



Australian Government



Queensland Government

# **Human dimensions: social factors influencing agricultural management practice adoption**

## **Methods**

Reef Water Quality Report Card 2020

Reef 2050 Water Quality Improvement Plan



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# HUMAN DIMENSIONS: SOCIAL FACTORS INFLUENCING AGRICULTURAL MANAGEMENT PRACTICE ADOPTION

This report updates the method to collect, assess and report the social factors that influence agricultural management practice adoption against the 2025 Human Dimensions target in the Reef 2050 Water Quality Improvement Plan (Reef 2050 WQIP; Australian and Queensland governments 2018). This report outlines the results of the 2019-2020 social monitoring data and recommends presentation format for these data.

Out of scope of this statement is the supporting communication regarding the release of this data which will be handled as part of the Reef Water Quality Report Card 2020 communication strategy.

## Introduction

The Reef 2050 WQIP recognises that a range of human dimensions (i.e., social, cultural, institutional, environmental and economic factors, see Figure 1) play a role in shaping outcomes associated with water quality and the Great Barrier Reef (Australian and Queensland governments 2018a, p. 20). The Scientific Consensus Statement 2017 also recognised that 'further consideration of economic and social dimensions is needed in the development and implementation of programs to improve water quality' (Waterhouse et. al 2017, p. 8). Further, achievement of the land management targets to improve the quality of water flowing to the Great Barrier Reef will only be delivered by supporting industries and communities to build a culture of innovation and environmental stewardship towards agricultural land management adoption (Australian and Queensland governments 2018a, p. 7). Accordingly, the Reef 2050 WQIP set a human dimension target as follows:

- *Active engagement of communities and land managers in programs to improve water quality outcomes is increased.*

The effectiveness of the Reef 2050 WQIP, including the human dimension target, is monitored and reported through the Paddock to Reef Integrated Monitoring, Modelling and Reporting Program (Paddock to Reef program). The Reef 2050 WQIP highlighted that the human dimension target was to be further refined as indicators or measures relevant to Reef water quality were identified and a baseline developed (Australian and Queensland governments 2018a, p. 20). The following action was set:

- Develop a baseline for a variety of practice, behavioural and attitudinal drivers that influence Reef water quality. The baseline will be consistent with related Reef 2050 Plan Targets (Action 7.3, p. 50-51).

## Methods

As the lead agency for developing a human dimension baseline, the Office of the Great Barrier Reef (OGBR), Department of Environment and Science, funded a project to understand the human dimension indicators of agricultural innovation and stewardship behaviours (Hobman and Taylor 2018). The project identified key 'themes' and six social monitoring questions to include in the existing Paddock to Reef agricultural management practice adoption questionnaire for the cane, grazing, grains, horticulture and banana industries. The quantitative measures will inform a social monitoring baseline against the Human Dimensions target for future Reef water quality report cards.

The Paddock to Reef Integrated Monitoring, Modelling and Reporting Program: Program Design 2018-2022 (Australian and Queensland governments 2018b, p. 47-49) outlined a phased approach for the addition of questions that assess the social monitoring factors<sup>1</sup>. The approach included development, testing and consultation in the 2022 Paddock to Reef program design review.

First year data, collected from a suite of cane and grazing projects, is presented in the Reef Water Quality Report Card 2020 with supporting communication handled through the Reef Water Quality Report Card 2020 communication strategy.

## Applications of the data collection

The primary purpose of the human dimensions data is to provide a measurement of the social monitoring responses regarding agricultural management practice adoption and to create a baseline plus ongoing trend data to report progress towards the Reef 2050 WQIP human dimension target in the Reef water quality report card. The data also has several other important applications including:

- Providing insights into why (or why not) landholders are making particular land management decisions and the differentiating factors.
- Informing the design of future water quality investment programs by utilising the knowledge of the drivers and barriers of management practice adoption by landholders and providing an assessment to identify areas for improvement.
- By tracking progress over time, the data will provide an indication of likely trajectory of practice change.
- Comparing and understanding the effectiveness of different interventions across region, commodity and program scales.

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<sup>1</sup> The Paddock to Reef Integrated Monitoring, Modelling and Reporting Program: Program Design 2018-2022 indicated that the phased approach to the addition of social factors to the Paddock to Reef Management Practice Adoption (MPA) questionnaire would be fully operational by March 2019 and that a baseline would be developed using existing monitoring and evaluation datasets (p. 48-49). However, due to the small number of datasets available across commodities and poor alignment between the available datasets and the identified social factor themes, a baseline was unable to be established (Jarvis, Taylor and Hobman, 2018). This necessitated delays in expected delivery timeframes.

- Providing feedback to delivery organisations on the drivers and barriers of change which can be used to adaptively manage the program design and delivery to meet the needs of involved landholders and achieve greater outcomes.
- Providing opportunities to align the data with the regional report cards with regards to how stewardship behaviours are reported and monitored across industries.
- Informing and creating a data flow to the Reef Integrated Monitoring and Reporting Program human dimensions reporting process.
- Providing internal reports to the Queensland and Australian governments on the social impacts of their respective investment.

## **Social factors that influence agricultural management practice adoption**

In the review of human dimension factors that are directly related to agricultural management practice change, Hobman and Taylor (2018) identified seven themes to help develop the social monitoring, and recommended measures. These thematic variables (refer Table 1) demonstrated both strong conceptual validity and supporting empirical evidence.

**Table 1. Identified themes that influence agricultural management practice adoption (Hobman and Taylor, 2018)**

<b>Theme</b>	<b>Description</b>
Attitudes (towards the practice)	How attractive, beneficial/advantageous (relative to the current practice), and/or risky is the practice.
Perceived behavioural control	How easy or difficult it is to perform the practice (self-efficacy/capability), and whether it is within one's control (perceived control).
Perceived barriers (control beliefs)	The extent to which one perceives that certain barriers are impeding performance of the practice.
Motivation	How motivated one is to perform the practice, and whether this is for intrinsic or extrinsic reasons.
Behaviours (past and future)	Whether the practice (or precursor practices) has been used in the past, and whether there is a stated intention to trial or use certain practices in the future, in a particular situation, or at a particular time.
Group norms	Whether other land managers/ farmers in the community (with whom one has strong ties) approve of and perform the practice themselves.
Trust	Level of trust in information sources and advice networks related to improved practices.
Cultural norms and artefacts	Community- and industry-level norms that encourage/facilitate innovation and stewardship practices.

Except for cultural norms and artefacts, the identified themes are classified as ‘social factors’ that measure the human dimensions that directly influence the capacity, motivations and barriers of landholder engagement and management practice adoption.

The themes were tested in a pilot project, with extensive stakeholder consultation to guide the format and design of Paddock to Reef questions (Appendix 5 and 6).

## **Question/s format and design**

In addition to the social monitoring questions, a project extension officer records:

- whether the survey is being completed before or after a practice change
- project ID – a unique identifier
- project description – ascribes the survey to a program/delivery agent
- specific Great Barrier Reef catchment
- specific agricultural commodity
- management practice – nominated practice (Table 3) the landholder is considering changing (at the commencement of the project) or has changed (at the end of the project).

**Table 3. Agricultural management practice options for each commodity**

<b>Commodity</b>	<b>Management practice</b>
Cane	<ul style="list-style-type: none"> <li>• changing my fertiliser management</li> <li>• changing my soil management</li> <li>• changing my pesticide management</li> <li>• changing my irrigation management</li> <li>• becoming Best Management Practice (BMP) accredited</li> </ul>
Grazing	<ul style="list-style-type: none"> <li>• changing my pasture management</li> <li>• changing the way I manage streambanks</li> <li>• changing the way I manage gullies</li> </ul>
Grains	<ul style="list-style-type: none"> <li>• changing my soil management</li> <li>• changing my fertiliser management</li> <li>• changing my pesticide management</li> <li>• becoming BMP accredited</li> </ul>
Horticulture	<ul style="list-style-type: none"> <li>• changing my soil management</li> <li>• changing my fertiliser management</li> <li>• changing my pesticide management</li> <li>• becoming BMP accredited</li> </ul>
Bananas	<ul style="list-style-type: none"> <li>• changing my soil management</li> <li>• changing my fertiliser management</li> <li>• changing my pesticide management</li> <li>• changing my irrigation management</li> <li>• having 60% covered ground, living or dead</li> <li>• becoming BMP accredited</li> </ul>

The nominated management practice is the focus for the remaining social monitoring questions. Landholders are asked to respond as follows:

*Attitude.* A five-point scale (1 = strongly agree to 5 = strongly disagree, 'don't know' or 'decline to answer') to the statement "*I think this farming practice is a positive thing to do on my farm*".

*Self-efficacy (perceived behavioural control).* A five-point scale (1 = strongly agree, 5 = strongly disagree, 'don't know' or 'decline to answer') to the statement "*I feel that this farming practice is easy to do on my farm*".

*Group norm.* A five-point scale (1 = strongly agree to 5 = strongly disagree, 'don't know' or 'decline to answer') to the statement "*Most farmers in my local area and industry have adopted this farming practice*".

*Motivation.* Landholders are asked to select up to three (3) "main reason/s for implementing this farming practice". The options are:

- I received government funding (e.g. a grant or incentive)
- It will increase profitability
- It will increase production
- To save time
- To save money
- To comply with regulations
- It will benefit local water quality
- It will benefit the environment
- For my family
- There are no reasons to change
- Other landholders in my area have adopted this practice
- I don't know/I need more information to answer this question
- I'd prefer not to answer
- Other (free response)

*Barriers.* Landholders are asked to select up to three (3) “main challenge/s in relation to implementing this farming practice”. The options are:

- I am worried about a reduction in production
- I am worried about a reduction in profitability
- I do not have the time
- I need more information before I can make a change
- It costs too much
- I don't think it will make a positive water quality impact
- It is not the way I have managed my farm in the past
- Weather and seasonal issues
- I tried it before and I was not happy with the outcome
- Lack of family support
- I am constrained by the availability of contractors and/or contractors' equipment
- There are no challenges/difficulties
- I'd prefer not to answer
- I don't know/I need more information to answer this question
- Other (free response)

*Attribution.* As a free-response question, landholders are asked to *list “all people, projects, grants or events that have helped with or contributed to you adopting this farming practice”.*

## **Reef Water Quality Report Card 2020 – social monitoring reporting**

Social monitoring to support the 2025 Human Dimensions target in the Reef 2050 WQIP has been in place since mid-2019 and, as such, is still in early stages and continuously developing and improving both data collection and reporting. The planned reporting scale, assumptions and issues associated with the data was extensively workshopped with the Human Dimensions Working Group and experts were engaged to assist with reporting (Dr Tracy Schultz and Dr Angela Dean).

### **Reporting scale**

The pathway for reporting social monitoring data in the Reef water quality report card will vary slightly from year to year, depending on the data availability and granularity, emerging trends and the content management system (CMS) capability. The current CMS does not allow for interactivity details, so a visually simple approach has been chosen. New features including interactivity and a split of data per region and other commodities will be added in future reports.

Data have been collected from the grazing, cane and banana industries. However, only the grazing and cane industries have sufficient data for inclusion in Report card 2020. Banana industry data will be included in future report cards. The granularity of data collected from the grazing and cane industries varies across Reef regions and in some regions, numbers are well below the threshold. The threshold for minimum reporting is set at 50 records per region and commodity, which is considered a

reasonable level to ensure a greater level of confidence in the data and farmer cohort anonymity.

## **Case studies**

In addition to social monitoring data, the Reef Water Quality Report Card 2020 will also include narrative case studies to share examples of individual practice change journeys and personal grower stories.

## **Data collection issues**

The current data collection mechanism is still under development to increase functionality of pairing data from one year to the next. Further, social monitoring is voluntary and farmers can choose to report in one year but not the next. For this reason, and to report on industry trends, data is aggregated to present the results of a whole cohort, while noting that the individuals in the cohort may potentially be different. The relevant information is presented at a project level and only projects that have provided 'before' and 'after' data are included in analysis. Those that have provided only 'before' data will be reported in future report cards. This limits the current size of the data set; however, it presents an approach more consistent with the management practice adoption reporting.

The key social findings from the Human Dimensions program will be presented as follows in the Reef Water Quality Report Card 2020:

- Two infographics (grazing and cane) showcasing motivations (before engagement in the project), barriers, attitudes and self-efficacy (after engagement in the project).
- Data (graphs) supporting the two infographics (Appendix 1).

## **Future Reef water quality report card considerations**

Future Reef water quality report cards will seek to include:

- Aggregated paired data at the deidentified landholder level 'before' and 'after' engagement.
- A five-year trend of cumulative data reporting, aligning with the Paddock to Reef program design which also allows for program design reviews at those points in time.
- Data at a commodity level and by Reef region.
- Infographics to communicate social data at the higher level.
- Updated grading scales: social monitoring data should not be reported in an ABCD grading scale as this has been identified as inappropriate for this type of social monitoring.
- Further testing with stakeholders and users of report cards.

## Data limitations

**Table 5. Limitations of data collection approach**

Limitations	How is it addressed:
Relies on delivery organisations appropriately collecting social monitoring data.	<ul style="list-style-type: none"> <li>• Training.</li> <li>• Cross validation with qualitative survey data.</li> <li>• Established quality assurance and quality control processes (see section below).</li> <li>• Expert review with Human Dimensions Working Group and delivery agents.</li> </ul>
Potential for response bias due to existing relationships between the landholders and those delivery agents administering the questionnaire.	<ul style="list-style-type: none"> <li>• Training on the role of response bias and strategies to minimise.</li> <li>• Landholder consent processes to establish the purpose of the study and reassurance regarding data confidentiality.</li> </ul>
Data of participating landholders is currently captured with no mechanism to report non-participating landholders. This limits the generalisability of the results; however, the current reporting still yields valuable behavioural insights.	<ul style="list-style-type: none"> <li>• Acknowledgement and appropriate use of the data.</li> <li>• Collecting similar data from other lines of evidence (e.g. extension officers)</li> <li>• Seek other opportunities to collect data from a range of stakeholders in the practice change value chain (i.e. potentially as part of <a href="#">Management Practice Adoption</a> baseline reset in 2022).</li> </ul>
Data is collected from landholders in Australian or Queensland government funded programs: some regions and commodities will not have social monitoring data reported against the Human Dimensions target.	<ul style="list-style-type: none"> <li>• Where no or limited data (below 50 records) exists for a region and/or commodity, this will be stipulated in the report card as N/A (Not Applicable).</li> </ul>
Minimum standards for data quality and assumptions for analysis, including minimum sample sizes, may not be met.	<ul style="list-style-type: none"> <li>• Data will not be published if data quality standards and assumptions for analysis are not met.</li> </ul>

<b>Limitations</b>	<b>How is it addressed:</b>
Data collection mechanism issues including inability for data pairing at the landholder level.	<ul style="list-style-type: none"> <li>• Investigate options to facilitate pairing of data.</li> <li>• Other data collection mechanisms will be considered. Data pairing is important to report and adapt programs based on changes that happen at the landholder level, to accurately reflect their engagement in the practice change journey.</li> </ul>
Survey questions limitations, including scale and demographic and refinements needed.	<ul style="list-style-type: none"> <li>• Consult with extension providers and industry in advance to determine changes that are required to the social monitoring questions. This will be completed in time to inform the Paddock to Reef program design review.</li> </ul>
Database limitations involving download and transfer processes posing risks to integrity.	<ul style="list-style-type: none"> <li>• Investigate database options that allow upload and download efficiencies as well as effective analysis and reporting.</li> </ul>

## Data privacy and informed consent

The program complies with the *Privacy Act 1988* and the privacy of the landholders completing the Paddock to Reef Management Practice Adoption questionnaire is protected. Social monitoring data is linked to de-identified management practice adoption data through a unique identifier (Project ID) created by the delivery agent. At no stage does the Office of the Great Barrier Reef have access to, or receive, the 'spatial layer' data or any other identifying information.

Answering the social monitoring questions is voluntary for landholders and participation is initiated through an informed consent process.

## References

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