

Private Transaction Costs of Best Management Practices (BMP) through Reef Rescue

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Executive summary

Private transaction costs or hidden costs are the cost of a landholder's time and effort invested in learning about, trialling, adjusting and implementing a change in land management over time. Transaction costs are also incurred due to the expenses incurred throughout information collection etc (e.g. cost of travel, cost of information purchase etc). These are referred to as financial transaction costs. The understanding of private landholder transaction costs is limited despite the claims that transaction costs can have a major bearing on the adoption of best management practices (BMPs) such as those of the Australian Government's Reef Rescue initiative.

The aim of this research was to generate an understanding of the extent and drivers of transaction costs borne by sugarcane farmers in their Reef Rescue applications and activities. Through a mail out mail back landholder survey sent to 546 landholders and answered by 110 landholders (20% response rate), we analysed:

- 1) the extent of transaction costs involved in applying for and implementing BMPs under Reef Rescue (plus an analysis by practice type such as sediment, nutrient etc. and extent of change such as C to B etc.);
- 2) which BMP application and implementation activities generate the largest transaction costs;
- 3) what type of landholders incur transaction costs; and
- 4) if and how transaction costs affect adoption of BMPs.

By exploring the nature, extent, distribution, cause and influence of transaction costs we provide recommendations on how transaction costs can be managed for improved policy delivery outcomes. Through the survey we also gained an understanding of the overall landholder experience of applying for and implementing Reef Rescue funded BMPs. Key findings are presented below.

The growers

- Most of the respondents were male with a fairly basic level of formal education and had been growing sugarcane for a relatively long length of time (>21 years) on a property which they own. The respondents were a good representation of growers making only small turnovers (<\$50K per year) through to growers with large turnovers (>\$501K per year).
- Most respondents had a very good understanding of the link between their farm management activities and the quality of the water on the Great Barrier Reef (GBR). Accordingly, most respondents had already implemented or intended to implement the Reef Rescue funded BMPs to most of their cane area. **Most respondents also had a strong understanding of the link between the BMP and GBR water quality.**
- For most respondents, Reef Rescue funding was seen as making environmental improvements on the property financially possible.

The experience with Reef Rescue

- For most respondents, the Reef Rescue funded BMPs were noted to reduce operating costs and maintain yields therefore the BMPs were seen to be **profitable land management activities**.
- For most respondents, the application process was easy and the rules for applying were considered to be fair. The majority of respondents interacted with an extension person in the development of their application which was noted to bring down the transaction costs. Despite this, a large number of respondents noted that they would like **more training specifically about the BMPs**. Most respondents were satisfied with the timeliness and level of funding provided by Reef Rescue.
- Implementing BMPs have not significantly changed the time farmers spend out in the paddock¹.
- Almost all respondents noted that they would be interested in adopting further BMPs with Reef Rescue funding in the future if the opportunity arose.

¹Labour savings due to farming systems change could have resulted in a shift of labour to other activities.

Transaction costs

- The average total transaction cost was \$9,026 per farm (all reference to transaction costs is per farm unless otherwise stated). This was calculated based on the number of hours spent researching and applying for Reef Rescue funding as well as the financial transaction costs of these activities (travel, information purchase etc).
- Pesticide type BMPs generated the lowest transaction costs whilst soil based BMPs generated the highest transaction costs.
- Transaction costs per hectare decreased as the area under Reef Rescue increased. This indicates that transaction costs are fixed and that **larger farms may have a greater capacity to absorb transaction costs.**
- Transaction costs varied depending on the size of improvement of the BMP (eg a change from D practice to A practice versus B practice to A practice). On average, the larger the change the higher the transaction costs. This was also the relationship between transaction costs and the level of the starting practice (A, B, C or D). The lower the starting practice the greater the transaction costs of the BMP change regardless of the extent of change.
- Farmers that had been growing sugarcane for a shorter period of time tended to have lower transaction costs. This is not due to the long term farmers engaging in a more radical change (in fact they tended to make smaller changes) or implementing more complex BMPs **but could be due to long term farmers demonstrating a reluctance to change.**
- Most respondents incurred their transaction costs deciding if they would make the BMP changes and apply for Reef Rescue funding and/or learning how to implement the change on the ground.
- The average financial transaction costs (cost of travel, information purchase etc) was \$1,298 per farm. Those with the highest hourly rate had the highest direct transaction costs indicating that **those that valued their time more were likely to be more willing to outsource information collection activities.**
- Respondents were not very trusting of government. Of the 'government' agencies, respondents were most trustful of the Regional bodies followed by the State and least trustful of the Australian Government. Those that expressed a trust in the Australian government had lower transaction costs.

1 Introduction

Landholders changing agricultural practices incur a range of direct and transaction costs. The direct costs of practice change include the purchase of equipment and perhaps even a reduction in short term profit. The direct costs of practice change have been extensively studied and are well understood. Less well understood are the private transaction costs of practice change – the (opportunity) cost of time and cost of time and effort to learn about, trial, adjust and implement, and manage any change to practices over time. Previous research suggests that the private transaction costs of practice change are not small. For example, Mettepenningen et al. (2009) report that the average private landholder transaction cost of adopting practice changes under various European Agri-Environmental schemes was 15% of the total cost.

Current research suggests that changing cane farm management in the Great Barrier Reef catchments may generate water quality improvements and long term financial benefits to the farming community. Specifically, CSIRO research indicates that adopting ‘best practice’ sugarcane management practices (BMPs) generates a reduction in direct costs to farmers with a marginal change in yield (Roebeling et al., 2009; van Grieken et al., in press). The fact that some cane farmers are reluctant to make these seemingly profitable changes indicates that there may be substantial transaction costs to changing land management practice. When profit increases are relatively small, even low transaction costs may have significant adverse impacts on adoption. Hence it is important to understand the nature, extent, distribution and drivers of transaction costs to sugarcane growers.

The aim of this research was to generate an understanding of the extent and drivers of transaction costs borne by sugarcane farmers in their Reef Rescue applications and activities. Specifically, we analysed:

1. the extent of transaction costs involved in applying for and implementing BMPs under Reef Rescue (plus an analysis by practice type such as sediment, nutrient etc and extent of change such as D to C, C to B etc);
2. which BMP application and implementation activities generate the largest transaction costs;
3. what type of landholders incur transaction costs; and
4. if and how transaction costs affect adoption of best management practices

By exploring the nature, extent, distribution, cause and influence of transaction costs we provide recommendations on how transaction costs can be managed for improved policy delivery outcomes.

In Section 2 the background to the water quality problem in the GBR as well as policy solutions is introduced. Section 3 provides an introduction to the method applied to collect data. In section 4 the basic results from the survey are presented with the transaction cost analysis presented in section 5. In section 6 the key results and some policy recommendations from the research are discussed.

2 Background

2.1 Sugarcane and water quality

The Great Barrier Reef (GBR) is situated adjacent to the Queensland coast, Australia. It is the largest reef system in the world with over 3000 reefs covering an area of approximately 350,000 square kilometres (Haynes & Michelak-Wagner, 2000) (Figure 1). The catchment draining into the GBR lagoon contains 39 basins, with each basin comprising one or more river systems. Since European settlement in the late 1800s, water quality in the GBR lagoon has declined significantly (Furnas, 2003). This decline has been driven primarily by a combination of increased pollutant run-off from agricultural and urban activities and removal of the coastal ecosystem's filtering and buffering capacity (Furnas, 2003). For example, sediment loads due to soil erosion have increased 3–7 fold over the last 140 years (Furnas, 2003; McKergow et al., 2005) with Kroon et al. (2012) estimating current annual total suspended sediment load exported to the GBR at 17 million tonnes. Total nitrogen and phosphorus exports to the reef have increased 2–5 fold and 4–5 fold, respectively (Furnas, 2003; McKergow et al., 2005), partly due to fertilised land use in coastal floodplains. Sugarcane production is regarded as a major source of agricultural pollutants to the GBR.

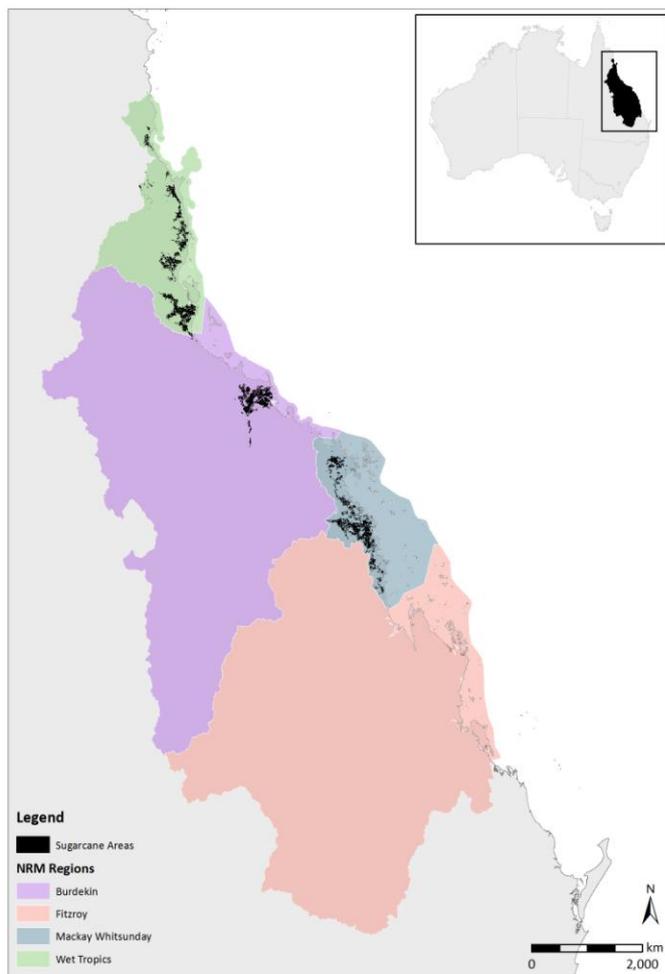


Figure 1 GBR catchment including NRM regions

2.2 Best management practices (BMPs) and Reef Rescue

In 2008, the Federal Government announced its Reef Rescue Program, one of a number of Australian and State Government initiatives to change land management practices and improve water quality in the GBR. This included the Water Quality Grants Scheme (\$146 million over 5 years) that provides land managers with matching funding (up to \$50,000) to implement BMPs that will improve water quality run-off from properties. Sugarcane-growing farmers may apply to implement practices such as soil management, nutrient management, pesticide and herbicide management practices. These activities are often referred to as A (aspirational/cutting

edge), B (best practice), C (compliant) or D (degrading/old) level activities referencing the 'ABCD' framework (See for example Higham et al. 2008).

Farmers apply for Reef Rescue funding by describing the BMP they propose to implement, how it will impact on the environment, and what they do need in terms of funding and machinery to implement. If their bid is successful, Reef Rescue's funding must reach 50% of the total funding request. If successful, farmers buy their new equipment from local suppliers or they can also modify their current machinery. Figure 2 illustrates the operation of the Reef Rescue program. Figure 2 also demonstrates that Reef Rescue results in two potential transactions— one between the farmer and the government in terms of funding and one between the farmer and equipment suppliers. We concentrate on the transaction between the farmer and the government in this analysis.

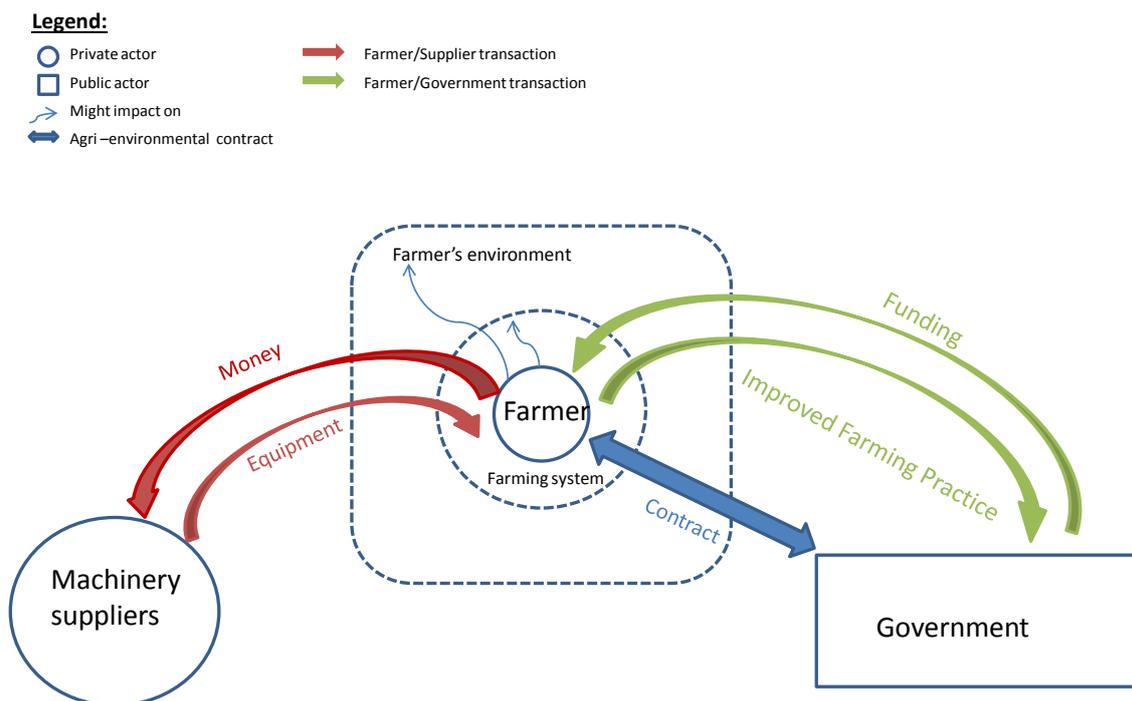


Figure 2: The Reef Rescue Program

3 Method

3.1 Introduction to the method

Previous studies into transaction costs of environmental policy (Falconer, 2000; Falconer et al., 2001; Falconer & Saunders, 2002; Howitt, 1994; Kuperan et al., 2008; McCann et al., 2005; Mettepenningen et al., 2009; Ofei-Mensah & Bennett, 2013; Rorstad et al., 2007) have tended to employ a mixed method of data collection with the method used guided by who the data was being collected from, data availability and whether the focus of the research was on measuring transaction costs or generating an understanding of causes of transaction costs. For example, Falconer and Whitby (1999), McCann and Easter (2000) and Falconer et al. (2001) used government databases when measuring public transaction costs of government Agri environmental schemes (AESs). Others have estimated transaction costs based on reports of time taken to develop, implement and use a policy and backed this up with interviews with informants (Falconer & Saunders, 2002; Fang et al., 2005; Kuperan et al., 2008; McCann & Easter, 1999; McCann & Easter, 2000; Ofei-Mensah & Bennett, 2013). When collecting data from farmers (Mettepenningen et al., 2009) used face to face surveys and Mettepenningen et al. (2013) used a mixed approach of online surveys and face to face interviews.

3.2 Our approach

Due to a limited budget, data was collected using a paper based survey sent to a 546 landholders who had been successful in 2010/11 and or 2011/12 Reef Rescue rounds.² The survey was developed in consultation with experts from the North Queensland Dry Tropics (NQDT), Reef Catchments and Terrain regional bodies and was pre-tested by 3 sugarcane growers prior to amendment and implementation (copy of the survey located in Appendix A1). The surveys were sent out during the last week of November 2012. For respondents in the NQDT and Reef Catchments regions, the surveys were sent out from the regional body office with assistance from the CSIRO. In order to maintain recipient anonymity, names and addresses of survey recipients were supplied by the regional bodies and were not released to the CSIRO.

² NQDT provided 150 recipients, Reef Catchments provided 200 recipients and Terrain provided 197 recipients

Terrain managed the mail out of surveys to Wet Tropics recipients. Survey recipients had the option to fill in the survey and mail it back using the reply paid envelope or complete the survey online. A thankyou/reminder postcard was sent to all recipients in the first week of January 2013. Reef Catchments also followed up landholders with a reminder email.

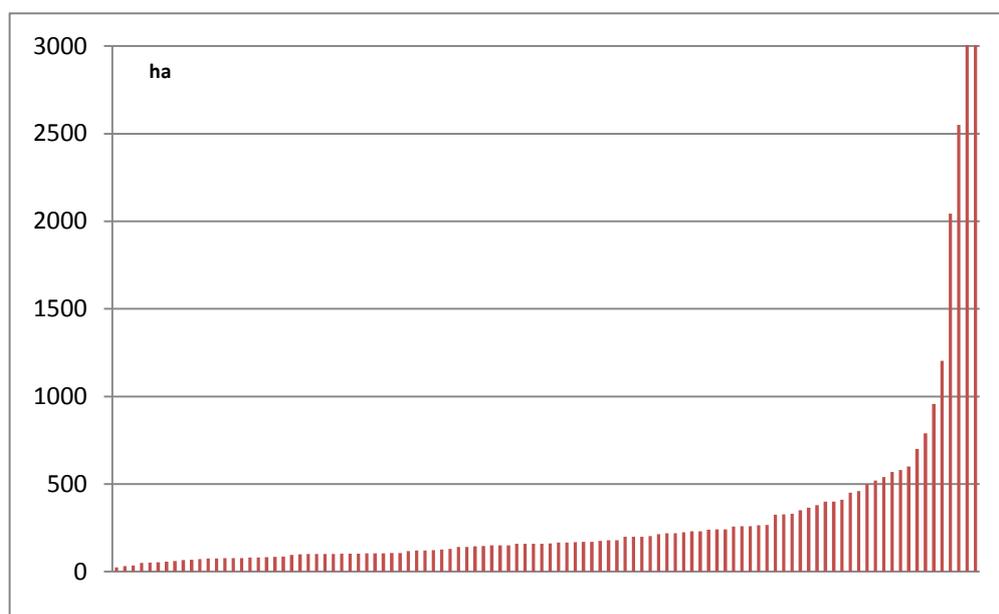
To encourage responses, all respondents were entered into the draw to win an iPad. The winners of the iPad were drawn and informed on the 4th April 2013. The data collection methodology was approved by the CSIRO Human Ethics Committee.

A total of 110 surveys were returned resulting in a 20% response rate.

4 Survey response and basic results³

4.1 About the properties

The average property size of respondents was 440 ha (without the very large outliers the average property size was 261 hectares) and the average area dedicated to the production of sugarcane was almost half of this at 217 ha. The data distribution is more or less constant (Figure 3), although there were few farms with a very large sugarcane area (Figure 4).



³ In this section we present the analysis of data resulting from the respondents. We acknowledge that this may not be a truly representative sample of all the landholders in the regions.

Figure 3: Size of the property

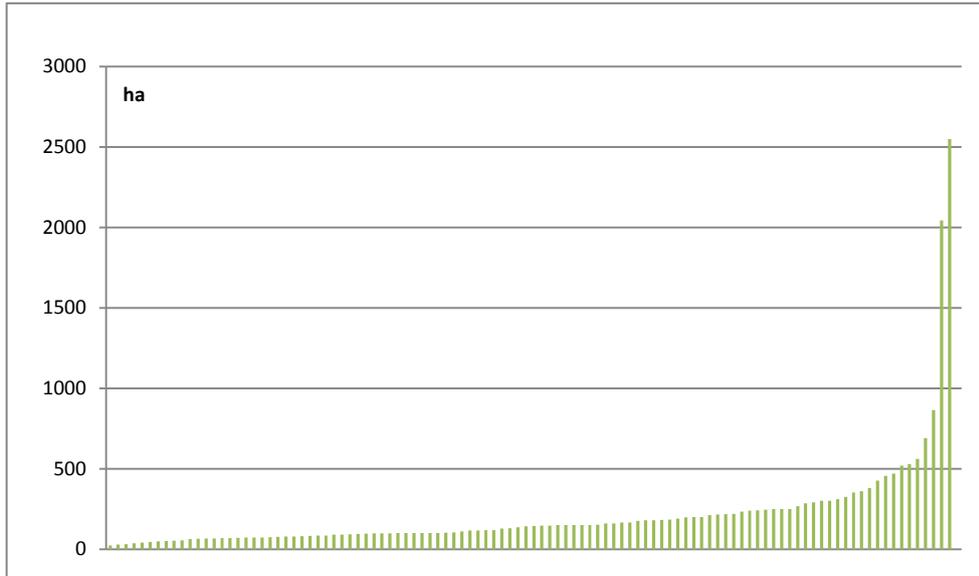


Figure 4: Sugarcane area

There were also a high percentage of farmers that had been growing sugarcane for a relatively long length of time. For example, 24% had been growing sugarcane from between 21 and 30 years and 32% had been growing sugarcane for more than 40 years (Figure 5).

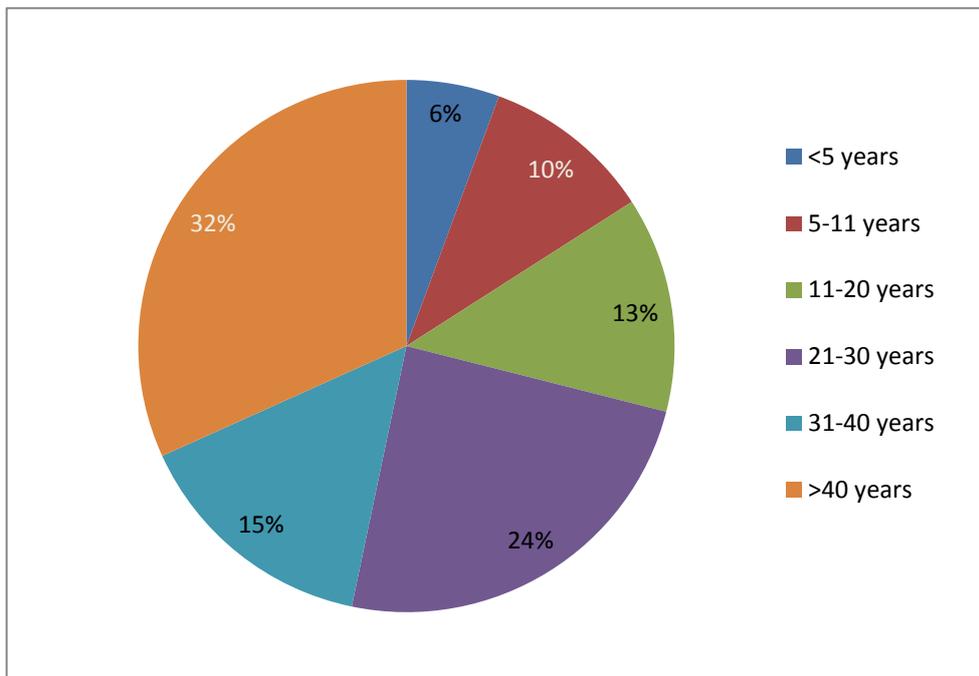


Figure 5: Years growing sugarcane

More than 90% of respondents own the property that they manage. 42% of respondents had succession plan, 38 % did not, and 20% were not sure if they had a succession plan.

4.2 About the growers

4.2.1 DEMOGRAPHICS

Most respondents were male between 31 and 60 years of age. There was a fairly even spread of representation of respondents with gross annual turnover in the \$101 to \$200k per year (17%), \$201-\$300k per year (17%), \$301-\$500k per year (21%) and >\$501k per year (26%).

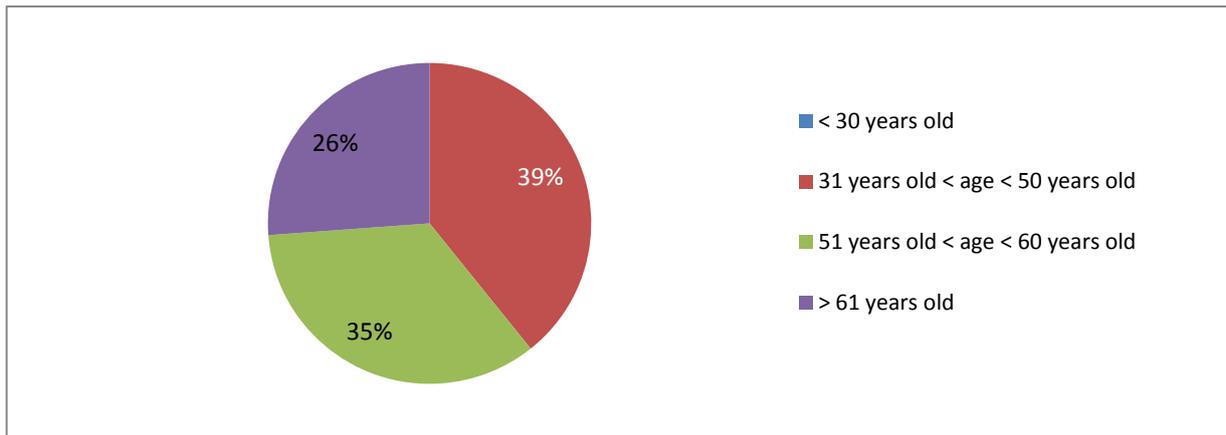


Figure 6: Grower age

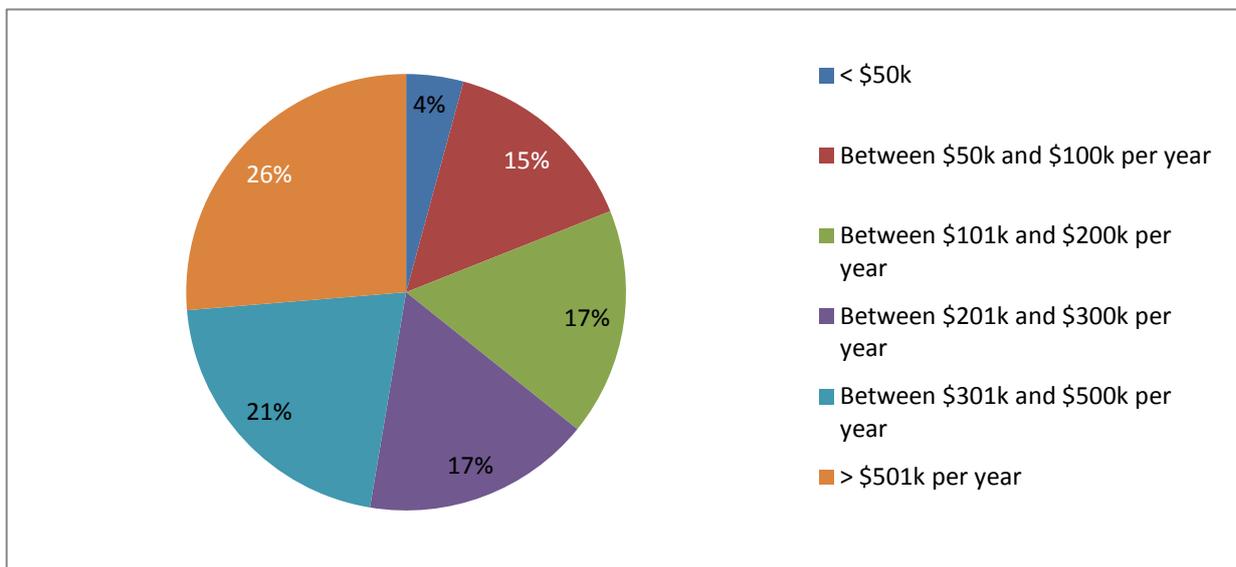


Figure 7: Gross annual turnover

38% of respondents worked some time off farm whilst 62% did not participate in off farm work. On average 32 hours per week were worked off farm. Most respondents had a very basic level of formal education with 35% not completing high school, 34% noting that high school was their highest level of education, 20% completing a certificate through the community college

(trade certificate), 7% completing a graduate diploma and 7% completing a bachelor degree or more (Figure 8).

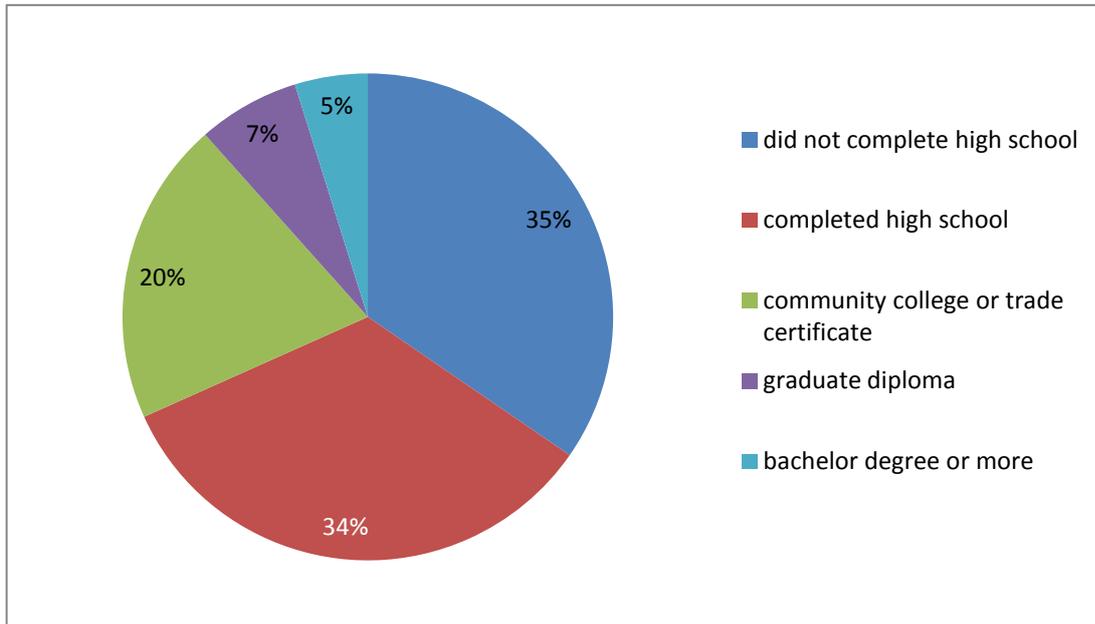


Figure 8: Education

Generally speaking, respondents were distrustful of government (this varies by which Government department) but trusting of other farmers and people more generally.

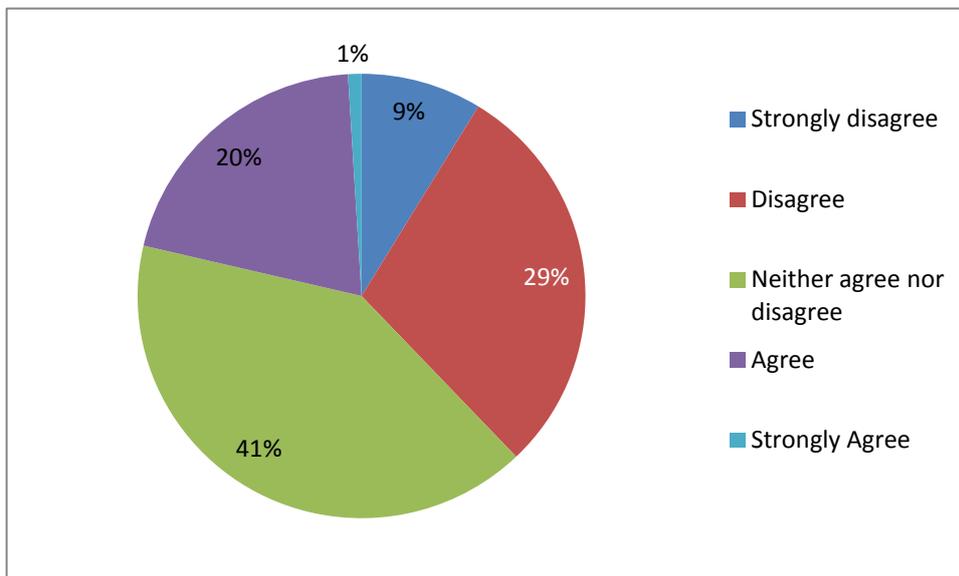


Figure 9: The State Government can be trusted

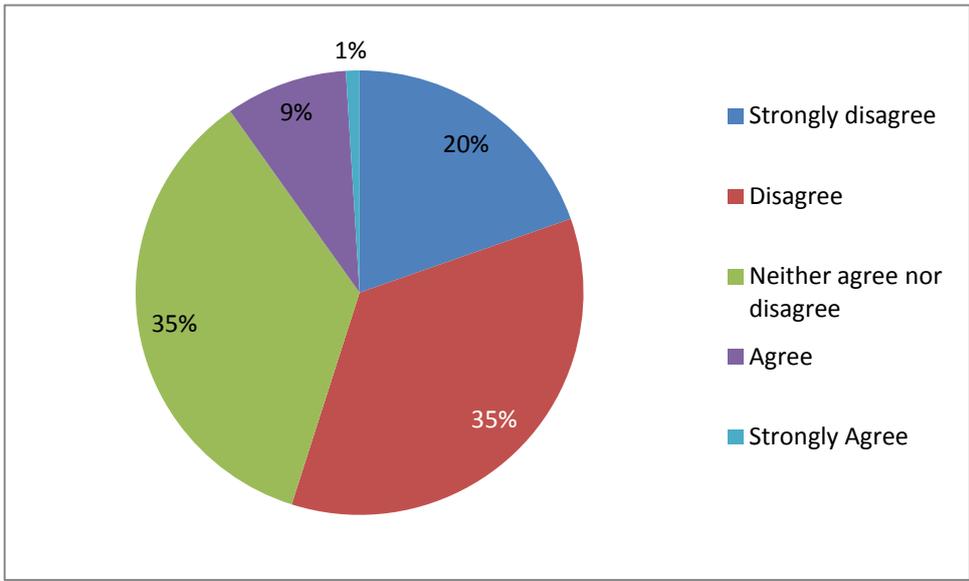


Figure 10: The Australian Government can be trusted

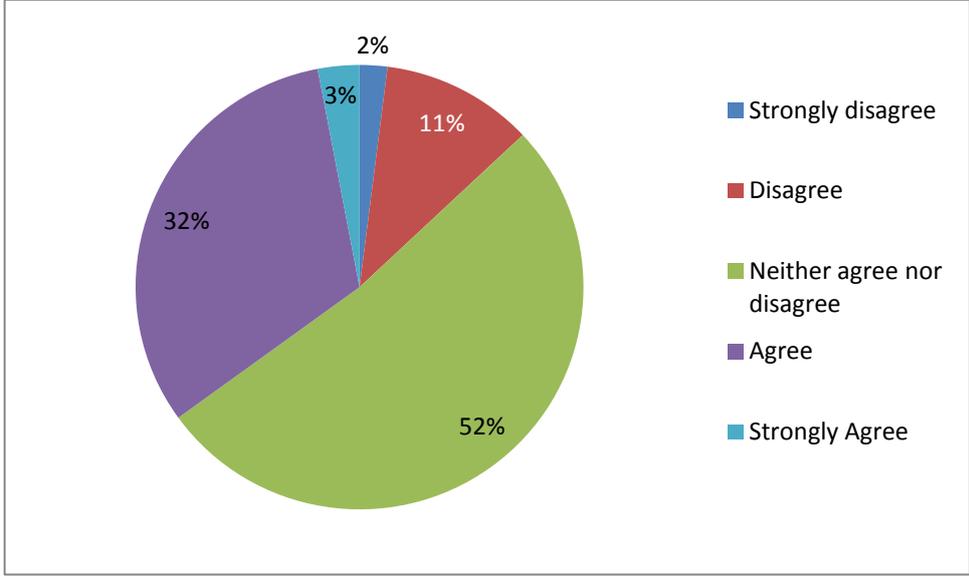


Figure 11: Regional bodies can be trusted

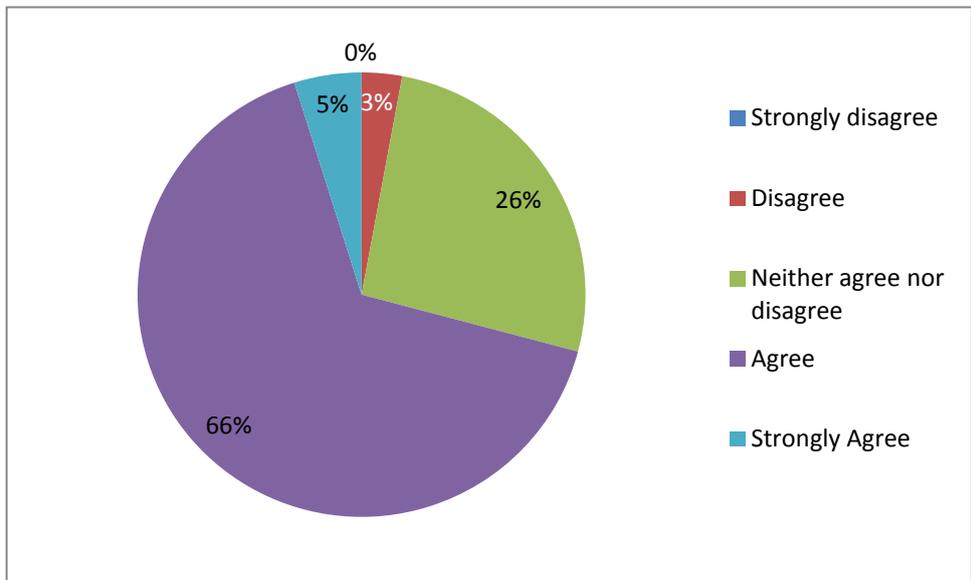


Figure 12: Other farmers can be trusted

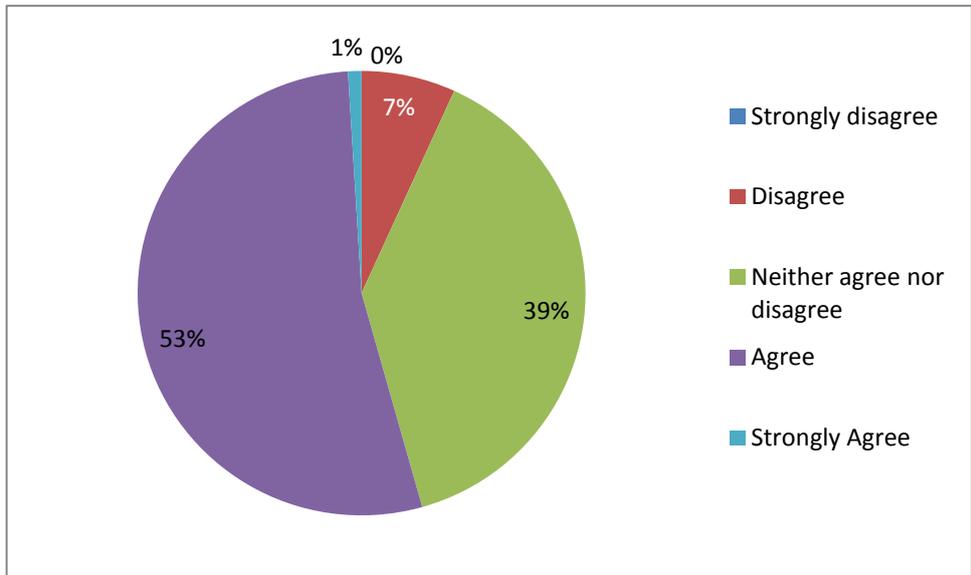


Figure 13: Most people can be trusted

4.2.2 ENVIRONMENTAL INCLINATION

Most respondents understood the link between the quality of water leaving their property and the health of the Great Barrier Reef with 52% and 19% strongly agreeing with the statement that the quality of the water leaving the farm is critical to the health of the Great Barrier Reef. 21% were neutral and 5% disagreed and 3% strongly disagreed (Figure 14).

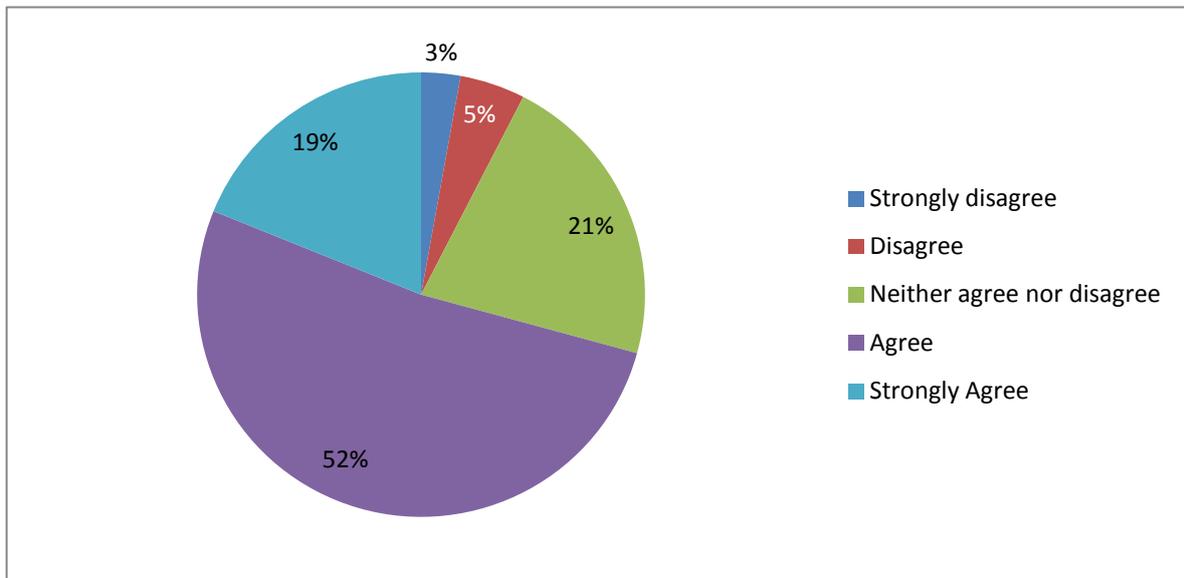


Figure 14: The link between the farm and water quality

Most respondents (88%) also agreed that improvements in water quality are valued by the community (only 1% disagreed). Finally, most respondents (95%) agreed that improved farm management results in water quality improvements. 82% agreed or strongly agreed that it was easy to relate the BMPs to improvements in water quality, agreeing that it was easy to understand how the BMPs would impact on water quality. 6% found this link difficult and disagreed with this statement (Figure 15).

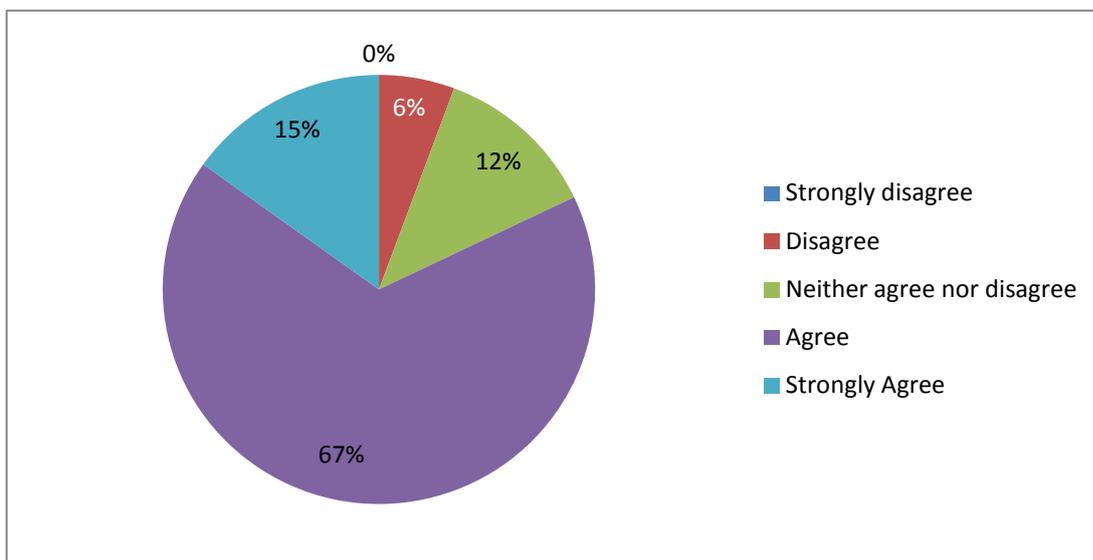


Figure 15: It was easy to link the BMP with water quality improvements

4.3 The Reef Rescue experience

73 (66%) respondents had a successful Reef Rescue funding application in 2010/2011 and 69 (62%) respondents had a successful Reef Rescue funding application in 2011/2012 (some had successful applications in both years). For 76% of the respondents the application was just for their property, for 20% it was a multi farm application for which they were the primary applicant and 3% for which they were not the primary applicant. Most of the respondents (85%) didn't think that they were the first to trial the BMP in the local area.

The average number of hectares that were subject to Reef Rescue funded BMPs was 198 ha, which is very close to the total sugarcane area. More than 40% of the respondents had already applied the BMPs to all their sugarcane area. 98% of the respondents declared that they intended to adopt these BMP across all the property that they manage.

The Reef Rescue application which was the point of reference for respondents⁴ was not the first application for Reef Rescue for 42%. 80% of respondents had successful Reef Rescue applications in the past.

4.3.1 WHY DID RESPONDENTS APPLY FOR REEF RESCUE FUNDING?

The four most popular reasons for applying for Reef Rescue funding were (Figure 16):

- 1) To lower the environmental impact of my farm (76%);
- 2) the Reef Rescue money made it financially possible to trial new practices (76%);
- 3) to increase production (58%); and
- 4) the Reef Rescue activity supported my desire to decrease the use of inputs (56%).

⁴ Respondents were asked to answer the survey based on their first successful funding application out of the years 2010/2011 and 2011/2012

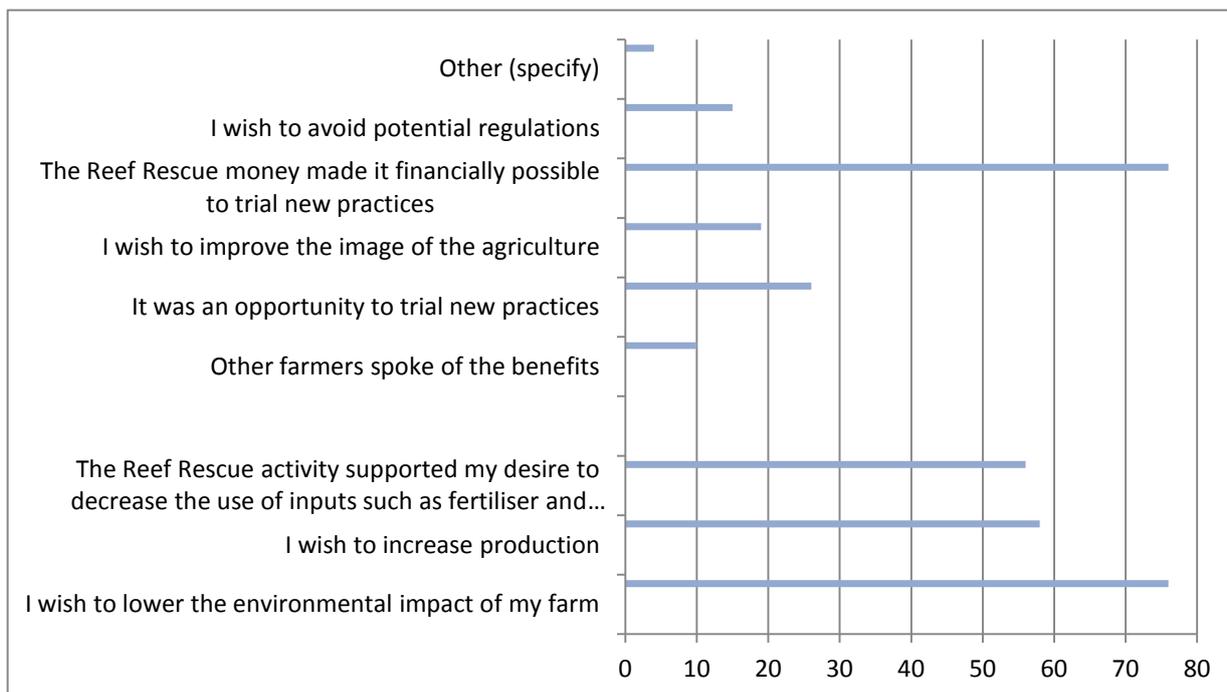


Figure 16: The main reasons to apply for Reef Rescue funding for BMPs

The reason for engaging with Reef Rescue was more or less the same regardless of the areas used to grow cane. However the response “Other farmers spoke of the benefits” was a key reason for applying for respondents with a small cane area and the response “I wish to improve the image of the agriculture” was more important for respondents with a larger cane area.

4.3.2 THE REEF RESCUE APPLICATION AND IMPLEMENTATION EXPERIENCE

67% of respondents agreed with the statement that the rules for applying for Reef Rescue funding were fair, 11% were neutral, 14% disagreed and 8% strongly disagreed (Figure 17).

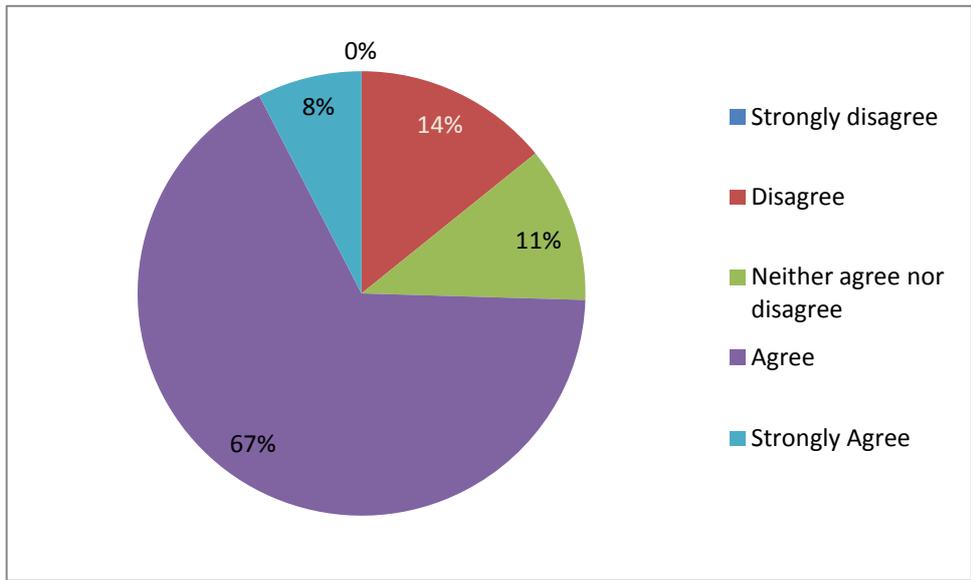


Figure 17: Rules for applying were fair

60% of respondents agreed with the statement that the application process was easy with 6% strongly agreeing with this statement. 27% were neutral and 7% disagreed and found the application process difficult (Figure 18).

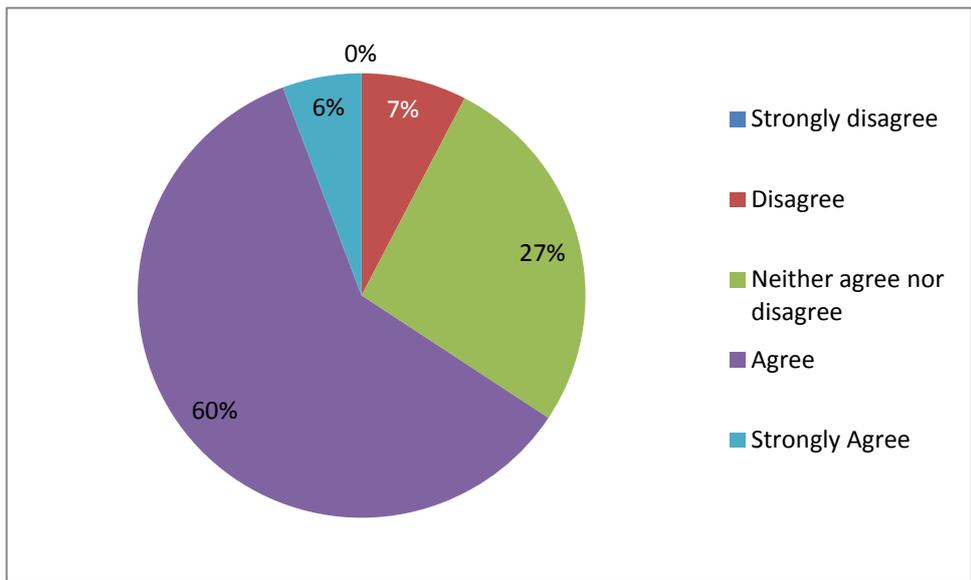


Figure 18: The application process was easy

73% of respondents agreed with the statement that it was easy to contact the relevant person when they needed more information. 16% strongly agreed with this statement and 8% were

neutral. 3% disagreed and found it difficult to contact the relevant person when more information was required (Figure 19).

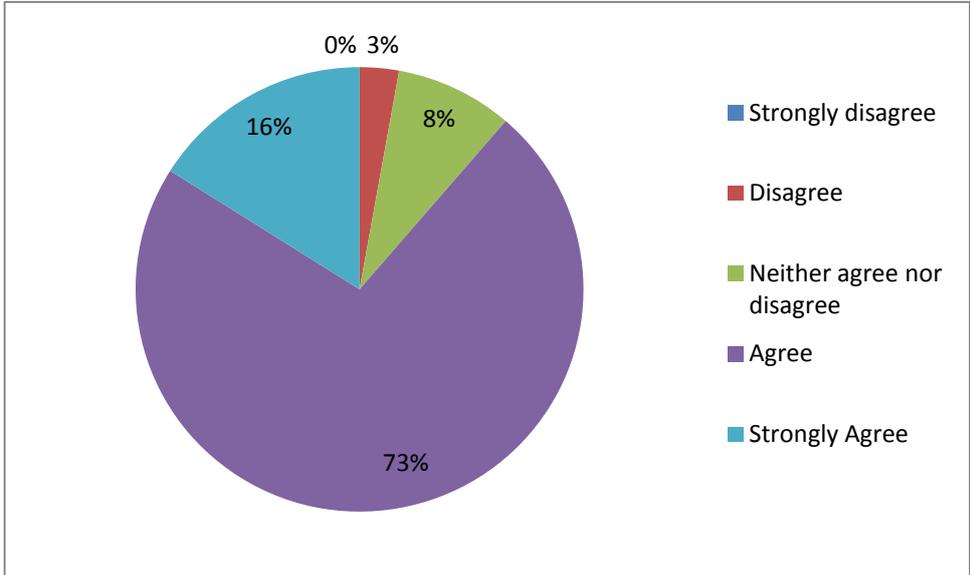


Figure 19: It was easy to contact the relevant person when more information was needed

74% of respondents felt that there was enough information about the BMPs, 8% strongly agreed with this statement whilst 7% disagreed (Figure 20).

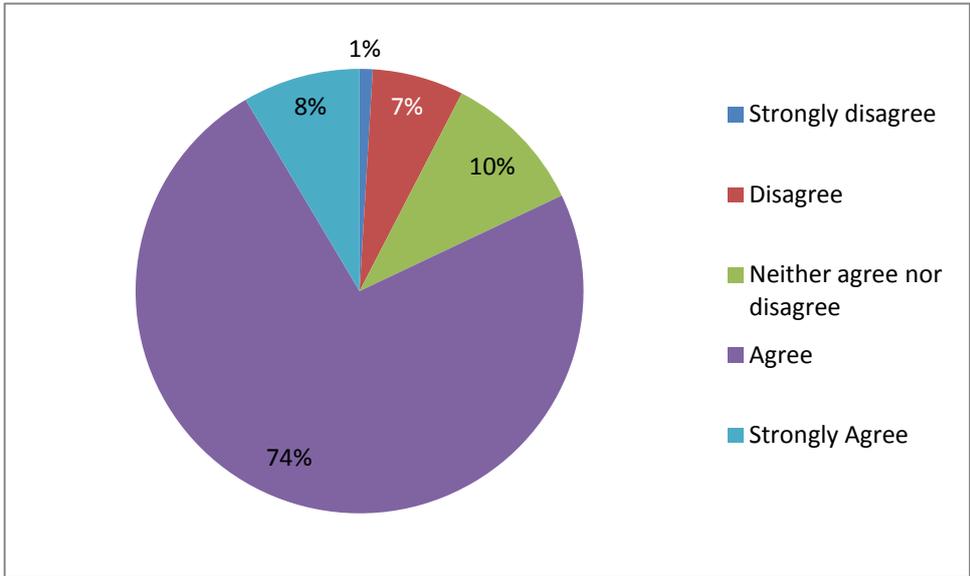


Figure 20: Was there enough information available about the BMPs?

38% agreed that there should be more training about BMPs, 6% strongly agreed with this, 42% were neutral whilst only 14% felt there was enough training (Figure 21). One policy response to improve uptake may be to facilitate targeted training about the BMPs.

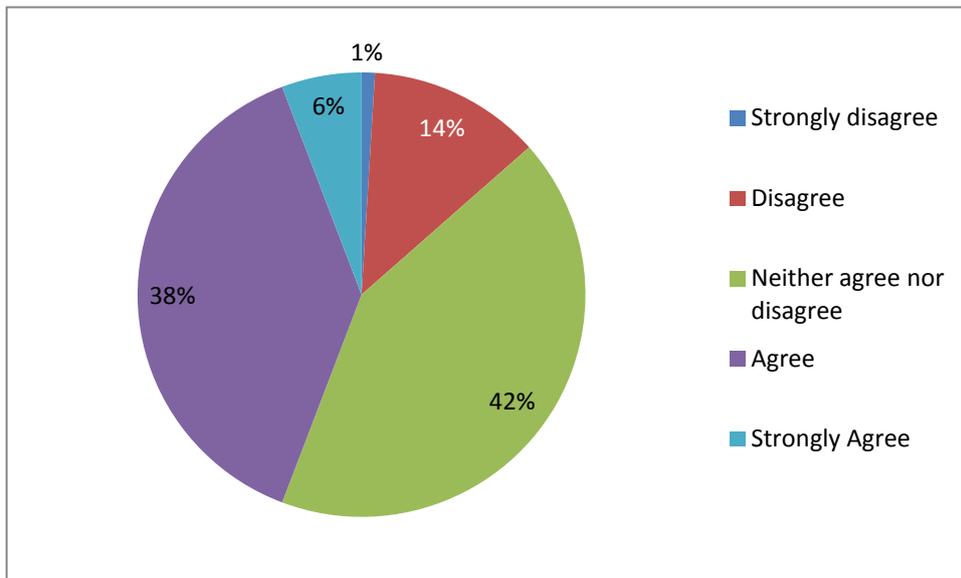


Figure 21: There should be more training about BMPs

73% agreed and 7% strongly agreed that it was easy to understand how the BMP would impact on broader farm management. 3% disagreed with this statement.

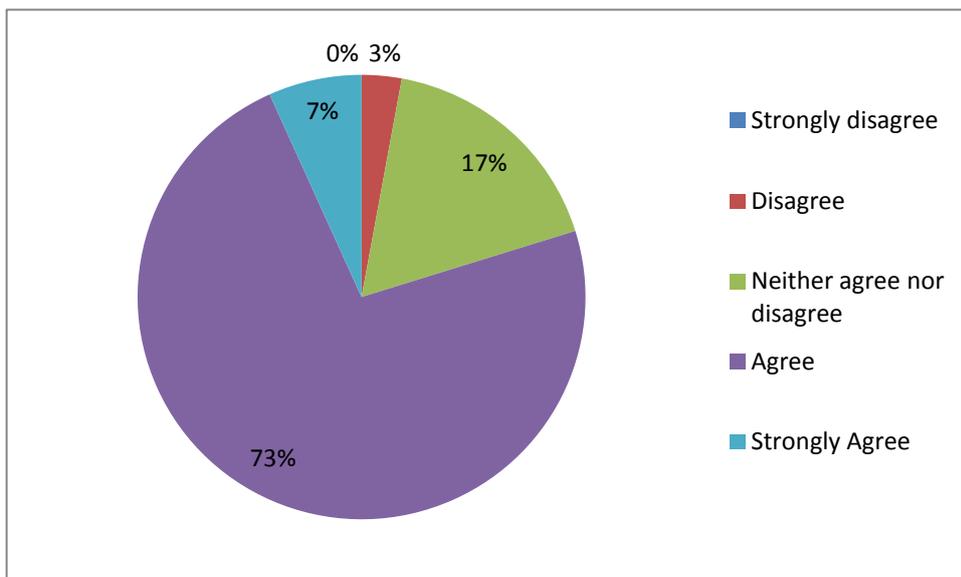


Figure 22: I could identify the impacts of the BMPs on broader farm management

59% agreed that it was easy to incorporate the BMPs into the farm management. 18% strongly agreed with this and only 11% disagreed (Figure 23).

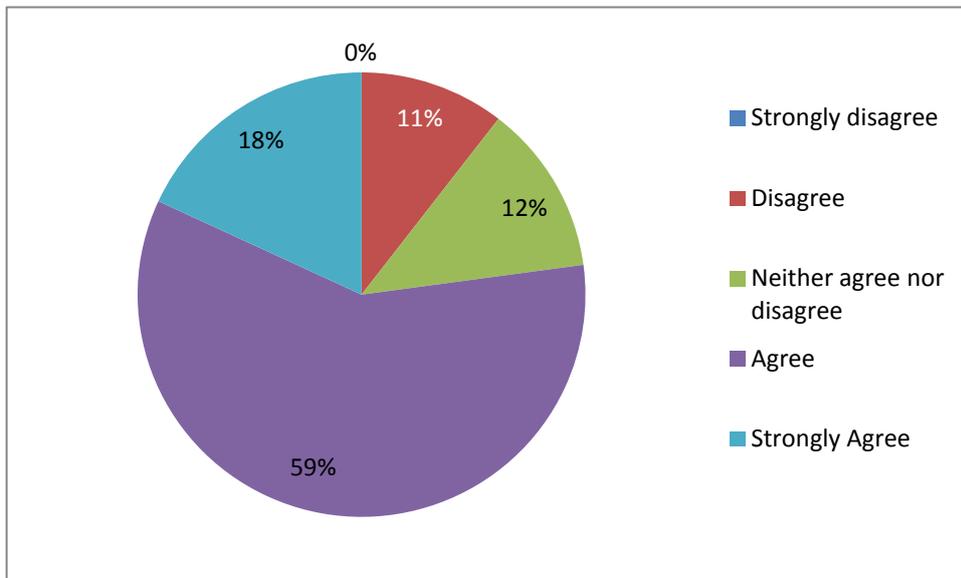


Figure 23: It was easy to incorporate the BMPs in my farm management

Only 51% of respondents agreed or strongly agreed that the Reef Rescue funding was sufficient. 23% were neutral whilst 21% disagreed and 5% strongly disagreed (Figure 24).

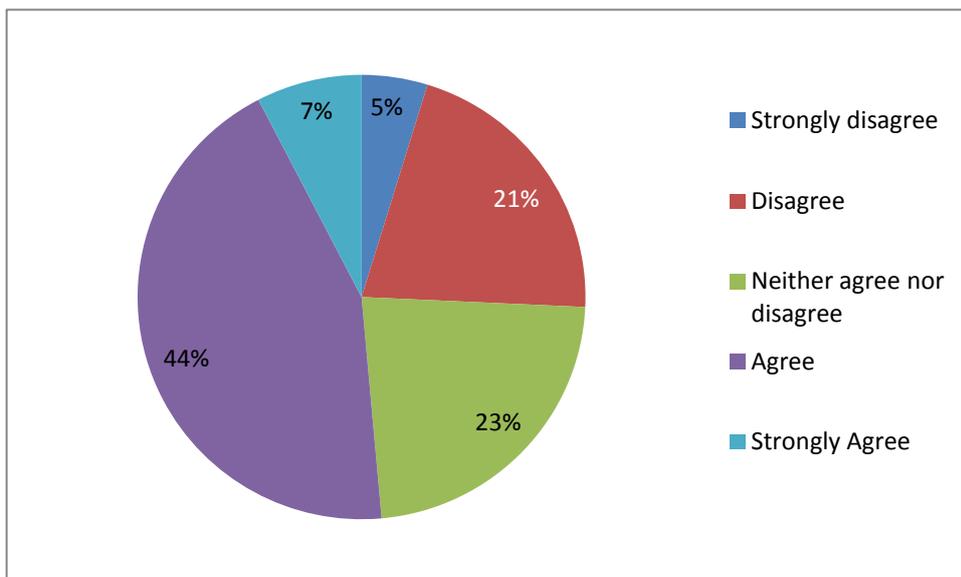


Figure 24: Was the Reef Rescue funding enough?

72% agreed that Reef Rescue funding was made on time. Only 10% disagreed with this statement (Figure 25).

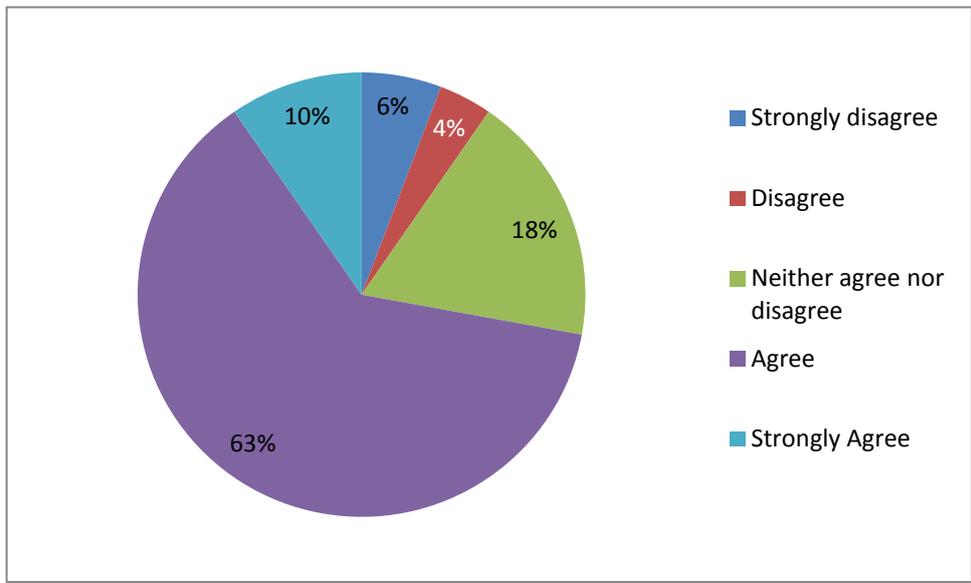


Figure 25: Reef Rescue funding was made on time

4.3.3 BMPS AND THE FARMING ENTERPRISE

69% of respondents agreed or strongly agreed that the BMPs reduced operating costs whilst maintaining yields. 23% of respondents were neutral about this statement and 8% disagreed. For many respondents, engaging in Reef Rescue funded BMPs is a profitable exercise.

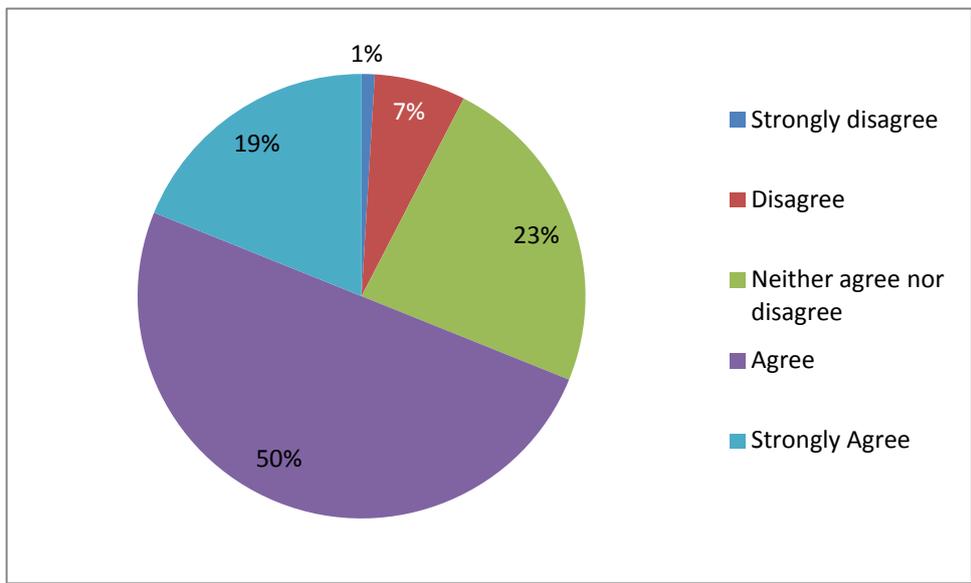


Figure 26: BMPs and farm profit

52% of respondents agreed that the BMP may reduce the risk of production losses from pests, disease and climate variability. 36% were neutral and 12% disagreed with this statement.

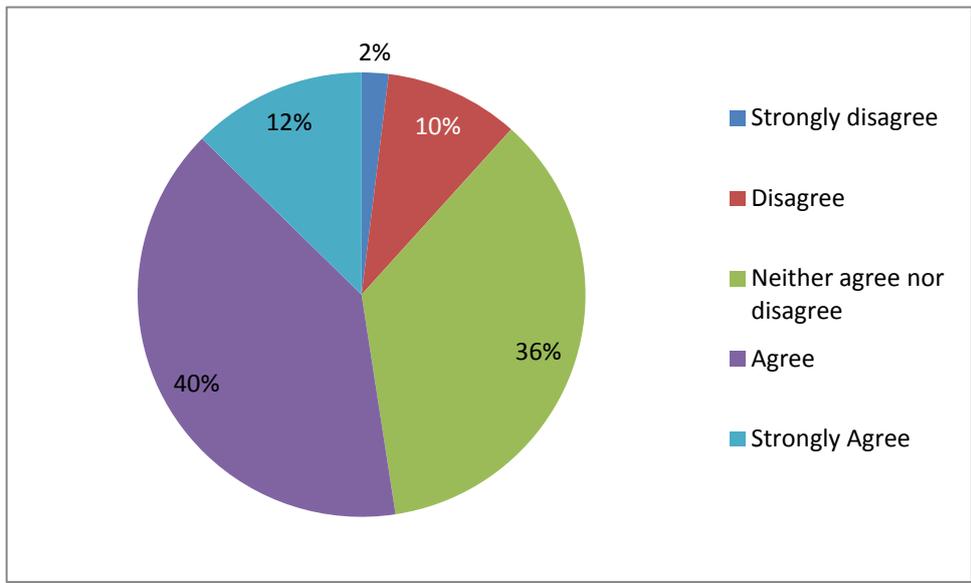


Figure 27: BMPs and risk management

Almost all respondents (96%) noted that they would be interested in adopting further BMPs with Reef Rescue funding in the future if the opportunity arose. Those that said no or that they were not sure noted that there was still a cost that was borne by the landholder when conducting BMPs, that their age limited their ability to conduct the activities, that they should let others have a go or that they did not feel that any more real improvements could be achieved on their property.

5 The transaction (hidden) cost of Reef Rescue

5.1 Transaction cost extent

The average transaction cost per farm as \$9,026 (Table 1). This number was calculated based on the equation:

$$TC = \text{number of hours} * \text{Standard hourly rate} + \sum (\text{financial transaction costs})$$

Where:

- The number of hours and standard hourly rate is that reported by respondents in the survey.⁵
- Financial transaction cost are all the costs associated with the Reef Rescue activity which are not time related and not the cost of the equipment. Some examples of financial transaction cost are cost of consultants, cost of fuel and accommodation if travel was required during information collection activities etc.

Table 1: Transaction cost extent

	Number of hours	Standard hourly rate	\sum (financial transaction costs)	Total transaction cost
Sum	21,180		\$138,845	\$965,810
Average	198	\$39	\$1,298	\$9,026

The average total transaction cost per farm was \$9,026. This varied slightly according to the type of BMP adopted. Pesticide type BMPs generated the lowest average transaction per farm and soil type BMPs generated the highest average transaction costs per farm (Table 2). This difference may be due to the spill over impact of soil BMPs into other parts of the farming business.

⁵ For respondents who did not report their hourly rate we used the average hourly rate which was \$39/hr

Table 2: Average transaction costs for BMP type.

TYPE OF BMP	Number of farmers who applied this type of BMP (once, twice, three times etc)	Average total transaction cost per farm
Nutrient	58	\$10,039
Soil	48	\$10,449
Pesticide	22	\$8,559
Irrigation	51	\$9,051

The extent of change also influences the transaction cost (Table 3). The current practice before the BMP also influences the extent of the transaction costs. The less advanced the current practice, the higher the transaction costs (Table 4).

Table 3: Extent of practice change and transaction costs

Extent of change	Average total transaction costs per farm	Hours invested in BMP decision making	Number of farmers
C to A	\$8,165	193	20
B to A	\$7,288	169	9
D to B	\$10,132	259	4
C to B	\$8,054	193	71
D to C	\$7,509	164	4
B to B	\$8,640	207	4

Note: This table does not have data from Reef Catchments as this was not available at the time of writing. The lack of Reef Catchments data could influence the results.

Table 4: Starting practice and transaction costs

Starting practice	Average total transaction costs per farm	Hours invested in BMP decision making	Number of farmers
B	\$7,763	177	8
C	\$8,662	207.3	57
D	\$11,598	274.3	5

Note: the data used to construct this table did include data from all catchments and is probably more accurate than Table 4.

5.2 What is generating transaction costs?

5.2.1 TIME RELATED TRANSACTION COSTS

In this section we report the time and effort (resources such as travel to meetings, purchase of information etc) that applicants invested when applying for the Reef Rescue funding and doing the BMP on ground. Questions about time were broken up into the categories of:

- 1) time deciding to apply;
- 2) time spent preparing and submitting the RR funding application;
- 3) time spent reading, signing and returning;
- 4) time and effort invested in learning how to implement the improved farm management activity or activities on ground; and
- 5) time spent drafting and submitting a management plan.

Most respondents reported a large amount of time deciding if they would make the BMP changes and apply for Reef Rescue funding (Figure 28).⁶

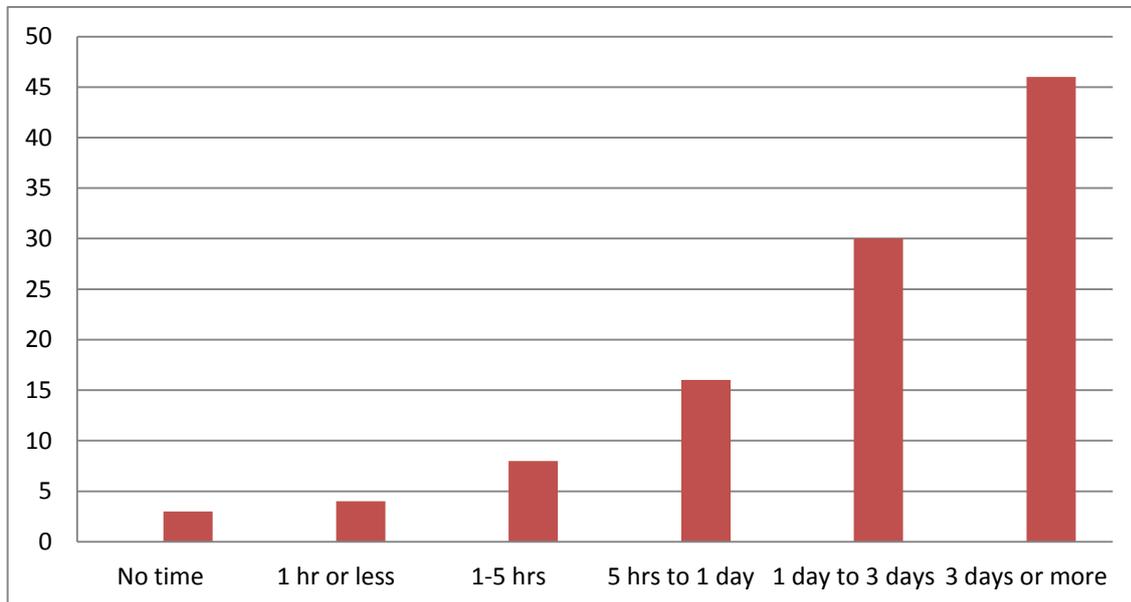


Figure 28: Time spent deciding to apply for Reef Rescue

⁶ The results indicate that in future TC studies we need to be able to capture a greater length of time invested in deciding to apply for the program. It is likely that the time costs are higher than what we have been able to capture in this analysis.

Most respondents only spent between 1 and 5 hours preparing and submitting the Reef Rescue application (Figure 29) and up to half a day reading, signing and returning the contract (Figure 30).

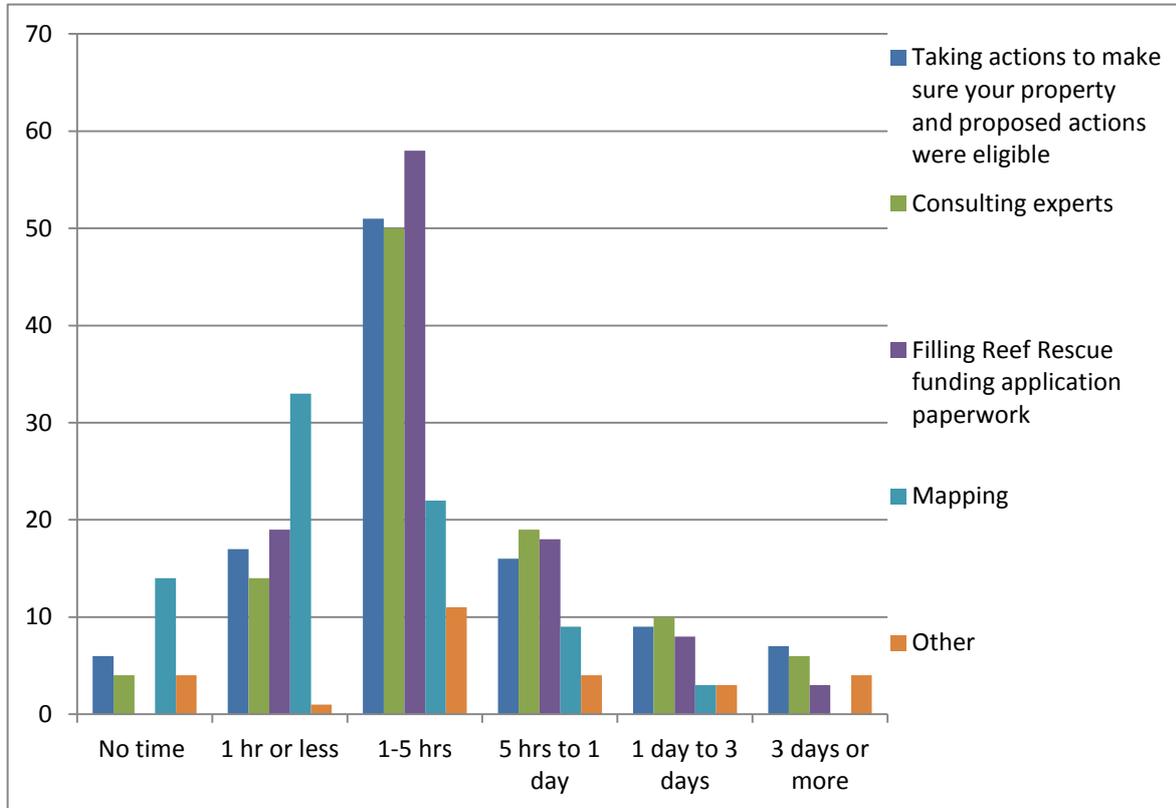


Figure 29: Time spent preparing and submitting Reef Rescue application

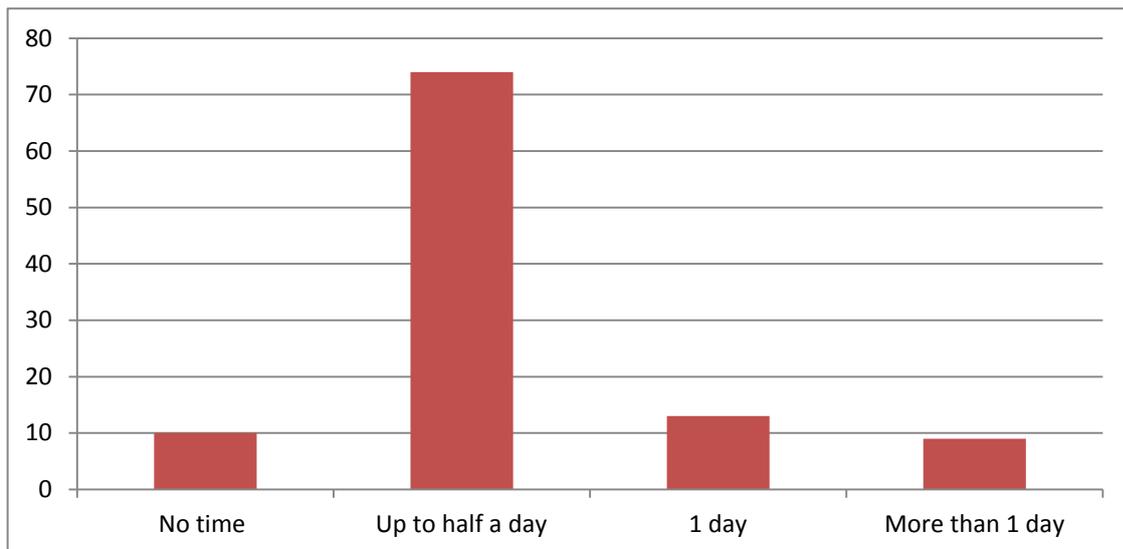


Figure 30: Time spent reading, signing and returning the contract

Learning how to implement the BMP took most respondents between 1 to 3 days or 3 days or more to complete (Figure 31). It is assumed that the cost of time to learn was reported against the implementation question and the question about time to decide to apply.

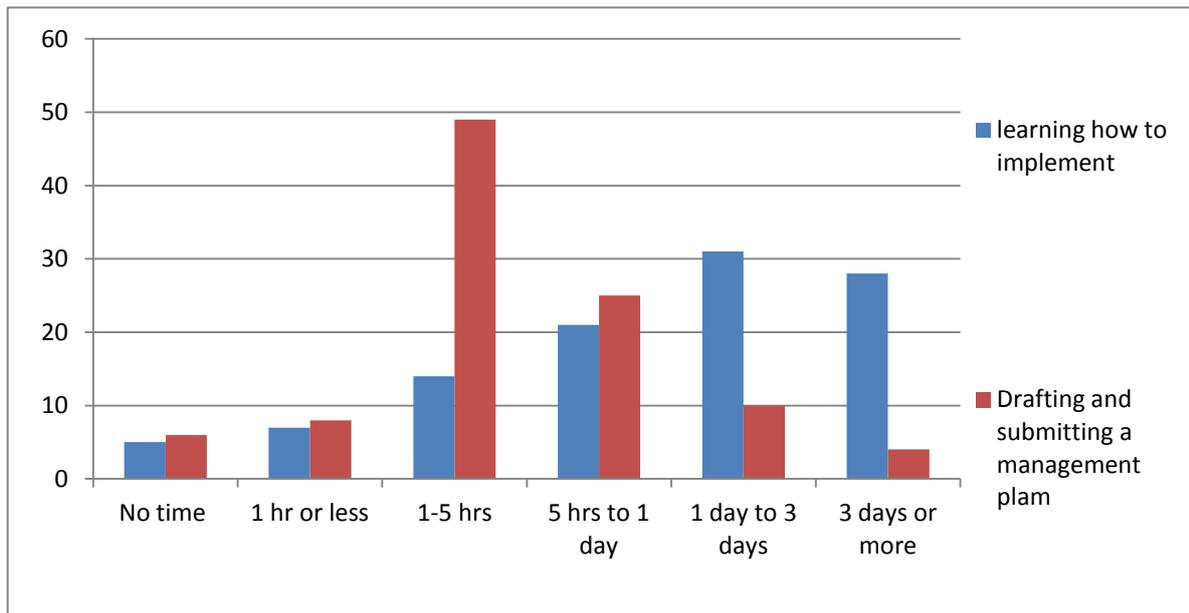


Figure 31: Time spent learning about how to implement the BMP and drafting and submitting a management plan

Time spent working out in the paddock has not changed for 50% of the farmers. For those that have reported a change in hours, these have decreased (36%) but this reduction is small at only 1 or 2 hours per week. It may be the case that although in general the time hasn't changed, the mix of activities may have changed due to a farming systems change.

5.2.2 FINANCIAL TRANSACTION COSTS

Financial transaction cost are all the costs associated with the Reef Rescue activity which are not time related and not the cost of the equipment. Some examples of financial transaction cost are cost of consultants, cost of fuel and accommodation if travel was required during information collection activities etc. The average per farm financial transaction cost of Reef Rescue BMPs was \$1,298 per farm.

To understand the influence of financial cost to transaction cost we assessed if transaction costs increased with standard hourly rate. We found this to be the case but that the increase was exponential meaning that total transaction costs are comprised of time related transaction

costs as well as financial transaction costs (expenditure on travel and accommodation, information from experts etc) (Figure 32). We also found that those respondents with the highest hourly rate (\$/hr) also had the highest financial transaction costs. This indicates that respondents with a low hourly rate tend to be more willing to spend their time reading about BMPs, attending meetings and training whilst respondents with a higher hourly rate are more likely to outsource activities associated with the BMP.

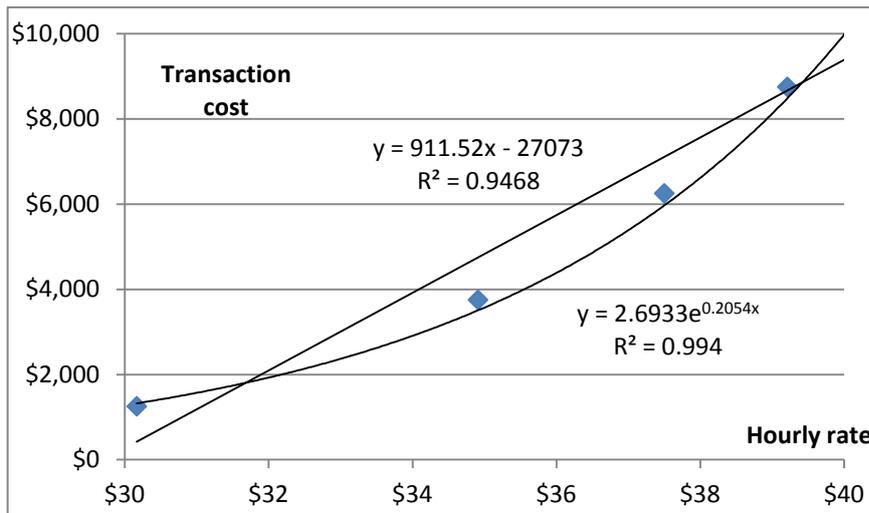


Figure 32: Regression between transaction cost and standard hourly rate

5.3 What influences transaction costs?

5.3.1 FARM SIZE AND CANE AREA

Transaction costs can be fixed or variable. Variable transaction costs are those that vary with farm size and production inputs where fixed transaction costs are the same regardless of area of inputs. To analyse if the transaction costs are fixed or variable we assessed if transaction costs changed with the farm size and the area under sugarcane. We found that producers with larger farms or a greater area under sugarcane do not have larger or smaller transaction costs compared with smaller farms or farms with a smaller area under sugarcane production (regression line with slope close to 0 in Figure 33 and Figure 34). We can therefore state that transaction costs are fixed costs.

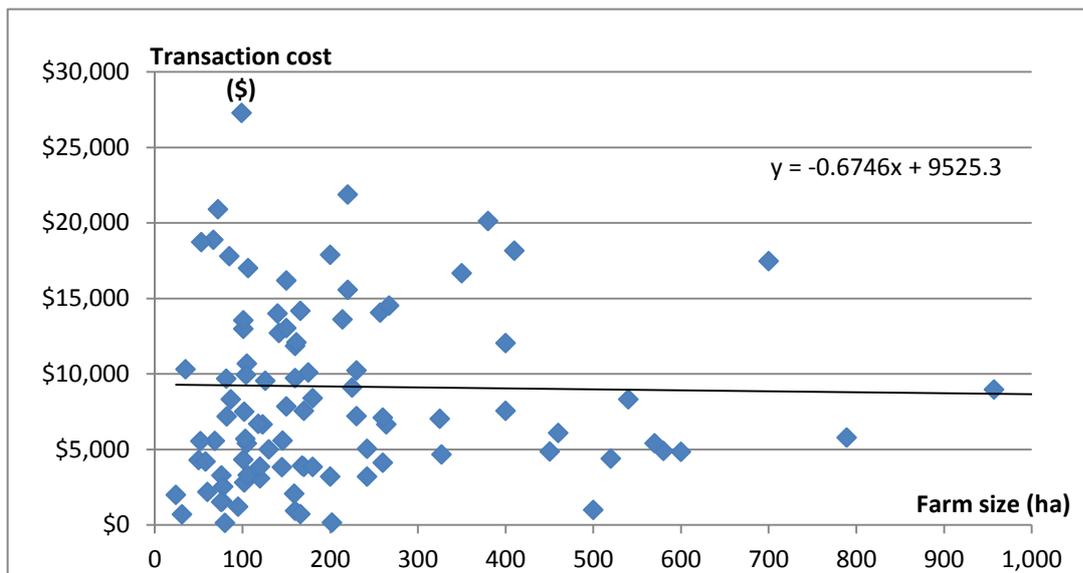


Figure 33: Linear regression between transaction costs and farm size

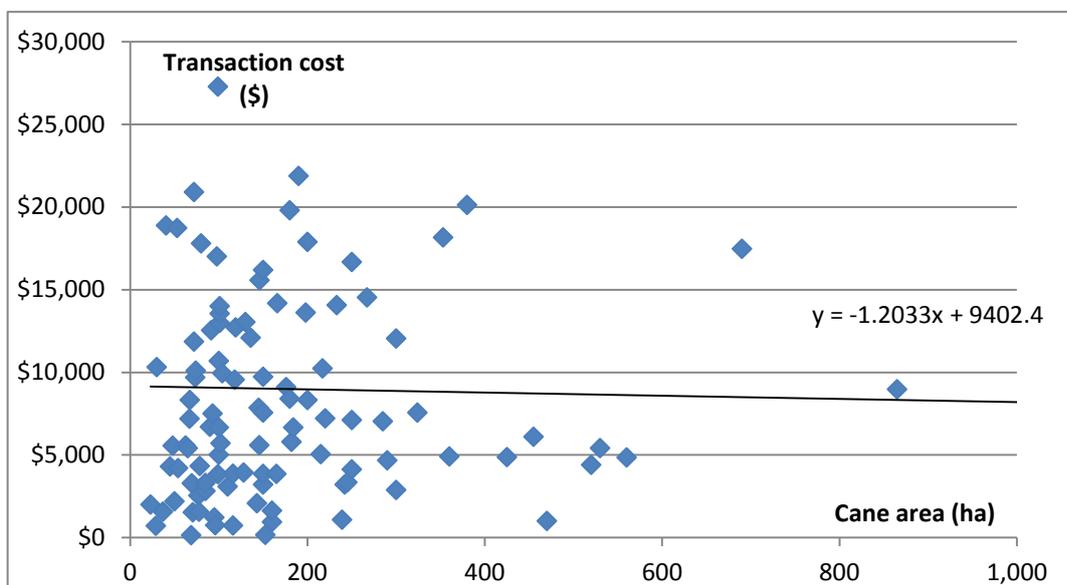


Figure 34: Linear regression between transaction costs and sugarcane area

Analysis was also assessed if the transaction costs per hectare changed with the size of the area which the Reef Rescue BMP was applied to. That is, did the properties with larger areas on which to change farm management have higher or lower transaction costs compared with those with small areas to apply the BMP. This was conducted with 2 analyses. The first one split respondents into 4 groups with the same number of farmers in each group (Table 5).

Table 5: Group 1

Applied area	0-60 ha	60-106ha	106-182ha	>182ha
TC/ha (average)	\$645	\$159	\$57	\$32

The second analysis split respondents into 3 groups with the same number of hectares (Table 6).

Table 6: Group 2

Group	1	2	3
Applied area	0-99 ha	100-199 ha	>200 ha
TC/ha (average)	\$453	\$60	\$29

The transaction costs per hectare decreased as the areas under the Reef Rescue BMP increased. This result is statistically significant and suggests that the transaction costs are fixed and not a variable costs. That is, the transaction costs are the same regardless of the size of the area on which the BMPs are being applied. It might be the case that the larger farms (with a larger area on which to apply the BMP) have a greater capacity to absorb the transaction costs. If this is the case, transaction costs will be less of a participation deterrent for large farms compared to small ones. If an objective is to increase participation in farms with smaller areas on which to apply BMPs, one policy recommendation may be to provide some support to these properties.

5.3.2 INFLUENCE OF OTHER INDEPENDENT VARIABLES ON TRANSACTION COSTS (GROWING YEARS)

To assess the influence of factors such as hourly rate, area that the BMP was applied to, level of education, growing years, experience with past Reef Rescue applications, technical advice and financial advice on transaction cost, a logit regression was performed.

Logit regression is a type of regression analysis used when the dependant variable (transaction cost) can take one of a limited number of possibilities and when the independent variables (education, growing years etc) are continuous and/or discrete. To use this model we transform the transaction as a binary variable. (0 = group of the farmers with the lowest TC, 1 = group of the farmers with the highest TC). The median of the transaction cost variable, \$7,068, was used to distinguish the two groups of farmers (with an equal number of farmers in the group with transaction costs less than \$7,068 and above \$7,068).

According to the logit analysis, the farmers with less growing years have lower total transaction costs per farm compared with the farmers with many growing years. That is, transaction costs appear to increase with the years growing sugarcane. Figure 35 confirms the logit analysis. Statistical tests (Mann Whitney) suggest that this relationship is not significant.

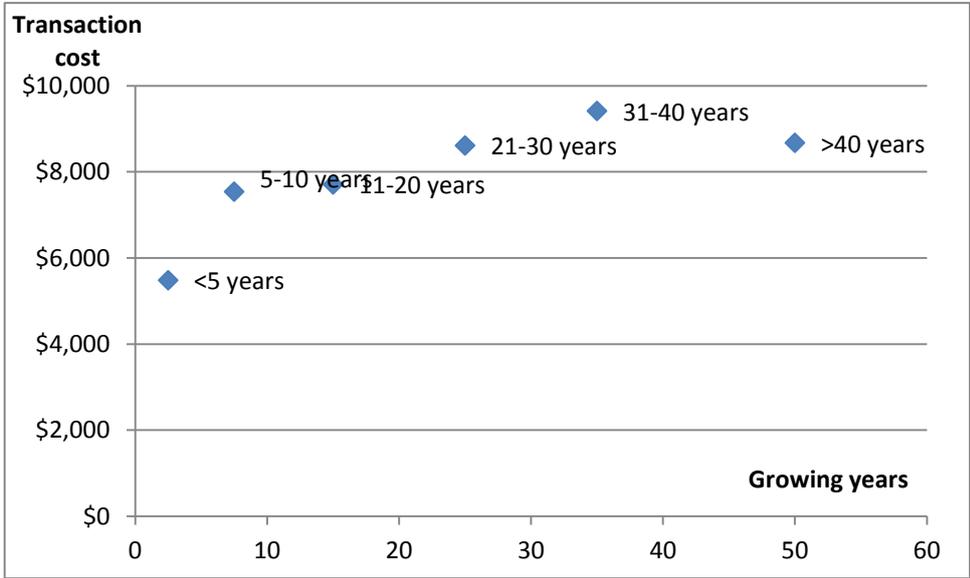


Figure 35: Relation between the transaction costs and the growing years (average by groups)

Transaction cost theory suggests that past experience reduces transaction costs. Therefore this result calls for a deeper analysis to understand why transaction costs are higher for sugarcane producers who have been growing cane for the longest period of time.

We first assessed if the average hours and financial transaction costs are the same between newer and more established growers. We found that the number of hours reported is very similar between the groups. Direct transaction costs are also very similar except for growers who have been growing between 31 and 40 years. The factors that generate the transaction costs differ between the newer and the more established growers. Newer growers tend to incur direct transaction costs in phone and email communication as well as travel to collect information about the BMP. More established growers tend to incur most of their direct transaction costs in accreditation and training as well as in engaging experts such as consultants.

We also assessed if the more established growers were more likely to adopt A level BMPs compared with the newer growers. The hypothesis being that adopting A level practice may require greater information collection effort driving up transaction costs. We found that there was not a strong correlation between growing years and level of practice adoption which would explain the higher transaction costs. Perhaps farmers that have been farming for longer periods of time are more locked in to certain production ways. Support for farmers that have been farming for longer to assist in learning about BMPs may be a policy initiative to address this adoption constraint.

5.3.3 THE EXTENT OF FARM MANAGEMENT CHANGE AND TRANSACTION COSTS

It was also assessed if the farm management practice starting point influences the transaction costs of the BMP. That is, if the transaction costs are different if a grower moved from a D level practice to an A level practice compared to a C level practice to a B level practice. To analyse this relationship we assessed the relationship between transaction costs and the number of steps associated with the BMP. Where a move from A to A or B to B etc is one step, B to A or C to B etc is 2 steps, C to A or D to B is 3 steps and D to A is 4 steps. When a farmer applies for 2 BMPs we added the steps. For example, B→A and D→B, is 4 steps.

We found that when the number of steps increases, the transaction costs also increase (Figure 36). That is, the larger the changes in farm management (reflected by a greater number of steps), the larger the transaction costs. We also found that those with more years growing sugarcane tended to adopt BMPs that required fewer steps (Figure 37). On average the more established growers are starting from C level practice, but this is not substantially different to the growers with less growing experience.

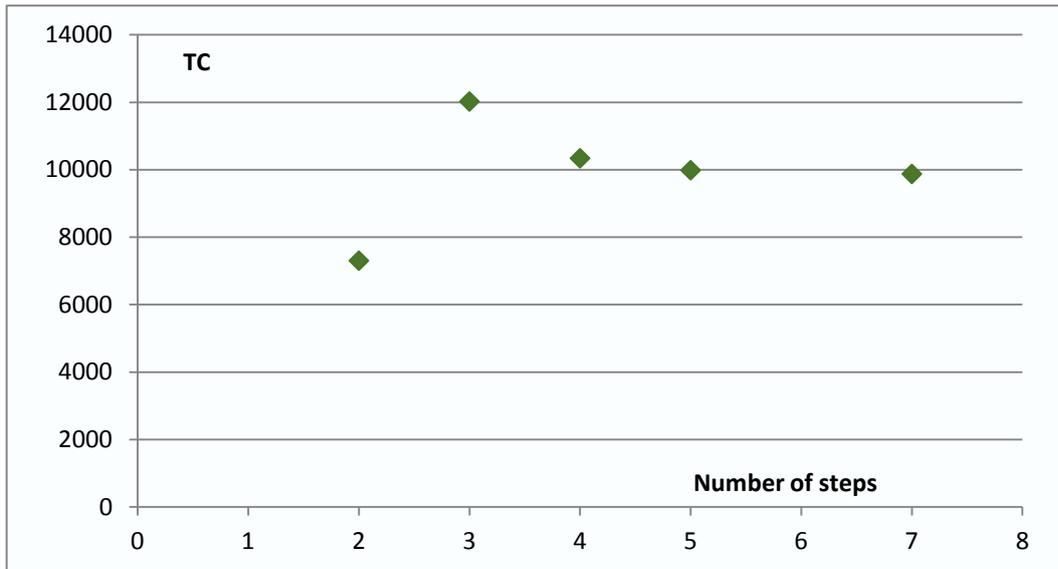


Figure 36: Relationship between the number of steps and the average transaction costs

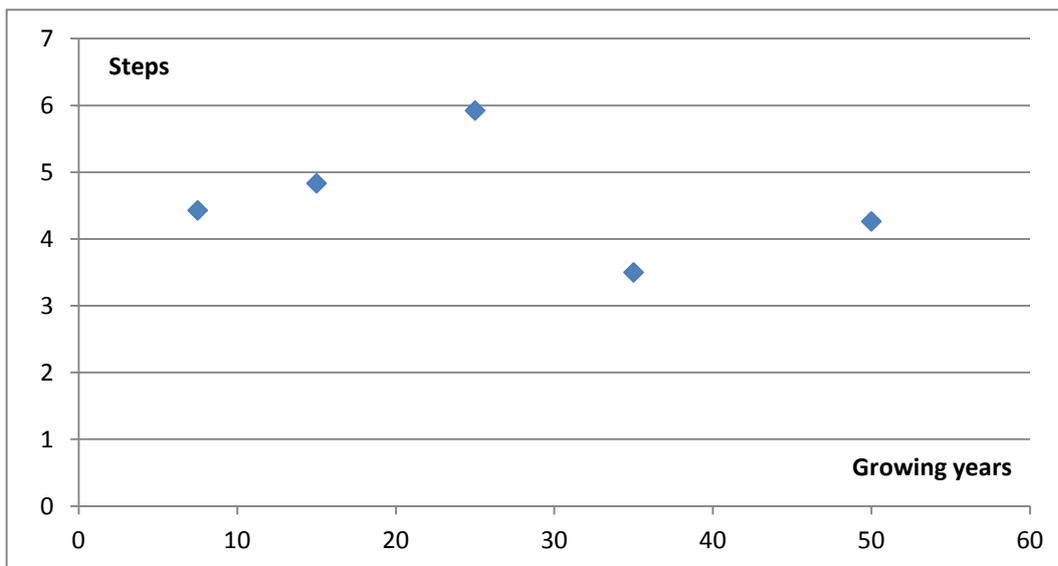


Figure 37: Relationship between growing years and number of practice jump (steps)

5.3.4 PAST EXPERIENCE WITH REEF RESCUE FUNDING APPLICATIONS AND TRANSACTION COSTS

According to the logit analysis, farmers that had applied for Reef Rescue funding before this application had a higher transaction cost compared with those who have not had past experience with Reef Rescue (

Table 7). This result was found to be statistically significant.

Table 7: Transaction costs of those who have applied for Reef Rescue funding before

Answer	Applied before?	
	No	Yes
Average transaction cost per farm	\$7,368	\$11,827

This result is counter intuitive to the theory which states that past experience reduces transaction costs. Given that the application forms and process has remained the same over time, we tested the data to assess if those with past experience in Reef Rescue applications are applying for more complicated BMPs compared to previous applications. More complicated BMPs are likely to increase transaction costs due to the increase in time, effort and direct expenses incurred in information collection about the BMPs. To assess this relationship we assessed the average of how many steps applicants were making in their applications (ie A to A being one step; B to A being 2 steps; C to A being 3 steps and D to A being 4 steps). We found that on average, those who had completed a Reef Rescue application in the past tended to apply for a bigger improvement (greater number of steps) in BMP compared to those who had not applied before (Table 8).

Table 8: Relationship between past applications and complexity of BMP

Had they applied for Reef Rescue before?	On average how many steps were taken in the application
No	2.9
Yes	3.6

* Note that some applicants had more than one BMP in their proposals. In these cases the average of the steps was taken. For example if there was a total of 8 steps taken over 3 BMPS in the one application, the average of a step of 2.7 was taken for this analysis.

5.3.5 USE OF ADVICE

Using a similarity matrix we found that those respondents who accessed technical advice tended to have higher per farm transaction costs whilst those who accessed financial advice tended to have lower transaction costs. This may support the previous discussion about the importance of financial transaction costs on the total sum of transaction costs. Further, this may suggest that technical advice is costly whilst financial advice is not. Support for accessing

technical advice could assist in improving adoption of BMPs by lowering transaction costs of information collection.

5.3.6 EDUCATION AND TRANSACTION COSTS

The higher the highest level of education the lower the transaction costs. This relationship was significant using the Mann Whitney test and consistent with theory.

5.3.7 TRUST AND TRANSACTION COSTS

Respondents were generally trusting of other farmers and other people but not so trusting of government. Of the 'government' agencies, respondents were most trustful of the Regional bodies then the state and least trustful of the Australian Government. Those that agreed or strongly agreed that the Australian Government could be trusted had lower transaction costs than those who disagreed or were neutral on this statement (though this is not statistically significant). This is consistent with theory and literature which states that an increase trust will decrease transaction costs due to a reduced effort to validate information from government.

6 Discussion, conclusion and policy recommendations

The aim of this research was to generate an understanding of the extent and drivers of transaction costs borne by sugarcane farmers in their Reef Rescue applications and activities. Through a mail out mail back landholder survey sent to 546 landholders and answered by 110 landholders (20% response rate), we analysed:

- 1) the extent of transaction costs involved in applying for and implementing BMPs under Reef Rescue (plus an analysis by practice type such as sediment, nutrient etc and extent of change such as D to C, C to B etc);
- 2) which BMP application and implementation activities generate the largest transaction costs;
- 3) what type of landholders incur transaction costs; and
- 4) if and how transaction costs affect adoption of BMPs.

By exploring the nature, extent, distribution, cause and influence of transaction costs we provide recommendations on how transaction costs can be managed for improved policy delivery outcomes.

Overall we found that most growers who apply for Reef Rescue funded BMPs have a good understanding about the link between their farm, farm management and the quality of water in the GBR. The Reef Rescue funded activities were seen as providing the financial support to improve the environmental management of respondent's properties. The overall experience with the Reef Rescue funding process was positive.

The average transaction cost (time and direct transaction costs) of participating in Reef Rescue BMPs was \$9,026 per farm. Pesticide type BMPs tended to have the lowest transaction cost whilst soil related transaction costs tended to be the highest.

Transaction costs were most heavily incurred in the process of decision making about applying for Reef Rescue funding and investigating how to implement the BMP on the property. That is, transaction costs are primarily incurred in information collection activities. Transaction costs per hectare were also found to decrease as the area that the BMP is applied to increases. This indicates that transaction costs are fixed and that larger farms may have a greater capacity to absorb transaction costs. If a policy objective is to increase participation by smaller farms, some support to reduce transaction costs (such as information provision) may assist in improving participation of this demographic. It was also found that farmers with fewer years growing sugarcane had lower transaction costs. This was not because long term farmers are engaging in larger and more complex changes (in fact they tended to make smaller changes) but could be due to farmers with greater growing years being more reluctant to changing practices. Adoption could be increased by assisting longer term farmers with information about BMP changes and how these apply to their properties. Finally, it was found that farmers with past Reef Rescue applications had larger transaction costs than those who had not applied before. This was because in the following rounds of Reef Rescue these farmers were making bigger changes to their BMPs. Whilst the process for applying remains the same, the information required for more complex BMPs is not transferable from past applications, driving up transaction costs. Once again, information provision about how to apply BMPs has the potential to reduce these transaction costs. This is especially the case as BMPs increase in complexity and interact more broadly with other areas of farm management.

Table 9: Summary of issues and policy recommendations

Issue	Recommendation
Landholders with greater growing years may be more reluctant to changing practices.	Adoption could be increased by assisting longer term farmers with information about BMP changes and how these apply to their properties.
Transaction costs are primarily incurred in information collection activities.	Information provision may assist in reducing transaction costs.
Transaction costs are mainly fixed costs hence larger farms may have a greater capacity to absorb transaction costs.	Support to reduce transaction costs may assist in improving participation, especially amongst landholders with smaller farms.
Landholders that previously applied for Reef Rescue funding had larger transaction costs than those who had not applied before due to bigger BMP changes. The information required for more complex BMPs is likely not transferable from past applications.	Generally, information provision about how to apply BMPs has the potential to reduce transaction costs. More specifically this is the case when BMPs increase in complexity and interact more broadly with other areas of farm management.

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THE HIDDEN COSTS OF YOUR REEF RESCUE FUNDED IMPROVED FARMING ACTIVITIES



A SURVEY ON YOUR EXPERIENCES AND OPINIONS



1. If not already inserted for you, please enter your landholder number (this number is located on the top right hand corner of the letter of introduction about this survey).

Landholder number _____

ABOUT YOUR PROPERTY

In this section we would like to know a few things about your property.

2. What is the total size of the property or properties that you manage (ha)? (include all blocks across all catchments) _____ hectares

3. How many hectares of the property or properties that you manage are used for sugarcane production? _____ hectares

4. How many years have you been growing sugarcane?

Less than 5 years Between 21 - 30 years

Between 5 - 10 years Between 31 - 40 years

Between 11 - 20 years More than 40 years

5. Which of the following best describes the ownership of the property that you manage? (you can tick several answers)

I own it I manage this property for other people

I lease it I manage this property for a corporation

6. Do you have a succession plan in place?

Yes No Not sure

ABOUT YOUR REEF RESCUE FUNDED FARMING ACTIVITIES

7. In what years have you had successful Reef Rescue funding applications (tick all that apply)?

- 2010/2011 2011/2012

For the remainder of the survey, we would like you to answer based on the first successful funding application out of the years 2010/2011 and 2011/2012.

That is, if you were successfully funded for both 2010/2011 and 2011/2012, please fill out the survey based on your 2010/2011 application.

8. Was your successful Reef Rescue funding application?

- For just your property A multi farm application for which you were the primary applicant A multi farm application for which you were **NOT** the primary applicant

9. Briefly describe the improved farming activity or activities that you have implemented on your property as a result of your successful Reef Rescue application. (use back of page if needed)

10. Do you think you were the first to implement/trial the improved farming activity or activities in your local area?

- Yes No

11. How many hectares have you applied the (2010/2011 or 2011/12) Reef Rescue funded improved farming activities to so far? _____

12. Do you intend to adopt these improved farming activities across all the property that you manage?

Yes

No

13. Why/Why not? _____

14. What were the three MAIN reasons why you applied for Reef Rescue funding for improved farming activities? (please tick the **3** most important)

I wish to lower the environmental impact of my farm

It was an opportunity to trial new practices

I wish to increase production

I wish to improve the image of agriculture

The Reef Rescue activity supported my desire to decrease the use of inputs such as fertiliser and herbicide I use on my farm

The Reef Rescue money made it financially possible to trial new practices

Other farmers spoke of the benefits

I wish to avoid potential regulations

Other (specify)

15. Had you applied for Reef Rescue funding before this application?

Yes

No → **go to question 17**

16. Were you successful?

Yes

No → **go to question 17**

17. Briefly describe the improved farming activity or activities that you implemented on your property as a result of **previous** Reef Rescue applications. (use back of page if needed)

18.Have you improved your farming activities without funding over the last 10 years?

Yes

No → **go to question 19**

19.What were these unfunded improved farming activities (use back of page if needed)?

Now we are interested in the time and effort that you spent applying for the 2010/2011 or 2011/2012 Reef Rescue funding and doing the improved farming activity or activities on your property.

20.Approximately, how much time did you spend collecting information about the improved farming activity or activities before you decided to apply for the Reef Rescue funding? (e.g. conversations with other farmers, conducting your own research and planning, attending meetings, etc.)

No time Between 5 hours and up to 1 day

1 hour or less Between 1 day and up to 3 days

Between 1 and up to 5 hours 3 days or more

21.Did you experience any direct financial costs when deciding to apply for the Reef Rescue funding? (e.g. accessing farm management advice, expenses to travel to meetings etc.)

Yes → **please complete questions 22 and 23** No → **go to question 24**

22. If yes, what were the activities?

23. What were the corresponding costs?

Activity 1:	Cost 1:
Activity 2:	Cost 2:
Activity 3:	Cost 3:

24. Approximately, how much time did you spend preparing and submitting your Reef Rescue funding application? Especially, how much time did you spend on the following activities?

	No time	1 hour or less	Between 1 hour and up to 5 hours	Between 5 hours and up to 1 day	Between 1 day and up to 3 days	3 days or more
Taking actions to make sure your property and proposed actions were eligible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Consulting experts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Filling out Reef Rescue funding application paperwork	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mapping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

25. Did you experience any direct financial costs when preparing and submitting the Reef Rescue funding application? (e.g. consulting fees, travel to meetings etc.)

Yes → **please complete questions 26 and 27** No → **go to question 28**

26. What were the submission activities?

27. What were the corresponding costs?

Activity 1: _____ Cost 1: _____

Activity 2: _____ Cost 2: _____

Activity 3: _____ Cost 3: _____

28. Did you receive assistance from the regional body (extension officer) when preparing your Reef Rescue application?

Yes No

29. What was this assistance? _____

30. Approximately, how much time did you spend reading, signing and returning the contract?

No time 1 day

Up to half a day More than 1 day

31. Did you experience any direct financial costs when reading, signing and returning the contract? (e.g. consulting or legal fees)

Yes → **please complete questions 32 and 33** No → **go to question 34**

32. If yes, what were the activities?

33. What were the corresponding costs?

Activity 1: _____ Cost 1: _____

Activity 2: _____ Cost 2: _____

Activity 3: _____ Cost 3: _____

34. Approximately, how much time did you spend learning about how to implement the improved farm management activity or activities? (e.g. formal learning such as attending a course or informal learning such as observing other farmers, talking to your peers, trial and error in the paddock etc.)

<input type="checkbox"/> No time	<input type="checkbox"/> Between 5 hours and up to 1 day
<input type="checkbox"/> 1 hour or less	<input type="checkbox"/> Between 1 day and up to 3 days
<input type="checkbox"/> Between 1 and up to 5 hours	<input type="checkbox"/> 3 days or more

35. Did you experience any direct financial cost from this learning? (e.g. course and workshop fees, purchase of information, travel cost to training etc.)

Yes → **please complete questions 36 and 37** No → **go to question 38**

36. What were the learning activities?

37. What were the corresponding costs?

Activity 1: _____	Cost 1: _____
Activity 2: _____	Cost 2: _____
Activity 3: _____	Cost 3: _____

38. Approximately, how much time did you spend drafting and submitting a management plan for the Reef Rescue funded improved farming activities?

<input type="checkbox"/> No time	<input type="checkbox"/> Between 5 hours and up to 1 day
<input type="checkbox"/> 1 hour or less	<input type="checkbox"/> Between 1 day and up to 3 days
<input type="checkbox"/> Between 1 and up to 5 hours	<input type="checkbox"/> 3 days or more

39. Did you experience any direct financial costs related to drafting the management plan? (e.g. costs for consulting fees, travel to meetings etc.)

Yes → **please complete questions 40 and 41** No → **go to question 42**

40. What were these activities?

41. What were the corresponding costs?

Activity 1:	Cost 1:
Activity 2:	Cost 2:
Activity 3:	Cost 3:

42. Did you purchase any equipment specific to your improved farming activity or activities that were not covered under the Reef Rescue funding but that were directly linked to Reef Rescue funded activities? (e.g. computer and software, machinery, farm buildings, etc.)

Yes → **please complete questions 43 and 44** No → **go to question 45**

43. What was this equipment?

44. What were the corresponding costs?

Equipment 1: _____	Cost 1: _____
Equipment 2: _____	Cost 2: _____
Equipment 3: _____	Cost 3: _____

45. Since the adoption of the improved farming activity or activities, has the time that you spent working out in the paddock:

Increased? → go to question 46 Decreased? → go to question 46

Not changed? → go to question 47

46. Approximately how much has the time that you spend working in the paddock increased or decreased since your successful Reef Rescue application?

- | | |
|---|--|
| <input type="checkbox"/> Less than 1 hour per week | <input type="checkbox"/> Between 6 and 10 hours per week |
| <input type="checkbox"/> Between 1 and 3 hours per week | <input type="checkbox"/> More than 10 hours per week |
| <input type="checkbox"/> Between 3 and 6 hours per week | |

Now we are interested in your perceptions of the Reef Rescue funded improved farming activity or activities that you have applied on your farm

47.What is your level of agreement with the following statements?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
In general, there was enough information about the improved farming activity or activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It was easy to understand how my improved farming activities would impact on water quality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Prior to implementing the improvements, I could identify the likely impact on my broader farm management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It's easy to incorporate the improvements in my farm management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There should be training about the improved farming activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The improved farming activities generate environmental benefits on my farm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The improved farming activities reduce my operating cost whilst maintaining yields	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The improved farming activities may reduce the risk of production losses from pests, disease and climate variability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Work and time to carry out the improved farming activities were too large	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The Reef Rescue funding is sufficient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reef Rescue funding is made on time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

48.What is your level of agreement about the application process?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Rules for applying were fair	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was confident about the success of the improved farming activities that I implemented	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The application process was easy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It was easy to contact the relevant person when I needed more information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

49. Would you apply for Reef Rescue funding again?

Yes

No

50.Why/Why not?

51.What is your level of agreement with the following statements about water quality?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
The quality of water leaving my farm is critical to the health of the Great Barrier Reef	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improved farm management results in water quality improvement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improvements in water quality are valued by my community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ABOUT YOU

52. Are you?

Male

Female

53. How old are you?

Less than 30 years old

Between 51 – 60 years old

Between 31 – 50 years old

61 years or older

54. What is the composition of your household?

Number of people 18 years and over in your household:

_____ people

Number of people under the age of 18 in your household:

_____ people

55. In an average year, what is the gross annual turnover of your property?

Less than \$50k per year

Between \$201k – \$300k per year

Between \$50k – \$100k per year

Between \$301k and \$500k per year

Between \$101k – \$200k per year

More than \$501k per year

56. To help us estimate costs of time, please estimate your standard hourly rate (\$/hr):

_____ \$/hr

57. Do you do any work off-farm?

Yes

No → go to question 60

58. On average, how many hours per week do work off-farm?

_____ hours

59. What percentage of your total annual after tax income is earned off-farm? _____ %

60. Are you or members of your household a member of any producer or community groups? (e.g. CANEGROWERS, sporting groups etc.)

Yes

No → go to question 62

61. Which groups are you or members of your household a member of?

62. From what organisations or persons do you usually get your technical advice?

Regional or local extension services Agri input supplier (e.g. fertiliser supplier)

Agronomists Other farmers

Private advice service/ consultants Friends and family

Farmer association I don't get any technical advice

Milling sector Other (please specify)

63. From what organisations or persons do you get your financial advice?

- | | |
|---|---|
| <input type="checkbox"/> Regional or local extension services | <input type="checkbox"/> Agri input supplier (e.g. fertiliser supplier) |
| <input type="checkbox"/> Agronomists | <input type="checkbox"/> Bank |
| <input type="checkbox"/> Private advice service/ consultants | <input type="checkbox"/> Other farmers |
| <input type="checkbox"/> Farmer association | <input type="checkbox"/> Friends and family |
| <input type="checkbox"/> Milling sector | <input type="checkbox"/> I don't get any financial advice |
| <input type="checkbox"/> Farm financial counsellor | |
| <input type="checkbox"/> Other (please specify) | |
-

64. What is your highest level of education?

- | | |
|---|--|
| <input type="checkbox"/> Did not complete high school | <input type="checkbox"/> Community college/trade certificate |
| <input type="checkbox"/> Completed high school | <input type="checkbox"/> Graduate diploma or equivalent |
| | <input type="checkbox"/> Bachelor degree or higher |

65. Do you participate in any of the following nature-based activities?

- | | |
|---------------------------------------|---|
| <input type="checkbox"/> Fishing | <input type="checkbox"/> Hunting |
| <input type="checkbox"/> Diving | <input type="checkbox"/> Bird watching |
| <input type="checkbox"/> Snorkelling | <input type="checkbox"/> No nature-based activities |
| <input type="checkbox"/> Bush walking | <input type="checkbox"/> Other (please specify) |
-

66.What is your level of agreement with the following statements

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
The state government can be trusted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The Australian government can be trusted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Regional NRM bodies can be trusted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Generally speaking, other farmers can be trusted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Generally speaking, most people can be trusted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

67.Do you have any additional comments about your experience with Reef Rescue improved farming activities that you would like to share with us (use back of page if needed)?

THANK YOU FOR COMPLETING THE SURVEY. YOUR TIME IS MUCH APPRECIATED