policy related strategies that the project contributed to (Applied research and development – Wet Tropics).	Technical panel, reference group, steering committee, think tank, etc.
Governance establishes clear roles, responsibility and expectations amongst various partners and stakeholders	Governance structures and processes were put in place to ensure that there was a shared understanding of roles, responsibility and expectations among the various stakeholders involved. This ensured smooth running and coordination of the project overall. Clear governance structures and processes also facilitated other benefits such as establishing processes for review and reflection, adaptive management, reporting and collaboration, alignment and integration with other projects in the region (Multiple projects – multiple regions).	Technical panel, reference group, steering committee, think tank, etc. Project review and reflection Project reporting Regional collaboration / coordination Terms of reference Project plan

Success factor	Supporting evidence	Example tools and process used in application
Clarify and agree on project protocols such as having clear duties, expectations and accountability for contractors and partners (e.g. through contracts, terms of reference, etc)	Clear roles and expectations were agreed upon and formally established with contractors and partners, with clear lines accountability was critical to ensure that everyone understood what they were responsible for, what the expectations were, and ultimately that everything that needed to get done would get done (Multiple projects - multiple regions). Clear contractual arrangements were put in place to agree on duties and expectations for external contractors supporting the project, contractors were provided with templates for reporting and the work they were expected to undertake, this ensured that contractors understood their role and duties, and were held accountable (Applied research and development – Wet Tropics, Burdekin, Mackay-Whitsunday). As a counterfactual example, the expectations and duties of an external contractor were not made clear and were not precisely detailed in a contract. It was only assumed that they would do certain things. As a result, the contractor did not deliver on expectations for the project (Applied research and development – Mackay-Whitsunday).	Contracts Budgets Detailed project plan Reporting mechanisms
Co-ordination and alignment between levels of government and policy areas (e.g. where there are multiple investors or multiple projects involving the same site)	High level governance structures that operate across multiple jurisdictions and geographical boundaries, e.g. pesticide working group, sediment working group (these governance structures were linked to multiple projects reviewed as part of this project) (Multiple projects – multiple regions).	High level working groups
Governance structures sustain participatory processes throughout the life of the project	Governance structures were put in place to purposefully facilitate stakeholder engagement throughout the life of the project. For example, development of an industry reference group comprised of farmers and industry bodies that were continually involved in decision-making throughout the project (Applied research and development - Wet Tropics). Development of a project panel that represented different interests in the region (place-based, integrated) and held connections to representative stakeholder groups was established to ensure that a broad range of stakeholders were able to participate (through consultation or involvement in decision-making) throughout the life of the project (Innovative engagement - Wet Tropics).	Technical panel, reference group, steering committee, think tank, etc.
Clarify and negotiate expectations with investors early on (e.g. reporting requirements)	Expectations were clarified and negotiated with investors early on to reduce potential inefficiencies and ensure that everyone is getting their needs met. This required both the investor and proponent to be clear about their expectations, needs, and capacity to meet expectations (Extension – Burnett Mary). The project proponent and investor maintained open and regular communications, this allowed expectations for key milestones and deliverables to be discussed and negotiated. Providing clarity to the proponent and ensuring that the investors needs were met. This also improved the efficiency of the project, so that minimal reiterations of deliverables such as reporting were required (Applied research and development – Fitzroy, Mackay-Whitsunday).	Formal and informal discussions

Success factor	Supporting evidence	Example tools and process used in application
Establish and agree on clear processes and expectations for data collection, management and sharing upfront	Clear process and expectations were established around how monitoring data would be collected, stored and shared early on in the project. To ensure that privacy issues or concerns were respected, expectations and a process was discussed upfront so everyone understood and agreed to whom and when the information will be shared. This was critical to ensure that later in the project there was no resistance to sharing or using the information as required, and so that organisations (such as peak industry bodies) had adequate timeframes to prepare a response once the results came in (Applied research and development - Wet Tropics). Clear processes and expectations were developed around how monitoring data would be collected and stored to ensure that it was an appropriate quality and could be used for specific purposes (Applied research and development – Mackay-Whitsunday, Burdekin & Wet Tropics). Grower agreements were made upfront to ensure that growers understood that all the information and data gathered during the project would be transparent and made publicly available, this ensured that they understood the expectations upfront and agreed to have their information shared (Applied research and development – Mackay-Whitsunday, Burdekin & Wet Tropics).	Terms of reference Agreeing on a protocol for who gets access to data and when Informed consent process Memorandum of understanding Grower agreements
Agree upfront with stakeholders on the representativeness of data (e.g. what industries a monitoring site represents)	Stakeholders (e.g. landholders, industry groups, scientist) were consulted on the representativeness of each monitoring site so that there was agreement about the data represented early on (e.g. representative of the water quality impacts from certain land uses or properties), which could not be disputed at a later stage when results came in (Applied research and development - Wet Tropics).	Terms of reference Formal and informal engagement to reach a consensus on site representativeness

MANAGEMENT PRINCIPLE:	Build strong interpersonal relationships
DESCRIPTION:	Strong interpersonal relationships built on trust have been shown to underpin the success of projects. But getting the conditions right to facilitate the development of strong interpersonal relationships over time, or within the life of a project can be challenging. Successful projects were considerate of the timeframes required to build relationships, setting up the right foundations, and the behaviours and attitudes that can promote or break strong interpersonal relationships.

Success factor	Supporting evidence	Example tools and process used in application
Consider timeframes for meaningful interactions that allow relationships and trust to grow	Projects actively considered, in project plans and milestones, the timeframes associated with the development of an interpersonal relationship built on trust, multiple project examples discussed this as a key success factors, and the time required largely depend on if the relationship is pre-existing or completely new. For projects that were seeking to build new relationships, building relationships could take up to 18 months (Extension - Burnett-Mary). An extensive co-design process allowed time and activities for meaningful interactions with a variety of stakeholders in the design process, this has now established strong foundations for behaviour change outcomes later in the project (Innovative engagement – Burdekin, Wet Tropics). As a counterfactual example, projects that did not adequately consider timeframes in their project planning did not develop relationships fast enough to meet key project deliverable and milestones, and in the worst case relationships were ruined by trying to force things to happen too fast too soon (Catchment restoration – Fitzroy).	Project planning Stakeholder engagement planning
Continuity of delivery team and key individuals is essential for building trust over time	Many projects were mindful about retaining key individuals who had developed strong relationships in their region. It is important to try and retain these individuals where possible because trust is built over timeframes that extend beyond an individual project. Many organisations try to develop succession plans to keep these individuals in the region between fixed term contracts (Extension – Burnett Mary). There is a belief that landholders can develop deep scepticism and distrust in NRM organisations generally when continually dealing with new people who they don't trust, and therefore retaining key individuals with relationships in the region is vital to the long-term goal of practices change.	Succession planning Contracts
Consider the risk / trust nexus – start with low risk interactions / activities, only increase risk as trust grows	Project activities were designed or had the flexibility to start landholders out with low risk interactions and activities and increase the risk as relationships of trust grow, this ensured that landholder willingness was aligned with what is being asked of them, and ultimately allowed the relationship to grow so that higher risk and higher benefit activities could be undertaken successfully. For example, landholders were initially engaged to participate in low risk interactions (e.g. a farm shed meeting	Informal engagement / discussions – shed meetings, field days, on farm demonstrations, informal catch-up (cups of tea)

	with no obligations) or activities that may have proportionately weaker links to water quality (e.g. pig shooting, or installing off-stream watering) with the intent that these provide opportunities to build relationships and trust that will ultimately lead to higher risk activities with a much larger water quality benefit (Extension - Burdekin).	On-ground project activities
Practice change is a journey undertaken alongside a landholder, not telling them what to do	It was recognised that landholders did not want to be told what to do and were more receptive to working alongside individuals (e.g. extension officers) as mutually respected members of the 'practice change journey'. Demonstrating that the journey was a collaborative effort through behaviours and attitudes was therefore key to successfully establishing interpersonal relationships based on trust (Extension – Burdekin and Mackay-Whitsunday). Multiple counterfactual examples were given of attempts to engage landholders by providing overly scientific or technical information as 'the answer' and framing oneself as an expert. It was noted that this approach is not an effective approach and does not result in good outcomes (Multiple examples – multiple regions).	Informal discussion
Demonstrate where you have common values and that you care	It was recognised that landholders were more willing to engage and open to developing an interpersonal relationship when they felt that the individuals they were working with (e.g. extension officer, project officer) held common values around caring for farm productivity and profitability. Demonstrating commonly held values through behaviours and attitudes was therefore key to successfully establishing interpersonal relationships that underpin practice change (Catchment restoration – Fitzroy).	Informal discussions Social surveys at project commencement

MANAGEMENT PRINCIPLE:	Build capacity and capability
DESCRIPTION:	Building the capacity and capability of stakeholders maximises the potential for positive change with sustained outcomes. Successful projects were strategic about providing the 'right' information and support to build capacity and capability. Successful projects were thoughtful about the key audience they were working with and provided a variety of opportunities for learning that catered to different learning styles. For projects working with landholders, successful projects provided information that landholders could easily relate to and understand such as through peer to peer learning or tailored agronomic extension.

Success factor	Supporting evidence	Example tools and process used in application
Peer to peer learning is one of the most effective methods of influencing change through improved uptake of information	Surveys conducted through a project captured feedback from project participants and this found that landholders will research farm management practice changes themselves but take in the most information and make decisions following interactions with other landholders in a peer to peer format (Applied research and development– Mackay-Whitsunday, Wet Tropics, Burdekin, Fitzroy). Multiple examples were provided of peer to peer learning being a highly effective approach to promoting practice change and sharing information (Multiple examples – multiple regions).	Peer to peer learning
Landholders need to see the 'success story' of someone that is similar, to have confidence in proposed practice change	The re-telling of 'success stories' was a successful model for communicating to landholders the benefits of practice change. It was shown that landholders needed to hear from someone that was in a similar situation to them, who they could relate to in order to have confidence in the proposed change (Applied research and development – Mackay-Whitsunday, Wet Tropics, Burdekin, Fitzroy). For example, a grazing extension project used case studies or presentations from landholders to other landholders, and was selective about choosing the right person to tell the success story to ensure they had something in common with the audience (e.g. farming the same thing in the same region with similar property type) (Extension - Fitzroy).	Peer to peer learning Case studies Farm shed meetings Conferences Workshops Online videos On farm demonstration
Provide additional support to early adopters to maximise their confidence and ability to capture 'success stories'	Key to the success of peer to peer learning was gathering high quality information that could be used to develop and share 'success stories' or case studies. Surveys conducted at the end of a project confirmed that advice and guidance on how to implement and measure practice change through the use of agronomic and extension service providers was for capturing the information and a story that could be shared among peers. The additional support was critical not only from a data perspective, but allowed early adopters to have a much deeper understanding of the practice change they were undergoing so that they were able to confidently communicate their story to peers (Applied research and development – Mackay-Whitsunday, Wet Tropics, Burdekin, Fitzroy).	Monitoring Media training

Success factor	Supporting evidence	Example tools and process used in application
Providing a variety of networking opportunities builds potential for learning	Providing a variety of networking opportunities accommodated for different preferences and learning styles which ultimately increased attendance and potential for learning (multiple project examples, multiple regions). A project aimed at facilitating peer to peer learning provided a variety of networking opportunities (e.g. both formal and informal in a variety of formats such as one-on-one, farm shed meetings, conferences) to maximise the potential pool of landholders willing to attend, and accommodating for different learning styles and preferences (Applied research and development – Mackay-Whitsunday, Wet Tropics, Burdekin, Fitzroy).	A range of formal and informal events Farm shed meetings Conferences Workshops On farm demonstrations
Use of decision support or data that is directly relevant to individual landholders to base meaningful discussions off	Landholders were involved in gathering monitoring data from their own property which created the conditions for a meaningful discussion about the results because they knew that the information was directly relevant to them (Applied research and development – Mackay-Whitsunday). Decision support tools / data (e.g. property mapping, soil testing, etc) were used to inform tailored property plans (or other plans such as nutrient management plans). It was found the use of tools that were directly relevant to the landholders (i.e. from their own property) resulted in a higher level of engagement and motivation to learn and act on the information (Extension – Burdekin & Mackay-Whitsunday).	Website development Case studies Property mapping, soil testing, nutrient uptake data etc.
Building stakeholder understanding of interventions encourages maintenance and upkeep	Building a deeper understanding with landholders of the purpose of gully remediation and how the on-ground remediation is intended to solve the problem was found to result in landholders being more diligent in maintaining the site and assisting with monitoring efforts (Catchment restoration - Fitzroy).	Co-design Engagement and participation Behaviour and attitudes
Create new social norms	Over time through multiple stakeholder participation events and conversations, the desire to be an early adopter and change practices to improve water quality became normalised within the community. This has fundamentally changed the attitude of the community with early adopters confidently sharing their story (Innovative engagement – Burdekin).	Co-design

MANAGEMENT PRINCIPLE:	Reflect, review and revisit the project logic
DESCRIPTION:	There is not always a silver bullet when it comes to reef water quality projects, things don't always go exactly as planned, new aspects emerge, and assumptions are made and realised. The only way to manage these things is to continually reflect, review and revisit the project logic in order to adaptively manage. Successful projects pre-anticipated this and set in place systems or procedures to support ongoing adaptive management. While the development of project logics and Monitoring, Evaluation, Reporting and Improvement (MERI) plans are becoming more common, it is still a challenge to use these well as a tool to drive continual improvement.

Success factor	Supporting evidence	Example tools and process used in application
Adaptive approaches are critical for addressing wicked problems where solutions are not always clear - put process for adaptive management in place to facilitate this	For projects that work with the environment and people, there is rarely a silver bullet for success. Every situation is different and may require a slightly different approach each time to achieve success. Successful projects were those that set up systems or procedures to reflect and be adaptive in seeking out a path towards success. For example: • Clear processes and timeframes were built into the project (e.g. as part of the reporting cycle) to ensure that opportunities for adaptive management occurred on a frequent routine basis (Innovative engagement, Wet Tropics) • Emphasis was placed on developing conceptual models or refining a project logic to document and test and refine intervention theories (Applied research and development – Wet Tropics) • For some projects this process was more informal but instilled as an adaptive management culture that encourages team members to continually reflect and improve and seek help from others where required (Extension – Fitzroy) • Tools for monitoring were used to allow for adaptive management in real-time, such as the use of water level sensors that trigger a management response (Catchment restoration – Burdekin).	Reporting cycles Project phases with a period for review Peer or external review Program logic Conceptual diagrams MERI plan
Open communication with investors and partners to discuss what's working well, what can be improved and how	Open, regular and transparent communication with investors and partners was used to review progress and work together flexibility when there was a need or opportunity to variate from the original plan. Keeping everyone in the loop allowed for variations to be undertaken smoothly, and ultimately a project that was able to adapt as required and as circumstances changed or opportunities arose (Extension - Fitzroy & Mackay-Whitsunday). Project was set up with investor to be innovative and therefore flexible on a variety of levels, to actively manage this, open communication and regular reporting including sections detailing adaptive management was a key aspect to allow for adaptive management (Innovative engagement – Wet Tropics, Burdekin).	Informal and formal discussion Scheduled meetings to review progress Scheduled reporting MERI plan
Understanding where governance processes are	Recognition that the project did not require excessive governance structures gave primary delivery agent the freedom and flexibility to quickly adapt the project where required, with minimal complexity or delays. A strong	Informal and formal discussion

Success factor	Supporting evidence	Example tools and process used in application
beneficial or a hinderance to allow for flexibility and quick adaptive management	relationship was maintained with the investor, and communication lines were well established. This allowed the project to quickly respond to issues (Extension - Mackay-Whitsunday and Burdekin).	Review governance arrangements
Build MERI processes into the life of the project	Formalised monitoring, evaluation, reporting and improvement processes were built into project design at the start. This ensured that relevant data was being captured from the start, and opportunities to reflect on and document what's working well, what's being learnt, and what needs to be adapted (Catchment restoration, Cape York & Burdekin). The utilisation of inbuilt MERI ensured that data capture demonstrated credibility and success and could be used to justify continuity of the project / program (Extension - Fitzroy and Mackay-Whitsunday).	MERI plan

MANAGEMENT PRINCIPLE:	Embed outputs and outcomes
DESCRIPTION:	Projects don't always stop when the money runs out, there are important roles and responsibilities for ensuring project outputs and outcomes are not only shared but are used to influence other Reef outcomes. Successful projects sought to identify and negotiate early on the intended use and users of the project's outputs and outcomes, to ensure that these could be practically used by others. For example, considering the type and format of information and data. Projects that were thoughtful about how outputs could be practically used, and how outcomes linked back to the bigger pictures were more likely to create a strong legacy.

Success factor	Supporting evidence	Example tools and process used in application
Identify early on the intended use and users of information and data to ensure that it is a suitable quality / format to be used by others	Gathering data and information is something that happens throughout the life of the project and so its important to understand what information will be needed at the end for other users or uses to make sure that its collected in an appropriate way from the start. For example: • A data and information project engaged with stakeholders (e.g. catchment modellers) who were identified as future users of the data to ensure that monitoring sites were gathering the correct data and monitoring site locations met their needs. This ensured that the information was able to be successfully integrated into a catchment model for the region which was a key desired outcome of the project (Applied research and development – Wet Tropics) • A gully remediation project engaged with the landholder to find out what data they would find useful to understand the impact of the project and ongoing requirements for maintenance. This ensured that the landholder was inform and understood the positive impacts of the project, and was equip to be a part of the ongoing maintenance of the site (Catchment restoration – Fitzroy and Cape York) • A monitoring project asked landholders to identify what information they would need to see to believe that their management practices were negatively impacting water quality. This allowed the project to gather the relevant data and present the results to the landholders in a way that facilitated meaningful discussions (Applied research and development – Mackay-Whitsunday) • An innovative gully remediation project installed time lapse cameras so that other practitioners could observed the process of undertaking the project from start to finish (e.g. the earthworks, what order things were done in, what happened during weather events) and the outcomes. This maximised the learnings of the project for others wanting to do something similar (Catchment restoration – Cape York).	Engaging with intended data users Clear monitoring and data protocols Co-design Communications plan MERI plan

Success factor	Supporting evidence	Example tools and process used in application
Continue to communicate project learnings beyond the end date	Several projects set up resources that could be accessed beyond the end date of the project to ensure that the learnings prom the project could continue to be used by others. This was in addition to routine project reporting. • Examples include creating YouTube videos (Catchment restoration – Cape York), writing academic papers (Applied research and development – Wet tropics), presenting at conferences and participating in expert panels etc to continue to informally share learnings. • making sure that the data gathered during the life of the project could be used elsewhere such as an input into a model (Applied research and development – Wet Tropics) • Setting up frameworks, guidelines or handbooks that communicate the learnings in practical way (Catchment restoration – Fitzroy, Burdekin).	Online resources Academic papers Conferences Panels Frameworks, guidelines, handbooks
Provide information in a timely manner – even if it's not perfect	Science-policy project was focused on providing policy makers with scientific information continually as it was developed. Policy can change rapidly but good science takes time. This project found that it was more important to inform policy development with the best knowledge there is at the time, even if its not complete or perfect (Applied research and development – Wet Tropics).	Engaging with intended data users

Attachment

Meta data categories and descriptions

G

Contexts for applying success factors

Understanding context influencing success

Many success factors are relevant to different projects and programs, however some have a greater relevance to specific contexts.

Four different contextual elements were identified as being potentially important to determining which success factors are more significant to project success. These are:

1. commodity and / or land use
2. target water quality management priority
3. project lifecycle phase
4. project type (evaluation theme).

1. Commodity and/or land use: The main type of primary production being undertaken. In some cases (e.g. in the case of system repair projects) the option might not be as relevant as the land use the project is being conducted on. Commodity categories currently include:

- sugarcane
- bananas
- grazing
- horticulture
- mixed.

In addition to the primary production sectors above, other relevant land uses include:

- nature conservation
- urban or peri urban
- extractive industry.

2. Target water quality management priority: Refers to the Reef 2050 WQIP 2017-2022 Water Quality Targets or ecologically relevant targets (ERTs). These include:

- dissolved inorganic nitrogen
- fine sediment
- particulate phosphorus
- particulate nitrogen
- pesticides.

3. Project lifecycle: This management synthesis project has identified a number of different phases a project will most commonly pass through. Some principles are likely to be more relevant and/or important (but not exclusively) to a specific stage of the project. The key phases that have been identified are:

- investment planning
- preparatory / enabling
- scoping and design
- implementation
- post-project.

4. Project type: Have been based on the Evaluation Themes described in the Queensland Reef Water Quality Program Evaluation Framework: Evaluation Framework and Recommendations Report for DES (Roberts et al, 2018). These include:

- regulation and compliance
- BMP program
- extension
- innovative engagement
- applied R&D
- catchment restoration
- communication
- governance
- data and information
- reporting.

Attachment

Case Studies

H

Designing holistic management responses

Project Grassroots (TF11.3.4)

Summary

Reef water quality projects typically aim to reduce the risk of target pollutants entering waterways, often by changing management practices in agriculture. It can be tempting to design projects that only aim to change a specific management practice. However, it has been found that projects that are more holistic in their management responses and work with landholders beyond a single management practice are demonstrated to have a higher chance of success and create long-term sustainable outcomes or legacy.

Project Grassroots illustrates this lesson particularly well. While this project has sought changes in specific grazing management practices to reduce sediment and nutrient losses to waterways, the management responses in this project are holistic, because rather than focusing on specific management practices, the project seeks to understand each individual landholder they are working with. Namely their circumstances, their property, their family and their business to deliver a project that works on positively changing the mindset and perspectives of the individual, as well as guiding them through property management planning that considers all aspects of its management, including water quality outcomes.

What was done?

Resource Consulting Services (RCS), the organisation primarily responsible for the delivery of Project Grassroots, places considerable value in getting to know the landholders they are dealing with. As a project team member from RCS notes:

> *"unless you completely support and understand where they're at in terms of how they run their business or what drives them to get out of bed in the morning, and then deal with all of those things, then you can't even begin to make a change out in the paddock. We get to know them [landholders] intimately because they invite us into their lives, essentially, to say, 'right, I'm ready to do something different now'. We do that with a large, diverse team with a wide skillset across many disciplines".*

Project Grassroots is one of several projects delivered by RCS, that take the same holistic approach to every project they deliver:

"We work across the whole of the landscape and the whole of the business. We don't just go out and focus on the gully on the property, that's pointless. You need focus on the whole of the property and the whole of the business and the family, which means that we get families involved, we make sure that when we do our training the husband and the wife are both there. We try and engage the kids and make sure that they've got a plan for succession and that it's not just one person that's got the plan in their head. We start to get them to work completely professionally and treat the business like it's the multimillion dollar business that it is…and if you don't get them to change the way they manage the business in their head, you can forget about anything else you do out on the ground. There's a lot of paradigm shifting, mindset changes that need to occur".

Why is it important?

A project team member discussed the importance of considering everything holistically when attempting to achieve practice change. He highlights that businesses, people and property management are complex, and changing one aspect of a farm's management can have flow on affects elsewhere, so the only way to embed practice change in a sustainable way is to look at how everything is managed as a whole:

> *"You can't reduce agriculture into its bits and then expect to get complete change in behaviour and success, because agriculture is everything. It's all of the parts. You can't just go and change a specific bit in your ecology and expect to get an outcome in your biodiversity.... And it truly is systems thinking and systems perspective. You can't take a bit out of that system*

and expect to make a significant change… because what happens to the rest of it? All you do is create more chaos… So that's why we offer that complete support because they're making significant changes in a system".

What are the benefits?

This approach has been demonstrated to be successful in Project Grassroots, and other projects where RCS have taken the same approach:

> *"It's completely possible to shift producers from B and C class, up to B and A class[1], even in a drought".*

> *"we've essentially established a program for landholders to bring them on a journey of continuous and infinite professional and personal development. We use this framework when we develop projects, because we know it works. We know it works because we've got financial and economic benchmarks, we know that they get improvements in their KPIs in the business, we know that they get growth personally. We know that when the people grow, their land and their ecology grows and improves along the way.*

[1] As per relevant land management practice ABCD framework for grazing lands developed as part of the Australian Government Paddock to Reef initiative

Focus on the bigger picture

Project Grassroots (TF11.3.4)

Summary

Projects are always limited in the outcomes that can be achieved within the project timeframe and budget. It can be tempting to think about a project in isolation, working only to achieve its own goals and outcomes. But to have a meaningful impact on the Reef, the environment and the community, current and future projects need to be working in synchronisation to establish foundations and collectively build towards long-term outcomes. Successful projects were those that were thoughtful about how they were contributing to something bigger and beyond their own lifespan, purposefully setting up the project to facilitate continual advancement towards a long-term goal.

Project Grassroots and Project Pioneer illustrate this lesson particularly well. These projects were both primarily delivered by Resources Consulting Service (RCS) following a similar structure and format that:

1. Provided specialised education and extension to graziers to support a transition into land management practices that reduce sediment to the Great Barrier Reef, in alignment with the Reef 2050 WQIP; and
2. Aligned with RCS's overall vision of profitable farming that supports happy people and a healthy environment.

What was done?

What has really supported successful outcomes in these projects has been RCS's approach of channelling multiple streams of funding and income to delivering and improving a set program of events and activities each year. This program has been proved to successfully facilitate practice change and other co-benefits:

> *"These little projects give us an opportunity to fast track some change in the industry and they're great opportunities. We implement a whole heap of our own learning into projects."*

RCS points out that the generational shift in practice change required to create a true legacy can only be achieved over decades, not multi-year projects.

> *"We want to invest in people and agriculture for 10 to 20 to 30 years if we're going to be serious about long term environmental change, because you've got to focus on a generational shift if you want true legacy".*

Why is it important?

Having a well-defined and developed framework with structure and flexible format enabling integration of multiple lines of funding and income has allowed the organisation to continually improve the delivery of the program, keep information up to date, develop tools and resources for landholders, and maintain key staff members who are able to continually build their skills, capacity and social capital. As noted by a project officer from RCS:

> *"A lot of the tools and resources we use have been developed over 30, 35 years, so the client [landholder] gets more value than what's perceived initially… we invest a lot into our clients to ensure we help them manage in the changing world we live in. They're privy to those tools and resources, and they become members of the organisation where they've got access to those tools any time they want".*

> *"We've got a whole team of administration, and technical support guys behind our advisors to make sure we deliver anything that the client [landholder] needs and we're keeping up to date with changes in the industry from a technical and policy perspective. We do a lot of professional development ourselves….".*

What are the benefits?

By focusing on the bigger picture, RCS is able to deliver projects like Project Grassroots and Project Pioneer with additional value that has accumulated over 30 years or more. This has resulted in a model that has been demonstrated to be successful, and there is currently a waitlist of landholders interested in participating in future projects.

"we've essentially established a program for landholders to bring them on a journey of infinite professional and personal development…We use this framework when we develop projects, because we know it works. We know it works because we've got financial and economic benchmarks, we know that they get improvements in their KPIs in the business, we know that they get growth personally. We know that when the people grow, their land and their ecology grows and improves along the way"

Develop a shared understanding of the system and context

Complete Nutrient Management Planning for Cane Farming (RP161)

Summary

Reef water quality management projects occur in a complex physical, social and policy environment. Too often water quality improvement projects are undertaken without a thorough understanding of the physical, social and policy context. Developing a shared foundational understanding of the system and context by looking at a situation from multiple perspectives leads to a common understanding of the problem. It involves accurately defining the problem, understanding the risks, forming clear goals, objectives and developing an effective method for how to address the problem. Successful projects inherently include multiple stakeholders.

The Complete Nutrient Management Planning for Cane Farming in the Burdekin demonstrates these principles. The goal of the project was a reduction in excess nitrogen loads from Burdekin farms to the reef by finetuning fertiliser inputs using the Six Easy Steps methodology at the farm scale. However, the exact design of the project was informed early on by placing great effort on understanding the situation and context from the growers' perspective and running a pilot project (RP20) to test assumptions.

What was done?

Farmacist, a locally trusted agronomy provider in the Burdekin, worked with farmers to develop tailor-made nutrient management plans based on the 6 Easy Steps methodology that had been successfully piloted in a smaller project – RP20.

At the very start of this project, time was taken to engage with local growers to understand 'the problem' and some of the underlying behaviour, barriers and drivers for practice change using this methodology from the growers perspective. This was done by a team of practitioners that work on the ground and have taken the time to understand the system from the growers point of view. As a project team member notes, drivers for landholders are different to the investor and so this project needed to understand this situation from both perspectives to develop a clear solution:

> *"No farmer rolls out of bed in the morning and says, "I'm going to do something about my water quality". But they certainly want to maximize productivity, profitability, and they are all motivated".*

By understanding the complexities associated with the intended practice change, the project identified early on that a holistic approach would be required to be effective:

> *"There's not one farm that's the same. They've all got different limitations, challenges, soil types, labour force, risk management, cash flow, there's so many variables. Even though it's a nitrogen project, we're not looking at nitrogen in isolation. It's part of a holistic approach".*

Why is it important?

The long-term success of the project lies growers getting value out of the program, which has resulted in a high level of uptake and on-going implementation. The project demonstrated that a shared understanding is critical to provide benefits to both the funding body as well as the farmer. A project team member discussed the benefits of developing a shared understanding of the system and context:

> *"It was really good because we took the time to understand what the values were for the growers, as well as the investor at the beginning. And I see some projects get up where the goal posts are constantly changing, and that could be due to the fact that s a lot of thought wasn't really put into the design of the project and the value to the end user".*

The team member also identified the necessity of understanding the system and context in project success:

> *"if you understand what you're trying to change, make sure there's a valid reason for changing it, understanding that the growers are going to be better off for, to take your advice, and you're meeting what the investor wants, well you can't go wrong".*

What are the benefits?

The project was proven to be successful from multiple perspectives. Major nutrient reductions were achieved in the first year of engagement and there was significant uptake of the program, with an oversubscription of growers willing to participate. The project has continued to build the legacy of the pilot project RP20 which demonstrated that the nitrogen rates in line with reef protection regulations and industry developed methodology SIX EASY STEPS are sufficient to meet the nitrogen requirements of the sugarcane crop. In fact, farm profitability is improved with this level of nitrogen application. The funding body recognised the success of the project and has committed to further funding. Additionally, following the success of the project a similar template was repeated in the other reef catchments.

Negotiate clear goals, objectives and project logic

Complete Nutrient Management Planning for Cane Farming (RP161)

Summary

Reef water quality management projects need to respond to investment priorities of the funding body. However, there is often a disconnect between the funding body's top down priorities and bottom up priorities at the local scale, or realistic drivers for practice change. Negotiating clear goals, objectives and a logical approach for how it's going to achieve these can help bridge the gap between the objectives of the funding body and other stakeholders to ensure mutually beneficial outcome. Successful projects have negotiated clear goals and objectives with multiple stakeholders, to allow a clear line of sight to plan and implement the project without the goalposts changing.

The Complete Nutrient Management Planning for Cane Farming in the Burdekin demonstrates these principles. The overall goal of the project was a reduction in excess nitrogen loads from Burdekin farms potentially getting to the reef. However, in addition to the investment priorities, the project utilised a strong understanding of the system and context through engagement with growers to set clear goals, objectives and a methodology that would produce win-win outcomes for both the investor and growers. Significant effort was put into understanding how the project could achieve win-win outcomes upfront based on sound evidence.

What was done?

Farmacist, a locally trusted agronomy provider in the Burdekin, designed a project to work with growers to develop tailor-made nutrient plans that reduced unnecessary fertiliser usage, and improved profitability. As a project team member from Farmacist notes:

> *"The mark is focusing on what the client wants, not what you want to give the client. And successful projects, the trick to successful projects, and especially reef related projects is to make sure that it is a win-win project that outcomes are beneficial for both. So RP161 helps growers get their fertilizer usage in order. They save money, it maximizes productivity, it meets reef regulations".*

While this method was clear, the project was still flexible and holistic in the way that it worked with individual landholders to achieve practice change. As a project team member from Farmacist notes:

> *"There's not one farm that's the same. They've all got different limitations, challenges, soil types, labour force, risk management, cash flow, there's so many variables. Even though it's a nitrogen project, we're not looking at nitrogen in isolation. It's part of a holistic approach.*

Why is it important?

The project had a clear logic for how and why there should be practice change and the goal posts did not change. Things were adaptively managed as they came up, but overall it was very clear what this project was seeking to achieve and how from the start. This allowed the project to be developed and implemented efficiently and effectively.

> *"It was really good because we took the time to understand what the values were for the growers, as well as the investor at the beginning. And I see some projects get up where the goal posts are constantly changing, and that could be due to the fact that s a lot of thought wasn't really put into the design of the project and the value to the end user".*

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The project was proven to be successful from multiple perspectives. Major nutrient reductions were achieved in the first year of engagement and there was significant uptake of the program, with an oversubscription of growers willing to participate. The project has continued to build the legacy of the pilot project RP20 which demonstrated that the nitrogen rates in line with reef protection regulations and industry developed methodology SIX EASY STEPS are sufficient to meet the nitrogen requirements of the sugarcane crop. In fact, farm profitability is improved with this level of nitrogen application. The funding body recognised the success of the project and has committed to further funding. Additionally, following the success of the project a similar template was repeated in the other reef catchments.

Focus on the bigger picture

Cost-effective restoration of wetlands that protect the Great Barrier Reef (RP152P)

Summary

Projects are always limited in the outcomes that can be achieved due to constraints with project timeframes and budgets. It can be tempting to think about a project in isolation, working only to achieve its own goals and outcomes. But to have a meaningful impact on the Reef, the environment and the community, current and future projects need to be working in synchronisation to establish foundations and collectively build towards long-term outcomes. Successful projects were those that were thoughtful about how they were contributing to something bigger and beyond their own lifespan, purposefully setting up the project to facilitate continual advancement towards a long-term goal, as part of a greater whole.

The 'Cost-effective restoration of wetlands that protect the Great Barrier Reef' project successfully demonstrated this. The overall focus of the project was identifying the cost-effectiveness of restoring wetlands to improve water quality. This was recognised as a significant knowledge gap that has resulted in a lack of inclusion of wetland restoration targets in major reef water quality plans and funding programs. This project had a targeted objective of establishing strong foundations for future work, to facilitate further research and policy development.

What was done?

The project was an Advance Queensland research project with a collaboration between the Queensland Department of Environment and Science (formerly EHP) Wetlands Team, Environment Policy and Planning, and Griffith University. Significant effort was placed up front in co-designing research questions to ensure that the outputs and outcomes of the work could be practically used by policy makers. The project investigated the nutrient removal capacity and additional ecosystem services of different types of wetlands and subsequently made recommendations on the most cost-effective wetlands to restore. A project team member summed up the wider implications of the project below:

> *"This has been a major question that we've had for 18 years in wetlands and we haven't been able to answer itt. For the last scientific consensus statement there was, very limited direct information on the role of the nitrogen removal body wetlands. We had to use external and overseas literature. We had nothing to go on really in Queensland except one single paper that was quite limited. And this project has basically succeeded in delivering multiple outcomes for us and answering a very significant amount of the questions that we had. And also it's recognised that wetlands are much more significantly in terms of the roles in water quality improvement in the reef than they were before. … So it's a very effective project".*

Why is it important?

By embedding the bigger picture into the project design the project significantly contributed to longer-term reef water quality goals. The project was successful in big picture terms, by contributing to the knowledge base which informs reef water quality policy as well as building a research community of practice with relationships to the DES wetlands team.

> *"We continue to have expert workshops with a whole range of scientists that didn't exist beforehand. So we have a community of practice now when we never had before. And every time that we fill a gap, we identify another one. And so, the project is continuing to keep addressing gaps… we actually needed to come up with this conceptualisation of how wetlands are functioning in terms of nutrient removal".*

The project has set foundations to continue to address information gaps through a community of practice and has established foundations to practically use the information.

> *"We've actually got these conceptual models that will be going online that synthesizes this information. And attempts have been made to work with modellers and we've already done a paper on modelling the role of wetlands in nutrient removal. And our intent with the next project is to actually try and embed the findings into the catchment models so that the real role of wetlands and nutrients removal would be understood".*

What are the benefits?

This project successfully achieved its objectives of making recommendations of the most cost-effective wetlands to restore based on research specific to the Great Barrier Reef. The research outcomes have been used including in economic modelling and the development of conceptual models of wetland nitrogen removal. Additionally, the research has facilitated further research and policy development, including a further extension of funding to expand the project.

Embed outputs and outcomes

Cost-effective restoration of wetlands that protect the Great Barrier Reef (RP152P)

Summary

The legacy and outcomes from projects don't always stop when the money runs out, there are important roles and responsibilities for ensuring that project outputs and outcomes are not only shared, but actively used to influence other Reef outcomes. It can be tempting to think about this as an activity that occurs at the end of a project, but projects that successfully embedded outputs and outcomes to maximise impact were aware of the intended legacy of the project early on, and took steps throughout the project to ensure that this happened effectively.

The 'Cost-effective restoration of wetlands that protect the Great Barrier Reef' project successfully demonstrated this. The overall focus of the project was identifying the cost-effectiveness of restoring wetlands to improve water quality. From the very start of this project, a co-design process was undertaken to ensure that information produced through the research could be practically drawn on by multiple uses, and continue to be built upon by others. Furthermore, the project was established in a way that ensured that there was a continuous science-policy relationship that has successfully influenced policy design.

What was done?

The project was a collaboration between the Queensland Department of Environment and Science (formerly EHP) Wetlands team, Environment Policy and Planning, and Griffith University. The project investigated the nutrient removal capacity and additional ecosystem services of different types of wetlands and subsequently made recommendations on the most cost-effective wetlands to restore. Researchers sat within the Wetlands team several days per week, which allowed for a continuous and informal dialogue. This informed research questions that were relevant to policy and facilitated multi-directional learning. The project focused on providing policy makers with scientific information continually as it was developed.

Policy makers benefitted from interaction with researchers through enhanced knowledge and skills, and information about other pertinent research. Researchers benefitted as they gained a nuanced understanding of the policy or practice environment. Subsequently, they developed and pursued research questions that have real-world applicability, and, through ongoing conversations with policy makers, interpreted results with a deeper understanding of contextual circumstances. This, in turn, enhanced the usefulness of the research findings.

A project team member from the research side stated that:

> *"sitting here with a team and learning how they work and what were the things that they require … I was able to understand what things they needed and when do they need it and what scale, at what sites".*

A project team member from the policy side explained that:

> *"the answers that came out of it were actually basically directly related to the question that we actually had. Which was what was the role of wetlands in terms of nutrients, particularly nitrogen removal".*

Why is it important?

With the outcomes and outputs embedded into the project design from the beginning, the project team was able to ensure that the effort and investment put into this project had a real and positive impact. Indeed, the relationship developed between the researcher and the department meant that information could be continually provided and tailored for policy uses in a timely manner throughout the life of the project. It was noted that policy can change rapidly, but good science takes time, and it is important to inform policy with the best knowledge there is at the time, even if its incomplete or not perfect. A project team member summed this up below:

"Griffith university were very happy to share the data and information very early in the piece. And was really enthusiastic about it. So in sharing that information earlier than when it was published, we were able to, with caveats at least know what the outcome of the research was… if you have to wait until the paper is published, the policy issue has moved on".

What are the benefits?

This project successfully achieved its objectives of making recommendations of the most cost-effective wetlands to restore based on research specific to the Great Barrier Reef. The research outcomes have been widely used including in economic modelling and the development of conceptual models of wetland nitrogen removal. Additionally, the research has facilitated further research and policy development, including a further extension of funding to expand the project.

Establish a fit for purpose governance framework

Project Catalyst

Summary

Fit for purpose governance systems at that project scale underpin multiple aspects of a successful project. A core aspect of any governance system is establishing clear project protocols at the start of a project. When not established early in a project's life, a lack of project protocols can lead to a loss of confidence and respect, cause major time disruptions and create conflicts between stakeholders.

Project Catalyst provides a good example of clear project protocols including:

- Establishing clear roles, responsibilities, expectations and accountability among partners, contractors and stakeholders.
- Establishing clear processes and expectations for data collection, data representativeness, management and sharing upfront.

The multi-layered governance structure of the project team lends itself to transparency and accountability. The structure includes Project Officers and Coordinators to General Managers, to a Board of Directors, who were all held to account for their deliverables. The benefits of which are pointed out by a project team member:

> "*Having that structure there of checks and balances on a number of levels to make sure that the money's being handled correctly, the deliverables are being met, the outputs of the reporting, and the trial reports, and the grower stories, et cetera, are being met. I think that gives confidence to the people involved with the project, knowing that it's not being run out of someone's backyard.*"

What was done?

Project Catalyst identifies, implements and validates pathways to rapid adoption of enhanced management practices, leading to significant water quality improvements for the Great Barrier Reef. Innovation and early adoption trials are conducted as part of the project. The project fosters a 'grower led' approach, where landholders have input on all aspects of the trials and share their story with other growers' to promote peer to peer learning.

Early in the project, clear project protocols were established with contractors to provide agronomic support to landholders, including their workload, reporting, data collection, management and sharing. In addition, templates and examples were provided to contractors to set out clear expectations. A project team member describes the process of engaging contractors to undertake the work:

> "*It goes right through from the legal side of things, we actually contract these people, and we're quite specific and detailed in what our expectations are. They get as part of the contract a standard that these reports are due on these dates and these months. This is the type of detail that is expected. These are the templates we will use, here's how many growers that you will do trial work with. Obviously, there's communication that happens before that and negotiation, where we decide together about how many trials can they handle, how many adoption pieces of work can they do. Once they've sort of agreed on the workload then they're locked in, and we hold them to account on that".*

This ensures that the work undertaken by contractors is clear and mets multiple expectations for the project.

Additionally, it was made clear and agreed with landholders that all the data and information will be shared, which reduces the risk of resistance later on in the project once the landholder realises that they will be expected to put all their

information online and be publicly accessible. A project team member points out that:

> *"there are no secrets, it is all there for them to see. That sort of a learning as well that the transparency of the outcomes of the work that you've done need to be very upfront, so that people understand that it's going to be made available, so that other people can use it and make informed decisions with it."*

Why is it important?

Project Catalyst is now in its twelfth year and has expanded from operating within the Mackay region to include the Burdekin area and up into the Wet Tropics. Establishing and maintaining a fit for purpose governance structure and clear project protocols has enabled the project to expand, whilst ensuring that the outcomes are of a consistently high standard. Embedding a consistent reporting framework early on, including a quarterly, bi-annual and annual reporting scheme, ensures that results have been consistently quantified and demonstrate the success of the program. This in turn has led to further funding and further uptake of the program by landholders. The multi-layered governance structure has ensured oversight of the project and that outputs are consistent with what was agreed upon.

What are the benefits?

The results of the trials are openly available, so learnings are shared widely. In addition to successful trials, the project acknowledged from the outset that not all trials will produce positive results but identify these projects as important in flagging practices that should not be pursued. This project continues to produce significant reductions of agricultural pollutants contributed to the Great Barrier Reef, a major increase in capacity and knowledge base of growers and a major reduction in costs of fertiliser application.

Build capacity and capability

Project Catalyst

Summary

Building the capacity and capability of stakeholders maximises the potential for positive change with sustained outcomes. Successful projects are strategic about providing the 'right' information and support to build capacity and capability. Successful projects are thoughtful about the key audience and provide a variety of opportunities to build capacity and capability that caters to different learning styles.

Project Catalyst demonstrates building capacity and capability through successful peer to peer learning. The project leveraged the experience of early adopters to promote further practice change. The project did this well by gathering high quality data for effective communication, and producing multiple grower 'success stories' to promote peer to peer learning. A project team member describes the importance of capacity building in terms of peer-to-peer learning:

> *"peer-to-peer learning is critical. In particular with agriculture, but perhaps in all industries where growers will tend to take advice from extension officers and agronomists. They'll do a bit of research on their own in these days of the internet, but one grower being able to relay their experiences to another grower is where they pick up the most information."*

What was done?

Project Catalyst identifies, implements and validates pathways to rapid adoption of enhanced management practices leading to significant water quality improvements for the Great Barrier Reef. Innovation and early adoption trials are conducted as part of the project. The project fosteres a 'grower led' approach, where landholders have input on all aspects of the trials.

Two major components of the project facilitate sharing of knowledge between growers. Firstly, the project provides agronomic support to early adopters to undertake an innovative trial and capture the information and data required and share the results of the trial to other growers with confidence. Secondly, the project identified that peer to peer learning is the most successful when growers are presented with 'success stories' of someone that is similar to them, or in a similar situation. The project sought out multiple pathways to support grower networking and share success stories in a variety of formats which cater to different engagement and learning styles. This includes one-on-one interactions, farm shed meetings, conferences, as well as a variety of communication products. One thing that Project Catalyst prides itself on is developing a case study and providing the information online for every successful trial that is undertaken.

A project officer explains the project as such:

> *Project Catalyst, its innovation of farm management systems leading to practice change, and then broader adoption, and hopefully then that becoming a best management practice. You need to support your leaders within the group who tend to influence the broader growing community, we need to support them with the scientific information. That's where your agronomists and that come in handy because they're the ones that are generating the reports and the data, and assessing the findings. We support them with that sort of information in bite sized chunks…. You've then got the numbers behind it, and that's the whole idea behind trialling this stuff with some science behind it, is then you're backing up the anecdotal information with scientific rigor, but presenting it in such a way that the general community can understand.*

Why is it important?

Project Catalyst is now in its' twelfth year and has expanded from operating within the Mackay region to include the Burdekin area and up into the Wet Tropics. A project team member discusses the importance of the capacity building:

> *"If you don't have that ability for the people involved to be able to share their learnings and information with other people within their group, I think it doesn't stop practice change happening, but it certainly slows it down."*

The project team member goes on to say:

> *"I truly believe it's been a very successful project. You can gauge that by the number of growers that have remained loyal to it and are still involved with it 12 years later, the new growers who are vying to be part of it because they've heard what it does, the funding sponsors who, in some cases, have been involved with it, again, from the beginning, putting money into this because they can see the results that it generates. Then I look to the actual outputs of it. There's a number of farming practices, like I mentioned before, that were trialled, started being trialled, 10 years ago, 12 years ago, that are now considered industry best practice".*

What are the benefits?

This project has seen successful peer to peer learning that has built the capability and capacity of individual growers, as well as advancing industry standards. The success of sharing growers' stories has prompted further funding of this project to include additional growers who are interested in implementing a practice change they have seen from another grower involved in Project Catalyst.

Build interpersonal relationships based on trust

Landholders Driving Change (TF8.2.1)

Summary

Strong interpersonal relationships built on trust have been shown to underpin successful projects by building strong collaborative working relationships. Establishing trust with a landholder has also been shown to be a critical factor for successfully facilitating practice change. Getting the conditions right to facilitate the development of strong interpersonal relationships over time, or within the life of a project can be challenging. Successful projects were considerate of the timeframes required to build relationships, setting up the right foundations, and the behaviours and attitudes that can promote or break strong interpersonal relationships.

NQ Dry Tropics leads the delivery of the Landholders Driving Change (LDC) Project which provides a good example of building strong interpersonal relationships with landholders, scientists, industry and government. Trust has been critical to the high degree of collaboration through the design phase, overall level of engagement in the project, and has established strong foundations for future behaviour change outcomes.

What was done?

LDC aims to reduce erosion and deliver accelerated progress towards water quality outcomes through empowered communities who manage healthy and productive landscapes. Delivered within the Burdekin Region, the project relies heavily on behaviour change outcomes from graziers. The involvement of graziers in a co-design process is seen as a cornerstone to driving change. As noted by NQ Dry Tropics:

> *"In order for the project to be truly grazier-focused, it was critical to involve them from the very start of the design process… our goal is to engage and get everybody participating and adopt a good relationship ethic. We've just got to find the trigger that does that… that means that the LDC has resulted in a design and a delivery that is very tailored to individual needs, and is very flexible in its approach".*

The co-design process has been a key aspect in forming strong interpersonal relationships but is also in turn required to create safe spaces that support strong collaboration.

> *"There's a couple of really important things… one is providing an environment in which different perspectives can be heard. What we've done, particularly with the project panel, which brings together government industry, graziers, and scientists, is provide an environment that is very safe and respectful … no one perspective is right or wrong"*

> *"The stakeholder collaboration is very, very intense with landholders driving change. It takes time and money to invest in, support, and continue that. But it also builds that trust and allows that sharing and transferability…".*

Why is it important?

Building strong relationships based on trust has been demonstrated to be important for the co-design phase to promote collaboration. It is also a critical ingredient for long term behaviour change that is required for the project to reach its high-level outcomes of accelerated water quality outcomes and a culture of stewardship.

> *"I don't think you can undervalue or underestimate the importance of trust… At the end of the day, land managers need to trust us, in terms of going on the journey, and in terms of the advice we are giving."*

Involving graziers from the start of this project in the design process is also a key success factor because building strong relationships takes time. Starting out with

low risk activities such as attending meetings and workshops has been demonstrated to be more successful in establishing trusting relationships rather than trying to get practice change outright. As highlighted:

> *"There is a saying that change will happen at the speed of trust, and it's not something that happens overnight. So you can't just put all the ingredients into one workshop and go yeah, they trust us now, off we go".*

The project planned and catered for trust to be built at different scales. Providing opportunities for one on one interactions, peer to peer, cluster groups, sub catchment and whole of catchment events, it also allowed the project team to build strong relationships where they had not previously existed, establishing new forms of networking and social capital in the region. This also enables trust to continue as stakeholders change. As noted by NQ Dry Tropics:

> *"I think some of the ingredients to building that trust over time is the experienced and well respected team members. However, through the LDC project, it has been proven that we can have new team members come on and with the right support they are able to grow their own experience, build those relationships and form their own trust levels".*

What are the benefits?

The LDC project is successfully meeting the following project outcomes that have been enabled through strengthened relationships and trust at all stakeholder levels:

- Improved land management is achieved through conventional practice change support as well as a suite of new incentives for grazing properties. Trust is required to allow new ideas to be trialled.

  The integrated approach has doubled the number of properties committing to initiatives that will lead to improved land management within the catchment (currently 78 properties).

- Many of the ideas suggested from landholders during the grassroots design are being implemented, with oversight of a project panel comprised of 50% landholders. This has led to increased trust throughout the catchment and facilitates change.

  Overall engagement numbers are trending upwards. The depth and breadth of engagement is most significant, with 80% of landholders now taking part in 2 or more activities, up from 49% before this project

- Collaboration is a key component of the integrated delivery model, bringing together multiple stakeholders and strengthening relationships between all parties.

  Landholder engagement is also facilitated in policy development, review, and implementation. This collaboration supports graziers to better understand regulatory requirements, and has enabled them to work with government to review how regulations and policies may operate.

- Increasing knowledge, attitudes, skills and aspirations (KASA) throughout the catchment ensures stakeholders are equipped to continue improvements for years to come. This is achieved through formal arrangements (workshops, training, specialist technical advice) and leveraging relationships (peer to peer, clusters, catchment catch-ups).

  The impact of the training is also likely to be felt beyond those directly involved, with 83% indicating that it was likely that they would share what they had learned more widely within their own networks.

Reflect, review and revisit the program logic

Wet Tropics MIP (TF8.3.1)

Summary

There is not always a silver bullet when it comes to reef water quality projects, we are still trying to innovate, things don't always go exactly as planned, new aspects emerge and assumptions are made and realised. The only way to manage these things is to continually reflect, review and revisit the project logic in order to adaptively manage. Successful projects pre-anticipated this and set in place systems or procedures to support ongoing adaptive management. While the development of project logics and Monitoring, Evaluation, Reporting and Improvement (MERI) plans are becoming more common, it is still a challenge to use these well as a tool to drive continual improvement.

The Wet Tropics Major Integrated Project (WTMIP), funded by the Office of Great Barrier Reef, provides a good example of a project that embedded MERI processes into the project to continually review project progress, adaptively manage and learn as the project is being delivered. The Wet Tropics MIP is an innovative project and therefore the need to 'learn while doing' was identified upfront as a key component.

What was done?

The WTMIP relied heavily on a monitoring and evaluation strategy as the key framework to support adaptive management. In addition, it was also the subject of adaptive management itself.

Tools for collecting monitoring data have been embedded into the day-to-day work and governance of the MIP rather than relying on "point-in-time" evaluations which independently gather data on progress. In this way, monitoring and evaluation is not something that is done as a separate activity to mainstream project implementation or at the end of the project alone. The monitoring tools focus primarily on the "people and partnerships" impacts of the project, as opposed to the practice change and water quality impacts, which are tracked through the Paddock to Reef system. The project team was seen as fundamental to ongoing review and evaluation, and the project aimed to build a learning culture within the project team to support collaborative adaptive management throughout the life of the project.

Adaptive management is most often overseen by one organisation but in the instance of the MIP there was collaborative involvement of partners, community and individual participants as active participants in the process, predominantly through the cross-sector/cross-industry project panel.

Why is it important?

Providing opportunities to reflect and review is fundamental for identifying key learnings as the project progresses, ensuring that the project can be adjusted as the results of various actions are evaluated. These adjustments are tracked in regular milestone reporting. As noted by a project team member:

> "*For this project, it's about learning while doing… we're changing as we go and rather than having very, very, very hard milestones we work closely with OGBR to adjust according to what we learn".*

A well-developed monitoring and evaluation structure is critical to determine timely steps for testing, assessing, and adapting actions. As identified in the monitoring and evaluation strategy:

> *"When it works well it encourages learning, innovation and experimentation and can improve links between experience, observation, science, evidence and decision-making".*

Involving a broader range of individuals beyond the project team in collaborative adaptive management was a critical component for building capability and capacity

as the process encourages learning and innovation. As identified in the evaluation of the design phase (Taylor & Eberhard, 2017):

> *"We want to be open to what is coming out of the community – we want this to be an opportunity to learn together…to have a view to beyond the life of the project".*

What are the benefits?

The Wet Tropics MIP has successfully established a monitoring and evaluation structure and framework that has resulted in continual reflection and improvement of the project at a range of levels, throughout implementation.

The MIP is an innovative project and the learnings captured throughout the process are a key factor to understanding the transferability of the MIP approach for other locations in the Reef catchments.